Danish Ministry of Climate, Energy and Utilities

Denmark’s Fourth Biennial Report

– under the United Nations Framework Convention on Climate Change

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Denmark's Fourth Biennial Report

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Contents

I. Introduction

This report is Denmark's fourth biennial report (BR4) under the United Nations Framwork Convention on Climate Change (UNFCCC). The report has been prepared in accordance with the UNFCCC biennial reporting guidelines for developed country Parties contained in Decision 2/CP.17 (Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention - Document: FCCC/CP/2011/9/Add.1) adopted by the Conference of the Parties at its seventeenth session[1].

The report provides information on the historical and projected progress made in Denmark regarding Denmark's contribution to the achievement of joint European Union (EU) quantified economy-wide emission reduction target for 2020 under the UNFCCC, including information on historic emissions, targets, progress with policies and measures, projected emissions and Denmark's provision of financial, technological and capacity-building support to Parties not included in Annex I to the Convention.

Information in relation to Greenland and the Faroe Islands is included in Chapter VII of this report as these parts of the realm are covered by the Kingdom of Denmark's ratification of the Convention. However, as the Faroe Islands and Greenland are not members of the EU, the commitments of Denmark as a member of the EU do no apply to the Faroe Islands and Greenland.

The information to be reported electronically in the so-called Common Tabular Format contained in Decision 19/CP.18 (Document: FCCC/CP/2012/8/Add.3)[2] - as changed by Decision 9/CP.21 (Document: FCCC/CP/2015/10/Add.2)[3] on methodologies for the reporting of financial information by Parties included in Annex I to the Convention - is also included in Chapter VIII of this report.

[1] http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf (Decision pages 6-7 and Annex I pages 31-35).
[2] http://unfccc.int/resource/docs/2012/cop18/eng/08a03.pdf#page=3 (Decision pages 3-4 and Annex pages 5-42).
[3] https://unfccc.int/resource/docs/2015/cop21/eng/10a02.pdf (Decision pages 15-16 and Annex pages 17-22)

II. Information on greenhouse gas emissions and trends

A. Summary information from The Kingdom of Denmark's greeenhouse gas inventory on emissions and emission trends

The total inventories for the Kingdom of Denmark under the UNFCCC consistent with the data in the Common Reporting Format (CRF) reported under the UNFCCC in 2019 are given in Table 1 of the Common Tabular Format (CTF). The Kingdom of Denmark (or the Realm) comprises Denmark, Greenland and the Faroe Islands.

Greenland's and the Faroe Islands' greenhouse gas emissions are small compared with those of Denmark (each about 1 % of the total emissions), and they have been almost constant since 1990.

The emissions from the Kingdom (i.e. emissions from Denmark, Greenland and Faroe Islands) of the greenhouse gases CO_2 (carbon dioxide), CH_4 (methane), N_2O (nitrous oxide), and the so-called potent greenhouse gases (F-gases), which include HFCs (hydrofluorocarbons), PFCs (perfluorocarbons), SF_6 (sulphurhexafluoride) and NF_3 (nitrogen trifluoride) during the period 1990-2017 are shown in Figures II.1-II.4, aggregated into the five main sectors and the most relevant sub-sectors as defined by the UNFCCC reporting guidelines (Decision 24/CP.19). The underlying data are included in the CTF. Total greenhouse gas emissions for the Kingdom measured in CO_2 equivalents on the basis of the global warming potential of each gas are shown together with the distribution with respect to gas and source/sector in Figures II.1-II.6.

The inventory data to be reported electronically in Table 1 of the CTF are shown in Chapter VIII. Since Greenland and the Faroe Islands are not part of the EU territory, inventory data for Denmark alone and separately for Greenland and the Faroe Islands are also shown in ChapterVIII.

Carbon dioxide, CO_2

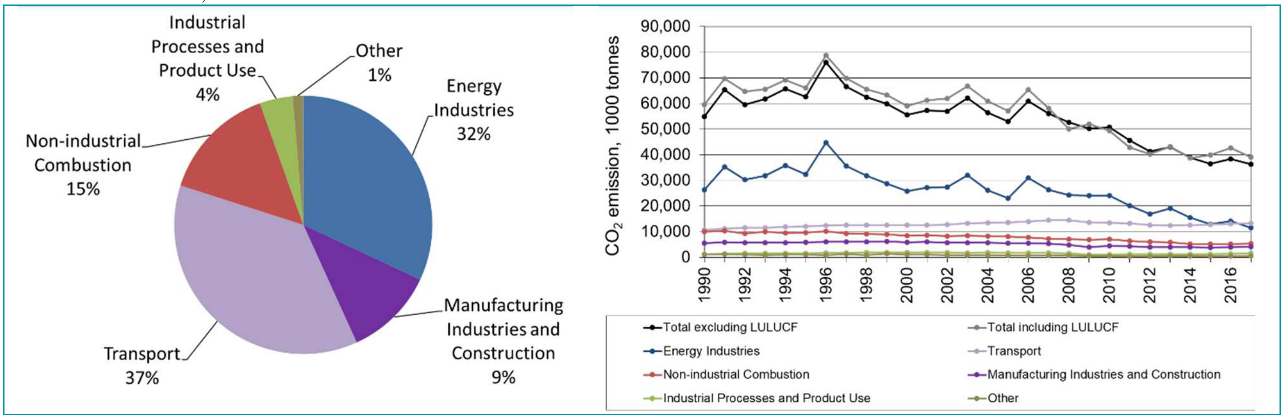
Most CO_2 emissions come from combustion of coal, oil and natural gas in energy industries, residential properties and in manufacturing industry. Road transport is also a major contributor. Outside the energy sector, the only major CO_2 emissions come from cement production, which accounts for 2-3 % of the annual national total. The transport sector is the only major emitting sector that has shown an increasing trend since 1990. However, in the latest years, CO_2 emissions from the transport sector have stabilised.

The relatively large fluctuations in the emissions from year to year are due to trade in electricity with other countries - primarily the Nordic countries. The large emissions in 1991, 1994, 1996, 2003 and 2006 are due to large electricity exports.

From 1990 to 1996, emissions showed a rising trend, but they have fallen since 1997 because many power stations have changed their fuel mix from coal to natural gas and biomass. Additionally, the production of renewable energy (mainly wind power) has increased significantly. As a result of the reduced use of coal in recent years, most of the CO_2 emissions now come from combustion of oil or oil-based products, both in stationary and mobile sources. Also, there has been a decrease in gross energy consumption, especially since 2006.

In 2017, total actual CO_2 emissions inventoried under the Climate Convention, excluding land-use change and forestry (LULUCF), were about 34 % lower than in 1990. If LULUCF is included, net emissions were similarly 34 % lower.

FIGURE II.1: CO_2 EMISSIONS BY SECTOR (2015) AND DEVELOPMENT IN 1990-2017 IN KT CO_2
Source: Nielsen et al., 2019.



Methane, CH_4

Anthropogenic methane (CH_4) emissions primarily stem from agriculture, landfills, and the energy sector, among which agriculture contributes the most by far.

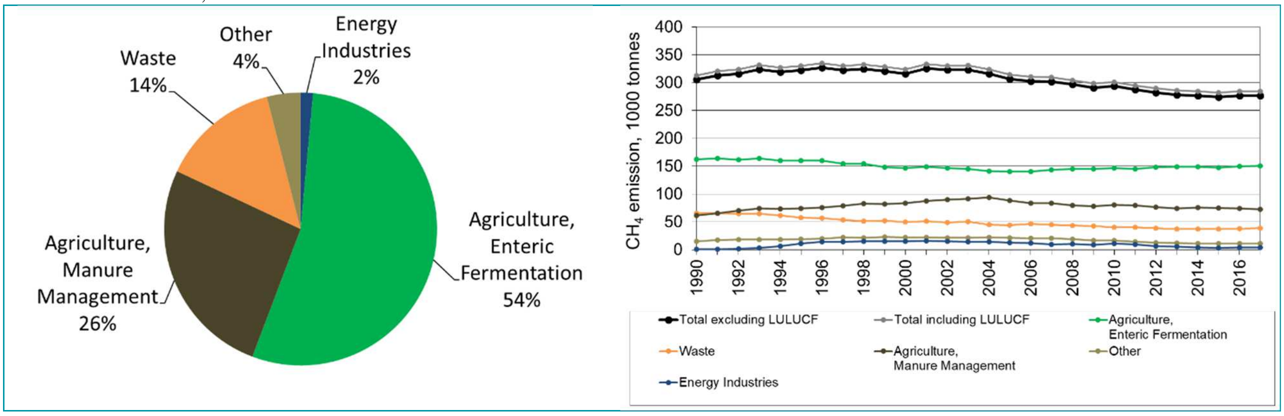
The emissions from agriculture are due to the formation of methane in the digestive system of farm animals (enteric fermentation) and manure management. Over the time series from 1990 to 2017, the emission of CH_4 from enteric fermentation has decreased by around 8 % mainly due to a decrease in the number of cattle. However, in the same period the emissions from manure management increased by around 17 % due to a change in animal housing systems from traditional systems with solid manure towards slurry-based housing systems.

Emissions of methane from landfills are decreasing, because of the ban on landfilling of combustible waste. This has led to a decrease in the amount of landfilled biodegradable waste and hence the emissions. Also, contributing to the decrease in emissions was the increased CH_4 recovery in the early part of the time series. This recovery has decreased in later years due to less CH_4 production in the landfills.

Emissions of methane from the energy sector increased up to 2003 due to increased use of gas-driven engines, which emit large amounts of methane compared to other combustion technologies. However in later years new legislation establishing emission limits for existing gas-driven engines came into force pursuant to Statutory Order No. 720 of 5 October 1998, and combined with decreased use of gas engines, this has resulted in lower emissions.

In 2017, total CH_4 emissions were 9 % below the 1990 level.

FIGURE II.2: CH_4 EMISSIONS BY SECTOR (2015) AND DEVELOPMENT IN 1990-2017 IN KT CH_4
Source: Nielsen et al., 2019.

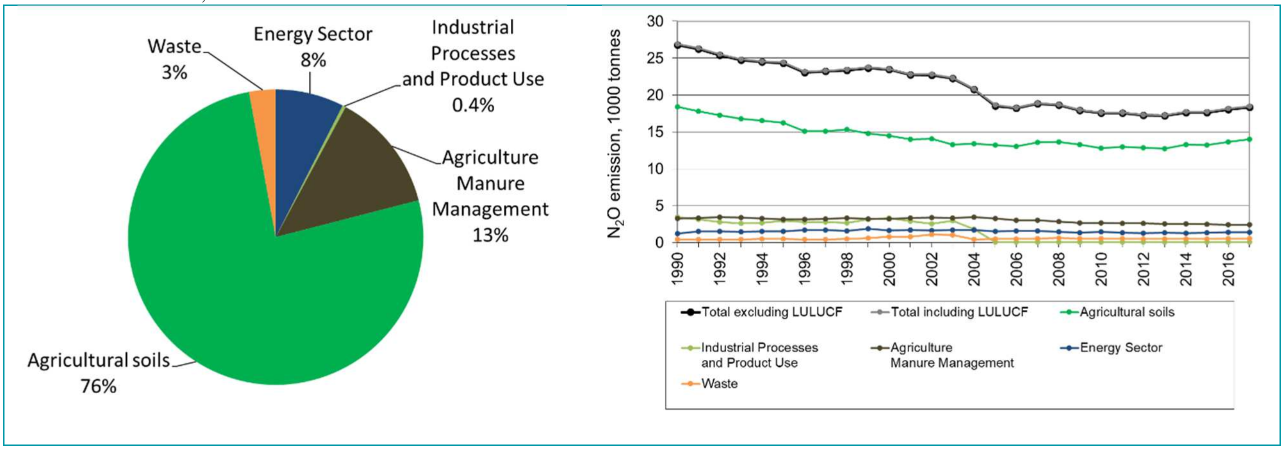


Nitrous oxide, N_2O

Agriculture constitutes the largest source by far of nitrous oxide (N_2O) emissions, since N_2O can be formed in the ground, where bacteria convert nitrous compounds from fertiliser and manure. Bacterial conversion of nitrogen also occurs in drain water and coastal water due to leaching and run off. This nitrogen largely comes from agriculture's use of fertiliser, and emissions from these sources are therefore included under agriculture. From 1990, N_2O emissions from agriculture have decreased by almost 25 % due to legislation to improve the utilisation of nitrogen in manure. The legislation has resulted in less nitrogen excreted per unit of livestock produced and a considerable reduction in the use of nitrogen fertilisers. The basis for the N_2O emission is then reduced. A small share of the nitrous oxide emissions originates from power and district heating plants, and cars with catalytic converters. Previously, a plant producing nitric acid was in operation in Denmark. However, this plant shut down in 2004, eliminating N_2O emissions from this activity.

In 2017, total N_2O were 31 % below the 1990 level.

FIGURE II.3: N_2O EMISSIONS BY SECTOR AND DEVELOPMENT IN 1990-2017 IN KT N_2O
Source: Nielsen et al., 2019.



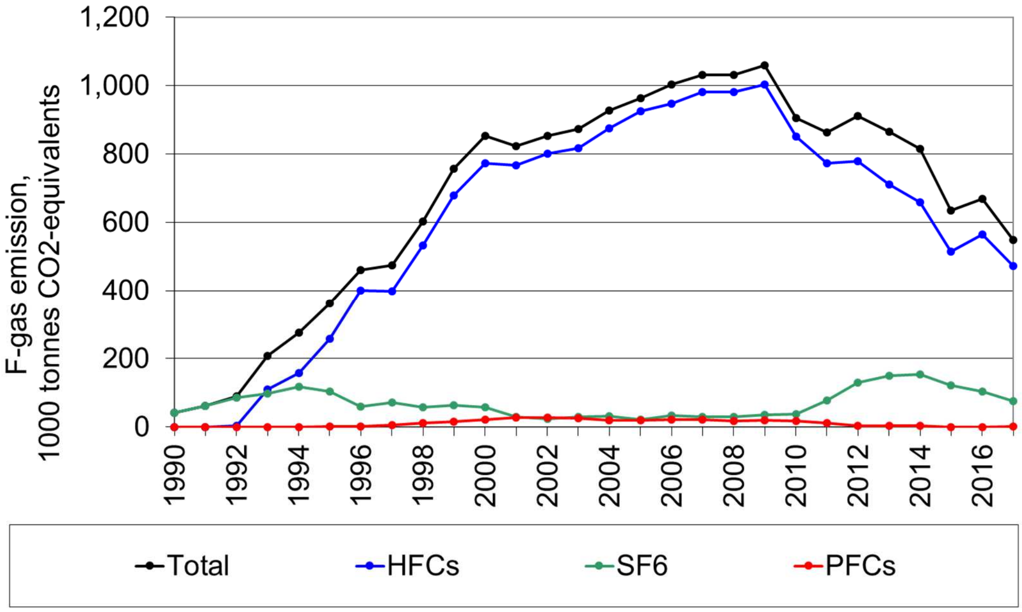
The f-gases: HFCs, PFCs, SF_6 and NF_3

The contribution of f-gases (HFCs, PFCs, SF_6 and NF_3), to Denmark's total emissions of greenhouse gases is relatively modest. However, the emissions of these gases increased significantly during the 1990s. Collection of data on the consumption of these substances started in the mid-1990s. Therefore, f-gas data and emissions inventories from before 1995 are less certain than in 1995 and later. In accordance with the Kyoto Protocol, Denmark has selected 1995 as the base year for the f-gases. There is no consumption of NF_3 in Denmark at any point during the time-series.

The HFCs, which are primarily used in refrigeration and air conditioning, are the biggest contributor to f-gas emissions. From 1995 to 2017 annual emissions of HFCs increased from 258 to 473 kt of CO_2 equivalents. However, emissions of HFCs peaked at 1023 kt of CO_2 equivalents in 2009. Emissions of PFCs increased in the same period from 0.6 to 1.1 kt of CO_2 equivalents, the emissions of PFCs peaked in 2002 at 28.0 kt of CO_2 equivalents. The emissions of SF_6 were at the same level in 1995 and in 2015 at103 kt of CO_2 equivalents. Emissions of SF_6 is peaking in the later years as double glazed windows using SF_6 in the early 1990'ties are currently being decommissioned, however, the emissions have again begun to decrease. The emission peak in 2014 was at 155 kt of CO_2 equivalents.

The total emissions of HFCs, PFCs and SF_6 increased by 52 % from 1995 to 2017.

FIGURE II.4: DEVELOPMENT IN HFC, PFC, AND SF_6 EMISSIONS IN 1990-2017 IN KT CO_2-EQ.
Source: Nielsen et al., 2019.



Total Danish emissions and removals of greenhouse gases

Figures II.5 and II.6 show the development in the Danish greenhouse gas emissions and removals as CO_2 equivalents and by gases and sources according to the reporting guidelines under the Climate Convention. CO_2 is the most important greenhouse gas followed by N_2O and CH_4. As mentioned previously, emissions fluctuate in line with electricity trade. To illustrate this, the total greenhouse gas emission in 1996 (excl. LULUCF) was estimated to 91,500 kt of CO_2 equivalents and the total greenhouse gas emissions in 2003 was estimated to 77,645 kt of CO_2 equivalents (excl. LULUCF). Both these years were years with high electricity export. In comparison the total greenhouse gas emission in 1990, a year with high import, was 70,515 kt of CO_2 equivalents. In 2017 the total emissions were estimated to 49,226 kt of CO_2 equivalents,

Of the total Danish greenhouse gas emissions in 2017, CO_2 made up 73.7 %, methane 14.1 %, nitrous oxide 11.1 %, and f-gases 1.1 %. If CO_2 emissions by sources and removals by sinks from forests and soils are included (i.e. with LULUCF), then net total Danish greenhouse gas emissions corresponded to 52,197 kt of CO_2 equivalents in 2017. The data underlying Figures II.5 and II.6 are included in the CTF.

FIGURE II.5: DANISH GREENHOUSE GAS EMISSIONS BY TYPE OF GAS IN 1990–2017,MT CO_2-EQ.
Source: Nielsen et al., 2019.

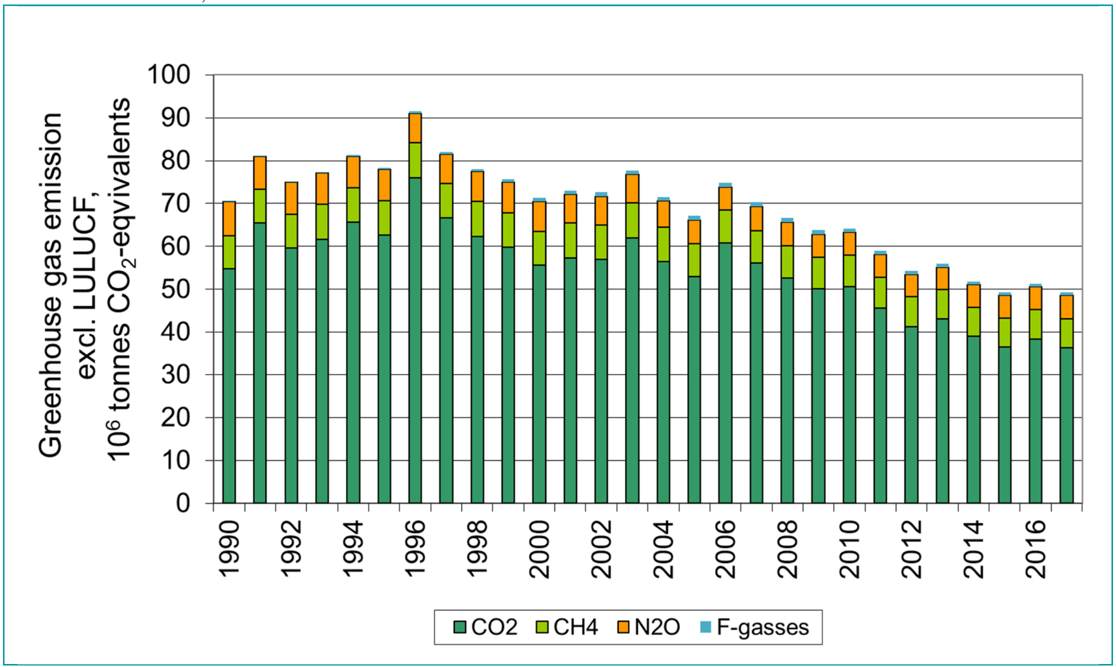
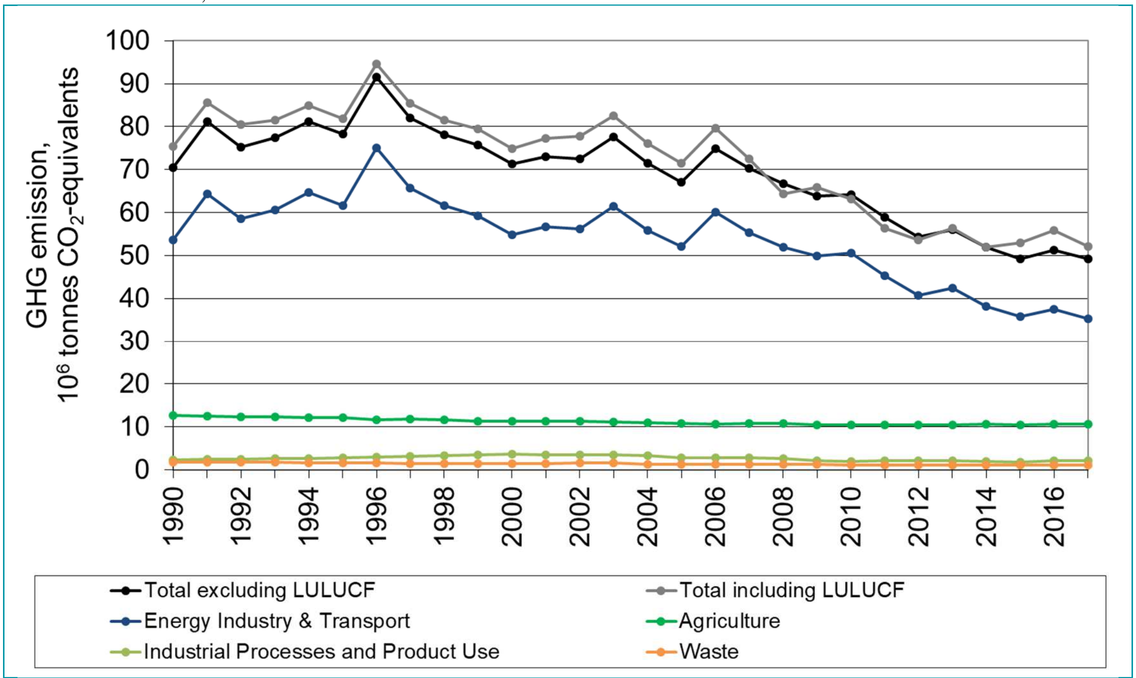


FIGURE II.6: DANISH GREENHOUSE GAS EMISSIONS BY SOURCE/SECTOR IN 1990–2017, MTCO_2-EQ.
Source: Nielsen et al., 2019.



As mentioned above, the emissions from Greenland and the Faroe Islands only contribute a very small share to the total emissions; hence the trends as described above are basically the trends in the emissions from Denmark.

B. Summary information on Denmark's national inventory arrangements

Organisation of work etc.

The Danish Centre for Environment and Energy (DCE) is responsible for producing the Danish greenhouse gas emission inventories and the annual reporting to the UNFCCC and is designated the single national entity under the Kyoto Protocol. Furthermore, DCE participates in work under the auspices of the UNFCCC, where guidelines for reporting are discussed and decided upon. DCE also participates in the EU monitoring mechanism for inventories of greenhouse gases, where guidelines for reporting to the EU are regulated.

The work on the annual inventories is carried out in cooperation with other Danish ministries, research institutes, organisations and private enterprises. The cooperating institutions provide a range of data that are needed to produce the inventory. DCE therefore has formal agreements with the most important partners to ensure that DCE receives the necessary data on time. For more comprehensive information, please see Nielsen et al. (2019).

Calculation methods

The Danish emission inventory is based on the IPCC guidelines for calculation of greenhouse gas emissions (the 2006 IPCC Guidelines) and the European CORINAIR (Coordination of Information on Air Emissions) programme for calculation of national emissions. Generally, emissions are calculated by multiplying the activity data (e.g. fuel consumption, number of animals or vehicles) by an emission factor (e.g. the mass of material emitted per unit of energy, per animal or per vehicle). Activity data are mainly based on official statistics. The emission factors are either plant-specific, country-specific, default factors from the IPCC guidelines, or values from international scientific literature.

Key categories

The choice of methodological tier for the individual categories depends, among other things, on the significance of the source. The categories that together accounted for 95 % of greenhouse gas emissions in the base year, in 2017 or accounted for 95 % of the change in emission levels from the base year to the most recently calculated year (2017) are defined as key categories according to the IPCC guidelines. An analysis of the Danish inventory shows that 43 categories account for 95 % of total greenhouse gas emissions when considering the inventory including LULUCF and using Approach 1 of the 2006 IPCC Guidelines and that the four largest sources – together accounting for about 50 % – are CO_2 emissions from road transport, CO_2 emissions from combustion of coal at stationary combustion plants, CO_2 from combustion of natural gas at stationary combustion plants and CH_4 from enteric fermentation.

Procedure for recalculation

At the same time as the annual calculation of emissions for another year takes place, any necessary recalculations of emission inventories from previous years are also carried out. Recalculations are made if errors or oversights are found or if better knowledge becomes available, e.g. updated statistical data, improvements of methodologies, updated emission factors due to new knowledge and research. In order to ensure consistent emission inventories, recalculations will be carried out on the whole time series, as much as circumstances permit and following the guidance in the IPCC Guidelines.

Uncertainty

Uncertainty in the greenhouse gas inventories is calculated as recommended in the IPCC guidelines and covers 100 % of the total Danish greenhouse gas (GHG) emissions reported under the Kyoto Protocol. The result of the calculations shows that total GHG emissions were calculated using Approach 1 of the 2006 IPCC Guidelines to have an uncertainty of 5.7 % and the uncertainty in the trend in GHG emissions since 1990 was calculated to be ± 2.0 %. The uncertainties are largest for N_2O emissions from stationary combustion and agricultural land and CH_4 emissions from enteric fermentation and solid waste disposal on land.

Quality assurance and quality control

As part of the national system, DCE is drawing up a manual to use in quality assurance and quality control of the emission inventories. The manual is in accordance with the 2006 IPCC Guidelines. The ISO 9000 standards are also being used as important input for the plan.

Reports are written for all sources of emissions that describe in detail and document the data and calculation methods used. These reports are evaluated by persons external to DCE who are experts in the area in question, but not directly involved in the inventory work. In addition, a project has been completed in which the Danish calculation methods, emission factors and uncertainties are compared with those of other countries, in order to further verify the correctness of the inventories.

For a more detailed description of the QA/QC system, please see the Danish National Inventory Report (Nielsen et al., 2019).

Annual reporting

DCE produces an annual report (National Inventory Report – NIR) for the Climate Convention in which the results of the calculations are presented and the background data, calculation methods, plan for quality assurance and control, uncertainty and recalculations are described and documented. At the request of the Climate Convention, the report is evaluated each year by international experts. Over the years, improvements have been made regarding the quality and documentation of the greenhouse gas inventory, as a result of the quality assurance and control procedures and the evaluations of national and international experts. The planned improvements can be found in the following section.

Improvements of emission inventories

A number of improvements have been made to the Danish greenhouse gas emission inventories since Denmark's Second Biennial Report to the Climate Convention (BR2). The improvements have either been at the initiative of DCE, or as a result of external reviews of the inventories. The majority of improvements have been concerned with better documentation, i.e. improvements in transparency. Furthermore, overall focus is on improving procedures for quality assurance and control and on improving documentation of the national emission factors.

Procedures for the official consideration and approval of the inventory

The complete emission inventories for the three different submissions (EU, Kyoto Protocol and UNFCCC) by Denmark are compiled by DCE and sent for official approval along with the documentation report (NIR). In recent years the responsibility for official approval has changed. Previously it was the Danish Energy Agency under the Ministry of Energy, Utilities and Climate, but now the responsibility lies with the Ministry itself. This means that the emission inventory is finalised no later than March 15, so that the official approval is prior to the reporting deadlines under the UNFCCC and the Kyoto Protocol.

Changes in national inventory arrangements since the previous submission

No changes have been made to the inventory arrangements since the submission of BR3.

III. Quantified economy-wide emission reduction target

A. The joint EU target for 2020 under the Convention

In 2010, the EU submitted a pledge to reduce its GHG emissions by 2020 by 20 % compared to 1990 levels[4]. As this target under the convention has only been submitted by EU-28 and not by each of its Member State (MS), there are no specified convention targets for single MS. Due to this, Denmark[5], as part of the EU-28, takes on a quantified economy-wide emission reduction target jointly with all Member States.

With the 2020 climate and energy package the EU has set internal rules which underpin the implementation of the target under the Convention. The 2020 climate and energy package introduced a clear approach to achieving the 20 % reduction of total GHG emissions from 1990 levels, which is equivalent to a 14 % reduction compared to 2005 levels. This 14 % reduction objective is divided between two sub-targets, equivalent to a split of the reduction effort between ETS and non-ETS sectors of two thirds vs one third (EU, 2009[6]).

Under the revised EU ETS Directive[7], one single EU ETS cap covers the EU Member States and the three participating non-EU Member States (Norway, Iceland and Liechtenstein), i.e. there are no further differentiated caps by country. For allowances allocated to the EU ETS sectors, annual caps have been set for the period from 2013 to 2020; these decrease by 1.74 % annually, starting from the average level of allowances issued by Member States for the second trading period (2008–2012). The annual caps imply interim targets for emission reductions in sectors covered by the EU ETS for each year until 2020. Further information on the EU ETS and the use of flexible mechanisms in the EU ETS is available in the BR4 of the EU.

Non-ETS emissions are addressed under the Effort Sharing Decision (ESD)[8]. The ESD covers emissions from all sources outside the EU ETS, except for emissions from international maritime, domestic and international aviation (which were included in the EU ETS from 1 January 2012) and emissions and removals from land use, land-use change and forestry (LULUCF). It thus includes a diverse range of small-scale emitters in a wide range of sectors: transport (cars, trucks), buildings (in particular heating), services, small industrial installations, fugitive emissions from the energy sector, emissions of fluorinated

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[4] FCCC/SB/2011/INF.1/Rev.1 and FCCC/AWGLCA/2012/MISC.1
[5] Since Greenland and the Faroe Islands are not included in the EU territory, the commitments of Denmark, as a member of the EU, are not applicable to these parts of the Realm.
[6] Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community (OJ L 140, 05.06.2009, p. 63) (http://eur-lex.europa.eu/ LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:00 63:0087:en:PDF)
[7] Directive 2009/29/EC of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community
[8] Decision No 406/2009/EC

gases from appliances and other sources, agriculture and waste. Such sources under the ESD accounted for 55 % of total GHG emissions in the EU in 2013.

While the EU ETS target is to be achieved by the EU as a whole, the ESD target was divided into national targets to be achieved individually by each Member State. In the ESD national emission targets for 2020 are set, expressed as percentage changes from 2005 levels. These changes have been transferred into binding quantified annual reduction targets for the period from 2013 to 2020 (EC 2013 and EC 2017)[9,10,11] expressed in Annual Emission Allocations (AEAs).

The national emissions target for Denmark under the ESD is 20 % reduction in ESD emissions in 2020 compared with 2005. The quantified annual reduction targets 2013-2020 of Denmark are tightened from 36.8 Million AEAs in 2013 to 32.1 Million AEAs in 2020.

The monitoring process is harmonized for all European MS, especially laid down in the Monitoring Mechanism Regulation[12]. The use of flexible mechanisms is possible under the EU ETS and the ESD. Further information on the use of CER and ERU under the ETS is available in the BR4 of the EU.

The ESD allows Member States to make use of flexibility provisions for meeting their annual targets, with certain limitations. There is an annual limit of 3% of verified emissions in 2005 for the use of project-based credits for each MS. For Denmark the amount of credits possible to use is 1.1 Million CERs and ERUs. If these are not used in any specific year, the unused part for that year can be transferred to other Member States or be banked for own use until 2020. As Denmark (together with Austria, Belgium, Cyprus, Finland, Ireland, Italy, Luxembourg, Portugal, Slovenia, Spain and Sweden) fulfills additional criteria as laid down in ESD[13] Article 5(5), an additional use of credits is possible from projects in Least Developed Countries (LDCs) and Small Island Developing States (SIDS) up to an additional 1 % of Denmark's verified emissions in 2005. For Denmark the additional amount of credits possible to be used is 0.4 Million CERs and ERUs. These additional credits are not bankable and transferable. Following from these limits, approximately 750 Mt of international credits can be used by EU Member States during the period from 2013 to 2020 in the ESD.

As Denmark project to reach its targets 2013-2020 under the ESD without the use of CERs and ERUs (the WEM projection from March 2017), Denmark does not intend to use CER- or ERU-credits under the ESD-part of Denmark's contribution to the joint EU target for 2020 under the Convention.

Table 2 of the CTF included in Chapter VIII of this biennial report contains information on the EU target for 2020 under the UNFCCC regarding the base year (1990), the gases included (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) and sectors covered (Energy, Transport (domestic and CO_2 from international aviation to the extent it is included in the EU ETS),

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9 Commission decision of 26 March 2013 on determining Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and of the Council (2013/162/EU)
10 Commission Implementing Decision of 31 October 2013 on the adjustments to Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/ EC of the European Parliament and of the Council (2013/634/EU)
11 The EU Commission's 2017 revision of the ESD target path 2017-2020: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2017.209.01.0053.01.ENG&toc=OJ:L:2017:209:TOC
12 Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC
13 Decision No 406/2009/EC

Industrial Processes, Agriculture and Waste), which set of global warming potentials on which the target is based (AR4), the approach to counting emissions and removals from the land use, land-use change and forestry (LULUCF) sector (excluded – i.e. no accounting towards the joint EU target for 2020 pledged under the Convention), the possible scale of contribution from use of international market-based mechanisms in achieving the emission reduction target and other relevant information (the limits specified under the EU ETS and ESD). Further information on the EU target for 2020 under the UNFCCC is available in the BR4 of the EU.

Since Greenland and the Faroe Islands are not included in the EU territory, the EU target for 2020 under the UNFCCC is not applicable to these parts of the Realm.

B. OTHER EMISSION REDUCTION TARGETS

The joint EU target and Denmark's target under the first commitment period of the Kyoto Protocol (2008-2012)

In relation to the 1st commitment period under the Kyoto Protocol (2008-2012), the EU committed itself to reducing emissions of greenhouse gases on average to 8 % below the level in the so-called base year; 1990 for CO_2, methane, and nitrous oxide and either 1990 or 1995 for industrial greenhouse gases. Under the EU15 Burden Sharing of this target, Denmark committed itself to a reduction of 21% as an element of the burden-sharing agreement within the EU in accordance with Article 4 of the Kyoto Protocol.

With Greenland and Faroe Island not being included in the EU territory, and with a territorial reservation for the Faroe Islands in accordance with the Vienna Convention, when the Kyoto Protocol was ratified by the Kingdom of Denmark, the quantified emission limitation for Greenland in 2008-2012 was 92 % of Greenland's base-year emissions. On the basis of total base-year emissions estimated at 69,978,070 tonnes CO_2 equivalents, the initial review report concluded in 2007 that the total assigned amount (number of AAUs issued) for Denmark and Greenland for the period 2008-2012 is 276,838,955 tonnes CO_2 equivalents[14]. In addition, Denmark received 5,000,000 AAUs as base year compensation under the EU15 Burden Sharing Agreement. Following from activities under Articles 3.3 and 3.4 of the Kyoto Protocol Denmark and Greenland achieved a further net-contribution of 8,654,523 Removal Units (RMUs) in the first commitment period and following from activities under Articles 6 (JI) and 12 (CDM) of the Kyoto Protocol, Denmark and Greenland acquired 16,563,791 JI/CDM credits (ERUs, CERs and early credits as AAUs) for the first commitment period until the end of the true-up period (18 November 2015).

Before the end of the true-up period Denmark and Greenland retired in total 297.984.143 Kyoto units which is a little more than Denmark's and Greenland's total greenhouse gas emissions 2008-2012 amounting to 297,947,591 cf. the last inventory review report for the first commitment period[15]. After Denmark's cancellation of 195.974 units as off-set of greenhouse gas emissions from COP15 held in Copenhagen in 2009 and air traffic by governmental officials in 2009-2011, until aviation was included under EU ETS, a further surplus of 3,400.000 units were cancelled in accordance with decisions taken by the Danish government and the Greenlandic government in 2015.

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[14] http://unfccc.int/resource/docs/2007/irr/dnk.pdf
[15] http://unfccc.int/resource/docs/2015/arr/dnk.pdf

The joint EU target and Denmark's target under the second commitment period of the Kyoto Protocol (2013-2020)

In addition to the EU target under the Convention, the EU also committed to a legally binding quantified emission limitation reduction commitment for the second commitment period of the Kyoto Protocol (2013-2020). This target will also be fulfilled jointly by the EU and its Member States. Denmark's contribution to the joint fulfillment of this target equals Denmark's commitment under EU Climate an Energy Package described above. Further information on the EU target under the second commitment period of the Kyoto Protocol is available in the BR4 of the EU.

Since Greenland are not included in the EU territory, the joint EU target for the second commitment period of the Kyoto Protocol is not applicable to this part of the Realm and with a territorial reservation to the Faroe Island, when the Kyoto Protocol was ratified in 2002, the protocol is not applicable to the Faroe Islands. On request from the government of Greenland, a territorial reservation to Greenland was taken, when the Kingdom of Denmark ratified the Doha amendment for the second commitment period 2013-2020 under the Kyoto Protocol.

The joint EU target and Denmark's target in the EU's Nationally Determined Contribution submitted under the Paris Agreement (2021-2030)

A further joint EU target has been pledged to the Convention through the EU's Nationally Determined Contribution submitted under the Paris Agreement, and has been adopted by the EU under the 2030 Climate and Energy Framework. The joint emission reduction target is a pledge to reduce emissions by at least 40% (compared to 1990 levels) by 2030, enabling the EU to move towards a low-carbon economy and implement its commitments under the Paris Agreement.

In October 2014 the European Council agreed on the 2030 climate and energy framework on objectives regarding greenhouse gas emissions, energy efficiency, renewable energy and interconnections. On greenhouse gas emissions the EU endorses a binding EU target of reducing greenhouse gas emissions by at least 40 % by 2030, compared to 1990.

The agreement on the 2030 framework, specifically the EU domestic greenhouse gas reduction target of at least 40 %, formed the basis of the EU's contribution to the Paris Agreement. The EU's so-called Intended Nationally Determined Contribution (INDC) was formally approved at an Environment Council meeting in March 2015. The 40 % reduction target is sub-divided into two separate targets for the EU Emission Trade System (ETS) and non-EU ETS sectors elaborated below.

In May 2018 the European Council adopted a regulation on the EU effort sharing of greenhouse gas emission reductions in the non-ETS sectors in the period 2021-2030 – the so-called Effort Sharing Regulation (ESR). Under this regulation Denmark is committed to a 39 % reduction of greenhouse gas in non-ETS emissions in the period 2021-2030 by 2030 relative to 2005.

Under the Effort Sharing Regulation flexibilities mechanisms ensuring cost-effective reductions include borrowing, banking and transfer of annual emission allowances between years and between member states (cf. Article 5), cancellation of EU ETS Allowances instead – in practice meaning that reductions are made under EU ETS instead of under ESR (cf. Article 6) and use of credits from LULUCF (cf. Article 7). Further details on the commitments under the ESR regulation are included below.

In May 2018 the European Council also adopted a regulation of emissions by sources and removals by sinks in the land sector – the LULUCF regulation, where LULUCF is “Land-Use, Land-Use Change and Forestry”. Credits obtained under this regulation can be used to reach the target for the non-ETS sector in accordance with the ESR up to a certain limit. The limit for Denmark is 14.6 million CO_2-equivalent credits from LULUCF during the period 2021-2030. Further details on the commitments under the LULUCF regulation are included below.

The EU is committed to reducing its ETS emissions by 43 % in 2030 from 2005 to achieve the total greenhouse gas emissions reduction of 40 % below 1990 levels by 2030.The EU has also set itself the target of increasing the share of renewables in energy use to 32 % by 2030.

In June 2018 all parties of the Parliament at the time agreed on a Danish Energy Agreement with funding that will set the path towards a 55 % renewables share in 2030 in Denmark. The Energy Agreement of June 2018 furthermore specifies that given the allocated funding renewables are to cover all final electricity consumption or more by 2030 The agreement also includes a phase out of coal in electricity production by 2030.

Consistency with Denmark’s long-term low emission strategy is ensured as Denmark’s targets under the ESR regulation and the LULUCF Regulation are to be seen as steps in 2021-2030 towards the objective to work towards net zero emissions in accordance with the Paris agreement and for a net-zero-emission target in the EU and Denmark by 2050 at the latest.

Effort Sharing Regulation (ESR)

In regards to “Decarbonisation”, and with respect to greenhouse gas emissions and removals as well as contributing to the achievement of the economy wide EU greenhouse gas emissions target of 2030, Denmark’s binding national target for greenhouse gas emissions and annual binding national limits pursuant to Regulation ESR are as follows:

2030: Limit Denmark’s non-ETS greenhouse gas emissions in 2030 at least by 39 percent relative to Denmark’s emissions in 2005 determined pursuant to paragraph 3 of Regulation ESR[16].

2021-2029: Ensure that Denmark’s non-ETS greenhouse gas emissions in each year between 2021 and 2029 do not exceed a specific linear trajectory.

The quantified annual reduction targets 2021-2030 is expected to be determined in 2020 on the basis of the Member States’ 2020 inventory submission (based on AR4 GWPs) recalculated into inventories based on AR5 GWPs – cf. the requirements in the Modalities, Procedures and Guidelines (MPGs) adopted under the Paris Agreement.

LULUCF Regulation

As regards the dimension "Decarbonisation", and with respect to greenhouse gas emissions and removals and with a view to contributing to the achievement of the economy wide EU greenhouse gas emissions reduction target in 2030, Denmark’s commitments pursuant to LULUCF Regulation are as follows:

2021-2030: Account for emissions and removals from land use, land use change and forestry ('LULUCF')[17] during the periods from 2021 to 2025 and from 2026 to 2030

[16] Taking into account the flexibilities provided for in Articles 5, 6 and 7 of Regulation 2018/842 [ESR] cf. the regulation’s Article 9 on compliance check (see footnote 5).

[17] MMR: Regulation(EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for

occurring in the following land accounting categories on the EU territory of Denmark: afforested land, deforested land, managed cropland, managed grassland and managed forest land and as of 2026 also managed wetlands.[18]

2021-2025 and 2026-2030: Denmark will ensure that emissions do not exceed removals under the accounting rules, calculated as the sum of total emissions and removals on Denmark's EU territory in the land accounting categories mentioned above combined and as accounted in accordance with the LULUCF Regulation.

Denmark's domestic targets (2030 and 2050)

The Government's objective for 2030 is to reduce greenhouse gases by 70%, relative to 1990 levels and the long-term objective for Denmark is to obtain net-zero emissions no later than 2050.

On December 6, 2019 the Government reached an agreement on a new Climate Act with 8 out of the 10 parties in the Danish Parliament. The agreement includes the following key elements[19]:

- the Climate Act is legally binding,
- a target to reduce greenhouse gas emissions by 70 percent by 2030 compared to the 1990 level,
- commitment to reach net zero emissions by 2050 at the latest,
- a mechanism for setting milestone targets every five year with a ten-year perspective,
- during the Government's forthcoming Climate Action Plan in 2020, an indicative milestone target will be set for 2025,
- the milestone targets will be implemented into Danish law,
- emissions are calculated in accordance with the UN greenhouse gas inventory rules,
- the Government will develop annual Climate Programmes that will outline concrete policies to reduce emissions,
- a strengthening of the Danish Council on Climate Change (Klimarådet) with tasks such as:
    - presentation of professional assessments of whether the initiatives in the Government's Climate Programme is sufficient to reduce emissions
    - recommendations on climate initiatives,
    - doubling of the council's annual budget[20],
    - more experts are added to the council,
    - the council's political independence is strengthened as is can now elect its own chairperson and members,

monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC (https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:165:0013:0040:EN:PDF)

[18] 'Afforested land': land use reported as cropland, grassland, wetlands, settlements, and other land converted to forest land. 'Deforested land': land use reported as forest land converted to cropland, grassland, wetlands, settlements, and other land. 'Managed cropland': land use reported as: cropland remaining cropland, grassland, wetland, settlement, other land converted to cropland, and cropland converted to wetland, settlement and other land. 'Managed grassland': land use reported as: grassland remaining grassland, cropland, wetland, settlement and other land, converted to grassland, and grassland converted to wetland, settlement and other land. 'Managed forest land': land use reported as forest land remaining forest land. 'Managed wetland': land use reported as: wetland remaining wetland, settlement, other land converted to wetland, and wetland converted to settlement and other land.

[19] For more information on the agreement on the Climate Act see: https://kefm.dk/media/12965/aftale-om-klimalov-af-6-december-2019.pdf

[20] As part of the agreement on the Finance Act 2020, 10m in 2020 and 15m annually in the period 2021-2023 was allocated to the strengthening of the Council on Climate Change.

- a new climate dialogue forum in relation to the Council on Climate Change with representatives from business organisations, think thanks, green organisations, worker's organisations and ministries,
- separate report on Denmark's impact on international emissions, including those pertaining to international shipping and aviation. Furthermore, reductions from electricity produced from renewable sources and the effects of Denmark's bilateral energy cooperation can be included in the separate report. Finally, the separate report will shed light on the impacts of consumption,
- formulation of a yearly global climate strategy to ensure that Denmark keeps on its ambitious work at the global scene.
- a citizens' initiative in relation to the Government's forthcoming Climate Action Plan in 2020.

The Climate Act is expected to be adopted by the Parliament in spring 2020.

Moreover, on 2 December 2019 the Government reached agreement with the Red-Green Alliance, the Social Liberal Party, the Socialist People's Party and the Alternative on the Finance Act 2020. With the Finance Act the parties agreed to implement a range of initiatives which will strengthen the effort for a better environment, create more nature and which is expected to reduce greenhouse gas emissions by approximately 0.5 million ton CO2- equivalents in the year 2030 on national level [21].

The Government has furthermore taken steps to ensure that climate, environment and nature will be considered across all relevant policy areas. A permanent government committee on green transition has been established to ensure that effects on climate, environment and nature is taken into account in government proposals and bills.

Moreover, Denmark has established a position among the world's elite in renewable energy through decades of committed efforts. With the Energy Agreement from June 2018 the parties have allocated funding that sets a course towards an RE (renewable energy) share of approximately 55% by 2030. The agreement will also give Denmark an RE share in electricity above 100% of consumption, while ensuring that at least 90% of district heating consumption is based on energy sources other than coal, oil or gas by 2030.

The Government (the Social Democrats) with the Red-Green Alliance, the Social Liberal Party and the Socialist People's Part have in the political understanding between the parties "A fair direction for Denmark" set the following climate and energy relevant objectives:

- **"Introduce binding targets.** During the first parliamentary year, the Government will present a proposal for a climate act with binding sub-targets and binding long-term targets, including:
  - A goal to reduce greenhouse gases by 70% by 2030, relative to 1990 levels. This is a very ambitious goal, and it will be particularly difficult to realise the last part of the goal, i.e. from 65% to 70%. This will require currently unknown methods and, therefore, also a close collaboration with the Danish Council on Climate Change and other experts.
  - That the Danish Council on Climate Change assists a the Government in making decisions on reduction targets and methods which ensure that Denmark complies with the Paris Accord temperature targets.

[21] See the agreement on the Finance Act here: https://www.fm.dk/nyheder/pressemeddelelser/2019/12/finanslovsaftale-prioriterer-velfaerd-og-et-mere-groent-danmark

- That an annual follow-up target assessment is performed, and that this follow-up is linked to the national budget process. [22]

- **Transport sector transition.** As part of a green mobility plan, a wide range of initiatives are required to ensure a significant increase in the number of electric vehicles on the roads and the required transport sector transition:
  - A stop to sales of all new diesel and petrol cars as of 2030 and enhanced low emissions zones.
  - It will be investigated whether the Commission for Green Transition of passenger cars can advance its work so that the final report is available before the end of 2020. As soon as possible thereafter, a political agreement must be reached to provide a sense of security to the industry and car owners and to ensure that the green transition can be undisturbed.
  - The Government will negotiate an infrastructure agreement, which will consider climate and environmental issues to a much higher degree. This requires investments in public transportation and cycling, among other things.
  - Implementing initiatives to ensure more sustainable aviation."

- **Secure climate contributions from agriculture.** Agricultural support shall be used as an active tool to provide farmers the incentive to transition to a more sustainable production and thereby supporting the green transition of the industry. The Government has decided to implement a pilot scheme for multifunctional land distribution which will contribute with experience and knowledge for a major land reform. It is important that it is designed in a way that contributes to solving multiple challenges at the same time and engages stakeholders.

- **"Adopt a climate action plan.** The climate act will be followed by a climate action plan, which will contribute to ensuring that national reduction targets are met. In addition to describing which initiatives, cf. above, will be required for the transport industry and agriculture, the action plan will also include the following elements:
  1) Energy efficiency measures, including energy saving requirements for public sector buildings;
  2) a national strategy for sustainable construction;
  3) a unified strategy for electrification of the transport sector, industry and society in general;
  4) increased funding for green research and demonstration programmes;
  5) investigating the potential for Denmark to prepare a common strategy with the North Sea nations for a significant expansion and exploitation of the offshore wind potential;
  6) investigating the potential for Denmark to construct the first energy island by 2030, with a minimum of 10 GW connected;
  7) support afforestation;
  8) climate adaptation, including stronger coordination of coast protection efforts.

- **Assume the responsibility for more ambitious targets in the EU and enhance green diplomacy**. EU started off as a coal and steel union. The Danish Government will propose the objective that a future EU will be a climate union.

[22] Cf. above as a follow-up on the political understanding an agreement on the climate act was reached on 6 December 2019.

This means, among other things, that Denmark will be working towards increasing the EU climate targets in 2030, that the EU will be climate neutral by 2050 and that the future EU budget will focus more on climate. Denmark will also, together with other ambitious nations, push for an expansion of sustainable energy in the EU so that the EU becomes self-reliant in terms of energy. The Government will also strengthen green diplomacy, thereby increasing Denmark's international commitment. The Government will implement a new development policy strategy with climate assistance as a central element.

- **Create greater biodiversity and more woodlands.** There is a need for more untouched woodlands and more cohesive nature areas where nature is allowed to spread out on more natural terms than is currently the case. A biodiversity package will improve conditions for biodiversity in Denmark. The plan will include clear targets for the proportion of the area of Denmark to be laid out as nature zones (including untouched woodlands and national nature parks) as well as specific initiatives to ensure that targets are reached.

- **Strengthen green calculation models**. Climate and green transition considerations shall be integrated in the Ministry of Finance's calculation models, and the effort to develop greener calculation models will be secured and enhanced. A dialogue will be entered into with Statistics Denmark about strengthening the effort to produce green national accounts and GDP.

- **Increase organic foods targets and strengthen initiatives against food waste**. The Government will increase the ambitions for more organic foods in Denmark, starting with an aim to double organic farming acreage, the export of organic foods and the consumption of organic foods by Danes by 2030, and to implement initiatives to reduce food waste.

- **Include stakeholders.** With the purpose of qualifying and anchoring Denmark's green efforts, the Government will include stakeholders in the work on an on-going basis, including independent experts, popular movements and interest organisations. This will be the case, e.g., for areas such as promoting a strategy for circular economy, transitioning to a more energy-efficient society, smarter waste sorting and transitioning public sector procurements so that they support the green transition to a higher degree.[23]"

[23] The involvement of stakeholders include the Government's launch of climate partnerships with Denmark's leading private sector organizations on 13 November 2019. The aim is to pave the way for the sustainable solutions of the future.

IV. Progress in achievement of quantified economy-wide emission reduction targets and relevant information

A. Mitigation actions and their effects

Mitigation actions

Information on Denmark's portfolio of mitigation actions, including information on policies and measures implemented or planned to achieve the economy-wide emission reduction targets described in section III of this biennial report, is included in Annex 1, which is an update of Chapter 4 in Denmark's Seventh National Communication.

A summary table on Denmark's portfolio of mitigation actions organised by sector: energy (with further specification of energy related measures within the business, transport and household sectors), industrial processes and product use, agriculture, LULUCF and waste as well as cross-cutting taxes and duties, and with information on which of the following gases will be affected by the individual measure: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride, is included as Table 3 in the Common Tabular Format (CTF) in Section VIII of this biennial report.

To the extent possible estimates of the expected effects of existing policies and measures on greenhouse gas emissions are included in Table 3 of the CTF. The sources of these estimates are:

- the 2005 Effort Analysis[24] described in Annex B2 of Denmark's Seventh National Communication,
- the 2013 Analysis of the Effects of Selected Measures for the National Audit Office[25] described in Annex B3 of Denmark's Seventh National Communication, and
- the ministry's updated analysis of the CO_2 reduction effects of Renewable Energy measures and Energy Efficiency measures using the methodologies described in Annex B4 of Denmark's Seventh National Communication[26].

Domestic institutional arrangements

Information on Denmark's domestic institutional arrangements, including institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress towards Denmark's economy-wide emission reduction targets described in section III of this

[24] http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf
[25] https://ens.dk/sites/ens.dk/files/energistyrelsen/Nyheder/kyoto-samlenotat_9._december.pdf
[26] https://unfccc.int/documents/28946

biennial report, is included in Annex 1 (Chapter 4.2). Since the last biennial report (BR3 and its CTF submitted in 2018) the changes in Denmark's domestic governmental institutional arrangements in relation to climate change are:

- as of 27 June 2019, a change in the name of the ministry in charge of climate change issues from the Ministry of Energy, Utilities and Climate to Ministry of Climate, Energy and Utilities
- a reshaping of Denmark's political infrastructure as climate change calls for new approaches and solutions – including
  - the establishment of a permanent government committee on green transition in order to ensure that effects on climate, environment and nature is taken into account in all government proposals and bills,
  - the establishment of 13 "climate partnerships" with the Danish business to ensure involvement and cooperation with the Danish business community on the climate agenda. The 13 partnerships represents all branches of Danish business. The Danish business community has a central role in the green transition and with the climate partnerships, the Government wants to work closely with the business community on how to contribute to solving the climate challenges.
  - initiation of work on new economic models that can assess the effects of economic activity and government proposals and bills on environment, nature and climate.
  - an agreement on a new Climate Change Act with the key elements described in chapter III (expected to be adopted in the Parliament in the beginning of 2020).

Further information on domestic arrangements for the process of the self-assessment of compliance with emission reductions in comparison with emission reduction commitments is included in Section VII of this biennial report.

Response measures

In Denmark, the government's proposals for new response measures to put before the parliament are in most cases accompanied by an assessment of the consequences in relation to socio-economic cost and – when effects on the environment are expected – also by an assessment of the consequences in relation to Denmark's greeenhouse gas emissions.

Further information is available in Chapter 15 of the National Inventory Report.

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

Base-year emission information

In relation to the joint EU28 economy-wide emission reduction target for 2020 under the Convention described in section III of this biennial report, information on EU28 base year (1990) emissions is contained in the BR4 and CTF of the EU.

As LULUCF is excluded from the joint EU28 economy-wide emission reduction target for 2020, information on LULUCF and total GHG emissions, including emissions and removals from the LULUCF sector is not relevant for the reporting of progress towards this target.

As there is no use of CERs and ERUs included in the base year, information on estimates of the use of units from market-based mechanisms is not applicable.

Denmark's contribution to EU28 total base year emissions under the convention amounts to 70.291 $MtCO_2eq.$ in 1990 excluding CO_2 from international aviation ("Total CO_2 equivalent emissions without LULUCF, with indirect CO_2")[27]. On guidance from the European Commission CO_2 from international aviation reported in the memo item of Denmark's greenhouse gas inventory ("inventory CO_2" from international aviation based on fuel sold to aircrafts starting from Danish airports) could be used as a proxy for CO_2 from international aviation activities reported by aviation entities registered in the Danish quota register ("entity CO_2" from international and domestic aviation based on fuel used by Danish entities). When CO_2 from international aviation reported in the memo item of Denmark's greenhouse gas inventory is included, Denmark's contribution to EU28 total base year emissions amounts to 72.065 $MtCO_2eq.$ in 1990.

Annual information on progress towards the emission reduction target with emissions, removals and the use of units from market-based mechanisms

For the quantification of the progress to 2020 targets, the development of GHG emissions is the key indicator. The Convention target of a reduction of emissions by 20 % from 1990 to 2020 only refers to the emissions of the EU-28 as a whole. GHG emissions of EU-28 are calculated as the sum of MS emissions.

Information on EU28 annual emissions for the Base Year and 2010-2017 is contained in the BR4 and CTF of the EU. These figures are shown in Table IV.1 together with Denmark's greenhouse gas emisions in the same years – without and with CO_2 from international aviation. In 2017, total EU28 GHG emissions were 22.2 % below the level in 1990 and Denmark's corresponding total GHG emissions (i.e. including CO_2 from international aviation) were 29.5 % below the level in 1990.

As shown in Table IV.1, Denmark's share of total EU28 GHG emissions was 1.14 % in 2017.

TABLE IV.1: TOTAL GREENHOUSE GAS EMISSIONS IN EU28 (WITH INDIRECT CO_2 AND INTERNATIONAL AVIATION, WITHOUT LULUCF) AND IN DENMARK (WITHOUT AND WITH CO_2 EMISSION REPORTED BY DENMARK UNDER THE MEMO ITEM "INTERNATIONAL AVIATION", WITHOUT LULUCF) IN KT CO_2 EQUIVALENTS AND AS DENMARK'S SHARE OF EU28 IN PERCENTAGE

Source: The BR4 and CTF of the EU and Nielsen et al., 2019.

Kt CO_2-eq.	EU28[a]	DK[b]	DK+Int.Avi.[a]	In % of EU28
Base Year:	5718654	70291	72065	1,26
2011	4915228	57813	60286	1,23
2012	4761679	53221	55719	1,17
2013	4696506	54923	57396	1,22
2014	4603595	50747	53427	1,16
2015	4434461	48133	50757	1,14
2016	4468478	50154	52976	1,19
2017	4451350	47892	50798	1,14

[a] Total GHG including domestic and international aviation, indirect CO_2, excluding LULUCF and NF_3

[b] Total GHG including domestic aviation and indirect CO_2, excluding international aviation, LULUCF and NF_3

[27] Excluding GHG emissions in Greenland and the Faroe Islands since these parts of the realm are not in the EU28 territory.

The development of GHG emissions is reported in CTF Table 4 for Denmark.

Emissions in the sector of LULUCF are not included under the convention target, therefore they are not included in CTF Tables 4, 4(a)I and 4(a)II. Since Tables 4(a)I and 4(a)II are only about LULUCF, these tables are not applicable at all.

The use of flexible mechanisms takes place on the one hand by operators in the EU ETS, on the other hand by governments for the achievement of ESD targets. For information on the use in the ETS, please see the BR4 of the EU. As the latest GHG projection (the WEM projection from August 2019) shows that Denmark's GHG emissions under the ESD are expected to be below the ESD target path 2013-2020 for Denmark, Denmark does not plan to use CERs or ERUs under the ESD.

V. Projections

Information on updated projections of Denmark's greenhouse gas emissions in 2020 and 2030 is included as Table 6 in the CTF in Section VIII of this biennial report.

Table 6(a) in the CTF contains the results from the "with (existing) measures" (WEM) projection from August 2019 ("Denmark's Energy and Climate Outlook 2019" or in short DECO19, Danish Energy Agency)[28]. The "existing measures" included in DECO19 are policies and measures implemented or adopted until June 2019. Further information on the projection is available in Annex 2 of this biennial report.

As the "with measures" projection shows that no new measures will be needed for achieving Denmark's targets 2013-2020 under the EU Climate and Energy Package – the framework for Denmark's contribution to the achievement of the joint EU target for 2020 under the UNFCCC – there has not been a need for adopting additional measures for the near term and prepare a "with additional measures" (WAM) projection for Table 6(c).

In Table 5 of the CTF in Section VIII, a summary of key variables and assumptions used in the projections is given.

Further information on models and methodologies used, is contained in Annex 2. There have been no major changes in the approaches, methodologies and key models used for the August 2019 WEM-projection compared with the March 2017 WEM-projection reported in BR3/NC7. However, both from the March 2017 WEM-projection to the April 2018 WEM-projection and from the latter to the August 2019 WEM-projection some minor refinements and improvements in different partial models have been made. On example mentioned in Annex 2, Appendix 1 is the introduction of a newly developed investment model for small-scale district heating areas.

Additional information on assumptions, projection parameters and results is available in "Projection of Greenhouse Gases 2018-2040" (Scientific Report from DCE – Danish Centre for Environment and Energy No. 345, November 2019)[29].

The remainder of this chapter contains an overview of assumptions and results from DECO19. Technology cost projections assumptions and results are from Denmark's technology catalogues[30]. The current situation refers to 2017, which is the latest statistical year. Projections refer to 2018-2040.

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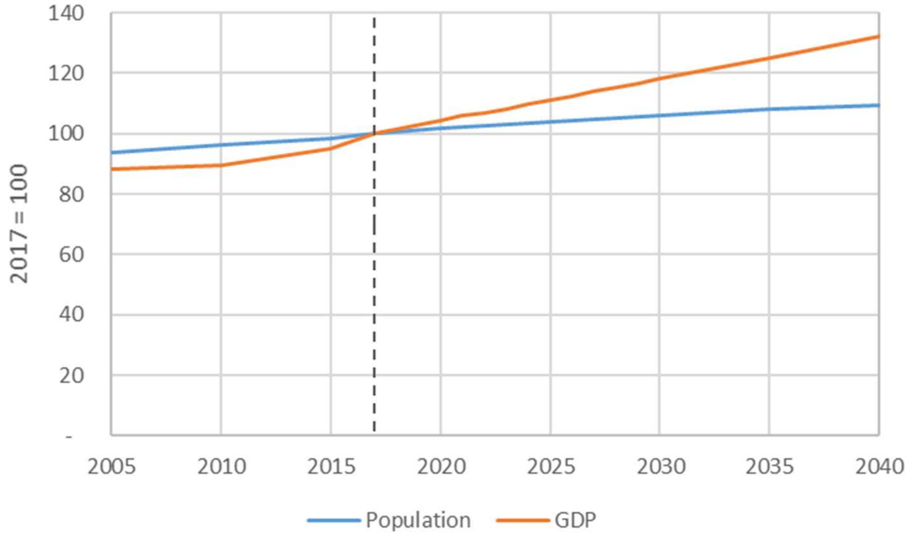
[28] https://ens.dk/en/our-services/projections-and-models/denmarks-energy-and-climate-outlook
[29] https://dce2.au.dk/pub/SR345.pdf
[30] https://ens.dk/en/our-services/projections-and-models/technology-data

A. Projected evolution of main exogenous factors influencing energy system and GHG emission developments

(i) Macroeconomic forecasts (GDP and population growth)

As shown in figure V.1, from 2017-2030 the population is projected to grow 6%, while GDP increases 18%. The trend is projected to continue beyond 2030, leading to a 9% population growth and a 32% GDP growth in 2040, compared to 2017.

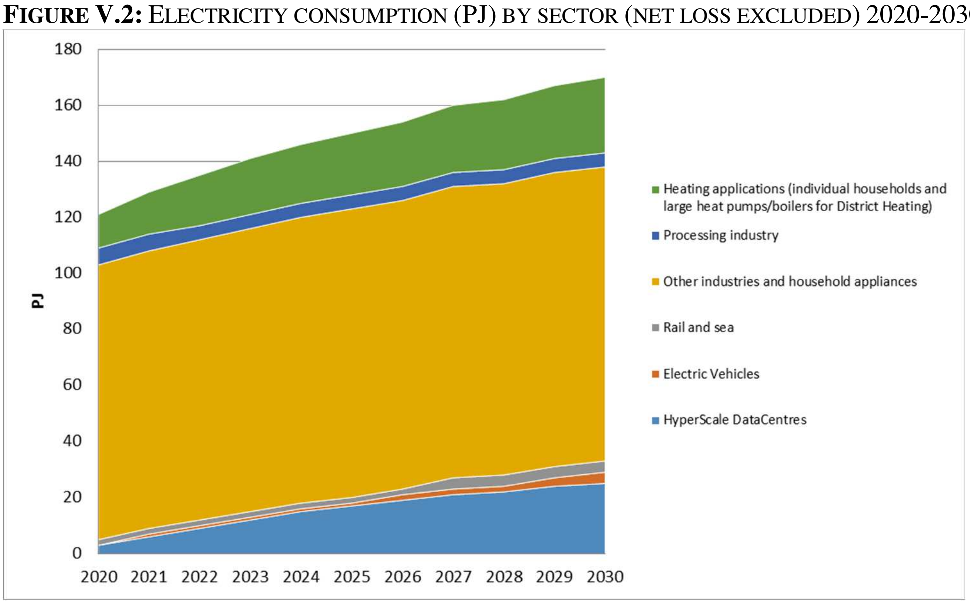
FIGURE V.1: POPULATION AND GDP 2005-2040 [2017=100].



(ii) Sectoral changes expected to impact the energy system and GHG emissions

Figure V.2 shows the electricity consumption for various sectors from 2020-2030, highlighting significant impacts, mainly due to the increase of electricity demand for hyper-scale data centers (HSDC's) and heating applications. GHG emissions will be less affected due to the increased deployment of renewable energy capacity in the same period.

FIGURE V.2: ELECTRICITY CONSUMPTION (PJ) BY SECTOR (NET LOSS EXCLUDED) 2020-2030.



(iii) Global energy trends, international fossil fuel prices, EU ETS carbon price

Figure V.3 shows the projections of fossil fuel prices used as assumptions in the NECP.

FIGURE V.3: FOSSIL FUEL PRICES 2005-2040 [2016-EUR/GJ].

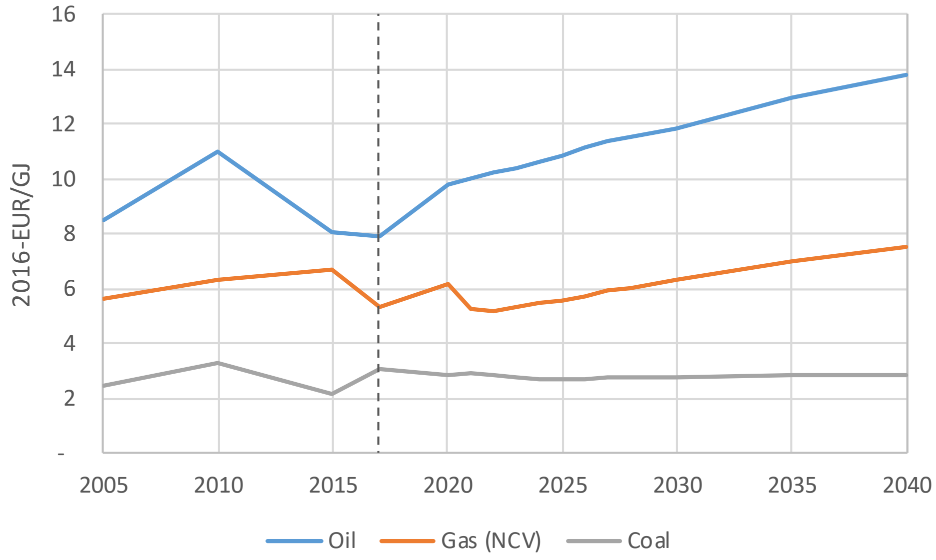
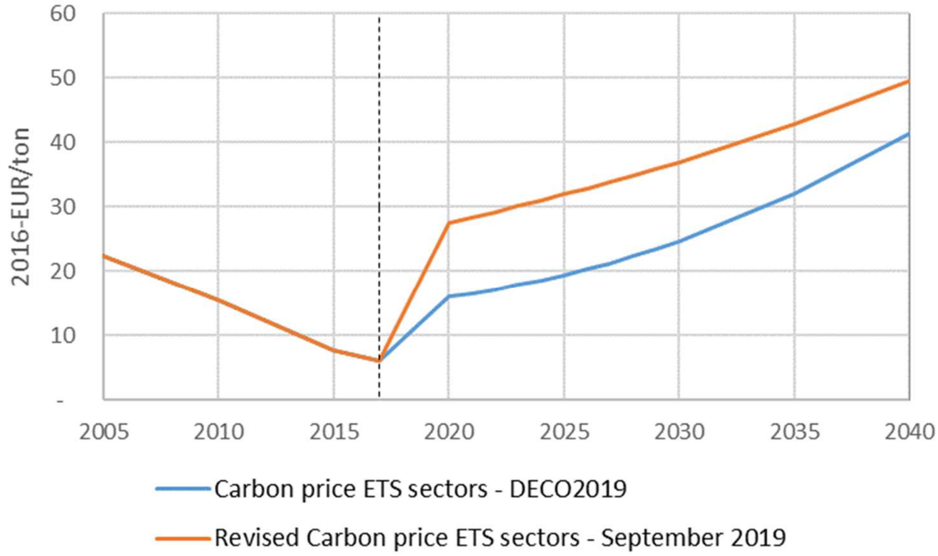


Figure V.4 shows the carbon price for the ETS sectors used for DECO2019 as well as a revised carbon price projection.

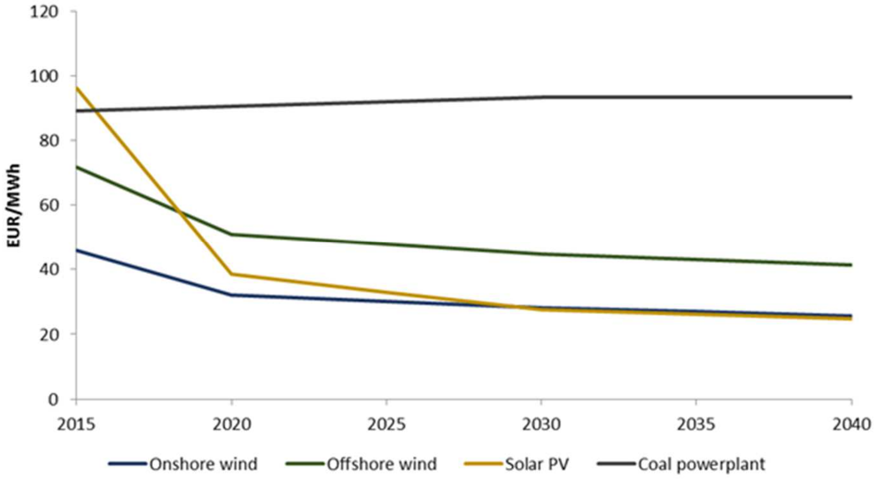
FIGURE V.4: CARBON ETS PRICE USED FOR PROJECTIONS IN DECO 2019. CARBON ETS PRICE WAS REVISED IN SEPTEMBER 2019 [2016-EUR/TON].



(iv) Technology cost developments

Figure V.5 shows the levelized cost of electricity (LCoE) for wind and solar power compared to a coal-fired power plant. The projection shows that LCoE for wind and solar power is lower than for a coal-fired power plant throughout the projection period.

FIGURE V.5: LEVELIZED COST OF ELECTRICITY GENERATION WITH YEARS OF FINAL INVESTMENT DECISION 2015-2040 [EUR/MWH] FOR UTILITY SCALE WIND AND SOLAR AND A COAL-FIRED POWER PLANT.

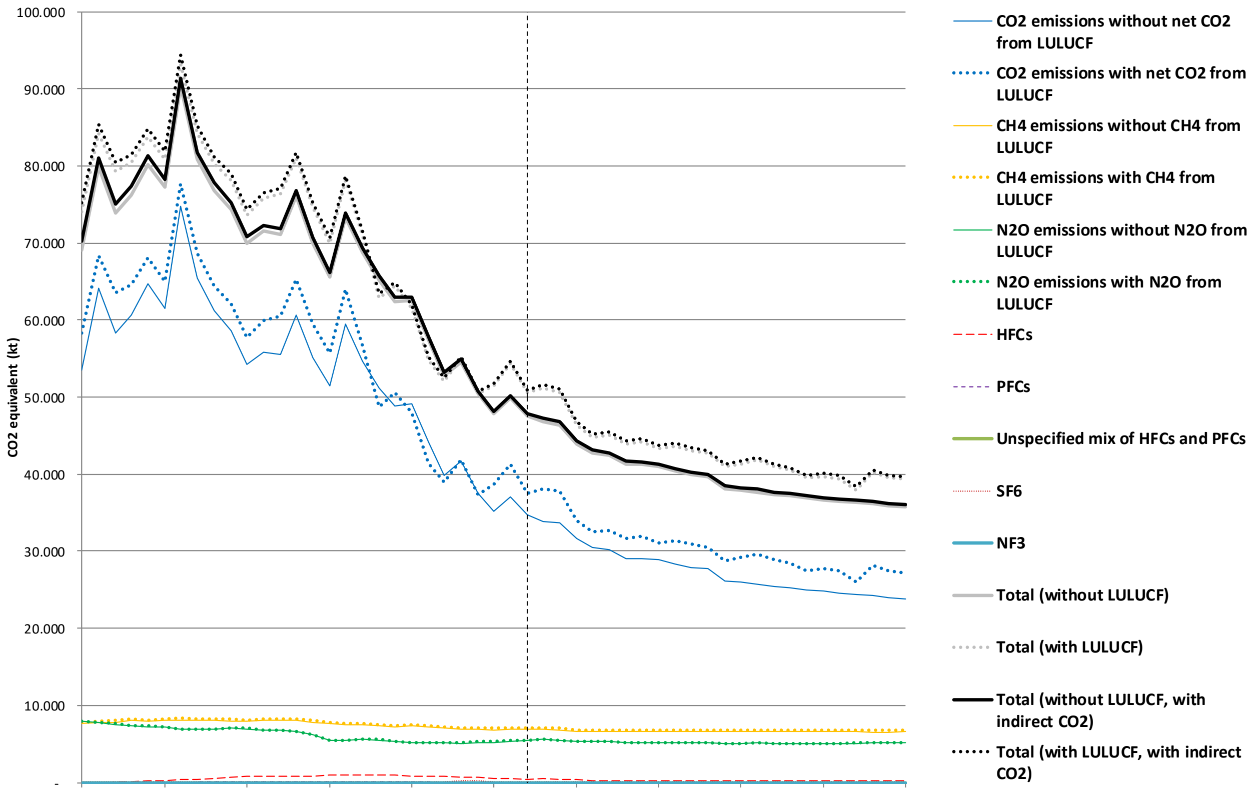


B. Trends in past and projected greenhouse gas emissions and removals in the WEM scenario

The trends in current Danish GHG emissions and removals 1990-2017 are shown as total and by gas in figure V.6. A key result is that total GHG emissions without LULUCF have decreased 32% since 1990. Other highlights are:

- total GHG emissions with LULUCF have decreased 32%
- CO_2 emissions without LULUCF have decreased 35%
- CO_2 emissions with LULUCF have decreased 36%
- CH_4 emissions without LULUCF have decreased 9%
- CH_4 emissions with LULUCF have decreased 9%
- N_2O emissions without LULUCF have decreased 32%
- N_2O emissions with LULUCF have decreased 31%

FIGURE V.6: GHG EMISSIONS BY GAS 1990-2040 [KT OF CO2-EQ.]



In figure V.6, the developments of total GHG emissions and by gas until 2040 in the WEM scenario are also shown. A key result of the WEM scenario projection is that total GHG emissions without LULUCF are expected to decrease 46% from 1990 to 2030 and 49% from 1990 to 2040. Other results of the projections are:

- total GHG emissions with LULUCF decrease 45% from 1990 to 2030 and 47% from 1990 to 2040
- CO_2 emissions without LULUCF decrease 51% from 1990 to 2030 and 56% from 1990 to 2040
- CO_2 emissions with LULUCF decrease 50% from 1990 to 2030 and 53% from 1990 to 2040

- CH_4 emissions without LULUCF decrease 13% from 1990 to 2030 and 14% from 1990 to 2040
- CH_4 emissions with LULUCF decrease 12% from 1990 to 2030 and 13% from 1990 to 2040
- N_2O emissions without LULUCF decrease 36% from 1990 to 2030 and 35% from 1990 to 2040
- N_2O emissions with LULUCF decrease 36% from 1990 to 2030 and 35% from 1990 to 2040

Figure V.7 shows the GHG emissions reductions achieved from 1990-2017, distributed between emissions covered by the EU ETS system and non-ETS emissions. As the EU ETS did not exist until 2005 the split of total emissions into ETS and non-ETS 1990-2004 is based on proxy estimates and not on reported ETS emissions.

From 2005, where the reporting of ETS emissions began, until 2017:

- EU ETS CO_2 emissions have decreased 43%
- non-ETS GHG emissions without LULUCF have decreased 17%

FIGURE V.7: GHG EMISSIONS IN THE ETS AND THE NON-ETS (ESD, ESR) SECTORS 1990-2040 [KT CO2-EQ.]

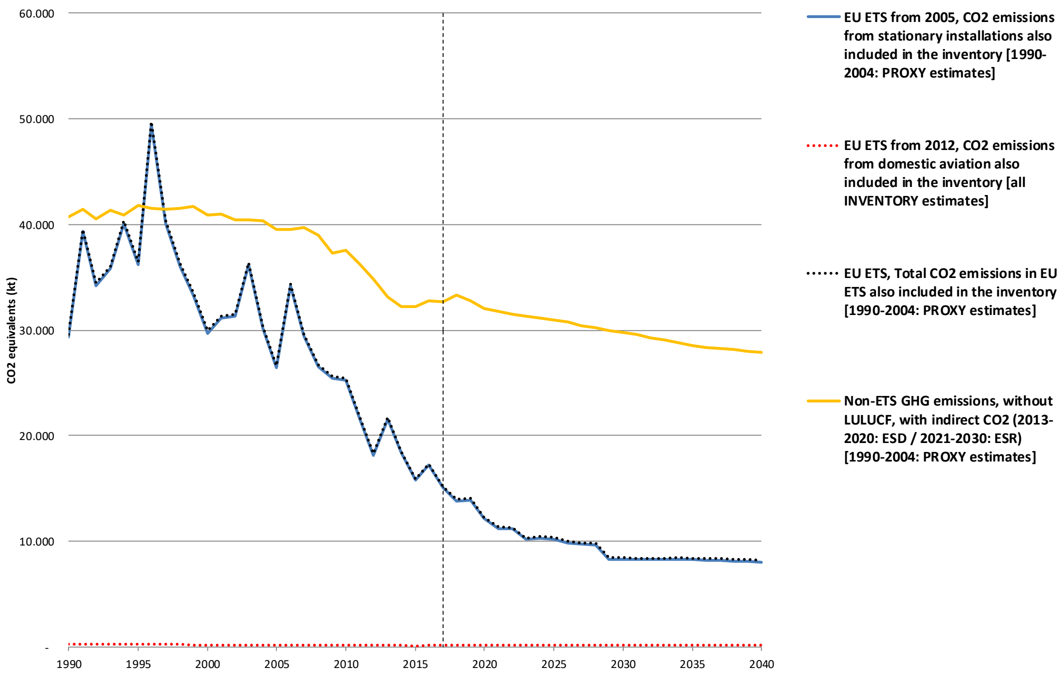


Figure V.7 shows GHG emissions in EU ETS and non-ETS until 2040 in the WEM projection scenario. As the EU ETS did not exist until 2005 the split of total emissions into ETS and non-ETS 1990-2004 is based on proxy estimates and not on reported ETS emissions. From 2005, where the reporting of ETS emissions began, the projection shows that:

- EU ETS CO_2 emissions decrease 68% from 2005 to 2030 and 69% from 2005 to 2040
- non-ETS GHG emissions without LULUCF decrease 25% from 2005 to 2030 and 30% from 2005 to 2040.

The non-ETS projection should be seen in context with Denmark's obligation to limit non-ETS greenhouse gas emissions in 2030 by at least 39 % relative to emissions in 2005. Additional policies and measures to meet the objective are to be decided after the submission of the LTS, including a climate action plan.

Emissions have been particularly reduced in the energy sector, which is shown in figure V.8 below. Highlights of GHG emissions reductions by IPCC energy sector are:

- energy sector emissions decreased 36%
- energy industry emissions decreased 57%
- manufacturing industry emissions and construction decreased 26%
- transport emissions increased 23%
- other sector's emissions (from energy use in commercial/institutional, residential and agriculture/forestry/fishing) decreased 53%

FIGURE V.8: GHG EMISSIONS BY IPCC ENERGY SECTOR 1990-2040 [KT CO2-EQ.]

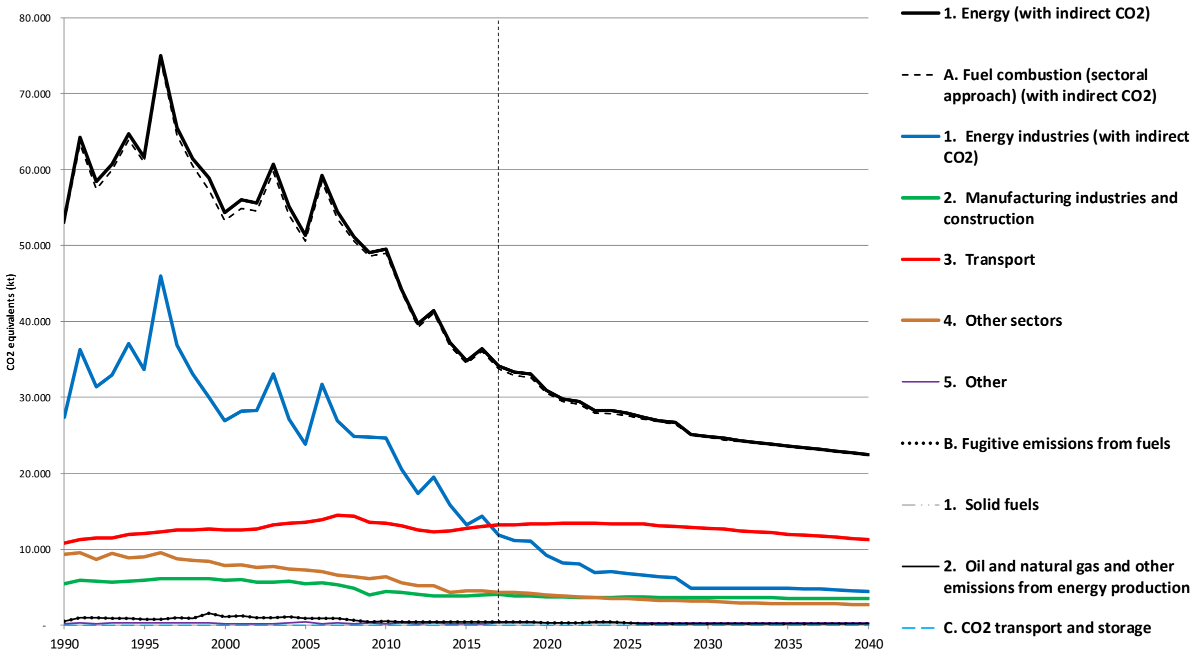


Figure V.8 shows from 1990-2040 the total GHG emissions by IPCC energy sector. The projection shows that:

- energy sector emissions decreases 53% from 1990 to 2030 and 58% from 1990 to 2040
- emissions from energy industries decrease 82% from 1990 to 2030 and 84% from 1990 to 2040
- emissions from manufacturing industries and construction decrease 33% from 1990 to 2030 and 35% from 1990 to 2040
- transport emissions increase 19% from 1990 to 2030 and 5% from 1990 to 2040
- other sectors (commercial/institutional, residential and agriculture/forestry/ fishing) emissions decrease 66% from 1990 to 2030 and 70% from 1990 to 2040

Figure V.9 shows the total GHG emissions by IPCC main sector from 1990-2017 where:

- energy sector emissions decreased 36%
- industrial processes and product use emissions decreased 14%
- agriculture emissions decreased 16%
- land use, land-use change and forestry (LULUCF) net-emissions decreased 40%
- waste emissions decreased 36%

FIGURE V.9: GHG EMISSIONS BY IPCC MAIN SECTOR 1990-2040 [KT CO2-EQ.]

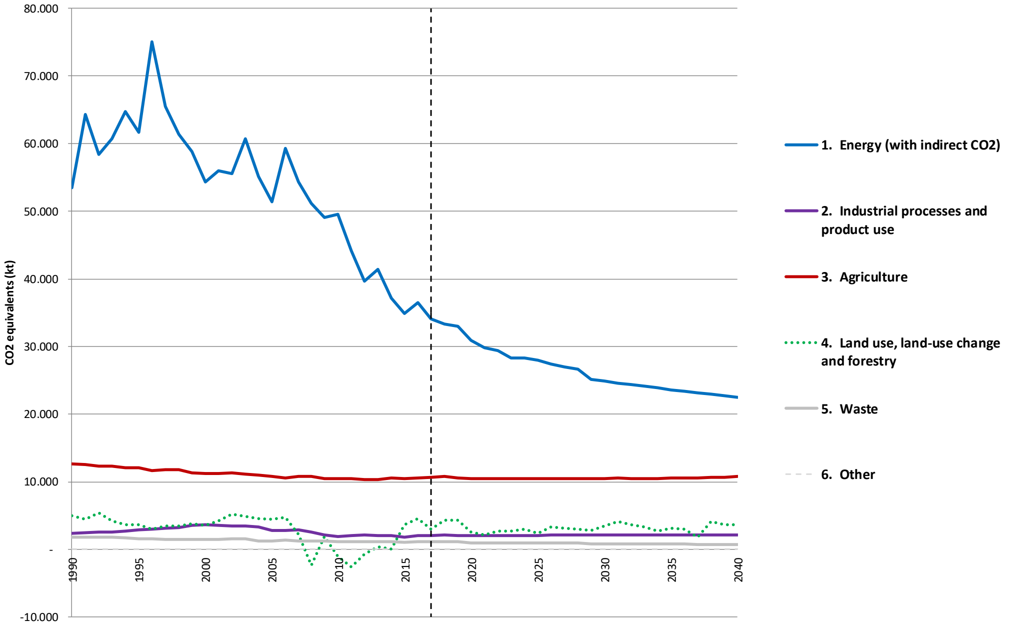


Figure V.9 also shows from 1990-2040 the total GHG emissions by IPCC main sector. The projection shows that:

- energy sector emissions decreases 53% from 1990 to 2030 and 58% from 1990 to 2040
- industrial processes and product use emissions decrease 12% from 1990 to 2030 and 9% from 1990 to 2040
- agricultural emissions decrease 17% from 1990 to 2030 and 15% from 1990 to 2040
- land use, land-use change and forestry (LULUCF) net-emissions decreases 31% from 1990 to 2030 and 25% from 1990 to 2040
- emissions from waste decreases 52% from 1990 to 2030 and 63% from 1990 to 2040

Figure V.10 shows that:

- LULUCF net emissions decreased 40% from 1990-2017
- KP1 net credits accumulated to 8,865 kt CO_2-eq.

FIGURE V.10: GHG EMISSIONS AND ACCOUNTING QUANTITIES IN THE LULUCF SECTOR 1990-2040 [KT CO2-EQ.].

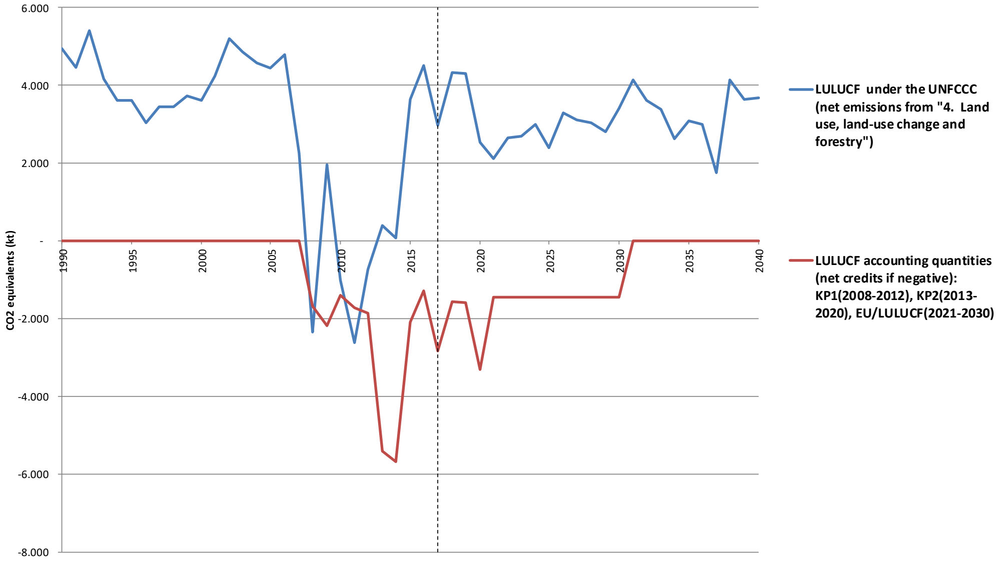


Figure V.10 also shows the LULUCF emissions and net credits from 1990-2040. The projection shows that:

- LULUCF emissions decrease 31% from 1990 to 2030 and 25% from 1990 to 2040,
- KP2 net emissions accumulates to 23,806 kt CO_2-eq., and
- EU/LULUCF (2021-2030) net emissions accumulate to at least 14.600 kt CO_2-eq. (1.46 kt CO_2-eq. per year in average)

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

VI.1 STRATEGIES FOR DANISH DEVELOPMENT ASSISTANCE AND CLIMATE CHANGE

Denmark is one of the few developed countries that fulfil the UN goal of contributing a minimum of 0.7 percent of gross national income to development assistance.

The strategy for development cooperation, 'The World 2030' specifically targets support to five Sustainable Development Goals: Goal No. 5 (gender equality), Goal No. 7 (sustainable energy), Goal No. 13 (climate), Goal No. 16 (peace, justice, institutions) and Goal No. 17 (partnerships).

This strategy guides the public support to developing countries for climate actions that further shall comply with the annual Danish Finance Act and on an operational level with Danida's 'Aid Management Guidelines' (AMG)[31].

VI.1.1 Danish climate finance

The public Danish support to climate relevant action in developing countries is on one hand provided through dedicated mechanisms, such as the "Climate envelope", and on other hand as an integrated element of bilateral development cooperation projects and programmes. A significant part of Danish climate finance is channelled through various international and multilateral development institutions, such as the EU, World Bank, African Development Bank, UNEP or UNDP, either as core funding or through the special climate windows and programmes of these institutions. Likewise, Denmark provides part of its climate financing through the Green Climate Fund being the financial mechanisms of UNFCCC as well as through the Global Environmental Facility, the Least Developed Countries Fund, GGGI among other international organisations.

Denmark seeks to support both adaptation and mitigation related action with a view to contribute to sustainable development. Danish support to adaptation related activities and programmes address underlying causes of vulnerability, and contribute to building resilience against crises, natural disasters and the impacts of climate change. The support also assists developing countries in their efforts to integrate adaptation and emission reduction considerations in their national planning and policy preparation and implementation, including as part of a country's National Adaptation Plan (NAP) and Nationally Determined Contributions.

Through both multilateral and bilateral assistance, Denmark supports increased access to sustainable energy in developing countries, improvement in energy efficiency and

[31] Information on Danida's aid management guidelines can be found on the foreign ministry website: https://amg.um.dk/

improved access to climate-friendly technologies. This is done by strengthening national and local knowledge and capacity, by supporting policy development and implementation, and through support to investments in preparation and implementation of specific mitigation projects. Furthermore, Denmark offers technical assistance and advice on development of investment opportunities and by strengthening local businesses in developing countries.

The 'Climate Envelope' is an important part of Danish climate financing as a dedicated mechanism for supporting mitigation and adaptation activities in developing countries. The 'Climate Envelope' is programmed jointly by both the Danish Ministry of Foreign Affairs and the Danish Ministry of Energy, Utilities and Climate. The envelope had 300 million DKK in 2017 and 346 million DKK in 2018. A significant part of Danish climate engagements targets a range of priority partner countries, with whom Denmark has a long-term partnership for sustainable development. Danish bilateral development assistance is decentralised to Danish representations in partner countries, which have the primary responsibility for dialogue with the respective partner countries and the related programming and management of the development cooperation. Denmark cooperates with national and local government authorities, international agencies, civil society organisations, private companies, research institutions and other relevant actors, and specific projects and programmes are identified and prepared in close collaboration with national partners.

VI.1.2 New and additional

According to the reporting requirements, Annex II parties shall clarify how they have determined if resources are new and additional. For the purpose of this report, newly committed (for reporting on commitments) or disbursed (for reporting of disbursements) finance for climate change adaptation or mitigation activities within the reporting period and was not reported to UNFCCC in the previous report are considered new and additional.

Denmark sees the achievement of climate change and broader sustainable development goals as closely linked and strongly interdependent, and seeks to identify and support activities in developing countries that address multiple objectives as identified in partnership with these countries.

VI.2 METHODOLOGY FOR REPORTING

This report (BR4) includes figures on disbursements of climate finance in 2017 and 2018. Information on the disbursements is contained in Chapter VIII as Tables 7, 7(a) and 7(b) of the Common Tabular Format (CTF), which is also reported electronically.

Tables on disbursements and commitments of climate finance for all years 2013-2016 are available in Annex D1 of Denmark’s Seventh National Communication and in the previous Third Biennial Report (BR3).

It is important to note that commitments and disbursements describe two different phases in the deployment of climate finance. Climate finance is committed to a specific project, programme or institution when it is finally approved by the relevant Danish authority and an agreement or similar document is signed with the recipient country or organisation. Finance is disbursed when an actual transfer has taken place to an account of the recipient country or organisation. In some cases, commitment and disbursement takes place in the same year. In other cases, disbursements will take place over a number of years following the commitment.

Denmark has decided to report financial figures using the same CTF format as in previous Biennial Reports. This makes it possible to compare figures with the First Biennial Report (BR1) covering 2011-2012, the Second Biennial Report (BR2) covering 2013-2014 and the Third Biennial Report (BR3) covering 2015-2016. Denmark's method for reporting to the UNFCCC was changed between BR1 and BR2, as BR1 reported on commitments while BR2 reported on disbursements. By providing data on both commitments and disbursements in BR3 and in Annex D1 of Denmark's NC7, it is possible to compare with older reports using both reporting methods.

In the following, the methods behind the tracking and reporting of bilateral, multilateral and mobilised private climate finance are explained.

VI.2.1 Bilateral climate finance

For bilateral public climate finance, Denmark uses the OECD DAC 'Creditor Reporting System (CRS)' database with its Rio Markers as basis for reporting on climate-relevant activities. The Rio Markers on adaptation and mitigation are policy markers that indicate policy objectives in relation to each project/programme that is reported to the OECD's CRS. The markers are assigned based on well-defined guidelines and technical eligibility criteria agreed within OECD DAC.

The guidelines for Rio markers are part of the general 'Official Development Aid' statistics guidelines[32], which provide concrete examples of Rio-marking (Annex 18, Rio Markers). The Rio-marker framework is a useful result of the OECD initiatives to improve/develop the DAC reporting methodology related to transparency on public and private climate finance. Denmark has been an active member of an OECD working group refining and improving the Rio marker system to better serve the purpose of being used as the basis for climate finance reporting to UNFCCC.

Rio markers are applied to all bilateral support to developing countries, except general budget support, imputed student costs, debt relief, administrative costs, development awareness-raising, and refugee reception in donor countries. For a precise definition of OECD DAC Rio markers see the *'Converged Statistical Reporting Directives for the Creditor Reporting System (CRS)'* and *'the Annual DAC Questionnaire'* (including Annex 18 therein).

All Danish support to developing countries is screened and marked with Rio markers to establish whether the project targets adaptation and/or mitigation as a "principal objective", a "significant objective" or whether these objectives are "not targeted". The values of a project are attributed according to the extent to which the themes are explicitly addressed at the level of problem analysis (context); objectives and results; and activities as defined in the eligibility criteria.

The climate relevant contribution of a specific project or programme is quantified based on the adaptation and mitigation markers. If a project or programme is marked with Rio-marker 1 ("Significant") for adaptation and/or mitigation, 50% of the project is reported as climate relevant finance. If a project or programme is marked with Rio-marker 2 ("Principal"), 100% of the budget is reported as climate relevant. In order to avoid double-counting, Denmark ensures that in cases where projects or programmes are marked for

[32] Converged Statistical Reporting Directives for the Creditor Reporting System (CRS) and the Annual DAC Questionnaire, OECD DAC, DCD/DAC(2016)3/ FINAL (https://www.oecd.org/dac/stats/documentupload/DCDDAC(2016)3FINAL.pdf , https://www.oecd.org/dac/stats/DCD-DAC(2016)3-ADD1-FINAL-ENG.pdf and https://www.oecd.org/dac/stats/DCD-DAC(2016)3-ADD2-FINAL%20-ENG.pdf).

both adaptation and mitigation, the total amount of climate relevance finance reported does not exceed the highest marking given.

The types of climate specific support that are reported are “Mitigation”, “Adaptation”, “Cross-cutting” and “Other”. The applied Rio-markers are used to distinguish between the different support types. Contributions relating to programmes, projects and activities that are assigned with a positive Rio-marker for either mitigation or adaptation are reported under the relevant heading. Definitions of mitigation and adaptation are in accordance with the definitions by OECD DAC. Detailed information is provided in Annex 18 of the OECD DAC reporting directives. Mitigation seeks to limit climate change by reducing the emissions of GHGs or by enhancing sink opportunities. Adaptation aims to lessen the adverse impacts of climate change. Contributions to programmes, projects and activities assigned with a positive Rio-marker for both mitigation and adaptation are reported as cross-cutting.

A matrix indicating how climate change mitigation and adaptation Rio markers determine the type of support (mitigation, adaptation or cross-cutting) and the consequential application of Rio marker coefficients is shown below.

Rio marker	**Mitigation 0**	**Mitigation 1**	**Mitigation 2**
Adaptation 0	Not relevant	Mitigation: 50% of finance	Mitigation: 100% of finance
Adaptation 1	Adaptation: 50% of finance	Cross-cutting: 50% of finance	Mitigation: 100% of finance
Adaptation 2	Adaptation: 100% of finance	Adaptation: 100% of finance	Cross-cutting: 100% of finance

The Danish MFA has put in place a system of external quality assurance of all Rio markers in the project portfolio, which is done before submitting to the OECD CRS database and the use of the database for reporting UNFCCC. Furthermore, the MFA has internally made an effort to further develop its methods and understanding on the handling of reporting to the UNFCCC, including by addressing the comments and recommendation by the UNFCCC Expert Review Team to BR3 and NC7. The two most important improvements in the methods in BR4 are:

- Analysis of the climate relevant parts of Danish support to development research (through the Danida Fellowship Centre) and the re-granting mechanism to small and medium sized Danish NGOs through CISU is provided.
- The further development of sections concerning technology development and transfer support, alongside provision of capacity building support, to be more expansive.

The in-depth analysis of the climate relevant parts of support to development research (“FFU Windows 2018”) and re-granting through CISU is a measure taken to more accurately assess the proportion of these large pooled grants which are climate-relevant. This is produced by analysing individual projects receiving grants through these pools using the Rio marker methodology. A breakdown of the climate shares for these projects is provided in supplement to the CTF table 7(b) for 2018.

VI.2.2 Multilateral climate finance

Multilateral climate finance is divided in the CTF into core funding to institutions and climate-specific funding. Core funding is identified by Denmark as funding to selected institutions that are marked as "Core contributions to multilateral institutions" in CRS++ statistical reporting to OECD DAC. Core funding for multilateral institutions is *not* marked with Rio markers in CRS by member states. The numbers reported as core funding to multilateral institutions in CTF Table 7 are the actual amounts of disbursed annual contributions to the organisations.

With regard to CTF Tables 7 and 7(a), Denmark reports on core/general finance and climate-specific finance in a mutually exclusive way:

- Core contributions to 'Multilateral financial institutions, institutions, including regional development banks' and 'Specialised United Nations bodies' are reported as such. Including core funding for the World Bank, African Development Bank, Asian Development Bank, UNDP and UNEP. This also includes funding to the Global Environment Facility (GEF).
- Funding to the World Bank has been divided into support provided to specific institutions, including the International Development Association and International Bank for Reconstruction and Development and the Multilateral Debt Relief Initiative.
- Contributions to 'Multilateral climate change funds' are reported as climate-specific. Including funding to the Least Developed Countries Fund, the Green Climate Fund, UNFCCC Trust Fund for Supplementary Activities, and "Other multilateral climate change funds" (including the Multilateral Fund for the Implementation of the Montreal Protocol).
- In 2017 and 2018, general commitments and disbursements provided to: the World Meteorological Organisation, Intergovernmental Panel on Climate Change, Global Green Growth Institute (GGGI) and International Renewable Energy Agency, have been considered as climate-specific, based on assessments of these contributions. Following this, these projects had their climate objective ("mitigation", "adaptation" or "cross-cutting") assigned with regards to existing Rio marker allocations, or after a specific assessment of the provision if no Rio markers were initially assigned.
- Furthermore, climate-specific funding to a number of non-UN institutions have been included in Table 7(a) under the "Multilateral financial institutions, including regional development banks" category "Other ()". Including support provided to: the African Union, International Energy Agency, Mekong River Commission, and the Organisation for Economic Cooperation and Development. These climate specific contributions are to be distinguished from core contributions to the same organisations that are reported as core contributions as mentioned above.

Climate-specific finance channelled through specific programmes and Trust Funds managed by multilateral institutions is treated in the same way as bilateral and regional support and the climate relevance identified based on an application of Rio markers. Denmark separates climate-specific bilateral and multilateral funding based on OECD DAC channel codes. Multilateral funds are reported in CTF Table 7(a) and the bilateral funds are reported in CTF Table 7(b).

Reporting on climate finance through core contributions to multilateral organisations is a major challenge for Denmark and other donor countries. Therefore, Denmark values the annual reports ('*Joint Report on Multilateral Development Banks' Climate Finance*') that is made based on agreed methodology among the Multilateral Development Banks (MDBs), which is useful for monitoring of trends and progress in climate related-investment to developing countries, including public and private finance mobilised. Denmark is, together with other OECD countries and the MDBs, working on improving the reporting of the climate finance provided and mobilised through the MDBs by developing countries.

VI.2.3 Private climate finance

For the first time, Denmark applied in 2015 and 2016 Rio markers to private climate finance mobilised by public finance through the Danish development financing institution, the Investment Fund for Developing Countries (IFU). Denmark continues to report bilateral mobilised private finance for the years 2017-2018 in a separate box below. IFU both provides equity capital to climate relevant investments in developing countries using its own resources and it manages a number of investment vehicles that also involve private investors, such as the Danish Climate Investment Fund (DCIF) and the Sustainable Development Goal Fund (SDGF) that has climate investments as one of its objectives. The DCIF and the SDGF are innovative collective investment vehicles that combine public funds provided by the Danish government and IFU with financing from Danish pension funds and other private investors, and further mobilize further private investors at the project level.

IFU has since 2015 submitted an annual report to the Danish MFA with information about climate relevant investments, including private climate-finance mobilised.

In addition to the support provided by IFU, Denmark supports private sector climate projects through the Danida Business Finance and Danida Market Development Partnerships. Both programmes provide support to projects focused on sustainable development, including energy efficiency, resource use, environmental impacts and climate. A number of climate related activities have been supported, in particular investments in renewable energy.

VI.2.4 Methodological differences from BR3

The methodology used for calculating Danish climate finance for 2017 and 2018 is generally the same as the one that was used in BR3 for 2015 and 2016. Core funding is for 2017 and 2018 reported for several additional institutions, whose project portfolios may include some amount of climate finance. The institutions for which core finance was not reported in BR3, but is reported for 2017 and 2018 include the Food and Agriculture Organisation (FAO), the International Development Association's Multilateral Debt Relief Programme, the Asian Infrastructure Investment Bank, the Organisation for Economic Cooperation and Development (OECD) and the United Nations Convention to Combat Desertification.

VI.2.5 Final remarks

Denmark provides the information in CTF Tables 7, 7(a) and 7(b) in Danish Kroner and United States Dollars. Denmark uses the currency exchange of the OECD DAC[33].

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[33] https://data.oecd.org/conversion/exchange-rates.htm

Information on individual Danish development projects is publicly available in Danida's OpenAid database (http://openaid.um.dk), where updated disbursements to individual projects and total sums for disbursements to countries, sectors and particular implementing organisations can be found. This testifies to the Danish MFA's implementation of the International Aid Transparency Initiative (IATI).

Denmark, as an EU Member State, also reports under the annual EU Monitoring Mechanism (MMR), which provides annual reporting of up-to-date information on financial support, capacity building and technology transfer activities to developing countries based on the best data available. This updated reporting mechanism was initiated in 2013. To the extent possible, Denmark follows the recommendations made by the European Commission to allow comparable reporting among Member States of the EU.

VI.3 OVERVIEW OF DANISH CLIMATE FINANCE FROM 2013 TO 2018

This section presents an overview of Danish climate finance reported to the UNFCCC. The overview includes a breakdown by implementation channel (multilateral, bilateral etc.), an overview of recipient countries, mitigation and adaptation shares, bilateral and multilateral channels as well as support to LDC countries.

VI.3.1 Danish climate finance reported 2013 to 2018

In Table VI.1 below there is an overview of Danish climate-specific finance between 2013 and 2018 for disbursements and commitments. Denmark's core contributions to multilateral institutions are not included in Table VI.1 (reported separately under the 'Core/general' column in CTF Table 7 as required by the UNFCCC). The table shows how Danish climate finance disbursements and commitments have been distributed between mitigation, adaptation and cross-cutting based on the Rio marker methodology.

It should be noted that commitments may fluctuate significantly from year to year depending on the specific types of commitments made in specific years.

TABLE VI.1: DANISH CLIMATE FINANCE BR2-BR4 (2013-2018). FIGURES FOR BR2 ARE CALCULATED USING A METHOD SIMILAR TO THE METHOD USED FOR BR3 AND BR4. THESE MIGHT THEREFORE DIFFER FROM FIGURES REPORTED IN BR2.

Danish climate-specific finance (DKK Millions)		2013	2014	2015	2016	2017	2018	Average 2013-2018
Commitments	Mitigation	229	471	192	259	376	397	321
	Adaptation	81	0	89	394	581	462	268
	Cross-cutting	1,336	1,257	793	203	304	295	698
	Other	0	0	0	2	0	0	0
	Total climate-specific	**1,646**	**1,728**	**1,074**	**857**	**1,261**	**1,154**	**1,287**
Disbursements	Mitigation	392	492	296	346	414	587	421
	Adaptation	202	171	107	248	346	418	249
	Cross-cutting	665	788	762	691	583	470	660
	Other	33	33	43	7	0	0	19
	Total climate-specific	**1,292**	**1,484**	**1,208**	**1,293**	**1,352**	**1,474**	**1,351**

FIGURE VI.1: DISBURSEMENTS OF CLIMATE FINANCE FROM DENMARK BETWEEN 2013 AND 2018. VISUAL REPRESENTATION OF THE NUMBERS FOUND IN TABLE VI.1.

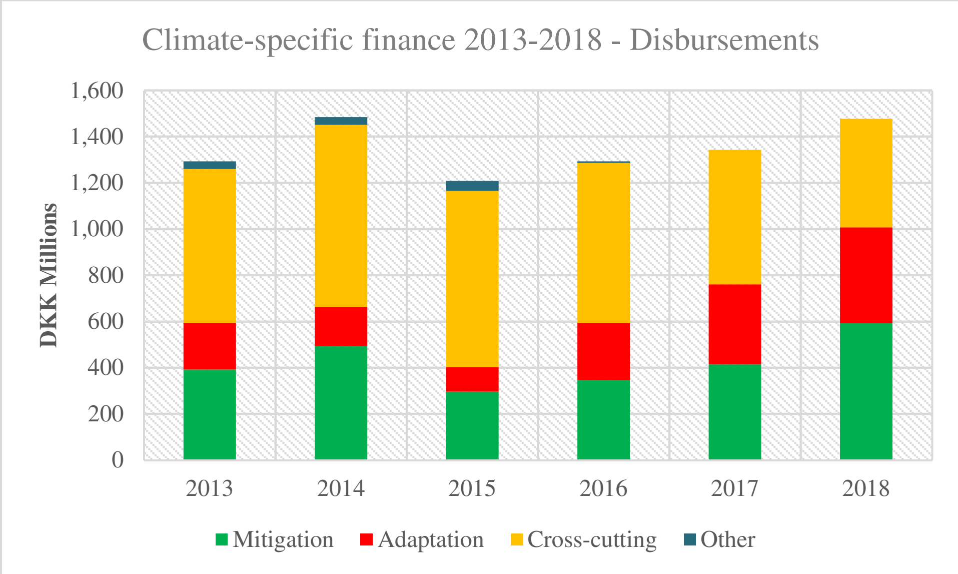


Figure VI.1 shows how Danish climate finance disbursements are distributed between mitigation, adaptation and cross-cutting in the period from 2013 to 2018. The support has, on average, targeted 31% on mitigation, 18% on adaptation and 49% on cross-cutting projects. For the year 2017, these shares are 31% for mitigation, 26% for adaptation and 43% cross-cutting, and in 2018 are 40% for mitigation, 28% adaptation and 32% cross-cutting. The cross-cutting category can be split equally into mitigation and adaptation with the result shown in Table VI.2[34].

TABLE VI.2: DANISH CLIMATE FINANCE BR2-BR4 (2013-2018). AS TABLE VI.1 BUT WITH THE CROSS-CUTTING CATEGORY EQUALLY SPLIT INTO MITIGATION AND ADAPTATION.

Danish climate-specific finance (DKK Millions)		2013	2014	2015	2016	2017	2018	Average 2013-2018
Commitments	Mitigation	897	1,100	589	361	528	545	670
	Adaptation	749	629	486	496	733	609	617
	Other	0	0	0	2	0	0	0
	Total climate-specific	**1,646**	**1,728**	**1,074**	**857**	**1,261**	**1,154**	**1,287**
Disbursements	Mitigation	725	886	677	692	706	822	751
	Adaptation	535	565	488	594	638	653	579
	Other	33	33	43	7	0	0	19
	Total climate-specific	**1,292**	**1,484**	**1,208**	**1,293**	**1,352**	**1,474**	**1,351**

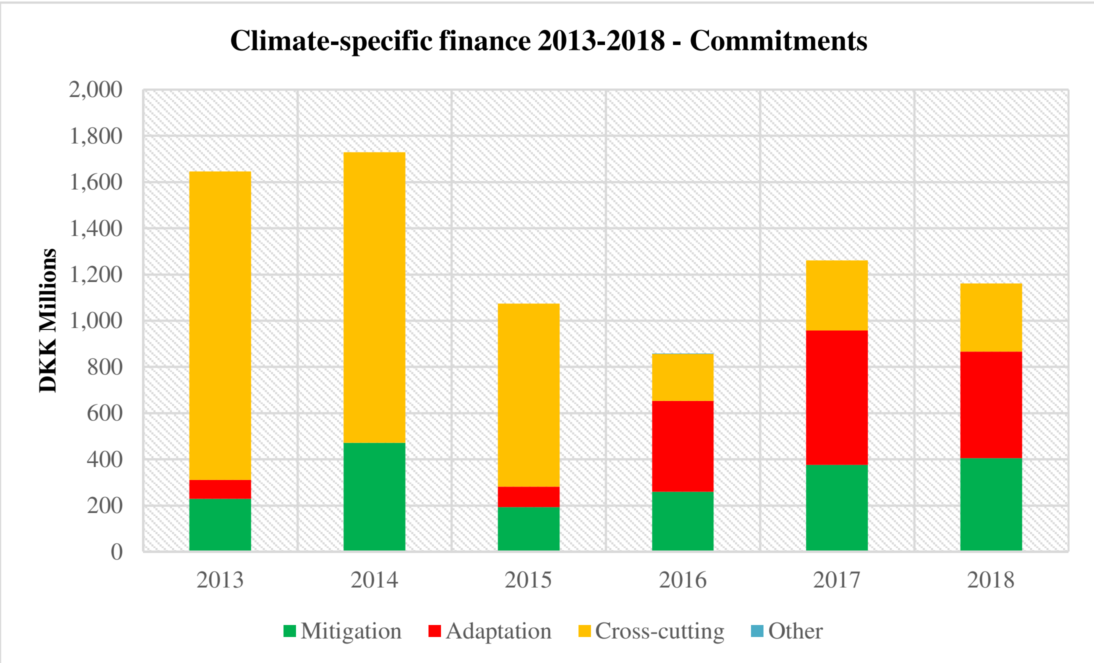
[34] Cross-cutting has been divided evenly between mitigation and adaptation. This has been done based on all projects included in the category having the same Rio marker in mitigation and adaptation (either Significant in both or Principal in both objectives).

With this method, Danish climate finance disbursements in the period from 2013 to 2018 has, on average, spent 56% on mitigation and 43% on adaptation. This average specifically for the period covered by BR4 (2017-2018) is 54% for finance on mitigation, and 46% on adaptation.

VI.3.2 Danish Climate Finance Reported to the UNFCCC (2013 to 2018) - commitments

Figure VI.2 shows Danish climate finance commitments between 2013 and 2018. On average, Denmark has committed DKK 1.29 billion annually, amounting to 8% of total Danish ODA commitments.

FIGURE VI.2: COMMITMENTS OF CLIMATE FINANCE FROM DENMARK BETWEEN 2013 AND 2018. VISUAL



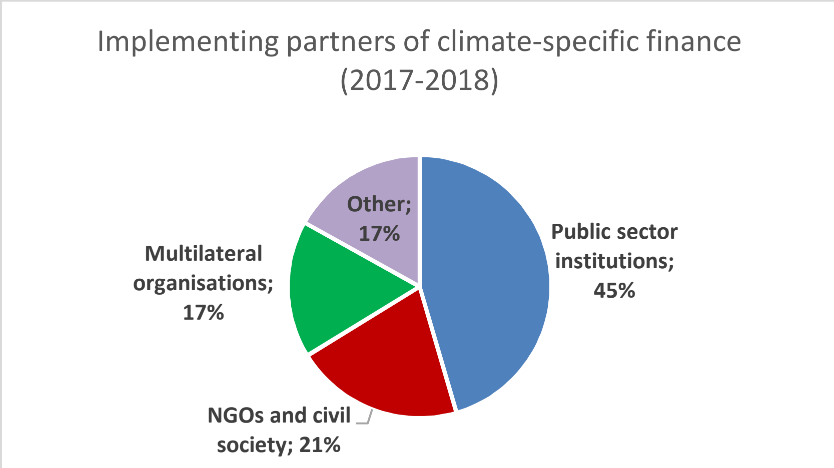
REPRESENTATION OF THE NUMBERS FOUND IN TABLE VI.1.

VI.3.3 Climate Finance by type of partner

Figure VI.3 below illustrates the breakdown of Danish climate finance by type of direct partner. The categories are based on information available in CRS, and include climate specific contributions channelled through multilateral institutions, bilateral grants to government institutions in partner countries, and NGO-managed funds. It does not, however include core contributions to multilateral organisations.

As shown in Figure VI.3, bilateral public sector institutions (45%) are the primary partners for Danish climate finance in 2017-2018, accounting for over twice as much of the climate finance as multilateral organisations (17%) and NGOs (21%). In comparison to the 4 reporting years preceding (2013-2016), there has been a slight increase in the share of funds being implemented by public sector institution partners (+1%), while multilateral organisations have a slight reduction in share (-5%), and NGOs and civil society have retained the same share (no change).

FIGURE VI.3: DANISH CLIMATE FINANCE DISBURSEMENTS AVERAGED ACROSS THE PERIOD 2017-2018 BY TYPE OF PARTNERS. CONTRIBUTION TO MULTILATERAL CORE FUNDING IS NOT INCLUDED.

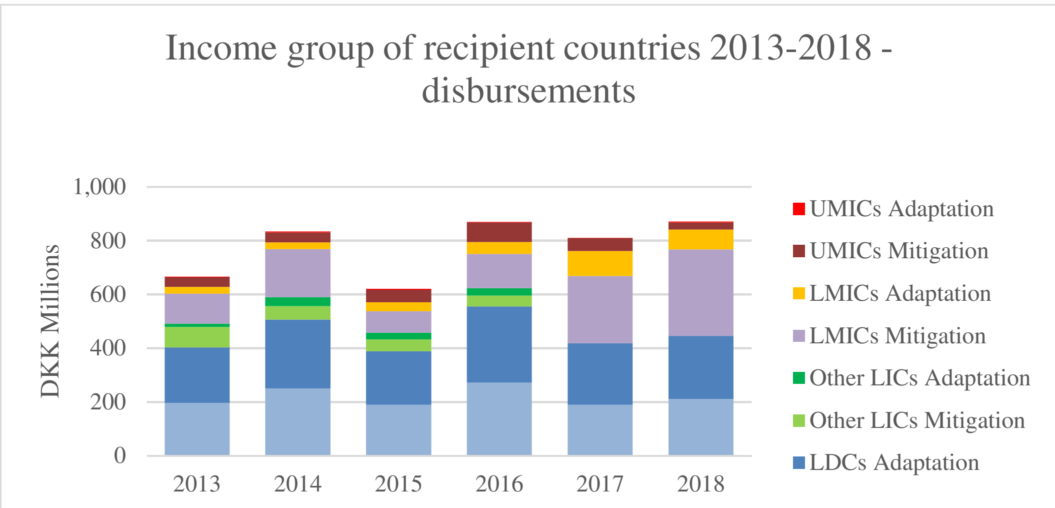


VI.3.4 Breakdown by Income Groups and Danida Priority Countries

Based on the project information available in OECD CRS, it is possible to categorise Danish climate finance according to recipient country income groups. This is illustrated in Figure VI.4, which shows how Danish climate finance disbursed between 2013 and 2018 is distributed between income groups used by the OECD-DAC (LDC: Least Developed Countries; Other LICs: Other Low Income Countries; LMICs: Lower Middle Income Countries; and UMICs: Upper Middle Income Countries). The figure excludes funding categorised as "*Unallocated*" (e.g. spent by means of framework agreements with NGOs or universities or programmes and contributions to multilateral organisations or targeting multiple countries). Least developed countries (LDCs), received more than 58% of bilateral country specific-climate finance from Denmark between 2013 and 2018. In the reporting period 2017-2018, LDCs received 51%.

Between 2013 and 2018, climate finance to LDCs was evenly distributed between adaptation (52%) and mitigation (48%). For the period 2017-2018 covered by BR4, this was more balanced at adaptation 54%, mitigation 46%. Climate finance to middle income countries has a stronger focus on mitigation.

FIGURE VI.4: BILATERAL COUNTRY SPECIFIC DANISH CLIMATE FINANCE DISBURSEMENTS 2013-2018 DISTRIBUTED BETWEEN DIFFERENT INCOME GROUPS OF RECIPIENT COUNTRIES.

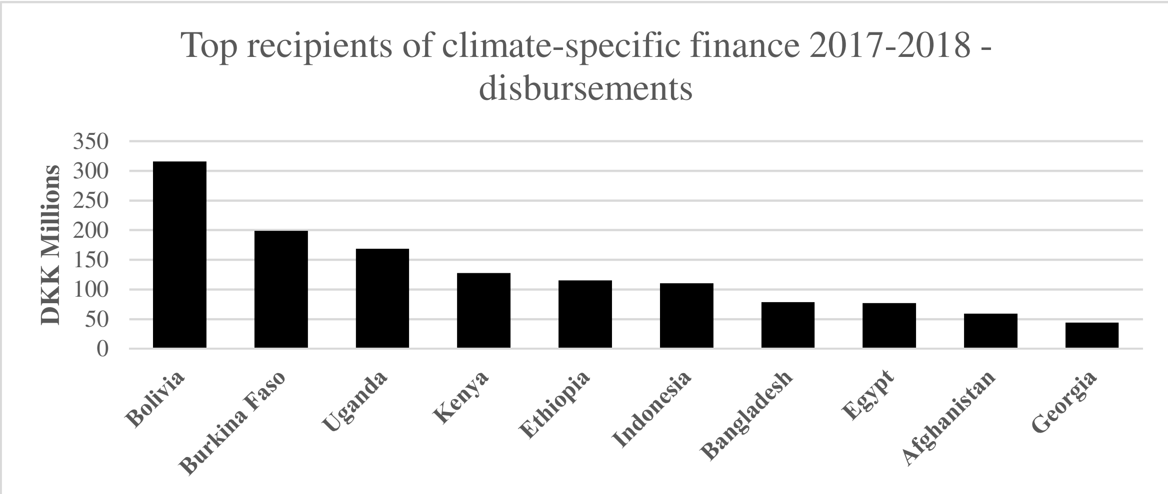


* Cross-cutting climate finance has in the figure been divided evenly between adaptation and mitigation.

VI.3.5 Allocation of Climate Finance to Danida Priority Countries

Figure VI.5 below shows disbursements of Danish climate finance between 2017 and 2018, to the top ten recipient nations by total finance disbursed. As indicated in Figure VI.5, the amount of climate finance varies a lot between the countries, but countries in South Asia, Southeast Asia and Africa are well represented.

FIGURE VI.5: TOP TEN RECIPIENT COUNTRIES OF CLIMATE FINANCE DISBURSEMENTS FROM DENMARK BETWEEN 2017 AND 2018.



VI.4 TECHNOLOGY TRANSFER AND BUILDING CAPACITY

VI.4.1 Introduction

For the present reporting cycle, all new Danish climate-relevant commitments in the years 2017 and 2018 have been manually screened for technology transfer and capacity building relevance. This has been done in conjunction with the existing processes of review regarding Rio marker allocation.

Danish climate support inherently seeks to include capacity building elements in its project design, with many projects and programmes also incorporate elements of technology transfer. As outlined in "The World 2030", Denmark's overall strategy for development cooperation and humanitarian action: "*Denmark will support the capacity of local civil society organisations and national and local authorities to deliver local responses to both immediate and long-term consequences of crises"*. Furthermore, it also states*: "Through Danish support to innovation facilities in the multilateral organisations, we will encourage and support the promotion of work with technology and innovation to boost local and concrete results that can inspire new and larger-scale initiatives."*

Regarding the implementation of the UNFCCC, Danish support to capacity building includes a broad spectrum of activities and public, private and civil society partners. Denmark aims to ensure that capacity building support provided to non-Annex I Parties reflects their endogenous priorities and needs through effective development cooperation and, where possible, with the use of prior engagement review and evaluation.

Transfers of both "hard" and "soft" technologies are seen in Danish climate-relevant activities, alongside or in unison with support seeking to enhance and develop the endogenous technologies and capacities of non-Annex I countries. Furthermore, examples of transfers can be seen in both adaptation and mitigation activities, provided, where appropriate, with the engagement of private-sector actors. The extent of this technology transfer is significant and integral to Danish development cooperation. Examples of Danish-supported bilateral activities leading to technology transfer are, for example, Strategic Sector Cooperation (SCC) initiatives (described in VI.4.2.5.2).

An overview of selected projects is set out in CTF Tables 8 and 9 in relation to country level 'technology development and transfer support' and 'capacity building support'. In addition, the projects outlined below are indicative examples of how Denmark is practicing an integrated approach to capacity building and technology transfer as part of its overall climate support portfolio within both bilateral and multilateral assistance.

VI.4.2 Examples of projects with technology transfer and capacity building components

VI.4.2.1 Support to multilateral institutions with technology transfer components

VI.4.2.1.1 Support for UN Environment's work on IWRM - UNEP-DHI Centre (adaptation and mitigation)

The activity supports the UN Environment initiative by promoting effective management of water resources (Integrated Water Resource Management (IWRM)) through helping identify and address key challenges at global, regional and national levels. Key results include:

- Improving the information and knowledge on key sustainable water resource management challenges at country and basin level as a basis for action.
- New tools and technologies such as knowledge products or specific technical solutions (e.g. decision support systems, information management systems etc.) developed and tested in collaboration with partners.
- Tools and technologies are disseminated and implemented with the support of leveraged resources. These could be short- and long-term capacity building or support for on the ground implementation.
- New partnerships especially with the private sector developed.
- Stronger link and synergy with the Danish private and public resource base.

VI.4.2.2 Support to multilateral institutions with capacity building components

VI.4.2.2.1 Support to the CIF Technical Assistance Facility for Clean Energy Investment Mobilization (mitigation)

The objective of the Climate Investment Funds (CIF) Technical Assistance (TA) Facility is to focus on upstream policy and regulatory framework and other enabling environment activities that will further enable increased renewable energy and energy efficiency. Through the enhancement of energy-focused policy and regulatory framework for private investments and financial sector and investment regulation increasingly conducive to financing of clean energy investment.

The TA Facility will address barriers to scaling up markets for clean energy, which include: A lack of a supportive enabling environments; Real and perceived risks; Capacity constraints that limit both the supply of investable projects with appropriate risk-return characteristics; The supply of finance to realize investable projects, constraining the wider scale up of clean energy technologies. The CIF is well-placed to address these barriers, with a long track record of funding activities focused on technical assistance, testing business models and supporting pipeline development through the MDBs in the Renewable Energy and Energy Efficiency space.

VI.4.2.2.2 Danish Contribution to ESMAP 2017-2020 (mitigation)

Denmark is a long-time supporter of the Energy Sector Management Assistance Programme (ESMAP), an assistance programme administered by the World Bank (WB). ESMAP provides analytical advisory services to low- and middle-income countries to reduce poverty and boost growth, through environmentally sustainable energy solutions. ESMAP builds capacity in client countries through targeted technical assistance, knowledge generation and dissemination, pre-investment project preparation, and implementation support. ESMAP tackles questions related to energy in all its forms in both rural and urban settings. It influences billions in loans for development projects, leverages public and private financing, working with global agendas on energy and climate in country partnership programs and beyond. Practically, ESMAP works in every WB client country supporting improved energy sector performance and governance, enhancing access to modern energy services and technology, increasing the efficiency of energy use, and/or promoting renewable energy.

VI.4.2.3 Support to multilateral institutions with both technology transfer and capacity building components

VI.4.2.3.1 Support for SEforALL (mitigation)

The UN initiative, SEforALL, seeks to enable universal access to sustainable energy, and thus the organisation targets SDG 7 (affordable clean energy), including the underlying targets of the goal concerning renewable energy and energy access and efficiency. The stated impact indicators are: (i) global population without access to electricity and clean cooking, (ii) rate of improvement of global energy intensity and (iii) rate of deployment of renewable energy. SEforALL aims to increase access to public and private finance in areas with great need for sustainable energy and is an example of Danish contribution to soft technology dissemination and capacity building through: (a) the creation of more enabling policy environments, (b) the faster scaling and replicating of innovative approaches and business models, and (c) the stronger alignment of country-level initiatives.

The Danish contribution to SEforALL is in support of 5 interventions stated in the SEforALL Workplan for 2019: (1) "Electricity for all in Africa"; (2) "Growing Big Markets for Clean Fuels"; (3) "Cooling for All"; (4) "Energizing Finance" and (5) "Gender and the People-Centered Accelerator".

VI.4.2.3.2 Support to the International Renewable Energy Agency (IRENA) (mitigation)

The strategic objectives of the activity are: to support partner countries in their efforts to achieve low-carbon development, implement the Paris Agreement on Climate Change and realise NDCs; to meet SDG7 target 7.2: by 2030; increase substantially the share of RE in the global energy mix; target 7.3 double the global rate of improvement in EE; as well as SDG13 target 13.2: Integrate climate change measures into national policies, strategies and planning. Long-term planning and solid energy scenarios are key to ensuring the right policies and investments, which can speed up the transition to renewable energy.

With a mandate from 158-member countries and the EU, IRENA encourages governments to adopt enabling policies for RE investments, provides practical tools and policy advice to accelerate RE deployment and EE, and facilitates knowledge sharing and technology transfer. The project focuses on long term planning, supported by activities producing regional analysis and energy transition system dynamics. The dissemination of this research, and the learnings from it, seek to inform and increased ambitions in RE/energy transition targets.

Furthermore, the exchange of best practices among practitioners and policy makers forms an integral part of the project design. Aided through both: reporting on the implementation of regional and global workshops and support to collaborative platforms; Regional and country-specific capacity building and technical advisory activities; and collaboration on clean energy investment strategies agreed with 2-3 countries.

VI.4.2.3.3 UNEP-DTU Partnership (UDP) 2018-21 (mitigation)

The UNEP DTU Partnership (UDP) is an international research and advisory institution on energy, climate and sustainable development that has received Danish Government core funding since it was established in 1990. The UDP supports UN Environment in facilitating a shift towards cleaner and more efficient energy systems and support more climate resilient sustainable development in developing countries through internationally leading research, policy analysis and capacity development. As a UN Environment Collaborating Centre, UDP specifically supports the planning and implementation of UN Environment's Programme of Work and Medium Term Strategy. The Copenhagen Centre on Energy Efficiency, which is one of the thematic programmes within UDP, also functions as an Energy Efficiency-Hub for SEforALL.

Focus in all UDPs activities is on capacity building and technology transfer, and includes;

- Technology Transfer Partnerships for SDG and Climate Action
- Strengthening markets and value chains for renewable energy in NDCs
- Scalable and replicable models for private sector adaptation and mitigation action, and the mobilisation of private finance
- Transparency of NDC and SDG actions
- Emissions and adaptation gap reports

Denmark has provided funding to both UNEP DTU thematic objectives: (1) "SDG 7.1. and 13: Ensure universal access to affordable, reliable, sustainable and modern energy for all and urgent action to combat climate change and its impact" (DKK million 38) and; (2) "SDG7.3: Double the global rate of improvement in energy efficiency" (DKK million 40).

VI. 4.2.3.4 Support to the IEA's Energy Efficiency in Emerging Economies, Phase II (E4 Phase II) (mitigation)

The objective of this Danish development engagement is for the International Energy Agency (IEA) to support a core group of six of the largest developing countries' energy transition in a low-carbon, sustainable direction, aiming to achieve efficient high-impact and cost-effective improvements in energy efficiency at national and sector levels. The "Energy Efficiency in Emerging Economies, Phase II" project has a strong focus on capacity building and soft technology transfer to developing country energy sectors, and a further focus on private sector engagement. Concretely, the project aims to:

- Increase knowledge and use of new digital technologies and approaches for monitoring and evaluation of existing and future energy efficiency policies.

- Increase knowledge and awareness of best practice policies for supporting energy efficient technologies and systems, including the use of digitalization for policy design, implementation and evaluation.
- Increase number of technical government staff trained on energy modelling including energy efficiency modelling for end-use sectors.
- Increase knowledge and use of new digital technologies and approaches for data collection and analysis on energy efficiency.

VI.4.2.4 Bilateral support with capacity building components

VI.4.2.4.1 Support to Climate Resilient Forest Livelihoods (CRFL) (adaptation)

The *Climate Resilient Forest Livelihoods (CRFL)* engagement pursues the sustainable management of forest resources in the Kaffa Biosphere Reserve through the promotion of participatory forest management, where communities are empowered and motivated to manage and conserve their forests through: capacity development on sustainable forest management, secured access to forest resources of economic and livelihoods importance, and legal recognition of their forest access and rights. CRFL will commence with an inception phase, where: a) the capacity development needs will be assessed and a capacity development plan developed to guide the technical advisory and capacity development to be provided under CRFL, and b) the potential of various livelihoods options will be analysed. Since the Zonal and local Government has the responsibility for promoting forest conservation and livelihoods improvements, further development of their capacity in this regard is an important element of the thematic programme. Moreover, the programme will support the Ministry of Environment, Forest, and Climate Change (EFCCC) at federal level and Southern Nations, Nationalities and Peoples Region's Government (SNNPR) Regional Government and Kaffa Zonal Administration through a social inclusion advisor strengthening their capacity to address social issues within the overall framework for the promotion of inclusive and sustainable forest management.

The project partners with The Government of Ethiopia established "Climate Resilient Green Economy Facility" (CRGE Facility), which is the single entry point for all stakeholders involved in Ethiopia's transformation to become a middle-income country through carbon neutral growth by 2025, through engagement with development partners, private sector, and civil society. Furthermore, in partnership with the Danida Market Development Partnership project "DMDP 2018 - NABU Ethiopia", these two projects will aim to develop and enhance inclusive income and employment generation, income diversification, alongside local and international market development through the involvement of the private sector.

Denmark has under the Greening Agricultural Transformation in Ethiopia (GATE) programme supported the CRGE Facility in 2015-2018 with funds from the Danish Climate Envelope. This engagement had two implementing partners, the EFCCC and the Ministry of Agriculture and Natural Resources (MoANR). Learnings from this experience have been integrated into the current engagement. This thematic programme is fully aligned with the Government's standard structure and procedures, giving the Southern Nations, Nationalities and Peoples Region's Government (SNNPR) Regional Government a more central role in programme delivery.

VI.4.2.4.2 C40 Cities Climate Action Planning (adaptation and mitigation)

The objective of this project is to provide support to five C40 megacities in China, Indonesia, Ethiopia and Vietnam to follow a trajectory that results in reduced emissions and increased resilience against the risk of climate change. Cities are offered resources to build their capacity to achieve these goals, of which the most important are:

- City Advisers and climate best practice from C40 networks: A key focus of this project is to embed a City Adviser in each city to act as a focal point for long-term climate action planning, engage internal and external stakeholders, facilitate knowledge transfer and capacity development, and ensure sustainability after the project duration.
- Regional planning academies and ‘peer-to-peer’ review workshops: Cities will be able to participate in regional 1.5 degree planning workshops that provide an important opportunity for them to learn from one another, in particular from cities that have gone through the pilot stage and are ready to share their knowledge and experience.

Tools and frameworks: C40 are developing various tools and frameworks to support the Deadline2020 programme, including the “1.5-degree planning and assessment framework” that clearly identifies the elements of a Paris compliant Climate Action Plan, as well as a “City Delivery Roadmap” showing cities how they can achieve it.

VI.4.2.4.3 Support to Climate Adaptation in Coastal Communities of Myanmar (adaption)

The *Climate Adaptation in Coastal Communities of Myanmar* activity is part of the Thematic Programme "Inclusive and Sustainable Economic Growth" of the Denmark-Myanmar Country Programme 2016-2020. This project seeks to enhance the capacity of the Forest Department of Myanmar, at central and local levels, to advocate for, establish and enforce Protected Forest Areas (PPFs) with mangroves, thereby increasing the resilience of coastal communities to climate change. To achieve this goal the activity seeks to increase access to technical support and to alternative sustainable livelihood opportunities, empowering communities to conserve, restore and sustainably manage mangrove forests.

VI.4.2.4.4 Support to Civil Society in Development (CISU): Climate action (adaptation and mitigation)

Civil Society in Development (CISU) is an independent association with more than 270 Danish civil society organisation (CSO) members. It supports its members by providing training courses, advice, online guidance on all aspects of Civil Society work. Danida has delegated the administration of various funds including:

- Specific fund for environment and climate change actions
- the Civil Society Fund, a fund for Danish CSOs in partnership with CSOs in developing countries

The objective of the activity is to increase climate resilience, particularly for vulnerable and marginalized groups. This will be achieved through capacity building of Danish CSOs, partners, their members and target groups for climate action on the ground and for advocacy towards duty bearers to hold them to account on climate issues. This will be achieved through capacity building of Danish CSOs, partners, their members and target groups for climate action on the ground and for advocacy towards duty bearers to hold them to account on climate issues. To enhance and develop national and community-level climate change policies, planning frameworks and information systems – especially with a view to adaptation, and to increase Danish civil society organisations' capacity to work with climate capacity building and advocacy with partners.

An external review of the fund in 2017 concluded that there is a significant achievement of objectives across the projects supported by CISU. Results feature within advocacy, where projects have promoted the voice of the poor on a variety of environmental and climate challenges, though the actual changes resulting of the advocacy is not captured well by monitoring. Capacity building results are also prominent, for example in the form of enhanced ability of rights-holders to hold duty bearers to account in their constituencies. Strengthened CSOs including their partnerships, networks, target group involvement etc. is another result area.

VI.4.2.4.5 Support to Strategic Partnership Agreements with Danish Civil Society Organisations (adaption and mitigation)

Through Strategic Partnership Agreements (SPAs) (formerly referred to as Framework Agreements), Denmark contributes to numerous Danish Civil Society Organisations (CSOs) in four-year agreements 2018-2021. CSOs focused primarily on adaptation include: CARE Denmark, Danish Church Aid and Danish Red Cross. Whilst the WWF, SustainableEnergy and Forests of the World pursue mitigation or cross-cutting targets, primarily relating to sustainable forests and their management.

The Ministry of Foreign Affairs (MFA) establishes Strategic Partnerships with professional CSOs that have a focus on strategic alignment and results within Danish development and humanitarian priorities as outlined in the overall Danish Strategy for Development Cooperation and Humanitarian Action. Principally important for climate-related capacity building are those activities undertaken with support from the civil society development budget line of the Danish Finance Act (the "Lot CIV"). The purpose under Lot CIV is to strengthen civil society in the global South so that it has the independence, space, diversity and capacity to influence and promote the realisation of the Sustainable Development Goals with a particular focus on pro-poor, marginalised and vulnerable groups. The objectives of projects under Lot CIV are:

- Capacity development processes that enable partners in the global South to effectively combat poverty, vulnerability, inequality, build community resilience, crisis preparedness and ability to adapt to climate change and build legitimacy, constituency and internal democracy, and accountability in organisations and movements;
- Promoting an enabling environment for civil society in the global South including i) basic legal guarantees such as the right to assembly, association and registration, ii) appropriate measures for CSOs' financial viability and sustainability and iii) appropriate spaces for participation in local, national and international decision-making processes;
- Global, regional and local advocacy efforts which involve and empower relevant local civil society actors and are informed by evidence and based on knowledge of the processes and stakeholders that need to be influenced. Such efforts include holding duty bearers accountable for implementing the SDGs in priority countries as well as at the global level;

- Strategic service delivery designed to reinforce advocacy, legitimacy of partners in the global South, innovation, learning, and capacity development of change agents and partner organisations in relation to the promotion of the SDGs.

CARE Denmark has a particularly strong focus on climate resilience through its Climate Learning and Advocacy for Resilience (CLAR) Programme, pursuing activities that develop the endogenous capacities of CSO partners in developing countries to advocate for climate policy, action and finance.

WWF Denmark's overall objectives more strongly focus on mitigation. With the strategic partnership agreement aiming to strengthen civil society to promote sustainable use and equitable benefit sharing of natural resources and ecosystem services, alongside the promotion of clean and affordable renewable energy. The immediate objectives concern rights to natural resources and access to energy, as well as promoting environmental sustainability, social inclusion and economic equity through markets, policies, regulations and practices in key sectors.

VI.4.2.5 Bilateral support with both technology transfer and capacity building components

VI.4.2.5.1 Bangladesh Country Programme 2016-2021 (adaption and mitigation)

Denmark supports a number of thematic programmes in Bangladesh focusing on climate change adaptation to the impacts of climate change in agricultural and rural development sectors.

The *Climate Resilient Rural Infrastructure Project II* engagement through Danida seeks to target high poverty areas vulnerable to tidal surge flooding, not covered by other similar projects. The primary objective, relevant to technology transfer, is to develop climate resilient infrastructure including cyclone shelters, social service institutions, markets, canals for storm water drainage and fish landing stations. Alongside hard technology provisions, a portion of the grant is provided to local government Union Parashads (UPs) to plan and implement climate interventions.

Also bilaterally implemented through Danida is The *Agriculture and Food Security Project in the Chittagong Hill Tracts (AFSP III)* engagement. The activity provides an example of both soft and hard technology transfer, with considerations of inclusive agricultural growth and employment in rural areas through better skills, organisation and market access. The project utilises Farmer Field Schools (FFS), in an Integrated Farm Management (IFM) approach to improve agricultural productivity and off-farm income through technology, methodological and practice transfers. The project seeks to enhance and develop the endogenous technologies and capacities already in use by farmers through its stated objectives of: increased uptake of climate resilient technology, increased use of decentralised agricultural extension services and increased yields and productivity. The framework is structured around three pillars: 1) Sustainable livelihoods and food security; 2) Effective and equitable coverage of basic services and practices; and 3) Improved governance and cohesion.

The project planning integrates experience and results from past cooperation. Danida has worked with agricultural extension in Bangladesh for over two decades. In the past decade important results have been achieved by reaching out to some three million people in half a million households. An evaluation carried out in 2011 concluded that FFS supported by Danida have been an effective way to increase productivity, income and food security by spreading knowledge and technology. Yearly incomes have increased by 38% for participating households. Gender data also showed positive impacts. It was found that the rate of female participation was high and in case of Barisal and Noakhali it reached 61% and 72% respectively.

The project explicitly addresses the existing needs for capacity-building in the target area, in the Chittagong Hill Tracts. The Chittagong Hill Tracts lag behind the rest of Bangladesh. The area is poorer and access to social services like education, health as well as water and sanitation is below the national level. This reflects a long-lasting post-conflict situation where issues from the 1997 Peace Accord remain outstanding.

The *Climate Resilient WaSH Support for Rohingya Refugees and Vulnerable Local Communities in Cox's Bazar District* engagement also provides an example of both soft and hard technology transfer. The activity supports the autonomous financial organisation "*Hygiene, Sanitation and Water Supply*" (HYSAWA), whose mandate is to increase resilience to climate impacts in vulnerable communities, and to improve access to climate resilient water and sanitation facilities. Concretely, the project will invest in climate adapted water, sanitation and hygiene infrastructure including deep wells and latrines. This transfer of hard technology is supplemented by support targeting capacity building and training related to sanitation and hygiene. The project seeks to enhance and develop the endogenous technologies and capacities associated with water, sanitation and hygiene infrastructure through the installation and rehabilitation of 2,500 climate adaptive water points, in an approach that is implemented by local government institutions. Danida has previously worked with HYSAWA in Bangladesh. The activity will therefore build on past experience and learnings to adapt proven models of engagement.

VI.4.2.5.2 The Strategic Sector Cooperation Initiative (adaption and mitigation)

The Strategic Sector Cooperation (SCC) initiative aims at mobilizing the competencies of Danish public authorities directly in long-term strategic cooperation with counterpart authorities in developing and growth economies.[35] Through this cooperation Danish authorities promote Danish societal solutions that have been developed through partnerships between the public and private sector – for example through soft technology transfer and capacity building on green economy, urbanisation, agriculture and climate change mitigation and adaptation.

Strategic Sector Cooperation (SSC) focuses on concrete development challenges and responds to current needs of the partner country. A primary aim of the initiative is to contribute to inclusive, sustainable growth and development in partner countries by supporting conducive framework conditions for the fulfilment of the SDGs.

As an example relevant to climate change adaptation, the SSC project *"Sustainable Urban Water management/Strategic Sector Cooperation project in Udaipur, India"* seeks to help strengthen water management in the City of Udaipur. The project will focus on capacity building and knowledge exchange through concrete cooperation on the planning an implementation of river and lake restorations, integrated water cycle management, improved sewage water treatment plants and efficiency of the provision of drinking water. With the overall objective of the project being to contribute to improved management of the water resources through introduction of integrated planning approaches and demonstration of new technologies. Aarhus municipality and Aarhus Water will contribute

[35] A full list of Strategic Sector Cooperation projects can be found at Danish Ministry of Foreign Affairs website: https://um.dk/en/danida-en/Sustainable%20Growth/strategic-sector-cooperation-new/list-of-strategic-sector-cooperation-projects/

with learned expertise in integrated planning processes, protection of surface- and groundwater resources and improved storm water management.

The SSC Strategic Sector Cooperation *"Sustainable and Smart Cities between City of Aarhus and City of Tshwane"* will utilise expertise, technology and knowledge from Danish public authorities in the field of sustainable urban development. Primarily drawing upon the Danish experience with holistic urban planning and technologies relevant to sustainable housing, water and electricity, as already deployed in Aarhus. The engagement seeks to address poverty, inequality, negative effects of climate change, and to promote good health and well-being, create work opportunities and economic growth, and to develop infrastructure. The SSC will integrate lessons learned from prior SSC initiatives between Denmark and South Africa, whilst also seeking to engage Danish private sector actors with access to relevant technological solutions.

SSC initiatives focused on mitigation look to disseminate knowledge on renewable energy generation and integration, grid flexibility and district heating alongside energy planning, modelling and analysis, through various forms of knowledge and expertise transfer. For example, the *"Offshore Wind Power"* SSC in India seeks to develop the national capacity to integrate off-shore wine energy into the grid is enhanced through the development of a Danish-Indian knowledge centre for wind energy. The further *"Efficient and Low Carbon Heating and Cooling"* SSC initiative in Turkey utilises Danish experiences and lessons learned regarding district energy systems to support the Turkish government's low carbon transition, using waste heat from power plants and industry, geothermal energy and an off-shore wind energy roadmap, primarily through local and national government capacity building in relation to enabling energy regulations and energy policy planning and implementation. The project also seeks to develop the endogenous capacity of Turkish research and development institutions in the field of energy through Danish-Turkish research institutions.

VI.4.2.5.3 Support to the Uganda Programme on Sustainable and Inclusive Development of the Economy (UPSIDE) (adaptation)

The *Northern Uganda Resilience Initiative (NURI)* forms 1 of 3 engagements of the Uganda Programme on Sustainable and Inclusive Development of the Economy (UPSIDE), a private sector development programme with the objective of "sustainable and inclusive economic growth". The NURI supports enhanced resilience and equitable economic development in supported areas of Northern Uganda, including for refugees and host communities. In terms of capacity building the initiative provides training in Climate Smart Agriculture to small-scale farmers.

The NURI engagement *Water resources management in the Upper Nile Water Management Zone* aims to improve climate change resilience in Northern Uganda through water resource management (WRM) to provide an enabling environment to small-scale farming and refugee and host communities. To achieve this the project aims to increase the endogenous capacity of national implementing partners, the Ministry of Water and Environment's Directorate for Water Resources Management and the Upper Nile Water Management Zone, to:

- Develop community-driven, micro-catchment management plans and implementation mechanisms to increase efficiency of water resource usage;
- Develop effective community agreements and bylaws on natural resource management that emphasize water management;

- Develop the capacity of Catchment Management Organisations and District Local Governments in relation to WRM.

The activity also focuses on technology transfer and aims to construct or renovate the agriculture-related physical and natural water infrastructure outlined in the Ugandan Ministry for Water and Environment's micro-catchment plans. Including multi-purpose dams and retention structures, and further support to communities for preparing, implementing and monitoring maintenance plans. The DEPP consists of experts within the fields of energy efficiency, renewable energy, mitigation analysis as well as international greenhouse gas emission baselines. The DEPP gives high quality technical government-to-government guidance to help developing countries and emerging economies with greenhouse gas emission reductions and low carbon transition in the energy sector. The DEPP works both with countries regarding general and methodological issues relevant to greenhouse gas emission reductions as well as with specific energy-related capacity building and technology transfer in selected emerging economies as described above.

The *Agricultural Business Initiative (aBi)* forms another of the 3 engagements of UPSIDE. aBi seeks increased income and employment through environmentally and socially responsible investments in improved productivity, quality and value addition in agri-businesses and among smallholder farmers in supported agricultural value chains. Concretely, aBi will pursue private sector led agri-business development through a combined value chain focus on increased and improved primary production (supply side) and improvements in processing capacity (demand side).

In terms of capacity building the activity supports the development of demonstration plots, training of farmers in good agricultural practices, post-harvest handling, quality aspects and other value addition interventions. It seeks to increase the endogenous capacity of small-scale farmers to access finance and markets by increasing the size of lending portfolios oriented toward agriculture by aBi partner financial institutions, leading to increased access to finance for agri-business and smallholder farmers.

UPSIDE recognizes the agricultural sector, and specifically private sector actors within it, as being the primary drivers of sustainable and inclusive economic growth in Uganda. The overall rationale behind UPSIDE is that environmentally improved production, processing and trade coupled closely with interventions to improve pro-poor market linkages and targeted capacity and business development of value chain actors, will at outcome level enhance resilience and equitable economic development in Northern Uganda.

VI.4.2.5.4 Danish Energy Agency Energy Partnership Programme (DEPP) 2017-20 (mitigation)

The Danish Energy Agency cooperates with the governments of a number of developing countries on capacity building and technology transfer related to sector energy transition to become a low-carbon economy. The cooperation is primarily focusing on policy improvements in long term energy planning and modeling, renewable energy integration and deployment, energy efficiency interventions and in climate change mitigation, and preparation of specific investments in renewable energy projects and technology transfer.

With the prospect of creating results for the longer term and building on the existing momentum, Denmark allocated DKK 115 million from the Climate Envelope 2017 to cooperation with Mexico, China, Viet Nam and South Africa in a new 3-year programme, the DEA Energy Partnership Programme (DEPP) Phase II. The programme looks to build the capacity of the national governments with regards to renewable energy sector planning, integration and policy. Whilst also providing access to Danish renewable energy technology solutions.

The intention is to assist the four countries with their transition to a low carbon economy and support them in implementation of the Paris agreement. The support is based on Denmark’s long-standing experience on energy transition away from a fossil fuel economy. Also, the DEPP builds on a well-tested government-to-government modality of cooperation featured by: A Memorandum of Understanding outlining shared government goals for the cooperation; provision of technical advisory support including from the DEA and the Danish power system operator and offering counterparts wider access to acquaint with Danish experience, expertise and technology solutions; daily programme presences in-country through Denmark’s embassy and through the posting of international Long-Term Advisors with key-partner institutions and; wider anchoring of programme objectives and results through high-level participation in programme steering and high-level policy dialogues.

Two programme objectives relate to:

- National and local government level policies, plans and regulation that reflect additional renewable energy and increased energy efficiency and the countries are on track to meet their GHG-targets as per their contribution to the Paris agreement.
- Implementation aspects of renewable energy and energy efficiency are strengthened leading to tangible energy savings and to more efficient integration of renewable energy into power grids, hence tangible GHG-emissions reductions.

Enabling environment and framework conditions for renewable energy and energy efficiency creates a level playing field and incentives for private sector.

VI.4.2.5.5 blueMoon - Agri-Tech Incubation and Innovation Lab 2018-2021 (adaptation)

The *blueMoon - Agri-Tech Incubation and Innovation Lab 2018-2021* activity aims to support blueMoon's "blueLab", an Agri-Tech start-up incubator, to support the transformation of agriculture and related agri-business in Ethiopia through enhancing blueMoon’s innovation reach and ability to apply a digital lens to all incubated start-ups in its program. As a platform, blueLab will provide four pillars of technology support to youth entrepreneurs relating to: (1) 3-D printing, (2) Blockchain, (3) the Internet of Things and (4) Mobile commerce. blueLab seeks to provide technical support, learning opportunities, and equipment to allow the prototyping and making of products, for start-ups in the Ethiopian agricultural sector. By incubating national start-ups, the activity seeks to develop the endogenous capacity of the Ethiopian agricultural sector to sustainably develop modern practices. Concretely, the project aims to demonstrate progress toward Ethiopian agricultural transformation, climate resilience and sustainability, and improved farmer livelihoods.

VI.4.2.6 Support to engage the private sector with both technology transfer and capacity building components

VI.4.2.6.1 Support to Danida Business Finance (DBF) Project Development Facility (adaptation and mitigation)

The purpose of the Danida Business Finance Project Development Facility is to build the capacity of authorities in developing countries to enable them to prepare sustainable infrastructure project proposals with a potential for financing with a concessional loan under the Danida Business Finance scheme. And therefore, also to engage the private-sector in sustainable infrastructure development projects.

An additional outcome will be capacity development of sector authorities in developing countries notably in terms of formulation, preparation and implementation of sustainable infrastructure projects with a Life-cycle cost prospective. The Facility aims to ensure the increased ownership of projects from recipient governments Sustainable infrastructure projects benefit from Danish technology and expertise in climate-relevant sectors such as wind energy and water and sanitation initiatives.

VI.4.2.6.2 Assela Wind Farm, Ethiopia (mitigation)

The Danida Business Finance Ethiopia *Assela Wind Farm* project contains both capacity building and technology transfer components, and is planned to result in the installation of a 100 MW wind farm, delivering on average 330 GWh of electricity a year to the national grid avoiding the release of 175,890 tons of CO2 annually. The activity also aims to improve the endogenous capacity of Ethiopian Electric Power (EEP) to operate and manage wind farms, and multiple sources of renewable energy, and actively engages private finance through a blended finance approach. The activity is in line with Ethiopian development policy and its stated goal to become a middle-income country by 2025, based on carbon neutral growth. With the development of renewable energy sources central to this. The Government of Ethiopia wants to avoid excessive dependence on hydropower during recurrent national drought. Hence, wind energy, together with solar and geothermal energy, could form important parts of the future energy mix. However, inadequate regulatory framework and low tariffs in the Ethiopian energy sector makes the wind sector too risky for private investors and therefore wind projects cannot be financed on commercial terms.

Alongside the transfer of physical technology, focus is given the to the increased ability for Ethiopia to optimize inputs from different energy sources in the grid. On-going Danish support, including the participation of Danish energy authorities, aims at helping Ethiopia to overcome this challenge. EEP has some, but limited capacity to operate wind farms - solid training of 20 EEP staff members, 5 years technical assistance and spare parts from the contractor on top of the 2-year guarantee period help to mitigate these challenges. Further technical assistance will be provided to EEP during the tender and construction phase to ensure adherence to IFC standards with regards to land acquisition and compensation processes. Both examples will help to disseminate knowledge, learning and expertise from the Danish experience, as examples of soft technology transfer.

VI.4.2.6.3 Support to the Neighbourhood Energy Investment Fund (NEIF) and energy sector transformation (mitigation)

The main objective of the Programme is technology transfer and aims to promote commercial investments in sustainable energy through the mobilisation of private capital, technologies and know-how in Ukraine and Georgia. The implementing partner for the intervention is the Investment Fund for Developing Countries (IFU). IFU will establish a Neighbourhood Energy Investment Fund (NEIF) to pursue investment opportunities in the two countries. A Project Development Facility attached to the NEIF will assist in developing possible investment projects and support energy efficiency measures amongst companies under the IFU portfolio in Ukraine and Georgia. IFU will build on its relevant experiences in Ukraine.

The investment facility is complemented by support to energy sector reform through collaboration with the ministries and key institutions in charge of the energy sector transformation on both Georgia and Ukraine. With a view to focussing the efforts and to develop managerial synergies, it is envisaged that the engagements can be narrowed down to two development engagement that cover both Ukraine and Georgia, namely: 1) Support to policy reform to create an enabling environment for energy sector transformation and private sector sustainable energy investments; 2) Facilitation of investments for energy efficiency and promotion of renewable energy to meet national targets and be a catalyst for further investments (national or foreign).

VI.4.2.6.4 Support to the SDG Investment Fund (adaption and mitigation)

The "SDG Investment Fund" has the thematic objective: Contribute to the achievement of the SDGs in developing countries by enhancing development relevant, inclusive and sustainable investments in affordable and clean energy, climate, industry, food and other SDG key areas through the mobilisation of Danish and foreign public and private capital, technology and knowhow based on international standards for responsible business conduct. The activity provides an example of Danish development aid which contributes to the transfer of both hard and soft technologies, whilst promoting the engagement of the private-sector. The expected key results are:

- Establishment of DKK 6 billion SDG investment fund of which 50% is provided by private institutional investors. The Fund is envisaged to promote investments of at least DKK 30 billion.
- Creation of decent jobs - 30,000 direct and 30,000 – 60,000 indirect jobs
- Comprehensive production of renewable energy and related reduction in greenhouse gas emission
- Considerable annual tax contributions from the investment projects
- Transfer of modern technology

Compliance with international standards for responsible business conduct and documentation of sustainability as a business opportunity.

VI.5 MOBILISED PRIVATE SECTOR CLIMATE INVESTMENTS THROUGH IFU

Denmark has made significant efforts to establish new and innovative instruments to mobilise private finance for climate relevant investments in developing countries. The main bilateral vehicle for these efforts has been the Investment Fund for Developing Countries (IFU; Investeringsfonden for Udviklingslande) and the various funds it manages.

Table VI.4 below shows the amount of private sector investments mobilised through projects that are co-financed by public resources from IFU and the Danish MFA of DKK 314,696,698 and DKK 799,870,569 of private investments mobilised in 2018 and 2017, respectively.

The Danish Climate Investment Fund (DCIF) and the Danish SDG Investment Fund are involved in 8 (DCIF) and 1 (SDG) of the 15 investment projects in 2017-2018 listed in Table VI.4. Both DCIF and the Danish SDG Investment Fund are public-private partnerships managed by IFU.

The Danish SDG Investment Fund was established in 2018 and received a total committed capital of DKK 4.86 billion, involving the Danish State and IFU (DKK 1.94 billion), and institutional and private investors (DKK 2.92 billion). The Fund is envisaged to promote investments of at least DKK 30 billion, and will form the primary vehicle for IFU's equity investment activities. The fund is an innovative addition to how Denmark will contribute to increasing private investments in developing countries towards the achievement of the SDGs. It will target a number of strategic sectors, such as: renewable energy, agribusiness, infrastructure, including water and sanitation, industry and service as well as the financial sector. The DKK 36 million investment in Table VI.4 was one of the Fund's first, and was towards a solar energy project in Ganska, Ukraine.

The DCIF was established as a close-end fund and its investment period ended in early 2018. Up to 2016 it raised EUR 174 million of public and private funds, used to mobilise further private investments at the project level. The public funds were provided by the Danish government and IFU, while Danish pension funds contributed the major remaining part (EUR 104 million). It is estimated that the fund will, in total, generate total investments of EUR 1-1.2 billion. The fund had the opportunity to invest in all developing countries by offering venture capital and advice to climate investors.

The amounts of private finance mobilised have been calculated by the IFU/DCIF and declares their commitments whilst expressing the level expected after the investments have been carried out.

TABLE VI.4: AN OVERVIEW OF SPENDING AS REPORTED BY IFU TO DANISH MFA.

Danish Investment Fund (IFU): Approved projects in 2018

Extending Agency	Recipient Country	Public finance commitment (DKK thousand)	Amount mobilised from private sector (DKK thousand)	Mitigation Rio marker	Adaptation Rio marker
IFU	Iran	22,700	68,233	2	0
IFU	Ghana	5,000	10,431	2	0
IFU	Ukraine	42,852	25,780	2	0
IFU	Ukraine	29,800	9,386	2	0
DCIF	Brazil	161,376	167,988	2	0
SDG	Ukraine	37,308	32,879	2	0
Total		**299,035**	**314,697**		

Danish Investment Fund (IFU): Approved projects in 2017

Extending Agency	Recipient Country	Public finance commitment (DKK thousand)	Amount mobilised from private sector (DKK thousand)	Mitigation Rio marker	Adaptation Rio marker
IFU	Egypt	63,928	391,031	2	0
DCIF	Mongolia	117,200	105,435	2	0
DCIF	Regional	50,000	50,000	2	0
DCIF	Brazil	29	96,033	2	0
DCIF	Mali	2,417	95,408	2	0
DCIF	India	19,626	21,444	2	0
IFU	Egypt	22,129	7,879	2	0
DCIF	Brazil	119,400	23,675	2	0
DCIF	Mali	39,673	8,965	2	0
Total		**434,403**	**799,871**		

VII. Other reporting matters

A. Denmark

Danish governments are continuously assessing historical and projected progress in Denmark's contribution to the joint EU28 economy-wide emission reduction target described in section III of this biennial report.

The latest assessment is contained in the report "Denmark's Energy and Climate Outlook 2019" (Danish Energy Agency, August 2019)[36].

Furthermore, in accordance with EU legislation[37], Denmark has in place a national system for reporting on policies and measures and for reporting on projections of anthropogenic greenhouse gas emissions by sources and removals by sinks.

This national system includes the relevant institutional, legal and procedural arrangements established in Denmark for evaluating policy and making projections of anthropogenic greenhouse gas emissions by sources and removals by sinks.

These domestic arrangements are considered to be sufficient for the process of the self-assessment of compliance with emission reductions in comparison with emission reduction commitments and the level of emission reduction recommended by science.

Denmark has established national rules for taking action against Danish entities under the EU ETS in case of non-compliance with their emission reduction targets under the EU ETS. These rules are contained in the Danish Act on CO_2 quotas (the Act of 9 May 2008 with amendments for the period 2008-2012[38] and the Act of 28 November 2012 for the period 2013-2020[39] as amended[40]).

As only Denmark's greenhouse gas emissions (i.e. without Greenland's and the Faroe Islands' greenhouse gas emissions) are relevant in relation to Denmark's contribution to the EU's greenhouse gas emissions (Greenland and the Faroe Islands are not EU territories), and therefore also the only emissions relevant in relation to the assessment of progress towards the joint EU target for 2020 under the convention as described in Chapter III, summary tables from Denmark's greenhouse gas inventory only are included Chapter VIII.

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[36] https://ens.dk/en/our-services/projections-and-models/denmarks-energy-and-climate-outlook f

[37] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:165:0013:0040:EN:PDF

[38] https://www.retsinformation.dk/Forms/R0710.aspx?id=117147

[39] https://www.retsinformation.dk/Forms/R0710.aspx?id=144102

[40] https://www.retsinformation.dk/Forms/R0710.aspx?id=167235 and https://www.retsinformation.dk/Forms/R0710.aspx?id=185713

B. GREENLAND

Information on greenhouse gas emissions and trends

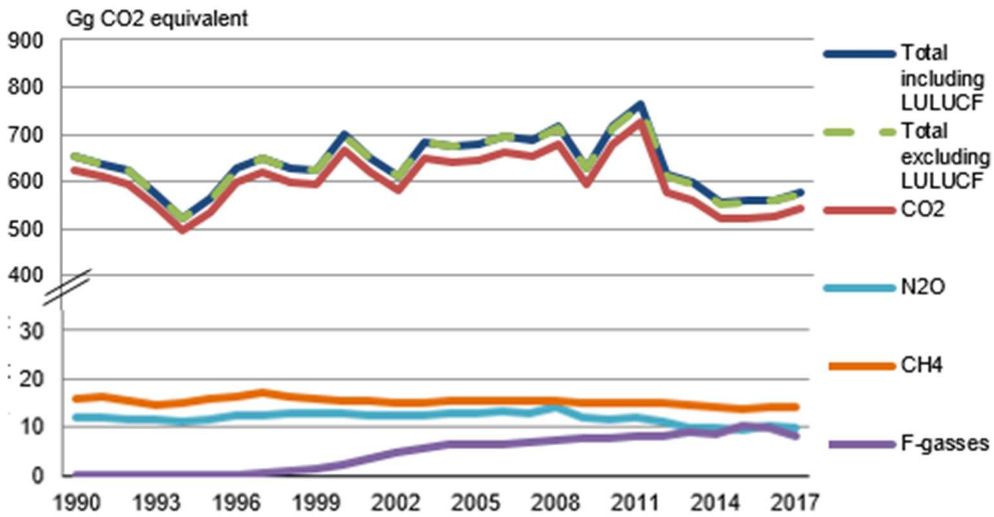
Summary information from Greenland's greenhouse gas inventory on emissions and emission trends

In 2017, the total emission of greenhouse gases excluding LULUCF was 573.80 kt CO_2 equivalent, and 575.02 kt CO_2 equivalent including LULUCF.

Figure VII.B.1 shows the total greenhouse gas emissions in CO_2 equivalents from 1990 to 2017. The emissions have not been corrected for temperature variations. CO_2 is the most important greenhouse gas. In 2017, CO_2 contributed to the total emission in CO_2 equivalent excluding LULUCF with 94.5 %, followed by CH_4 with 2.4 %, N_2O with 1.7 % and F-gases (HFCs and SF_6) with 1.4 %. From 1990 to 2016, these percentages have been increasing for F-gases and have decreased from 2016 to 2017, and falling for CO_2 and N_2O, and stable for and CH_4. Greenland has no consumption of PFC.

FIGURE VII.B.1: GREENHOUSE GAS EMISSIONS IN CO_2 EQUIVALENTS, TIME-SERIES 1990-2014.

Source: Greenland's Ministry of Industry, Energy and Research 2017.

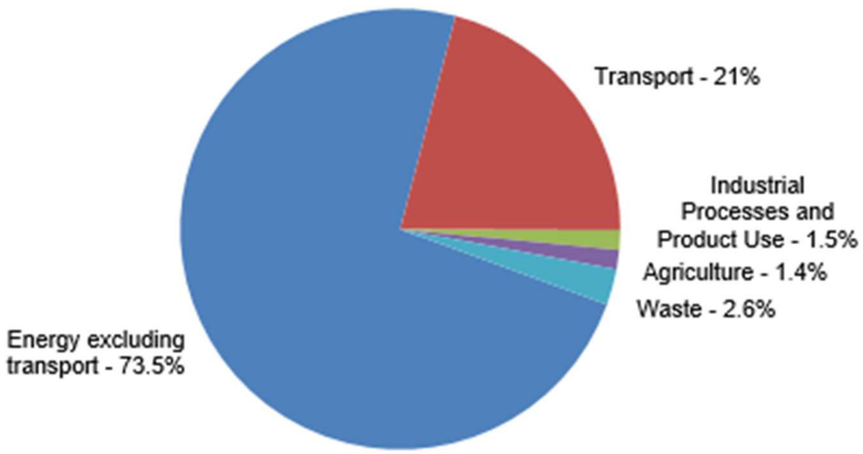


Stationary combustion plants and transport represent the largest categories. In 2017, energy excluding transport accounted for 73.5 % of the total emission in CO_2 equivalents excluding LULUCF; see Figure VII.B.2. Transport contributed with 21.0 %. Industrial processes and product use, agriculture and waste contributed to the total emission in CO_2 equivalents with 5.5 %.

The net CO_2 emission from forestry etc. was 0.2 % of the total emission in CO_2 equivalents in 2017. Total GHG emissions in CO_2 equivalents excluding LULUCF have decreased by 12.1 % from 1990 to 2017 and decreased 11.9% including LULUCF.

FIGURE VII.B.2: GREENHOUSE GAS EMISSIONS IN CO_2 EQUIVALENTS DISTRIBUTED ON MAIN SECTORS FOR 2015.

Source: Greenland's Ministry of Industry, Energy and Research 2017.



The summary tables from Greenland's greenhouse gas inventory are shown in Table VII.B.1 below (similar to the format of table 1 of the CTF).

TABLE VII.B.1: EMISSION TRENDS (SUMMARY), GREENLAND (I.E. NOT EU TERRITORY)

CTF: Table 1
Emission trends: summary
CRF: TABLE 10 EMISSION TRENDS SUMMARY (Sheet 6 of 6)
Greenland

GREENHOUSE GAS EMISSIONS	Base year[(1)]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	CO_2 equivalent (kt)																													(%)
CO_2 emissions without net CO_2 from LULUCF	624	624	610	596	546	496	534	597	618	597	595	667	618	580	650	640	644	662	653	678	593	679	725	579	561	521	524	525	542	-13.21
CO_2 emissions with net CO_2 from LULUCF	625	625	610	596	546	496	535	597	618	597	595	668	619	580	651	641	645	663	654	679	593	680	727	580	562	522	525	526	543	-13.05
CH_4 emissions without CH_4 from LULUCF	16	16	16	15	15	15	16	16	17	16	16	15	15	15	15	15	16	15	15	15	15	15	15	15	15	14	14	14	14	-12.72
CH_4 emissions with CH_4 from LULUCF	16	16	16	15	15	15	16	16	17	16	16	15	15	15	15	15	16	15	15	15	15	15	15	15	15	14	14	14	14	-12.68
N_2O emissions without N_2O from LULUCF	12	12	12	12	11	11	12	12	12	13	13	13	13	12	13	13	13	13	13	14	12	12	12	11	10	10	9	10	10	-18.50
N_2O emissions with N_2O from LULUCF	12	12	12	12	11	11	12	12	12	13	13	13	13	12	13	13	13	13	13	14	12	12	12	11	10	10	10	10	10	-18.40
HFCs	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0	0	0	0	1	1	2	3	5	6	6	6	6	7	7	8	8	8	8	9	9	10	10	8	100.00
PFCs	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Unspecified mix of HFCs and PFCs	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
SF_6	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100.00
NF_3	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Total (without LULUCF)	652	652	638	623	572	522	562	626	647	627	624	698	649	612	683	674	679	697	688	715	627	714	761	613	595	553	557	559	574	-12.06
Total (with LULUCF)	653	653	638	623	572	523	562	626	648	627	625	698	650	612	684	675	680	698	689	716	627	715	762	614	596	555	559	560	575	-11.91
Total (without LULUCF, with indirect)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
Total (with LULUCF, with indirect)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[(1)]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	CO_2 equivalent (kt)																													(%)
1. Energy	625	625	610	596	546	496	534	597	618	597	594	668	618	580	650	641	645	663	654	679	593	680	726	579	562	521	524	525	542	-13.26
2. Industrial processes and product use	0	0	0	0	0	0	0	0	1	1	2	2	4	5	6	7	7	7	7	8	8	8	9	9	9	9	10	10	8	2628.59
3. Agriculture	10	10	10	9	8	8	9	10	10	10	10	9	9	9	9	10	10	10	10	10	9	10	10	9	9	9	9	9	8	-14.42
4. Land use, land-use change and forestry[(5)]	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	366.43
5. Waste	17	17	18	18	18	18	18	18	19	19	19	18	18	18	18	18	18	18	18	18	16	16	16	16	15	15	14	15	15	-14.15
6. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Total (including LULUCF)[(5)]	653	653	638	623	572	523	562	626	648	627	625	698	650	612	684	675	680	698	689	716	627	715	762	614	596	555	559	560	575	-11.91

TABLE VII.B.1: EMISSION TRENDS (GHGS), GREENLAND (I.E. NOT EU TERRITORY)

CRF: TABLE 10 EMISSION TRENDS Inventory 2017
GHG CO_2 eq emissions Submission 2019 v2
(Sheet 1 of 6) GREENLAND
Greenland

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt CO_2 eq)																													%
Total (net emissions)[2]	653	653	638	623	572	523	562	626	648	627	625	698	650	612	684	675	680	698	689	716	627	715	762	614	596	555	559	560	575	-11.91
1. Energy	625	625	610	596	546	496	534	597	618	597	594	668	618	580	650	641	645	663	654	679	593	680	726	579	562	521	524	525	542	-13.26
A. Fuel combustion (sectoral approach)	625	625	610	596	546	496	534	597	618	597	594	668	618	580	650	641	645	663	654	679	593	680	726	579	562	521	524	525	542	-13.26
1. Energy industries	183	183	178	173	157	140	121	122	129	127	129	133	134	135	135	139	138	143	136	145	127	228	253	111	95	97	111	92	94	-48.43
2. Manufacturing industries and construction	27	27	26	25	23	20	44	45	46	40	46	48	46	43	50	51	55	56	58	60	43	39	47	37	39	25	24	27	26	-1.93
3. Transport	97	97	97	95	88	82	90	94	98	102	106	107	97	94	103	115	113	123	112	119	107	110	117	112	112	106	105	113	121	24.10
4. Other sectors	310	310	302	295	271	247	273	330	338	320	307	373	335	302	356	328	331	332	341	346	300	279	287	303	311	291	274	288	297	-4.40
5. Other	8	8	8	8	7	6	7	7	7	7	7	7	7	7	7	8	7	10	8	10	16	24	21	16	5	2	10	6	5	-42.95
B. Fugitive emissions from fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO,NA	NO,NA	NO	NO	NO	NO	NO	NO	0.00
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
2. Oil and natural gas and other emissions from energy production	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO,NA	NO,NA	NO	NO	NO	NO	NO	NO	0.00
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
2. Industrial Processes	0	0	0	0	0	0	0	0	1	1	2	2	4	5	6	7	7	7	7	8	8	8	9	9	9	9	10	10	8	2628.59
A. Mineral industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100.00
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
D. Non-energy products from fuels and solvent use	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2.36
E. Electronic industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
F. Product uses as ODS substitutes	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0	0	0	0	1	1	2	3	5	6	6	6	6	7	7	8	8	8	8	9	9	10	10	8	100.00
G. Other product manufacture and use	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100.00
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
3. Agriculture	10	10	10	9	8	8	9	10	10	10	10	9	9	9	9	10	10	10	10	10	9	10	10	9	9	9	9	9	8	-14.42
A. Enteric fermentation	8	8	8	7	6	7	7	7	8	8	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	-19.01
B. Manure management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-13.98
C. Rice cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
D. Agricultural soils	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	2	1	2	2	1	2	2	2	2	2	2	1	27.06
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
F. Field burning of agricultural residues	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
G. Liming	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-50.00
H. Urea application	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
I. Other carbon-containing fertilizers	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
4. Land use, land-use change and forestry[2]	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	366.43
A. Forest land	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-67.55
B. Cropland	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100.00
C. Grassland	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	451.41
D. Wetlands	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	0.00
E. Settlements	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
G. Harvested wood products	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
5. Waste	17	17	18	18	18	18	18	18	19	19	19	18	18	18	18	18	18	18	18	18	16	16	16	16	15	15	14	15	15	-14.15
A. Solid waste disposal	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.08
B. Biological treatment of solid waste	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C. Incineration and open burning of waste	6	6	6	6	6	6	6	6	7	7	7	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	-5.58
D. Waste water treatment and discharge	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	8	6	6	6	6	5	4	4	5	5	-32.96
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Memo items:																														
International bunkers	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	42	35	21	32	45	36	125	148	70	50	53	22	54	61	100.00
Aviation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Navigation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	42	35	21	32	45	36	125	148	70	50	53	22	54	61	100.00
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
CO_2 emissions from biomass	3	3	3	4	4	4	5	5	5	5	6	9	9	10	11	12	12	12	13	13	13	13	14	14	14	15	15	15	15	348.17
CO_2 captured	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Long-term storage of C in waste disposal sites	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0.00
Indirect N_2O	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	0.00
Indirect CO_2[3]	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	0.00
Total CO_2 equivalent emissions without land use, land-use change and	652	652	638	623	572	522	562	626	647	627	624	698	649	612	683	674	679	697	688	715	627	714	761	613	595	553	557	559	574	-12.06
Total CO_2 equivalent emissions with land use, land-use change and fore	653	653	638	623	572	523	562	626	648	627	625	698	650	612	684	675	680	698	689	716	627	715	762	614	596	555	559	560	575	-11.91
Total CO_2 equivalent emissions, including indirect CO2, without land	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
Total CO_2 equivalent emissions, including indirect CO2, with land use	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00

TABLE VII.B.1: EMISSION TRENDS (CO_2), GREENLAND (I.E. NOT EU TERRITORY)

CRF: TABLE 10 EMISSION TRENDS
CO_2
(Sheet 2 of 6)
Greenland

Inventory 2017
Submission 2019 v2
GREENLAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
															(kt)															%
1. Energy	621.61	621.61	606.84	592.73	542.76	492.74	531.08	593.61	614.21	593.03	590.70	663.97	614.50	576.23	646.21	636.42	640.52	658.78	649.73	674.32	589.40	675.41	721.87	574.99	557.83	517.30	520.39	521.43	538.52	-13.37
A. Fuel combustion (sectoral approach)	621.61	621.61	606.84	592.73	542.76	492.74	531.08	593.61	614.21	593.03	590.70	663.97	614.50	576.23	646.21	636.42	640.52	658.78	649.73	674.32	589.40	675.41	721.87	574.99	557.83	517.30	520.39	521.43	538.52	-13.37
1. Energy industries	182.19	182.19	176.95	172.80	156.38	139.91	120.77	121.64	128.58	126.50	128.65	132.11	133.24	133.90	134.45	138.46	137.09	142.35	135.10	143.95	126.04	226.46	251.73	110.67	94.44	95.84	110.14	91.09	93.63	-48.61
2. Manufacturing industries and construction	26.47	26.47	25.69	25.06	22.64	20.22	43.84	44.51	46.15	40.02	45.81	48.13	45.67	43.18	49.77	50.75	55.06	55.66	57.43	59.36	43.18	38.73	47.27	36.54	39.31	25.21	23.44	26.46	25.96	-1.93
3. Transport	96.07	96.07	95.58	93.58	87.19	80.81	88.80	92.73	96.72	101.16	104.53	105.91	96.10	92.45	101.35	113.55	111.93	121.16	110.40	117.12	105.94	108.45	115.54	110.74	110.13	104.72	104.08	111.81	119.09	23.96
4. Other sectors	308.65	308.65	300.63	293.49	269.51	245.52	271.07	328.13	336.15	318.73	305.10	371.20	332.86	300.08	354.02	326.18	329.14	329.97	339.14	343.85	298.26	277.38	285.99	301.39	309.04	289.11	272.98	286.10	295.13	-4.38
5. Other	8.23	8.23	7.99	7.79	7.04	6.29	6.61	6.61	6.61	6.62	6.62	6.62	6.62	6.62	6.63	7.48	7.31	9.65	7.66	10.03	15.98	24.38	21.32	15.64	4.90	2.42	9.75	5.96	4.69	-42.95
B. Fugitive emissions from fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO,NA	NO,NA	NO	NO	NO	NO	NO	NO	0.00
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
2. Oil and natural gas and other emissions from energy production	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO,NA	NO,NA	NO	NO	NO	NO	NO	NO	0.00
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
2. Industrial processes	0.31	0.31	0.30	0.30	0.31	0.32	0.32	0.24	0.31	0.34	0.39	0.31	0.29	0.32	0.48	0.42	0.49	0.35	0.36	0.36	0.45	0.33	0.33	0.37	0.32	0.34	0.32	0.32	0.30	-1.33
A. Mineral industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.00	100.00
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
D. Non-energy products from fuels and solvent use	0.31	0.31	0.30	0.30	0.31	0.32	0.32	0.24	0.31	0.34	0.39	0.30	0.28	0.32	0.47	0.42	0.49	0.35	0.35	0.36	0.45	0.33	0.33	0.35	0.32	0.33	0.32	0.32	0.30	-2.36
E. Electronic industry																														
F. Product uses as ODS substitutes																														
G. Other product manufacture and use	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
3. Agriculture	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-50.00
A. Enteric fermentation																														
B. Manure management																														
C. Rice cultivation																														
D. Agricultural soils																														
E. Prescribed burning of savannas																														
F. Field burning of agricultural residues																														
G. Liming	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-50.00
H. Urea application	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
I. Other carbon-containing fertilizers	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
4. Land use, land-use change and forestry [2]	0.21	0.21	0.27	0.30	0.33	0.36	0.38	0.41	0.44	0.47	0.50	0.52	0.60	0.08	0.71	0.83	0.63	0.61	0.95	0.85	0.15	1.42	1.21	1.32	1.12	1.13	1.04	1.11	1.16	462.89
A. Forest land	0.00	0.00	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02	-0.03	-0.03	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.03	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.05	-0.04	-112849.97
B. Cropland	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.05	0.05	0.05	0.05	0.05	0.05	0.05	100.00
C. Grassland	0.21	0.21	0.29	0.32	0.35	0.38	0.41	0.44	0.47	0.50	0.53	0.55	0.62	0.09	0.73	0.85	0.66	0.64	0.98	0.88	0.15	1.42	1.20	1.31	1.12	1.13	1.04	1.12	1.15	458.15
D. Wetlands	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	0.00
E. Settlements	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
G. Harvested wood products	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
5. Waste	2.55	2.55	2.57	2.59	2.61	2.66	2.74	2.93	3.09	3.51	3.42	3.21	3.28	3.24	3.14	3.07	3.09	3.10	3.10	3.08	3.10	3.12	3.13	3.13	3.14	3.15	3.15	3.16	3.18	24.59
A. Solid waste disposal	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0.00
B. Biological treatment of solid waste																														
C. Incineration and open burning of waste	2.55	2.55	2.57	2.59	2.61	2.66	2.74	2.93	3.09	3.51	3.42	3.21	3.28	3.24	3.14	3.07	3.09	3.10	3.10	3.08	3.10	3.12	3.13	3.13	3.14	3.15	3.15	3.16	3.18	24.59
D. Waste water treatment and discharge																														
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
6. Other ***(as specified in summary 1.A)***	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Memo items:																														
International bunkers	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	41.59	34.79	20.98	32.12	45.00	35.47	124.39	146.96	69.68	49.88	52.48	21.99	53.29	60.32	100.00
Aviation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Navigation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	41.59	34.79	20.98	32.12	45.00	35.47	124.39	146.96	69.68	49.88	52.48	21.99	53.29	60.32	100.00
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
CO_2 emissions from biomass	3.40	3.40	3.44	3.80	4.05	4.18	4.56	4.87	4.95	5.05	6.47	8.89	9.09	9.98	11.11	12.07	12.28	12.45	12.66	12.91	13.16	13.47	13.80	14.08	14.30	14.50	14.73	14.97	15.23	348.17
CO_2 captured	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Long-term storage of C in waste disposal sites	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0.00
Indirect N_2O																														
Indirect CO_2 [3]	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	0.00
Total CO_2 equivalent emissions without land use, land-use change and fores	624.48	624.48	609.73	595.63	545.69	495.73	534.15	596.79	617.62	596.89	594.53	667.50	618.07	579.80	649.84	639.92	644.11	662.24	653.19	677.77	592.96	678.87	725.34	578.50	561.29	520.79	523.86	524.91	542.00	-13.21
Total CO_2 equivalent emissions with land use, land-use change and forestry	624.68	624.68	610.00	595.93	546.02	496.08	534.53	597.20	618.06	597.36	595.02	668.02	618.68	579.88	650.56	640.76	644.74	662.86	654.13	678.62	593.11	680.28	726.54	579.82	562.40	521.92	524.90	526.02	543.16	-13.05
Total CO_2 equivalent emissions, including indirect CO2, without land use, l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
Total CO_2 equivalent emissions, including indirect CO2, with land use, land	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00

TABLE VII.B.1: EMISSION TRENDS (CH_4), GREENLAND (I.E. NOT EU TERRITORY)

CRF: TABLE 10 EMISSION TRENDS
CH_4
(Sheet 3 of 6)
Greenland

Inventory 2017
Submission 2019 v2
GREENLAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt)																													%
1. Energy	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.17
A. Fuel combustion (sectoral approach)	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.17
1. Energy industries	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	9.64
2. Manufacturing industries and construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-4.62
3. Transport	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	94.89
4. Other sectors	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.04	0.04	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	-13.32
5. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-42.63
B. Fugitive emissions from fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO,NA	NO,NA	NO	NO	NO	NO	NO	NO	0.00
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
2. Oil and natural gas and other emissions from energy production	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO,NA	NO,NA	NO	NO	NO	NO	NO	NO	0.00
C. CO_2 transport and storage																														
2. Industrial processes	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0.00
A. Mineral industry																														
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
D. Non-energy products from fuels and solvent use	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
E. Electronic industry																														
F. Product uses as ODS substitutes																														
G. Other product manufacture and use	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
3. Agriculture	0.31	0.31	0.31	0.28	0.25	0.27	0.29	0.30	0.33	0.31	0.28	0.27	0.28	0.27	0.27	0.29	0.30	0.29	0.29	0.29	0.28	0.29	0.28	0.28	0.28	0.26	0.25	0.26	0.25	-19.02
A. Enteric fermentation	0.31	0.31	0.31	0.28	0.24	0.26	0.28	0.29	0.32	0.31	0.28	0.27	0.27	0.26	0.27	0.28	0.29	0.28	0.29	0.28	0.28	0.28	0.28	0.28	0.27	0.26	0.24	0.25	0.25	-19.01
B. Manure management	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-19.57
C. Rice cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
D. Agricultural soils	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
F. Field burning of agricultural residues	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
G. Liming																														
H. Urea application																														
I. Other carbon-containing fertilizers																														
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
4. Land use, land-use change and forestry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	124.60
A. Forest land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.61
B. Cropland	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C. Grassland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	128.41
D. Wetlands	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
E. Settlements	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
G. Harvested wood products																														
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
5. Waste	0.28	0.28	0.28	0.29	0.29	0.30	0.30	0.30	0.30	0.30	0.30	0.28	0.28	0.28	0.27	0.27	0.27	0.27	0.27	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	-8.02
A. Solid waste disposal	0.17	0.17	0.18	0.18	0.18	0.18	0.19	0.19	0.19	0.20	0.20	0.20	0.20	0.20	0.20	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.18	0.18	0.18	0.18	0.18	0.18	5.08
B. Biological treatment of solid waste	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C. Incineration and open burning of waste	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.10	0.08	0.09	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	-29.08
D. Waste water treatment and discharge	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0.00
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Total CH_4 emissions without CH_4 from LULUCF	0.64	0.64	0.65	0.62	0.58	0.61	0.63	0.65	0.68	0.66	0.63	0.61	0.61	0.60	0.60	0.61	0.62	0.62	0.62	0.61	0.60	0.61	0.60	0.59	0.59	0.57	0.56	0.57	0.56	-12.72
Total CH_4 emissions with CH_4 from LULUCF	0.64	0.64	0.65	0.62	0.58	0.61	0.63	0.65	0.68	0.66	0.63	0.61	0.61	0.60	0.60	0.61	0.62	0.62	0.62	0.61	0.60	0.61	0.60	0.59	0.59	0.57	0.56	0.57	0.56	-12.68
Memo items:																														
International bunkers	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Aviation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Navigation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
CO_2 emissions from biomass																														
CO_2 captured																														
Long-term storage of C in waste disposal sites																														
Indirect N_2O																														
Indirect CO_2 [3]																														

TABLE VII.B.1: EMISSION TRENDS (N_2O), GREENLAND (I.E. NOT EU TERRITORY)

CRF: TABLE 10 EMISSION TRENDS
N_2O
(Sheet 4 of 6)
Greenland

Inventory 2017
Submission 2019 v2
GREENLAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt)																													%
1. Energy	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	9.03
A. Fuel combustion (sectoral approach)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	9.03
1. Energy industries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-8.76
2. Manufacturing industries and construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.37
3. Transport	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.93
4. Other sectors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-4.67
5. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-42.63
B. Fugitive emissions from fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO,NA	NO,NA	NO	NO	NO	NO	NO	NO	0.00
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
2. Oil and natural gas and other emissions from energy production	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO,NA	NO,NA	NO	NO	NO	NO	NO	NO	0.00
C. CO_2 transport and storage																														
2. Industrial processes	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0.00
A. Mineral industry																														
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
D. Non-energy products from fuels and solvent use	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0.00
E. Electronic industry																														
F. Product uses as ODS substitutes																														
G. Other product manufacture and use	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
3. Agriculture	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	6.75
A. Enteric fermentation																														
B. Manure management	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-12.91
C. Rice cultivation																														
D. Agricultural soils	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	27.06
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
F. Field burning of agricultural residues	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
G. Liming																														
H. Urea application																														
I. Other carbon containing fertlizers																														
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
4. Land use, land-use change and forestry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.61
A. Forest land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.61
B. Cropland	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C. Grassland	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
D. Wetlands	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
E. Settlements	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
G. Harvested wood products																														
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
5. Waste	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	-32.13
A. Solid waste disposal																														
B. Biological treatment of solid waste	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C. Incineration and open burning of waste	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-24.06
D. Waste water treatment and discharge	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	-32.96
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Total direct N_2O emissions without N_2O from LULUCF	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	-18.50
Total direct N_2O emissions with N_2O from LULUCF	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	-18.40
Memo items:																														
International bunkers	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Aviation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Navigation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
CO_2 emissions from biomass																														
CO_2 captured																														
Long-term storage of C in waste disposal sites																														
Indirect N_2O	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	0.00
Indirect CO_2[3]																														

TABLE VII.B.1: EMISSION TRENDS (HFCS, PFCS, SF_6 AND NF_3), GREENLAND (I.E. NOT EU TERRITORY)

CRT: TABLE 10 EMISSION TRENDS
HFCs, PFCs, SF_6, and NF_3
(Sheet 5 of 6)
Inventory 2017
Submission 2019 v2
GREENLAND

Greenland

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported
	(kt)																													%
Emissions of HFCs and PFCs - (kt CO_2 equivalent)	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0.02	0.03	0.09	0.45	0.83	1.50	2.19	3.47	4.57	5.57	6.35	6.41	6.45	7.00	7.50	7.55	7.77	8.18	8.37	8.99	8.53	10.18	9.88	8.05	100.00
Emissions of HFCs - (kt CO_2 equivalent)	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0.02	0.03	0.09	0.45	0.83	1.50	2.19	3.47	4.57	5.57	6.35	6.41	6.45	7.00	7.50	7.55	7.77	8.18	8.37	8.99	8.53	10.18	9.88	8.05	100.00
HFC-23	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-32	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
HFC-41	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-43-10mee	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-125	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
HFC-134	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-134a	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
HFC-143	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-143a	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
HFC-152	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-152a	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-161	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-227ea	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-236cb	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-236ea	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-236fa	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-245ca	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-245fa	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
HFC-365mfc	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Unspecified mix of HFCs[4] - (kt CO_2 equivalent)	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Emissions of PFCs - (kt CO_2 equivalent)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
CF_4	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C_2F_6	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C_3F_8	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C_4F_{10}	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
$c\text{-}C_4F_8$	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C_5F_{12}	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
C_6F_{14}	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
$C_{10}F_{18}$	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
$c\text{-}C_3F_6$	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Unspecified mix of PFCs[4] - (kt CO_2 equivalent)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Unspecified mix of HFCs and PFCs - (kt CO_2 equivalent)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
Emissions of SF_6 - (kt CO_2 equivalent)	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
SF_6	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Emissions of NF_3 - (kt CO_2 equivalent)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
NF_3	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00

Summary information on Greenland's national inventory arrangements

Greenland's national inventory is compiled by Ministry of Industry, Energy and Research and then submitted to DCE (Danish Centre for Environment and Energy). DCE reports to the UNFCCC on behalf of the Danish Realm.

Quantified economy-wide emission reduction target

Greenland has neither reduction commitments nor targets for greenhouse gas emissions in the period 2013-2020.

In August 2012, a cooperation agreement relating to the international climate change negotiations was signed by representatives from the Danish Government and the Government of Greenland. The agreement serves to facilitate closer cooperation on matters of mutual interest and to improve Greenlandic access to information and consultation in relation to the UNFCCC negotiations.

In 2012, the Government of Greenland requested Denmark to effectuate a territorial exclusion for Greenland, when ratifying the second commitment period of the Kyoto Protocol.

A territorial exclusion means that Greenland will be exempted from international reduction commitments in the period 2013-2020. It further implies that Denmark's ratification of the second commitment period of the Kyoto Protocol will not have any consequences for Greenland.

Progress in achievement of quantified economy-wide emission reduction targets and relevant information

Mitigation actions and their effects

<u>Renewable energy and energy efficiency</u>

During the last decades, it has been a consistent priority to expand the use of renewable energy. In 2017, about 17 % of the total energy consumption came from renewable sources. 54 % of the national energy production of heat and electricity was based on renewable energy, of which about 94 % came from hydropower and about from 6 % waste incineration. All sustainable energy from hydropower and waste incineration is used by the national energy company, Nukissiorfiit. Thus, 66.2% of the company's total energy sales come from sustainable energy.

The potential resources for solar energy, wind energy and geothermal heat production are being explored on a smaller scale with possibilities for future expansion.

Policies and measures targeting energy production and energy consumption have multiple purposes. In addition to emission reductions, the shift to renewable energy sources is associated with a decreasing dependence on imported fossil fuels and positive effects on the local and regional environment.

The Government of Greenland published a Sector Plan for Energy and Water Supply in 2017. The sector plan outlines the direction for the Government of Greenland's work and priorities for public energy and water supplies towards 2030. The sector plan has three main objectives:

1. Lower prices of electricity and water – This was achieved on the 1st of January 2018.

2. Green energy wherever possible. In 2030, the goal is for public energy services to based entirely on renewable energy sources.
3. Modernisation of the energy system – Energy production based on fossil fuels will be replaced by new energy technology, where this has not already been done. The new energy sources will be hydro, wind, solar and hydrogen.

A pilot project with a hybrid plant in Igaliku has already been launched, and this will provide better, cheaper and cleaner energy to villages and potentially small towns. The plant combines solar and wind power with a battery bank and a diesel generator. The objective is to replace as much as possible of existing diesel consumption.

In the autumn of 2019, the Government of Greenland put forth a formal proposal to the Parliament of Greenland regarding the construction of two new hydropower plants on the west coast of Greenland. The Parliament of Greenland has voted in favour of continuing the work on these projects.

After the implementation of these two projects, it is estimated that 90 % of the public energy supply in Greenland will be based on renewable energy sources.

The projects entail construction of a hydropower plant Qasigiannguit which can supply Qasigiannguit and Aasiaat and an expansion of the existing hydropower plant supplying Nuuk with cheap and clean energy.

Road transport

The number of electric cars in Greenland has increased from approximately zero to about 341[41] in the last seven years. The government actively promotes the use of electric cars by exempting them from taxes and by actively breaking down other barriers. The Government of Greenland works to ensure that everyone has good possibilities for charging their electric vehicles in public areas as well as near residential housing.

Heating

Hydropower and new technologies will be included in the heat system in all parts of Greenland, as the use of these technologies becomes technically, operationally and socioeconomically viable in Greenland.

The collective heat supply will be expanded with the objective of reducing fossil fuels in the private and public heat production. Waste is considered a resource, and residual heat from waste incineration plants wil be utilized for distric heating purposes.

Shipping

A number of actions have been taken to increase the level of available information on emissions from shipping within the Territorial Waters of Greenland (three nautical miles from the coastline) and to describe possible measures.

Niras (2014)[42] examines the pros and cons of regulating the emissions of greenhouse gases from ships within the Territorial Waters of Greenland. The report presents scenarios for emissions in 2020 based on the adoption of international maritime law.

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[41] Annual statistics 2017, Greenland Police

[42] Niras (2014). Emissioner fra skibe. Departementet for Miljø og Natur December 2013.

A study on the opportunities and barriers for introducing shorepower from hydropower for ships at berth at Nuuk harbor Sikuki has been introduced..

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

Not applicable.

Projections

Total greenhouse gas emissions in Greenland in 1990, 1995, 2000, 2005, 2010, 2015, 2016 and 2017are shown in Table VII.B.2.

TABLE VII.B.2: TOTAL GREENHOUSE GAS EMISSIONS (KT CO_2 EQUIVALENTS) IN 1990, 1995, 2000, 2005, 2010, 2015, 2016 AND 2017.

Source: Statistics Greenland (2017).

GHG (kt CO_2 Equivalents)	1990	1995	2000	2005	2010	2015	2016	2017
Total (without LULUCF)	652.48	561.71	697.68	679	713.53	557.41	559.02	573.80
Total (with LULUCF)	652.69	562.1	698.2	679.63	714.95	558.46	560.20	575.02

Greenland is likely to experience significant industrial growth over the coming years, which will impact on future emission levels. Possible sources of new emissions include:

- Further growth in the mining industry with the establishment of new mines
- Continuation of oil and gas explorations

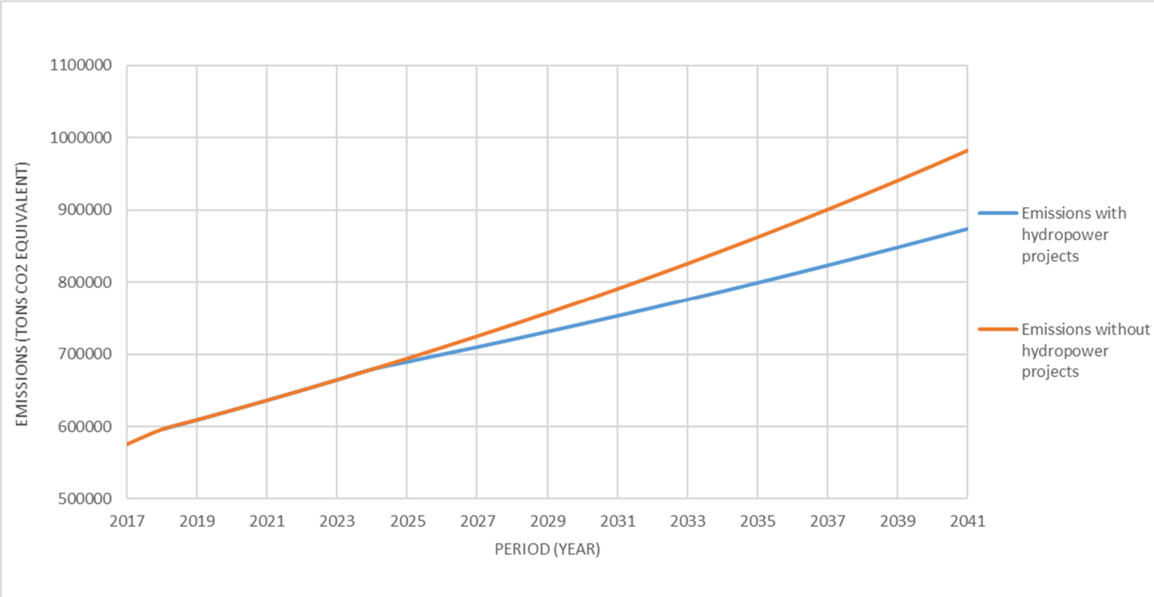
A number of exploration projects are ongoing, however the projected emissions related to these projects are subject to a significant degree of uncertainty and future scenarios have therefore not been included.

According to the latest data from Greenland's Ministry of Industry, Energy and Research the total greenhouse gas emissions is recorded at 575,023 tons CO_2 in the year 2017. Greenland's economic council has prepared a national economic outlook which projects the 2018 GDP growth rate at .3.6 %, and 2.2 % in 2019[43].. This rate has been maintained as a constant value throughout the period 2018 to 2041. Moreover upcoming mining activities in Aappaluttoq and Kangerlussuaq have been accounted for in the projections. The projected Greenlandic total annual greenhouse gas emissions 2017-2041 are shown in Figure VII.B.3 together with the inventory total for 2017.

Furthermore the Parliament of Greenland voted in favour of a decision of principal regarding the contruction of two new hydropower plants in Greenland. The implementation will reduce the greenhouse gas emissions as shown in figure VII.B.3.

[43]https://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Finans/DK/Oekonomisk%20raad/G%C3%98R%202019%20DK.pdf

FIGURE VII.B.3 GREENLAND'S TOTAL GREENHOUSE GAS EMISSIONS IN KT IN 2017-41, EMISSIONS IN 2017 ARE OBSERVED AND 2018-2041 PROJECTED



*NOTE: IN THE SCENARIO WITH THE IMPLEMENTATION OF THE AFOREMENTIONED HYDROPOWER PROJECTS AN ANNUAL GDP GROWTH OF 1.5% IS ASSUMED TO ACCOUNT FOR THE ECONOMIC DEVELOPMENT THAT IS NOT SUPPLIED BY HYDROPOWER.

C. FAROE ISLANDS

Information on greenhouse gas emissions and trends

Summary information from Faroe Islands' greeenhouse gas inventory on emissions and emission trends

Table VII.C.1 and figures VII.C.1 and VII.C.2 show the development in the Faroe Islands' greenhouse gas emissions and removals as CO_2 equivalents and by sources and gases according to the reporting guidelines under the Climate Convention (i.e. the Faroe Islands' contribution to the total of the Realm).

As shown in Figure VII.C.1 the development in total greenhouse gas emissions in CO_2 equivalents has increased by 48 % from 1990 to 2017. The total Faroese greenhouse gas emissions corresponded to 1.040 kt of CO2 equivalents in 2017.

As also shown in Figure VII.C.1 the main part - i.e. 91 % - of the emissions in 2017 were from the fuel consumption including waste incineration in the Energy sector. Almost 6 % were from Industrial processes and Product Use and nearly 3 % from Agriculture. Until recently, the fluctuations in the GHG emissions in the Energy sector were decisive for the fluctuations in the total GHG emissions. They still are, but in the last six years or so, there have been a significant increase in emissions from the Industrial processes and Product Use sector. The emissions from the Agriculture sector are and have always been relative small and constant.

FIGURE VII.C.1: GREENHOUSE GAS EMISSIONS BY SECTOR FOR 2017 AND DEVELOPMENT 1990 TO 2017

Source: Umhvørvisstovan, The Environment Agency, Faroe Island, 2019.

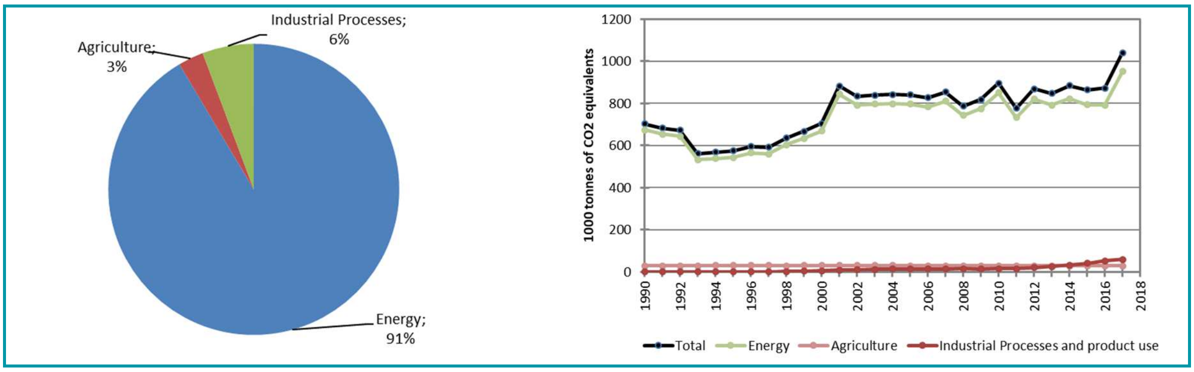
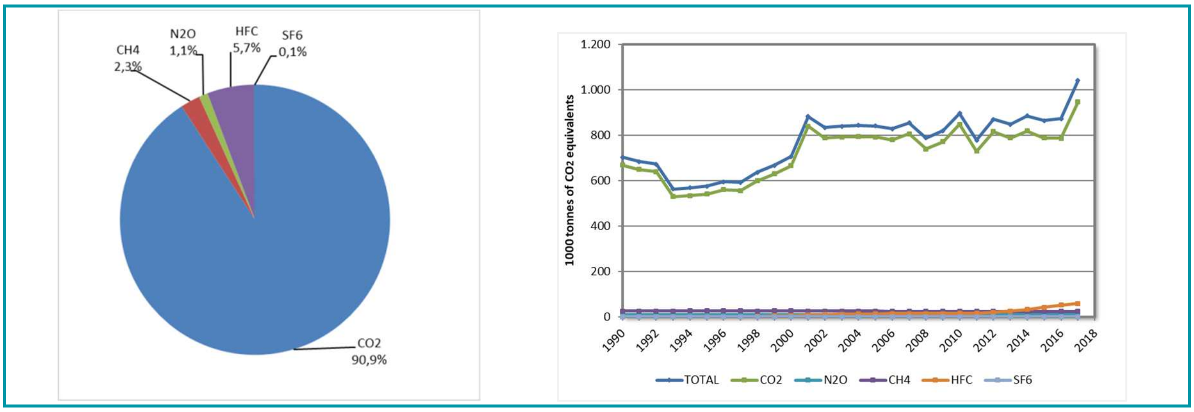


Figure VII.C.2 shows that CO_2 is the most important greenhouse gas, followed by F-gases, CH_4 and N_2O. Of the total Faroese greenhouse gas emissions in 2017, CO_2 made up 90.9 %, F-gases (HFCs and SF_6) 5.7 %, methane 2.3 % and nitrous oxide 1.1 %.

From 1990 to 1993, a decrease in total Faroese greenhouse gas emissions is observed, due to an economic crisis in the Faroe Islands, which lasted for 6-8 years. From 2001 to 2007, the emissions were rather stabile. The variation in the emisions that have been for the last 10 years or so are highly due to fluctuations in bunkring activity for fishing vessels.

FIGURE VII.C.2 EMISSIONS OF GHG BY GAS IN 2017 AND DEVELOPMENT 1990-2017.

Source: Umhvørvisstovan, The Environment Agency, Faroe Island, 2019.



Carbon dioxide, CO_2

The emission of CO_2 in the Faroe Islands is from fuel consumption (incl. waste incineration). The trend in the total emission of CO_2 (Figure VII.C.3) is nearly identical with the trend of the total emission of GHG in the Faroe Islands (Figure VII.C.2) showing the trends in CO_2 emissions in the period from 1990 to 2017. After the economic decline in the 1990s the emissions rose and were rather constant until 2007. As mentioned above, the fluctuations in the total emissions are highly related to the emissions from the fishing fleet. What is not seen in the figure, is that it is especially the bunkring activity of foreign fishing vessels, that causes the fluctuations. The bunkings of the Faroese fishing fleet have been relative stabile. Actually, from 2008 to 2013, the effort in the Faroese fishing fleet was significantly lower than previous years, also meaning a significant reduction in oil consumption. The reduction in the emissions for fisheries in 2009 and 2011 is not visible because a new oil bunkering activity (mostly used by foreign fishing vessels) started up in 2009 in the Faroes, introducing high fluctuations in the emissions from fishing, which also is the main reason for the high emissions in 2017.

FIGURE VII.C.3: TOTAL CO_2 EMISSIONS BY SECTOR FOR 2017 AND DEVELOPMENT 1990 TO 2017

Source: Umhvørvisstovan, The Environment Agency, Faroe Island, 2019.

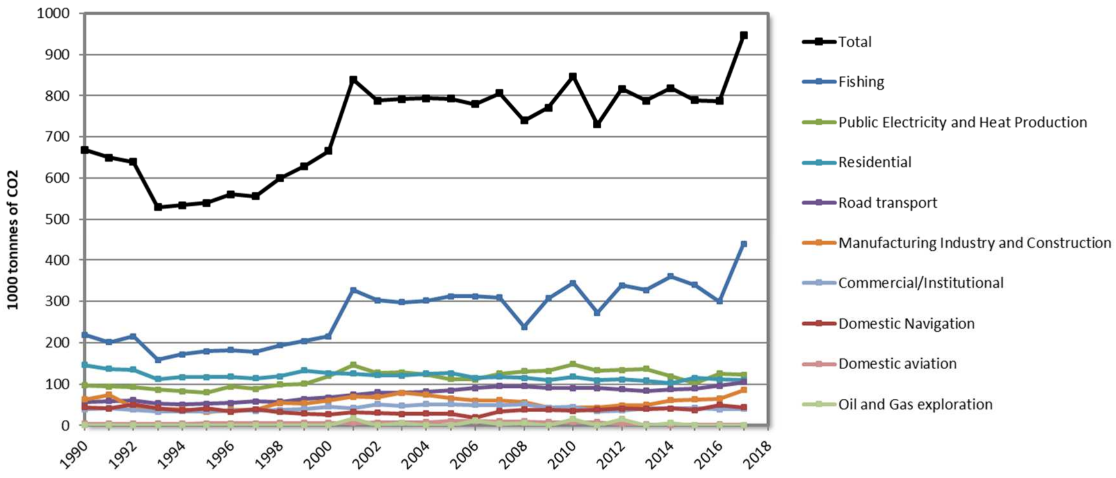


FIGURE VII.C.4: EMISSIONS OF CO_2 IN THE ENERGY SECTOR, DIVIDED IN FUEL CONSUMPTION CATEGORIES, 2017

Source: Umhvørvisstovan, The Environment Agency, Faroe Island, 2019.

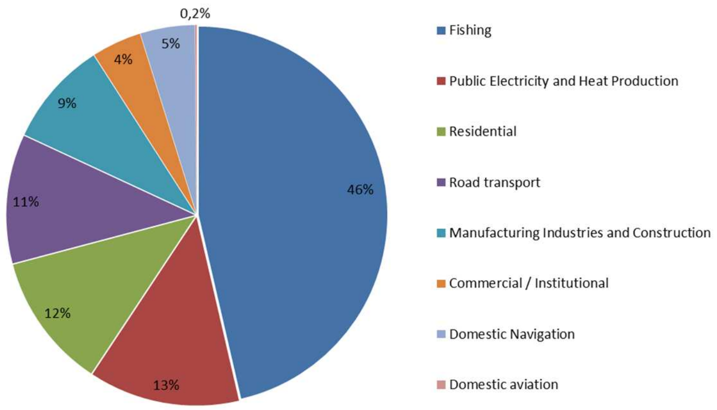


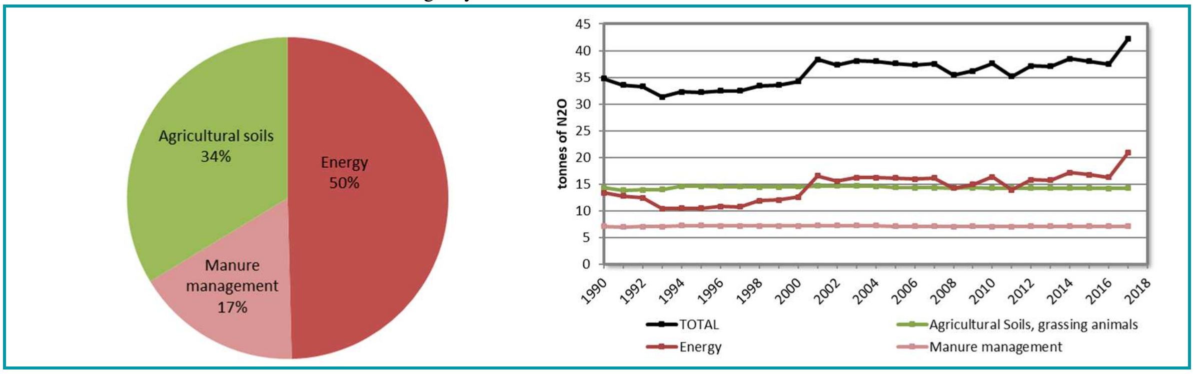
Figure VII.C.4 shows how the emissions are distributed when divided in fule consumption categories. In 2017 46 % of the CO_2 emission came from fishing vessels. Nearly half (44 %) of the emission from fishing vessels was from foreign fishing vessels. Public electricity and heat production accounted for 13 %, households 12 % and road transport for 11 % of the total CO_2 emission.

Nitrous oxide, N_2O

Figure VII.C.5 shows the emissions of nitrous oxide in the Faroe Islands 1990-2017. 50 % of the N_2O comes from energy sector and another 34 % comes from agricultural soils. The rest, around 17 %, comes from manure management.

FIGURE VII.C.5: N_2O EMISSIONS BY SECTOR IN 2017 AND DEVELOPMENT 1990-2017

Source: Umhvørvisstovan, The Environment Agency, Faroe Island, 2019

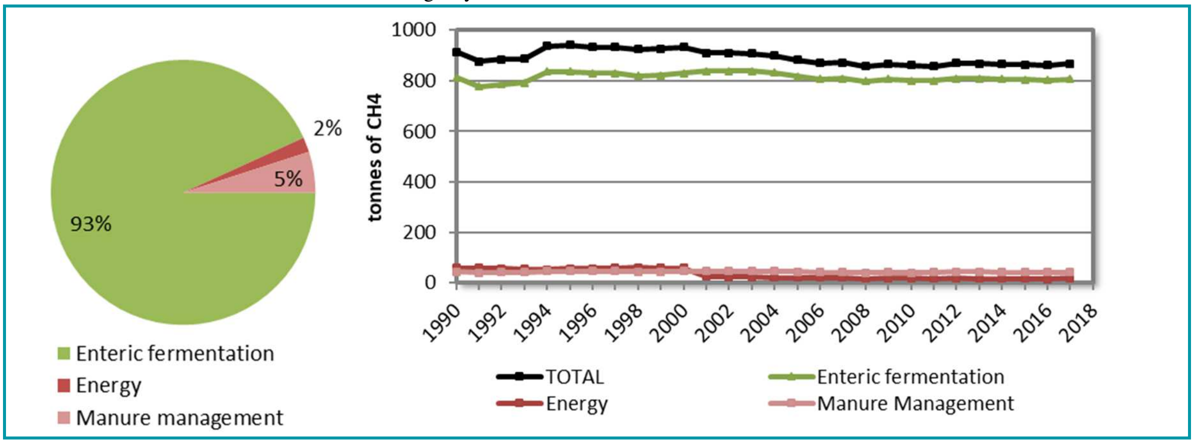


Methane, CH_4

Figure VII.C.6 shows the emissions of methane in the Faroe Islands 1990-2017. Most of the methane emission is from the agriculture (98 %), especially from enteric fermentation (93 %). Most of the emission of CH_4 in the energy sector is from civil aviation.

FIGURE VII.C.6: CH_4 EMISSIONS, BY SECTOR IN 2017 AND DEVELOPMENT 1990-2017

Source: Umhvørvisstovan, The Environment Agency, Faroe Island, 2019

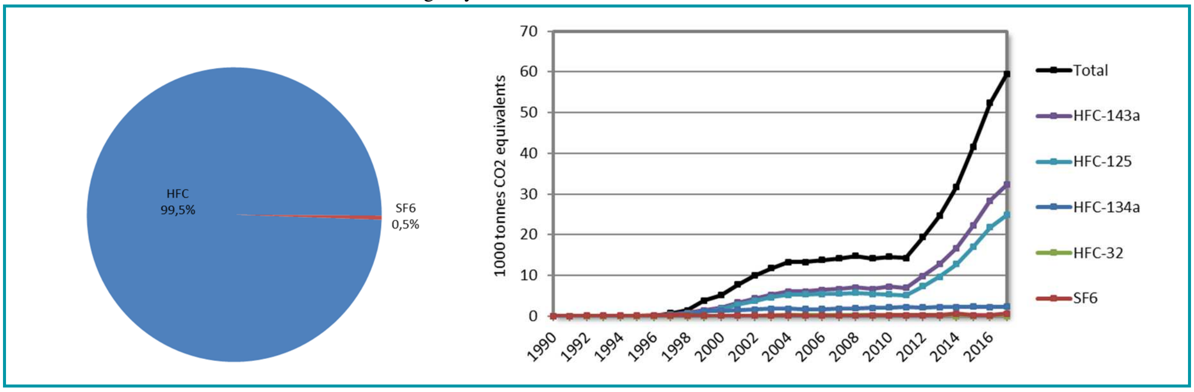


The f-gases: HFCs, PFCs, SF_6 and NF_3

Figure VII.C.7 shows the emissions of F-gases, HFCs and SF_6 respectively in the years 1990-2017. Most of the emission is HFCs, used for refrigeration purposes, as substitutes for HCFCs. After an increase in the emissions in the period 1996-2005, the emissions were rather stable at around 12,000 tonnes of CO_2 equivalents pr. year until 2011, where-after there has been a steep increase in the emissions of HFCs. This is due to higher use of HFC-125 and HFC-143a, both components in the HFC-blend HFC-507a, which in recent years has been used as a substitute when phasing out HCFC-22 (ozone depleting freezing agent) on fishing vessels. In 2017 the actual emissions of HFCs were around 59,000 tonnes of CO_2 equivalents.

FIGURE VII.C.7: F-GAS EMISSIONS, BY TYPE OF GAS IN 2017 AND DEVELOPMENT 1990-2017

Source: Umhvørvisstovan, The Environment Agency, Faroe Island, 2019



Neither PFCs nor NF_3 have been used in the Faroe Islands.

The summary tables from the Faroe Islands' greenhouse gas inventory are shown in Table VII.C.1 below (similar to the format of table 1 of the CTF).

TABLE VII.C.1: EMISSION TRENDS (SUMMARY), FAROE ISLANDS (I.E. NOT EU TERRITORY)

CRF: Table 1
Emission trends:summary
CRF: TABLE 10 EMISSION TRENDS SUMMARY (Sheet 6 of 6) — Inventory 2017, Submission 2019 v1, FAROE ISLANDS
Faroe Islands

GREENHOUSE GAS EMISSIONS	Base year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	CO_2 equivalent (kt)																													(%)
CO_2 emissions without net CO_2 from LULUCF	668	668	649	639	529	534	540	560	556	599	629	665	839	788	792	794	792	779	806	740	771	847	730	815	786	816	786	785	947	42
CO_2 emissions with net CO_2 from LULUCF	668	668	649	639	529	534	540	560	556	599	629	665	839	788	792	794	792	779	806	740	771	847	730	815	786	816	786	785	947	42
CH_4 emissions without CH_4 from LULUCF	23	23	22	22	22	23	23	23	23	23	23	23	23	23	23	22	22	22	22	21	22	22	21	22	22	22	22	22	22	-5
CH_4 emissions with CH_4 from LULUCF	23	23	22	22	22	23	23	23	23	23	23	23	23	23	23	22	22	22	22	21	22	22	21	22	22	22	22	22	22	-5
N_2O emissions without N_2O from LULUCF	10	10	10	10	9	10	10	10	10	10	10	10	11	11	11	11	11	11	11	11	11	11	10	11	11	11	11	11	13	22
N_2O emissions with N_2O from LULUCF	10	10	10	10	9	10	10	10	10	10	10	10	11	11	11	11	11	11	11	11	11	11	10	11	11	11	11	11	13	22
HFCs	NO	NO	NO	NO	NO	0	0	0	1	1	4	5	9	11	13	15	15	15	16	16	15	17	16	21	26	32	42	52	59	100
PFCs	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Unspecified mix of HFCs and PFCs	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
SF_6	NO	NO	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	100
NF_3	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Total (without LULUCF)	701	701	681	671	561	567	573	593	590	634	666	704	882	833	840	843	841	828	855	788	819	896	777	869	845	882	861	870	1040	48
Total (with LULUCF)	**701**	**701**	**681**	**671**	**561**	**567**	**573**	**593**	**590**	**634**	**666**	**704**	**882**	**833**	**840**	**843**	**841**	**828**	**855**	**788**	**819**	**896**	**777**	**869**	**845**	**882**	**861**	**870**	**1040**	**48**
Total (without LULUCF, with indirect)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
Total (with LULUCF, with indirect)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	CO_2 equivalent (kt)																													(%)
1. Energy	674	674	654	644	533	538	544	565	560	604	634	670	845	793	798	799	798	785	812	744	776	852	734	820	792	822	792	790	953	42
2. Industrial processes and product use	NO,NE	NO,NE	NO,NE	0	0	0	0	0	1	2	4	6	9	11	14	15	15	15	16	16	16	17	16	21	26	33	42	52	59	100
3. Agriculture	28	28	27	27	27	29	29	28	28	28	28	28	29	29	29	28	28	28	28	27	28	27	27	28	28	28	28	27	28	-1
4. Land use, land-use change and forestry	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
5. Waste	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	0
6. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Total (including LULUCF)	**701**	**701**	**681**	**671**	**561**	**567**	**573**	**593**	**590**	**634**	**666**	**704**	**882**	**833**	**840**	**843**	**841**	**828**	**855**	**788**	**819**	**896**	**777**	**869**	**845**	**882**	**861**	**870**	**1040**	**48**

TABLE VII.C.1: EMISSION TRENDS (GHGS), FAROE ISLANDS (I.E. NOT EU TERRITORY)

CRF: Table 1
Emission trends: GHG CO2 eq emissions

CRF: TABLE 10 EMISSION TRENDS — Inventory 2017
GHG CO_2 eq emissions — Submission 2019 v1
(Sheet 1 of 6) — FAROE ISLANDS

Faroe Islands

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt CO_2 eq)																													%
Total (net emissions)	701	701	681	671	561	567	573	593	590	634	666	704	882	833	840	843	841	828	855	788	819	896	777	869	845	882	861	870	1040	48
1. Energy	674	674	654	644	533	538	544	565	560	604	634	670	845	793	798	799	798	785	812	744	776	852	734	820	792	822	792	790	953	42
A. Fuel combustion (sectoral approach)	674	674	654	644	533	538	544	565	560	604	634	670	845	793	798	799	798	785	812	744	776	852	734	820	792	822	792	790	953	42
1. Energy industries	97	97	94	93	87	82	80	94	88	99	101	120	164	127	134	123	113	123	129	137	132	164	133	148	135	123	100	124	123	26
2. Manufacturing industries and construction	63	63	75	44	40	39	33	39	38	55	54	60	70	69	80	75	67	61	62	57	44	44	44	49	50	61	64	65	86	36
3. Transport	107	107	105	116	101	93	100	95	105	98	100	101	114	118	114	120	126	121	140	144	139	134	138	134	126	131	129	149	152	42
4. Other sectors	406	406	381	390	305	324	332	337	329	352	379	389	497	479	470	481	492	480	480	406	461	510	419	489	480	507	499	453	593	46
5. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
B. Fugitive emissions from fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
2. Oil and natural gas and other ems from energy prod.	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
2. Industrial Processes	NO,NE	NO,NE	NO,NE	0	0	0	0	0	1	2	4	6	9	11	14	15	15	15	16	16	16	17	16	21	26	33	42	52	59	100
A. Mineral industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
D. Non-energy products from fuels and solvent use	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
E. Electronic industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
F. Product uses as ODS substitutes	NO	NO	NO	NO	NO	0	0	0	1	1	4	5	9	11	13	15	15	15	16	16	15	17	16	21	26	32	42	52	59	100
G. Other product manufacture and use	NO	NO	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	100
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
3. Agriculture	28	28	27	27	27	29	29	28	28	28	28	28	29	29	29	28	28	28	28	27	28	27	27	28	28	28	28	27	28	-1
A. Enteric fermentation	20	20	19	20	20	21	21	21	21	20	21	21	21	21	21	21	20	20	20	20	20	20	20	20	20	20	20	20	20	-1
B. Manure management	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0
C. Rice cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
D. Agricultural soils	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	-1
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
F. Field burning of agricultural residues	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
G. Liming	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
H. Urea application	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
I. Other carbon-containing fertilizers	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
4. Land use, land-use change and forestry	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
5. Waste	NO,NE,I	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	O,NE,	0
A. Solid waste disposal	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
B. Biological treatment of solid waste	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C. Incineration and open burning of waste	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	0
D. Waste water treatment and discharge	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Memo items:																														
International bunkers	NE,NO	E,NO	0	106	144	141	133	144	139	113	123	138	130	80	70	80	69	28	24	22	65	36	44	55	20	31	17	49	52	100
Aviation	NE,NO	E,NO	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	100
Navigation	NE,NO	E,NO	E,NO	106	144	141	133	143	139	113	122	137	128	79	69	78	67	26	23	21	64	36	43	53	19	30	17	48	52	100
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
CO_2 emissions from biomass	16	16	16	17	16	16	17	18	21	26	28	28	29	30	27	25	25	25	29	28	25	28	26	26	26	28	28	30	30	88
CO_2 captured	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Long-term storage of C in waste disposal sites	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
Indirect N_2O	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
Indirect CO_2	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
Total CO_2 equivalent emissions without land use, land-use	701	701	681	671	561	567	573	593	590	634	666	704	882	833	840	843	841	828	855	788	819	896	777	869	845	882	861	870	1040	48
Total CO_2 equivalent emissions with land use, land-use	701	701	681	671	561	567	573	593	590	634	666	704	882	833	840	843	841	828	855	788	819	896	777	869	845	882	861	870	1040	48
Total CO_2 equivalent emissions, including indirect CO2,	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
Total CO_2 equivalent emissions, including indirect CO2,	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0

TABLE VII.C.1: EMISSION TRENDS (CO_2), FAROE ISLANDS (I.E. NOT EU TERRITORY)

CRF: Table 1
Emission trends: CO2
CRF: TABLE10 EMISSION TRENDS
CO2
(Sheet 2 of 6)

Inventory 2017
Submission 2019 v1
FAROE ISLANDS

Faroe Islands

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt)																													%
1. Energy	668	668	649	639	529	534	540	560	556	599	629	665	839	788	792	794	792	779	806	740	771	847	730	815	786	816	786	785	947	42
A. Fuel combustion (sectoral approach)	668	668	649	639	529	534	540	560	556	599	629	665	839	788	792	794	792	779	806	740	771	847	730	815	786	816	786	785	947	42
1. Energy industries	97	97	94	93	86	82	79	94	88	99	101	120	164	127	134	123	113	122	129	137	132	164	133	148	135	123	100	123	122	26
2. Manufacturing industries and construction	62	62	74	44	40	39	32	38	38	54	53	60	69	68	79	74	66	60	61	56	43	44	43	49	50	60	63	65	85	36
3. Transport	105	105	103	114	99	91	98	93	102	96	98	99	113	117	113	119	125	120	139	143	138	133	137	132	125	129	127	147	150	43
4. Other sectors	404	404	379	388	304	322	330	335	327	350	377	387	494	476	467	478	489	477	477	404	459	506	416	486	477	504	496	450	589	46
5. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
B. Fugitive emissions from fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
2. Oil and natural gas and other emissions from energy	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
2. Industrial processes	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	0
A. Mineral industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
D. Non-energy products from fuels and solvent use	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
E. Electronic industry																														
F. Product uses as ODS substitutes																														
G. Other product manufacture and use	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
3. Agriculture	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
A. Enteric fermentation																														
B. Manure management																														
C. Rice cultivation																														
D. Agricultural soils																														
E. Prescribed burning of savannas																														
F. Field burning of agricultural residues																														
G. Liming	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
H. Urea application	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
I. Other carbon-containing fertilizers	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
4. Land use, land-use change and forestry	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
5. Waste	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	O,NE,IE	0
A. Solid waste disposal	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
B. Biological treatment of solid waste																														
C. Incineration and open burning of waste	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	0
D. Waste water treatment and discharge																														
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Memo items:																														
International bunkers	NE,NO	NE,NO	0	105	143	140	132	142	138	112	122	136	129	79	70	79	68	27	24	22	64	36	44	54	20	31	17	48	52	100
Aviation	NE,NO	NE,NO	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	100
Navigation	NE,NO	NE,NO	NE,NO	105	143	140	132	142	138	112	121	136	127	78	69	78	67	26	23	21	64	35	43	53	19	30	17	48	51	100
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
CO_2 emissions from biomass	16	16	16	17	16	16	17	18	21	26	28	28	29	30	27	25	25	25	29	28	25	28	26	26	26	28	28	30	30	88
CO_2 captured	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Long-term storage of C in waste disposal sites	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
Indirect N_2O																														
Indirect CO_2	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
Total CO_2 equivalent emissions without land use, land-use	668	668	649	639	529	534	540	560	556	599	629	665	839	788	792	794	792	779	806	740	771	847	730	815	786	816	786	785	947	42
Total CO_2 equivalent emissions with land use, land-use change and forestry	668	668	649	639	529	534	540	560	556	599	629	665	839	788	792	794	792	779	806	740	771	847	730	815	786	816	786	785	947	42

TABLE VII.C.1: EMISSION TRENDS (CH_4), FAROE ISLANDS (I.E. NOT EU TERRITORY)

CRF: Table 1
Emission trends: CH4

CRF: TABLE10 EMISSION TRENDS | Inventory 2017
CH4 | Submission 2019 v1
(Sheet 3 of 6) | FAROE ISLANDS

Faroe Islands

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt)																													%
1. Energy	0,06	0,06	0,06	0,06	0,05	0,05	0,06	0,06	0,06	0,06	0,06	0,06	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	-68
A. Fuel combustion (sectoral approach)	0,06	0,06	0,06	0,06	0,05	0,05	0,06	0,06	0,06	0,06	0,06	0,06	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	-68
1. Energy industries	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	15
2. Manufacturing industries and construction	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	24
3. Transport	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,00	0,00	0,00	0,00	0,00	-91
4. Other sectors	0,01	0,01	0,01	0,01	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	94
5. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
B. Fugitive emissions from fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
2. Oil and natural gas and other emissions from energy production	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C. CO_2 transport and storage																														
2. Industrial processes	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	0
A. Mineral industry																														
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
D. Non-energy products from fuels and solvent use	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
E. Electronic industry																														
F. Product uses as ODS substitutes																														
G. Other product manufacture and use	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
3. Agriculture	0,85	0,85	0,82	0,83	0,83	0,88	0,88	0,88	0,87	0,86	0,87	0,87	0,88	0,89	0,88	0,88	0,86	0,85	0,85	0,84	0,85	0,84	0,84	0,85	0,85	0,85	0,85	0,85	0,85	-0,7
A. Enteric fermentation	0,81	0,81	0,78	0,79	0,79	0,84	0,84	0,83	0,83	0,82	0,82	0,83	0,84	0,84	0,84	0,83	0,82	0,81	0,81	0,80	0,81	0,80	0,80	0,81	0,81	0,81	0,81	0,80	0,81	-0,8
B. Manure management	0,04	0,04	0,04	0,04	0,04	0,05	0,05	0,05	0,05	0,04	0,04	0,05	0,05	0,05	0,05	0,05	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	-0,2
C. Rice cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
D. Agricultural soils	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
F. Field burning of agricultural residues	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
G. Liming																														
H. Urea application																														
I. Other carbon-containing fertilizers																														
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
4. Land use, land-use change and forestry	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
5. Waste	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	0
A. Solid waste disposal	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
B. Biological treatment of solid waste	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C. Incineration and open burning of waste	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	0
D. Waste water treatment and discharge	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
6. Other ***(as specified in summary 1.A)***	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Total CH_4 emissions without CH_4 from LULUCF	0,91	0,91	0,87	0,88	0,89	0,94	0,94	0,93	0,93	0,92	0,93	0,93	0,91	0,91	0,91	0,90	0,88	0,87	0,87	0,86	0,86	0,86	0,86	0,87	0,87	0,87	0,86	0,86	0,87	-5
Total CH_4 emissions with CH_4 from LULUCF	0,91	0,91	0,87	0,88	0,89	0,94	0,94	0,93	0,93	0,92	0,93	0,93	0,91	0,91	0,91	0,90	0,88	0,87	0,87	0,86	0,86	0,86	0,86	0,87	0,87	0,87	0,86	0,86	0,87	-5
Memo items:																														
International bunkers	NE,NO	NE,NO	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	100
Aviation	NE,NO	NE,NO	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	100
Navigation	NE,NO	NE,NO	NE,NO	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	100
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0

TABLE VII.C.1: EMISSION TRENDS (N_2O), FAROE ISLANDS (I.E. NOT EU TERRITORY)

CRF: Table 1																														
Emission trends: N2O																														
CRF: TABLE 10 EMISSION TRENDS N2O (Sheet 4 of 6)																														Inventory 2017 Submission 2019 v1 FAROE ISLANDS
Faroe Islands																														
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt)																													%
1. Energy	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,01	0,01	0,02	0,01	0,02	0,02	0,02	0,02	0,02	0,02	57
A. Fuel combustion (sectoral approach)	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,01	0,01	0,02	0,01	0,02	0,02	0,02	0,02	0,02	0,02	57
1. Energy industries	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	46
2. Manufacturing industries and construction	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	22
3. Transport	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	51
4. Other sectors	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	74
5. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
B. Fugitive emissions from fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
2. Oil and natural gas and other emissions from	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C. CO_2 transport and storage																														
2. Industrial processes	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	0
A. Mineral industry																														
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
D. Non-energy products from fuels and solvent use	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
E. Electronic industry																														
F. Product uses as ODS substitutes																														
G. Other product manufacture and use	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
3. Agriculture	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	-0,6
A. Enteric fermentation																														
B. Manure management	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	-0,3
C. Rice cultivation																														
D. Agricultural soils	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	-0,8
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
F. Field burning of agricultural residues	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
G. Liming																														
H. Urea application																														
I. Other carbon containing fertlizers																														
J. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
4. Land use, land-use change and forestry	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
5. Waste	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	NO,NE,IE	0
A. Solid waste disposal																														
B. Biological treatment of solid waste	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C. Incineration and open burning of waste	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	NO,IE	0
D. Waste water treatment and discharge	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
E. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Total direct N_2O emissions without N_2O from LULUCF	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	22
Total direct N_2O emissions with N_2O from LULUCF	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,03	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	0,04	22
Memo items:																														
International bunkers	NE,NO	NE,NO	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	100
Aviation	NE,NO	NE,NO	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	100
Navigation	NE,NO	NE,NO	NE,NO	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	100
Multilateral operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
CO_2 emissions from biomass																														
CO_2 captured																														
Long-term storage of C in waste disposal sites																														
Indirect N_2O	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0
Indirect CO_2																														

TABLE VII.C.1: EMISSION TRENDS (HFCS, PFCS, SF_6 AND NF_3), FAROE ISLANDS (I.E. NOT EU TERRITORY)

CRF: Table 1
Emission trends: HFCs, PFCs, SF6, and NF3
CRF: TABLE 10 EMISSION TRENDS — Inventory 2017
HFCs, PFCs, SF6, and NF3 — Submission 2019 v1
(Sheet 5 of 6) — FAROE ISLANDS
Faroe Islands

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt)																													%
Emissions of HFCs and PFCs - (kt CO_2 equivalent)	NO	NO	NO	NO	NO	0,001	0,001	0,03	1	1	4	5	9	11	13	15	15	15	16	16	15	17	16	21	26	32	42	52	59	100
Emissions of HFCs - (kt CO_2 equivalent)	NO	NO	NO	NO	NO	0,001	0,001	0,03	1	1	4	5	9	11	13	15	15	15	16	16	15	17	16	21	26	32	42	52	59	100
HFC-23	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-32	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,0000	0,0000	0,0001	0,0002	0,0002	0,0003	0,0003	0,0003	0,0003	0,0003	0,0003	0,0003	0,0003	0,0002	0,0002	0,0002	0,0002	0,0001	####	####	100
HFC-41	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-43-10mee	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-125	NO	NO	NO	NO	NO	NO	NO	0,000	0,000	0,000	0,000	0,000	0,001	0,001	0,001	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,003	0,004	0,005	0,006	0,007	100
HFC-134	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-134a	NO	NO	NO	NO	NO	0,000	0,000	0,000	0,000	0,000	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,002	0,001	0,002	0,002	0,002	0,001	0,001	100
HFC-143	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-143a	NO	NO	NO	NO	NO	NO	NO	0,000	0,000	0,000	0,000	0,001	0,001	0,001	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,003	0,004	0,005	0,006	0,007	100
HFC-152	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-152a	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-161	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-227ea	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-236cb	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-236ea	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-236fa	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-245ca	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-245fa	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
HFC-365mfc	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Unspecified mix of HFCs - (kt CO_2 equivalent)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Emissions of PFCs - (kt CO_2 equivalent)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
CF_4	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C_2F_6	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C_3F_8	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C_4F_{10}	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
$c\text{-}C_4F_8$	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C_5F_{12}	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
C_6F_{14}	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
$C_{10}F_{18}$	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
$c\text{-}C_3F_6$	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Unspecified mix of PFCs - (kt CO_2 equivalent)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Unspecified mix of HFCs and PFCs - (kt CO_2 equiv.)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
Emissions of SF_6 - (kt CO_2 equivalent)	NO	NO	NO	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,1	0,1	0,1	0,1	0,1	0,2	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2	0,2	0,6	0,2	0,2	0,6	100
SF_6	NO	NO	NO	5,E-06	5,E-06	6,E-06	6,E-06	7,E-06	7,E-06	8,E-06	4,E-06	3,E-06	3,E-06	4,E-06	3,E-06	8,E-06	6,E-06	6,E-06	6,E-06	7,E-06	9,E-06	7,E-06	7,E-06	8,E-06	9,E-06	3,E-05	1,E-05	1,E-05	3,E-05	100
Emissions of NF_3 - (kt CO_2 equivalent)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0
NF_3	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0

Summary information on Faroe Islands' national inventory arrangements

The Environment Agency (FEA), an agency under the Ministry of Environment, Trade and Industry (www.uvmr.fo), is responsible for the annual preparation and submission to the UNFCCC of the Faroe Islands' contribution to the Kingdom of Denmark's National Inventory Report and the GHG inventories in the Common Reporting Format in accordance with the UNFCCC Guidelines. The inventory is done with guidance from and in co-operation with DCE[44]. The work is carried out in co-operation with other Faroese ministries, research institutes, organisations and companies.

More comprehensive information, fx about the inventory preparation, calculation methods, annual reporting, improvements of emissions inventories, can be found in Nielsen et al. (2019).

Quantified economy-wide emission reduction target

In 2009 the Minister for Environment formulated a Climate Policy for the Faroe Islands[45]. The principal aim of this policy is to decrease the Faroese dependency on oil and fossil fuels and to increase the use of renewable energy sources significantly. In this way, achieve the ambitious and realistic target of reducing emissions of greenhouse gases by at least 20 % in 2020, compared with the level of emissions in 2005. This will in turn make Faroese society less vulnerable to the effects of ever-changing oil prices.

The key information regarding the target is shown in Table VII.C.2 below (similar to the formats of tables 2 (a-f) of the CTF).

TABLE VII.C.2: DESCRIPTION OF FAROE ISLANDS' QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET

Table 2(a)		
Description of quantified economy-wide emission reduction target: base year [a]		
Party	Faroe Islands	
Base year /base period	2005	
	% of base year/base period	% of 1990 [b]
Emission reduction target	20	
Period for reaching target	2020	
[a] Reporting by a developed country Party on the information specified in the common tabular format does		
[b] Optional.		

[44] Danish Centre for Environment and Energy

[45] https://d3b1dqw2kzexi.cloudfront.net/media/5522/veðurlagspolitikkur-føroya.pdf

Table 2(b)

Description of quantified economy-wide emission reduction target: gases and sectors covered [a]

Gases covered		Base year for each gas (year):
CO_2	Yes	2005
CH_4	Yes	2005
N_2O	Yes	2005
HFCs	No	NA
PFCs	No	NA
SF_6	No	NA
NF_3	No	NA
Other gases	No	NA
Sectors covered [b]		
Energy	Yes	
Transport [c]	Yes	
Industrial processes [d]	No	
Agriculture	No	
LULUCF	No	
Waste	No	
Other (specify)	No	

Abbreviations: LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] More than one selection will be allowed. If Parties use sectors other than those indicated above, the explanation of how these sectors relate to the sectors defined by the IPCC should be provided.

[c] Transport is reported as a subsector of the energy sector.

[d] Industrial processes refer to the industrial processes and solvent and other product use sectors.

Table 2(c)

Description of quantified economy-wide emission reduction target: global warming potential values (GWP) [a]

Gases	GWP values [b]
CO_2	AR4
CH_4	AR4
N_2O	AR4
HFCs	AR4
PFCs	AR4
SF_6	AR4
NF_3	AR4
Other gases [c]	NA

Abbreviations: GWP = global warming potential

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Please specify the reference for the GWP: Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) or the Fourth Assessment Report of the IPCC.

[c] Specify.

Table 2(d)

Description of quantified economy-wide emission reduction target: approach to counting emissions and removals from the LULUCF sector [a]

Role of LULUCF	LULUCF in base year level and target	Included	
		Excluded	Excluded
	Contribution of LULUCF is calculated using	Land-based approach	NA
		Activity-based approach	NA
		Other (specify)	NA

Abbreviation: LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

Table 2(e)I	
Description of quantified economy-wide emission reduction target: market-based mechanisms under the Convention [a]	
	Possible scale of contributions (estimated kt CO2 eq)
CERs	0
ERUs	0
AAUs [b]	0
Carry-over units [c]	0
Other mechanism units under the Convention (specify) [d]	0

Abbreviations: AAU = assigned amount unit, CER = certified emission reduction, ERU = emission reduction unit.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] AAUs issued to or purchased by a Party.

[c] Units carried over from the first to the second commitment periods of the Kyoto Protocol, as described in decision 13/CMP.1 and consistent with decision XX /CMP.8.

[d] As indicated in paragraph 5(e) of the guidelines contained in annex I of decision 2/CP.17.

Table 2(e)II	
Description of quantified economy-wide emission reduction target: other market-based mechanisms [a]	
(Specify)	Possible scale of contributions (estimated kt CO2 eq)
NA	NA

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

Table 2(f)
Description of quantified economy-wide emission reduction target: any other information [a,b]
IE

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] This information could include information on the domestic legal status of the target or the total assigned amount of emission units for the period for reaching a target. Some of this information is presented in the narrative part of the biennial report.

The Faroese Climate Policy contains a plan of actions on how to reduce emissions of greenhouse gases by at least 20 % in 2020, compared with the level of emissions in 2005. The plan is not an exhaustive outline of how this target can be met, but more a coherent plan of action by the current Government, which can be expanded over time, especially as new and more developed technology is established which can contribute in additional ways to reducing greenhouse gas emissions.

Thus, the action plan for reducing greenhouse gas emissions is based on the quantified economy-wide emission reduction target and the implementation of specific measures in the following three areas:

I. Heating
II. Electricity production
III. Land-based transport

I. Heating.

Target: In 2020 the oil consumption for heating shall be reduced by 50 % by putting into place energy saving measures and new energy efficient and environmental friendly technologies.

Measures: The use of environmentally friendly technologies such as heat pumps, newer and more efficient oil burners and boilers, district heating, solar power and other environmental friendly and renewable energy sources. To perform regular inspection of the above-mentioned systems to ensure that these are as energy efficient as possible.

II. Electricity production

Target: In 2020 about 75 % of the overall production of electricity is derives from renewable energy sources.

Measures: In order to significantly increase the production of electricity from renewable energy sources it is necessary to improve the system.

The Faroese electricity producing company SEV uses about 34,000 tonnes of oil annually for electricity production. In 2017 51 % of SEV's overall electricity production was produced from renewable energy sources, 33 % from hydro energy and 18 % from wind energy. With more windmills and expansion in waterpower in recent years, around 50 % of the electricity production was based on renewable energy sources. In 2015 it was even higher, 60 %. This year the usage of oil was 27.000, i.e. significantly lower than previous years.

Altogether, SEV has produced 300-330 million kWh of electricity yearly for the last five years. The production is steadily increasing.

III. Land-based transport

Target: In 2020 all gas and diesel fuelled vehicles shall be energy efficient and a significant number of vehicles are to run on renewable energy. The aim is to reduce CO_2 emissions from domestic transport by 50 %.

Measures:

- Importing more energy efficient gas and diesel vehicles,
- Encourage the use of vehicles that run on renewable energy,
- Bio-fuels become available when bio fuelled cars are introduced to the Faroese market,
- Public traffic is improved and strategically located junctions provide for easy access.

In addition to above mentioned quantified targets, the government also made target for other three areas:

IV. Ships and aviation

V. Renewable energy

VI. Public awareness and information

In all three cases, the targets have not been quantified, i.e. no specific reduction targets were set.

Proposal for a new Climate Policy 2020-2030

In a move to follow international recommendations, the Faroese Government has decided that the Faroe Islands shall be part of the Paris Agreement.

The Faroe Islands are covered by the Kingdom of Denmark's ratification of the Paris Agreement. The Faroe Islands will, in accordance with the Paris Agreement, define and notify a separate Faroese emission reduction target, National Determinated Contribution, NDC.

In 2019, the Faroese Ministry of Health and the Interior presented a proposal for a new Climate Policy for the Faroe Islands 2020 to 2030[46]. The aim of the proposal is to reduce greenhouse gas emissions from land based sources by 45 % by 2030 compared to the emissions in 2010.

Since round half of Faroe Islands' emission of greenhouse gases originate from fishing vessels, and recognizing that technical solutions to reduce emissions from fishing vessels are not yet fully developed, no exact reduction target has been set for fishing vessels until 2030. The aim though, is to reduce emissions by 50 % by 2050 compared to emissions in 2005, which is the International Maritime Organization's (IMO) goal for shipping.

Progress in achievement of quantified economy-wide emission reduction targets and relevant information

In 2008 the Faroese government published the report *Skjótt syftir seiðir og tunga takið* (Easy pickings and the long haul)[47], listing an arrow of possible measures to reduce greenhouse gas emissions.

In 2011 the Ministry of Trade and Industy published a Comprenhensive Plan for Electric Energy in the Faroe Islands - *Heildarætlan fyri elorkuøkið í Føroyum*[48] in which you can find a series of conclusions and recommendations on planning of the public electricity sector in the Faroes. And further, in 2012, the Ministry of Trade and Industry established a Working Group to draft an Action Plan and a series of Recommendations regarding the future electric energy system in the Faroe Islands, which, to a greater extent than today, would be based on renewable energy resources. The Working Group was composed of representatives from the Ministry of Trade and Industry; the Faroese electric utility, SEV; the Faroese Earth and Energy Directorate (Jarðfeingi), and Dansk Energi. In this Action Plan, the Working Group recommends 26 initiatives and seven specific and detailed initiatives within the areas of production, energy storage, consumption, and the electric system.[49] The goal was to provide a solid foundation upon which to build a future energy system that in the main is based on renewable energy, so that the Faroe Islands is less dependent upon fossil fuel.

In 2018 the Ministry of Interior published a plan for Energy Policy on how to reach the 2025 and 2030 goals[50].

Together with the climate policy from 2009, the documents mentioned are the fundament in reaching the reduction targets for greenhouse gas emissions.

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[46] Uppskot til Veðurlagspolitikk Føroya 2020-2030. Ministry of Health and Interior (2019).

[47] Skjótt syftir seiðir og tunga takið

[48] Comprehensive Plan for Electric Energy in the Faroe Islands. Ministry of Trade and Industry (2011)

[49] Report and Recommendations on the future electric energy system of the Faroe Islands. Action Plan. Ministry of Trade and Industry (2015).

[50] Plan on Energy Policy. Orkupolitisk ætlan - hvussu vit røkka málunum fram til 2025 og 2030. *In Faroese only.*

Mitigation actions and their effects

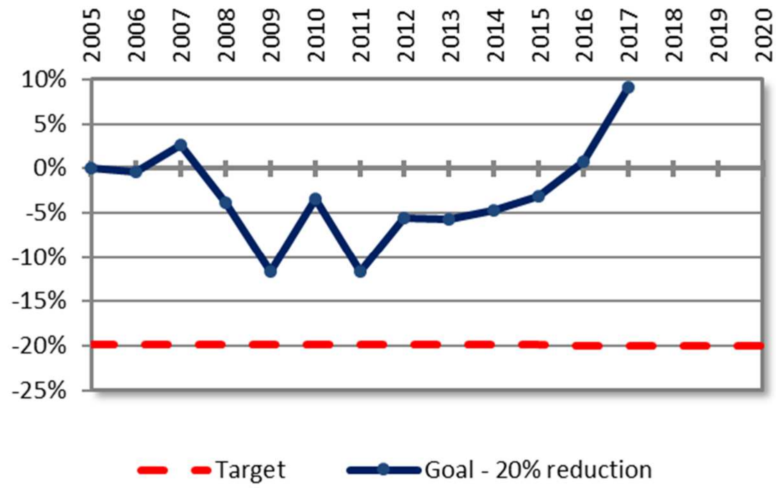
A summary table on mitigation actions in the Faroe Islands is included as Table 3 in the Common Tabular Format (CTF) in Section VIII of this biennial report.

Total emissions

In 2017 the total emission of greenhouse gases had increased by 9 % compared with the emission in 2005. This means that the emission shall be reduced with another nearly 30 % before 2020 to fulfil the target. See Figure VII.C.8.

FIGURE VII.C.8: TOTAL EMISSIONS OF GREENHOUSE GASES IN THE FAROE ISLANDS 2005-2017, RELATIVE COMPARED WITH 2005 AND IN TONNES OF CO_2 EQUIVALENTS (%)

Source: www.us.fo



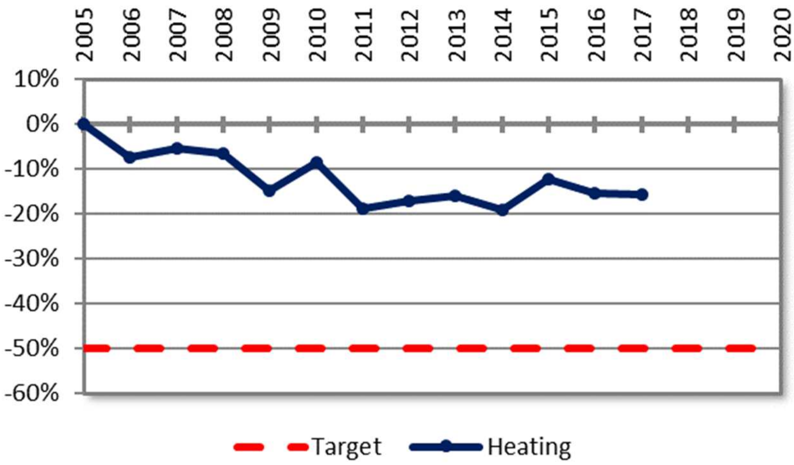
The total emission of greenhouse gases in Figure VII.C.8 does not include emissions from foreign fishing vessels, and the totals are therefore not the same as the totals reported to IPCC (CRF).

Heating

In accordance with the climate policy the amount of oil used for heating shall be reduced to 50 % in 2020. Since 2005, apart from 2010 and 2015, two years with cold weather, there has been a general fall in the emission from heating. In 2014 the emissions were about 20 % lower compared with 2005. But since then, the emissions have increased. In 2017 the emission from heating were 16 % below the base year, which means that 34 % reduction is needed to reach the 50 % reduction goal in 2020. See Figure VII.C.9.

FIGURE VII.C.9: EMISSIONS OF GREENHOUSE GASES FROM HEATING 2005-2017, RELATIVE COMPARED WITH 2005 AND IN TONNES OF CO_2 EQUIVALENTS (%)

Source: www.us.fo



Campaigns to increase the use of heatpumps are on-going. In 2017 around 1200 heat pumps have been installed in the Faroe Islands.

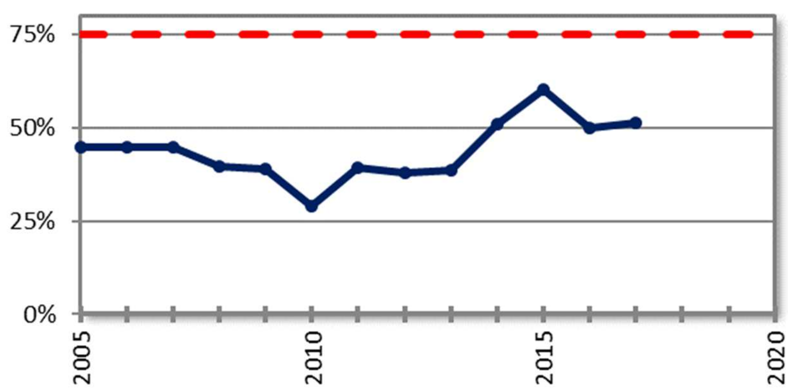
Electricity production

The target in the Climate Policy from 2009 for electricity production is that 75 % of the electricity production shall derive from renewable energy in 2020. In 2017 51 % of the electricity production was based on hydro- and wind power.

In 2014 13 new wind turbines were installed and the amount of renewable energy in electricity production in 2014 was more than 50 %. The main electricity company in the Faroe Islands, SEV, has made effective developments in the wind power systems, changing from oil based electricity production to more wind and hydropower. The company has set the goal to be 100 % green in 2030. Thus, with current plans for new wind mills, it is possible to reach the 75 % target in the climate policy. See Figure VII.C10.

FIGURE VII.C10: THE EMISSIONS OF GREENHOUSE GASES FROM ELECTRICITY PRODUCTION DERIVED FROM RENEWABLE ENERGY 2005-2017, RELATIVE COMPARED WITH 2005 AND IN TONNES OF CO_2 EQUIVALENTS (%)

Source: www.us.fo



Three new wind mill parks are expected to open in 2020 og 2021. In 2020 one park will open in Flatnarhagi outside the capital Tórshavn (6 x 3 MW) and one in Porkeri (7 x 0,9 MW) on the island of Suðuroy. In 2021 the third park is planned to open in Eiði on the island of Eysturoy (6 x 3 MW). In total 42,3 MW is expected to be added to the network in the next 2 years.

Under the coming Danish precidency in the Nordic Council of Ministers, around 15 mill. DKK have been allocated to project in the Faroe Islands with the objective to greening the electricity production in the Faroe Islands, especially on the smaller islands.

The Environment Agency of the Faroes participates in the *Smarter Energy Communities in Northern & Arctic Regions (SECURE)* which is an interregional project funded under the Northern Periphery and Arctic Programme 2014 – 2020[51].

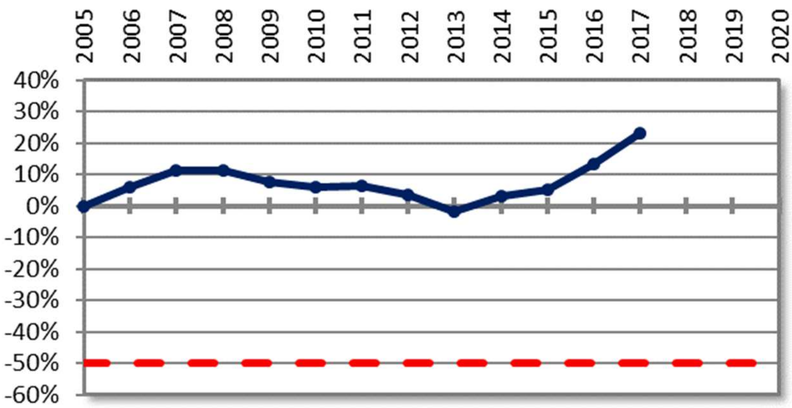
Road traffic

The emission of greenhouse gases from road traffic decreased every year from 2007 to 2013, but has since then increased again, even more the last two years (Figure VII.C.11). The increase is correlated to an increase in the number of cars registrated. With the trend until now it is most unlikely that the 50 % target for road traffic will be reached.

Campaigns to fasten the shift to electric cars are on-going. Ultimo 2017 37 electric cars were registred in the Faroe Islands.

FIGURE VII.C.11: EMISSIONS OF GREENHOUSE GASES FROM ROAD TRAFFIC 2005-2017, RELATIVE COMPARED WITH 2005 AND IN TONNES OF CO_2 EQUIVALENTS (%)

Source: www.us.fo



As part of the reporting on progress in achievement of the quantified economy-wide emission reduction target, information on mitigation actions and their effects is shown in Table VII.C.3 below (similar to table 3 of the CTF). In this regard, information on greenhouse gas emissions 2010-2017 is shown in Table VII.C4 (similar to table 4 of the CTF).

[51] SECURE

TABLE VII.C.3: PROGRESS IN ACHIEVEMENT OF FAROE ISLANDS' QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET: INFORMATION ON MITIGATION ACTIONS AND THEIR EFFECTS

Table 3

Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects

FO no.		Name of mitigation action [a]	Sector(s) affected [b]	GHG(s)	Objective and/ or activity affected	Type of instrument [c]	Status of	Brief description [e]	Start year	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO2		
											2020	2025	2030
E-1		Encourages competition on the green electricity market.	Energy - Public Electricity Production	CO2, CH4, N2O	Reduce prices on green electricity	Regulatory	Implemented	Increase the speed on the shift to green electricity.		Ministry of Environment, Industry and Trade	NE	NE	NE
E-2		Renewable energy sources in the electricity production - HYDROPOWER (*)	Energy - Public Electricity Production.	CO2, CH4, N2O	Reduce fossile fuel consumption		Implemented	Hydropower in the Faroe Islands.	1921	SEV	80	80	80
E-3		Renewable energy sources in the electricity production - WINDPOWER (*)	Energy - Public Electricity Production	CO2, CH4, N2O	Reduce fossile fuel consumption		Implemented	Neshagi I: 2,0 MW Neshagi II: 4,7 MW Tórshavn/Húsahagi: 11,7 MW	2003 2005 2014	SEV and Røkt. Ministry of Environment, Industry and Trade	47	47	47
E-4		Renewable energy sources in the electricity production - WINDPOWER (*)	Energy - Public Electricity Production	CO2, CH4, N2O	Reduce fossile fuel consumption		Adopted	Tórshavn/Flatnhagi: 18 MW Porkeri: 6.3 MW Eiði: 18 MW	2020 2020 2021	SEV, Magn. Ministry of Environment, Industry and Trade	56	97	97
E-5		Renewable energy sources in the electricity production - WINDPOWER (*)	Energy - Public Electricity Production	CO2, CH4, N2O	Reduce fossile fuel consumption		Planned	Four plants, 4x20 MW	2024-2030	Ministry of Environment, Industry and Trade	NA	51	205
E-6		Pump to storage	Energy - Public Electricity Production	CO2, CH4, N2O	Reduce fossile fuel consumption		Planned	Store energy from windpower	2026	SEV	NE	NE	NE
E-7		Biogas plant	Energy - Public Electricity Production	CO2, CH4, N2O	Reduce fossile fuel consumption		Adopted	Capacity: about 100,000 tonnes of biological waste. Goal: heating 400 homes + electricity for 1,900 houses. In addition: around 40,000 tonnes of manure (to fertilize).	2020	"FORKA", part of the Bakkafrost Group.	NA	11	11
E-8		SOLAR CELLS (*)	Energy - Public Electricity Production	CO2, CH4, N2O	Reduce fossile fuel consumption	Research	Implemented	A research field with solar cells in Sumba, on the island of Suðuroy. Two years project.	2019	Ministry of Environment, Industry and Trade	0,1	0,1	0,1
T-1		Registry fees of motor vehicles	Energy - Transport	CO2, CH4, N2O	Reduce fossile fuel consumption in transport.	Fiscal	Implemented	The law on registry fees of motor vehicles shall encourage drivers to shift to vehicles with low or no CO2 emissions.	2017	Ministry of Finance	NE	NE	NE
T-2		Prohibit use of gasoline and diesel cars	Energy - Transport	CO2, CH4, N2O	Reduce fossile fuel consumption	Regulatory	Planned		2030	Ministry of Environment, Industry and Trade	NE	NE	NE
T-3		Campain - use of electric cars	Energy - Transport	CO2, CH4, N2O	Reduce fossile fuel consumption in transport.	Informatory	Implemented	On-going	2018	Environment Agency	NE	NE	NE
A-1		More energy efficient airplanes	Energy - Transport - Civil Aviation	CO2, CH4, N2O	Reduce fossile fuel consumption		Partly implemented	Use more energy efficient aeroplanes.	2020	Atlantic Airways	NE	NE	NE
H-1		Better insulation of houses and buildings	Energy - Heating	CO2, CH4, N2O	Reduce fossile fuel consumption in buildings	Regulatory	Partly implemented	A new order "Bygningskunngerðin" from 2017 has demands for energy in new buildings.	2017	Ministry of Environment, Industry and Trade	NE	NE	NE
H-2		Improve the possibilities of funding for energy saving	Energy - Heating	CO2, CH4, N2O	Reduce fossile fuel consumption in buildings	Economic - regulatory	Implemented	Subsidies til insulate buildings ("Bjálvingarstuðul").		Ministry of Finance	NE	NE	NE
H-3		Energy loans	Energy - Heating	CO2, CH4, N2O	Reduce fossile fuel consumption in buildings		Implemented	The banks are giving loans to energy saving renovations.	2015	Betri banki BankNordik	NE	NE	NE
H-4		District Heating (*)	Energy - Heating	CO2, CH4, N2O	Reduce fossile fuel consumption in buildings		Implemented	Waste Heat from waste incineration and electricity plant.	1989	Municipality of Tórshavn and SEV	12	16	20
H-5		Certification requirements for installation, inspection and maintenance of heating and energy systems	Energy - Heating	CO2, CH4, N2O	Reduce fossile fuel consumption in buildings	Regulatory	Partly implemented. Partly planned			Ministry of Environment, Industry and Trade	NE	NE	NE
H-6		Prohibit the import and sale of non-efficient electricity and energy equipment	Energy - Heating	CO2, CH4, N2O	Reduce fossile fuel consumption in buildings	Regulatory	Planned			Ministry of Environment, Industry and Trade	NE	NE	NE
H-7		Heat Pump campaign	Energy - Heating	CO2, CH4, N2O	Reduce fossile fuel consumption in buildings	Informatory	Implemented	On-going	2018	Ministry of Environment, Industry and Trade	NE	NE	NE
H-8		Heat Pump. (incl. VAT excemption) (*)	Energy - Heating	CO2, CH4, N2O	Reduce fossile fuel consumption in buildings	Regulatory	Implemented		2017	Ministry of Finance	10	20	35
P-1		F-gases	Industrial Processes	HFC SF6	Reduce the use of F-gases	Regulatory	Planned	An order on reduction of use of F-gases will be put in force in order to implement the Kigali amendment to the Montreal protocol.	2020	Ministry of Environment, Industry and Trade	NE	NE	NE

TABLE VII.C.4: REPORTING ON FAROE ISLANDS' PROGRESS

Table 4

Reporting on progress [a, b]

Year [c]	Total emissions excluding LULUCF (kt CO2 eq)	Contribution from LULUCF [d] (kt CO2 eq)	Quantity of units from market based mechanisms under the Convention (number of units and kt CO2 eq)	Quantity of units from other market based mechanisms (number of units and kt CO2 eq)
	(a) total GHG emissions, excluding emissions and removals from the LULUCF sector;	*(b) emissions and/or removals from the LULUCF sector based on the accounting approach applied taking into consideration any relevant decisions of the Conference of the Parties and the activities and/or land that will be accounted for;*	*(c) total GHG emissions, including emissions and removals from the LULUCF sector.*	
Base year/base period (2005)	841	NA	NA	NA
2010	897	NA	NA	NA
2011	778	NA	NA	NA
2012	870	NA	NA	NA
2013	848	NA	NA	NA
2014	885	NA	NA	NA
2015	864	NA	NA	NA
2016	873	NA	NA	NA
2017	1.041	NA	NA	NA

Abbreviation: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] For the base year, information reported on the emission reduction target shall include the following: (a) total GHG emissions, excluding emissions and removals from the LULUCF sector; (b) emissions and/or removals from the LULUCF sector based on the accounting approach applied taking into consideration any relevant decisions of the Conference of the Parties and the activities and/or land that will be accounted for; (c) total GHG emissions, including emissions and removals from the LULUCF sector. For each reported year, information reported on progress made towards the emission reduction targets shall include, in addition to the information noted in paragraphs 9(a–c) of the UNFCCC biennial reporting guidelines for developed country Parties, information on the use of units from market-

[c] Parties may add additional rows for years other than those specified below.

[d] Information in this column should be consistent with the information reported in table 4(a)I or 4(a)II, as appropriate. The Parties for which all relevant information on the LULUCF contribution is reported in table 1 of this common tabular format can refer to table 1.

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

Since the Faroe Islands are not a part of the Kyoto Protocol, marked-based mechanisms are not in use.

No estimation has been made regarding emissions reductions/removals in land use, land-use change and forestry activities in the Faroe Islands. Though a continuously work is going on in planting trees, it is in quite small-scale dimensions.

Projections

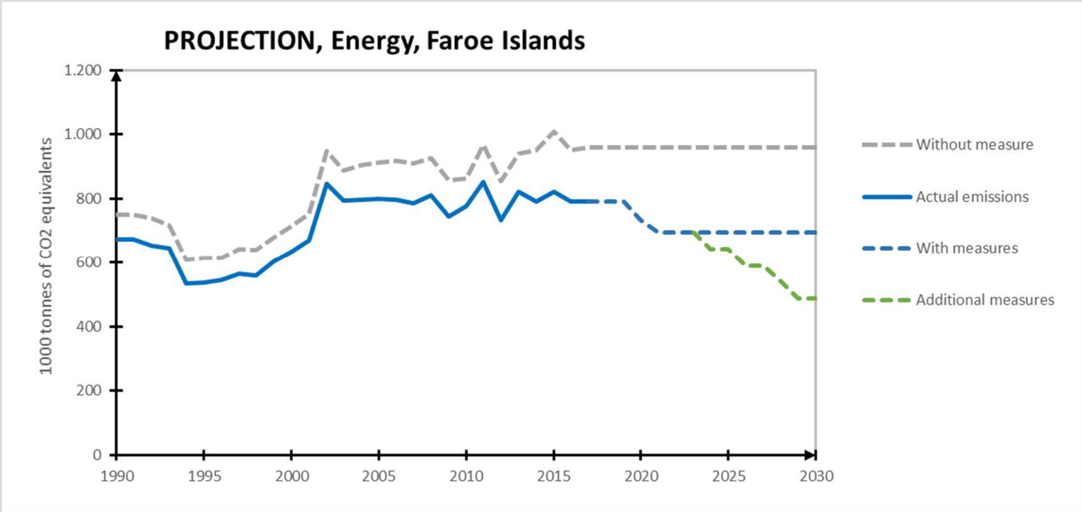
Figure VII.C.12 shows a simple projections for the emissions of greenhouse gases in the Energy sector in the Faroe Islands, 2018-2030.

In order to make the projection, the mitigations of emission of greenhouse gases have been calculated for some of the most effective measures implementend and planned, i.e. hydro power and wind power plants. District heating and heat pumps have also been included in the calculations. See table 3.

The *with measures* graph (in figure VII.C.12), from 1990-2017, is based on data actual emissions (exported from the CRF). The *with measures* projection 2018-2030 is primariliy based on the estimated effect of the mitigations due to the opening of three new windmill parks in 2020-2022 (as described earlier) and on the assumption that the total yearly emissions in 2018-2030 is the same as in 2017.

In the *addidtional measures* graph the plan to establish four additional wind mill parks 2024-2030, are included.

FIGURE VII.C.12 FAROE ISLANDS' GREENHOUSE GAS EMISSIONS KT IN THE ENERGY SECTOR 1990-36, EMISSIONS IN 1900-2017 ARE OBSERVED AND 2016-2030 ARE PROJECTED



The estimated impact of measures are in table VII.C.5.

TABLE VII.C.5: RESULTAS FROM SIMPLE ESTIMATIONS OF EFFECTS OF MEASURES ON THE EMISSIONS OF GREEN HOUSE GASES FROM THE ENERGY SECTOR, 2020, 2025 AND 2030.

Year	1990	1995	2000	2005	2010	2015	2020	2025	2030
With measures	674	538	634	799	776	822	734	693	693
Without measures	749	615	714	914	864	1.009	*960*	*960*	*960*
With additional measures	674	538	634	799	776	822	734	642	488

VIII. Common tabular format for UNFCCC biennial reporting

The information to be reported electronicly in the so-called Common Tabular Format (CTF) contained in Decision 19/CP.18 - Document: FCCC/CP/2012/8/Add.3) adopted by the Conference of the Parties on its eighteenth session is included in this chapter. Where the information in the tables shown in this chapter is difficult to read, please see the electronic version of the CTF available on the UNFCCC web-site (http://unfccc.int/national_reports/biennial_reports_and_iar/submitted_biennial_reports/items/7550.php)

As Greenland and the Faroe Islands are not in the EU territory and the assessment of Denmark's contribution to the progress towards the joint EU target for 2020 is relevant to Denmark only. Therefore only inventory data for Denmark are included in Table 1 of the CTF.

Inventory data for Greenland and the Faore Islands are shown separately in Chapter VII. Inventory data for total emissions in the realm are included in Annex A1 of Denmark's Seventh National Communication.

The following notation keys have been used in the tables:

NA = Not Applicable.
NE = Not Estimated.
NO = Not Occuring.
IE = Included Elsewhere.
INA = Information Not Available

TABLE 1: EMISSION TRENDS (SUMMARY) IN THE KINGDOM OF DENMARK (DENMARK, GREENLAND AND FAROE ISLANDS)

CTF: Table 1

Emission trends: summary

CRF: TABLE 10 EMISSION TRENDS — Inventory 2017

SUMMARY — Submission 2019 v1

(Sheet 6 of 6) — DENMARK (KINGDOM)

Denmark, Greenland and the Faroe Islands under the UNFCCC

GREENHOUSE GAS EMISSIONS	Base year(1)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	CO_2 equivalent (kt)																													(%)
CO_2 emissions without net CO_2 from LULUCF	54850	54850	65434	59599	61687	65704	62658	75989	66605	62398	59844	55611	57325	56898	62057	56503	52934	60859	56103	52648	50201	50695	45666	41229	43082	38872	36514	38329	36283	-33,85
CO_2 emissions with net CO_2 from LULUCF	59568	59568	69678	64780	65633	69093	66060	78805	69844	65623	63360	58998	61338	61881	66688	60865	57172	65427	58146	50082	51945	49467	42833	40278	43259	38722	39925	42608	39035	-34,47
CH_4 emissions without CH_4 from LULUCF	7635	7635	7825	7903	8098	7988	8061	8174	8063	8117	8019	7910	8147	8074	8080	7903	7666	7571	7554	7422	7279	7345	7185	7054	6954	6925	6857	6914	6920	-9,36
CH_4 emissions with CH_4 from LULUCF	7828	7828	8017	8095	8289	8178	8252	8364	8252	8305	8207	8098	8334	8260	8267	8089	7852	7757	7740	7608	7465	7529	7373	7243	7144	7113	7048	7107	7112	-9,15
N_2O emissions without N_2O from LULUCF	7988	7988	7826	7573	7378	7300	7250	6876	6916	6960	7052	6993	6772	6767	6635	6179	5527	5426	5604	5556	5337	5233	5232	5139	5120	5259	5247	5385	5473	-31,49
N_2O emissions with N_2O from LULUCF	8015	8015	7853	7600	7405	7327	7277	6903	6942	6987	7079	7020	6798	6793	6661	6205	5553	5452	5631	5582	5363	5260	5259	5166	5147	5287	5280	5416	5501	-31,37
HFCs	NO,NE,NA	NO,NE,NA	NO,NE,NA	4	110	157	258	399	399	532	678	774	766	800	818	874	924	947	981	982	1004	852	773	779	711	658	514	565	472	100,00
PFCs	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0	1	2	5	11	16	23	28	28	25	21	19	21	21	18	20	17	12	3	4	3	0	0	1	100,00
Unspecified mix of HFCs and PFCs	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
SF_6	42	42	61	86	98	118	104	59	71	58	63	57	29	24	30	32	21	35	29	31	35	37	78	130	150	155	122	104	76	79,31
NF_3	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Total (without LULUCF)	70515	70515	81146	75165	77370	81267	78332	91500	82058	78077	75672	71368	73066	72590	77645	71511	67091	74859	70293	66657	63876	64178	58947	54335	56021	51871	49254	51298	49226	-30,19
Total (with LULUCF)	75454	75454	85609	80565	81535	84874	81951	94533	85513	81517	79403	74968	77293	77787	82488	76086	71541	79639	72548	64302	65831	63162	56327	53600	56416	51937	52887	55801	52197	-30,82
Total (without LULUCF, with indirect)	71645	71645	82323	76312	78497	82349	79394	92552	83037	79019	76551	72192	73864	73342	78373	72201	67751	75478	70871	67207	64364	64648	59352	54703	56364	52183	49552	51583	49506	-30,90
Total (with LULUCF, with indirect)	76583	76583	86786	81711	82662	85956	83012	95585	86492	82459	80282	75792	78091	78539	83216	76776	72202	80258	73125	64853	66319	63632	56732	53969	56758	52249	53185	56087	52478	-31,48

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year(1)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	CO_2 equivalent (kt)																													(%)
1. Energy	53687	53687	64344	58495	60674	64679	61649	75144	65677	61621	59225	54862	56690	56166	61467	55875	52189	60102	55283	52028	49960	50626	45269	40687	42452	38169	35856	37476	35325	-34,20
2. Industrial processes and product use	2344	2344	2472	2527	2605	2723	2901	3048	3134	3266	3544	3707	3550	3491	3492	3317	2786	2844	2879	2573	2147	1936	2076	2114	2077	2043	1881	2087	2077	-11,38
3. Agriculture	12705	12705	12543	12376	12325	12164	12167	11741	11755	11745	11397	11294	11287	11364	11107	11045	10851	10591	10821	10767	10524	10442	10432	10408	10388	10560	10433	10610	10677	-15,96
4. Land use, land-use change and forestry(5)	4938	4938	4463	5400	4165	3607	3619	3033	3455	3440	3731	3601	4227	5197	4843	4575	4451	4780	2255	-2354	1955	-1016	-2620	-735	394	66	3633	4503	2972	-39,82
5. Waste	1779	1779	1787	1768	1767	1700	1616	1567	1492	1444	1507	1505	1539	1569	1579	1274	1264	1322	1311	1288	1244	1175	1170	1126	1104	1099	1084	1124	1146	-35,59
6. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
Total (including LULUCF)(5)	75454	75454	85609	80565	81535	84874	81951	94533	85513	81517	79403	74968	77293	77787	82488	76086	71541	79639	72548	64302	65831	63162	56327	53600	56416	51937	52887	55801	52197	-30,82

TABLE 1(0): EMISSION TRENDS (GHGS) IN THE KINGDOM OF DENMARK (DENMARK, GREENLAND AND FAROE ISLANDS)

CTF: Table 1
(cont.) Emission trends (GHG)
CRF: TABLE 10 EMISSION TRENDS
GHG CO_2 eq emissions
(Sheet 1 of 6)
Denmark under the EU (i.e. without Greenland and the Faroe Islands)

Inventory 2017
Submission 2019 v1
DENMARK

(kt CO_2 eq)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total (net emissions)[2]	74099	74099	84290	79271	80402	83784	80815	93313	84276	80256	78112
1. Energy	52388	52388	63079	57255	59594	63645	60570	73982	64499	60420	57997
A. Fuel combustion (sectoral approach)	51871	51871	62156	56298	58749	62800	59871	73221	63464	59604	56431
1. Energy industries	26251	26251	35154	30227	31850	35936	32559	44984	35816	32188	29096
2. Manufacturing industries and construction	5431	5431	5870	5728	5649	5791	5918	6069	6092	6065	6136
3. Transport	10752	10752	11264	11465	11515	11942	12075	12336	12535	12543	12575
4. Other sectors	9266	9266	9524	8678	9435	8812	8996	9581	8772	8520	8354
5. Other	170	170	343	199	300	319	323	250	249	287	269
B. Fugitive emissions from fuels	517	517	924	958	846	845	699	761	1035	816	1566
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	517	517	924	958	846	845	699	761	1035	816	1566
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Industrial Processes	2344	2344	2472	2526	2604	2723	2901	3047	3132	3264	3538
A. Mineral industry	1082	1082	1260	1383	1401	1423	1422	1530	1604	1636	1613
B. Chemical industry	1003	1003	918	812	765	776	870	803	816	776	914
C. Metal industry	60	60	60	60	70	77	73	44	49	58	59
D. Non-energy products from fuels and solvent use	166	166	181	190	174	194	185	196	182	187	191
E. Electronic industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes	NO	NO	NO	4	110	157	258	401	403	542	688
G. Other product manufacture and use	33	33	52	78	84	95	92	72	79	64	72
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Agriculture	12668	12668	12506	12340	12290	12128	12129	11703	11716	11707	11359
A. Enteric fermentation	4039	4039	4070	4019	4074	3978	3967	3965	3829	3833	3685
B. Manure management	2523	2523	2613	2769	2865	2806	2796	2827	2914	3049	2992
C. Rice cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural soils	5485	5485	5308	5146	4998	4928	4825	4489	4486	4557	4404
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field burning of agricultural residues	3	3	3	3	3	3	3	3	4	4	4
G. Liming	565	565	463	357	307	367	496	393	470	252	265
H. Urea application	15	15	12	13	13	18	15	9	4	4	3
I. Other carbon-containing fertilizers	38	38	37	33	30	27	26	16	10	7	6
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4. Land use, land-use change and forestry[2]	4938	4938	4463	5399	4164	3606	3618	3032	3454	3440	3730
A. Forest land	-543	-543	-545	-546	-548	-550	-552	-553	-556	-558	-560
B. Cropland	4384	4384	3800	4924	3918	3269	3291	2679	2969	2873	3074
C. Grassland	979	979	973	960	958	940	898	929	933	902	870
D. Wetlands	103	103	95	95	83	79	75	90	112	93	76
E. Settlements	17	17	18	19	20	20	21	22	23	24	25
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G. Harvested wood products	-2	-2	123	-51	-265	-153	-116	-135	-26	106	245
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5. Waste	1762	1762	1769	1750	1749	1682	1598	1549	1474	1425	1488
A. Solid waste disposal	1536	1536	1536	1517	1500	1418	1331	1290	1201	1125	1138
B. Biological treatment of solid waste	52	52	60	65	74	78	83	97	112	148	206
C. Incineration and open burning of waste	0	0	0	0	0	0	0	0	0	0	0
D. Waste water treatment and discharge	150	150	150	143	152	162	158	136	136	130	120
E. Other	23	23	23	25	23	23	25	26	24	22	23
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Memo items:											
International bunkers	4828	4828	4357	4540	5939	6637	6913	6762	6403	6565	6404
Aviation	1792	1792	1654	1713	1679	1840	1886	1982	2027	2179	2308
Navigation	3036	3036	2703	2827	4260	4798	5027	4779	4376	4386	4096
Multilateral operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
CO_2 emissions from biomass	4389	4389	4764	4998	5201	5137	5368	5726	5917	5869	6171
CO_2 captured	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA
Long-term storage of C in waste disposal sites	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Indirect N_2O	576	576	638	577	619	639	621	663	588	559	529
Indirect CO_2 [3]	1129	1129	1177	1146	1127	1082	1062	1052	978	942	879
Total CO_2 equivalent emissions without land use, land-use change and forestry	69161	69161	79827	73872	76238	80178	77197	90281	80821	76816	74382
Total CO_2 equivalent emissions with land use, land-use change and forestry	74099	74099	84290	79271	80402	83784	80815	93313	84276	80256	78112
Total CO_2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry	70291	70291	81004	75018	77365	81260	78259	91333	81800	77758	75260
Total CO_2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry	75229	75229	85467	80417	81529	84866	81877	94365	85254	81198	78991

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year (%)
Total (net emissions)[2]	73566	75761	76342	80965	74567	70021	78113	71004	62798	64385	61551	54788	52117	54974	50500	51468	54371	50582	-31,74
1. Energy	53524	55227	54793	60019	54435	50747	58654	53817	50605	48591	49094	43809	39288	41099	36826	34540	36161	33829	-35,43
A. Fuel combustion (sectoral approach)	52434	54073	53767	59001	53301	49870	57804	52967	49958	48127	48526	43388	38921	40707	36428	34149	35742	33446	-35,52
1. Energy industries	26051	27363	27574	32311	26404	23169	31070	26380	24287	24222	24104	20085	16900	19093	15554	12881	14054	11574	-55,91
2. Manufacturing industries and construction	5927	6029	5685	5659	5742	5446	5579	5326	4820	3998	4419	4346	4021	3871	3881	3833	3909	4025	-25,89
3. Transport	12469	12522	12688	13150	13377	13586	13912	14455	14291	13532	13405	13100	12524	12330	12445	12722	13012	13209	22,85
4. Other sectors	7786	7968	7631	7686	7430	7290	7012	6526	6348	6113	6390	5563	5261	5172	4316	4515	4559	4333	-53,24
5. Other	201	191	188	195	348	379	232	280	211	263	209	295	216	241	232	198	208	306	79,26
B. Fugitive emissions from fuels	1090	1154	1026	1018	1134	877	850	850	647	464	568	421	367	392	398	391	419	383	-25,83
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
2. Oil and natural gas and other emissions from energy production	1090	1154	1026	1018	1134	877	850	850	647	464	568	421	367	392	398	391	419	383	-25,83
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
2. Industrial Processes	3699	3537	3475	3472	3295	2764	2822	2856	2549	2124	1911	2052	2085	2042	2001	1829	2025	2010	-14,26
A. Mineral industry	1633	1629	1670	1542	1660	1567	1621	1621	1336	888	807	997	998	994	1023	1049	1231	1333	23,18
B. Chemical industry	966	852	745	861	511	1	1	1	1	1	1	1	1	1	1	2	1	1	-99,86
C. Metal industry	61	47	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	-99,72
D. Non-energy products from fuels and solvent use	190	176	199	190	192	215	195	199	184	174	201	192	183	195	182	172	164	172	3,92
E. Electronic industry	NO	NO	NO	NO	NO	NO	5	9	6	11	13	11	5	4	5	NO	NO	1	100,00
F. Product uses as ODS substitutes	789	782	812	823	873	922	941	971	970	990	832	750	748	677	615	462	504	405	100,00
G. Other product manufacture and use	60	51	48	56	58	43	58	54	51	60	58	100	148	171	175	144	125	97	193,67
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
3. Agriculture	11256	11249	11327	11069	11007	10813	10554	10783	10730	10487	10405	10395	10371	10350	10524	10397	10574	10642	-16,00
A. Enteric fermentation	3631	3703	3646	3604	3496	3483	3484	3565	3596	3596	3631	3590	3672	3694	3695	3667	3717	3731	-7,64
B. Manure management	3034	3163	3262	3281	3368	3167	2989	2980	2836	2757	2800	2769	2681	2619	2639	2609	2571	2528	0,21
C. Rice cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
D. Agricultural soils	4319	4173	4179	3951	3979	3937	3879	4041	4062	3943	3814	3867	3822	3788	3946	3939	4067	4160	-24,15
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
F. Field burning of agricultural residues	4	4	4	4	5	5	5	4	4	4	3	3	4	4	4	3	3	4	35,37
G. Liming	261	201	233	226	158	220	194	192	229	181	153	162	188	244	238	166	212	214	-62,09
H. Urea application	2	2	1	1	1	0	1	1	0	2	1	1	1	1	1	1	2	2	-89,50
I. Other carbon-containing fertilizers	5	4	3	2	1	2	1	1	2	4	3	3	2	2	2	10	3	3	-91,72
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
4. Land use, land-use change and forestry[2]	3600	4226	5197	4843	4574	4450	4779	2254	-2355	1955	-1018	-2621	-736	393	65	3632	4502	2971	-39,84
A. Forest land	-563	637	598	559	521	560	504	-2601	-6525	-1520	-3751	-5787	-4069	-2439	-3988	215	899	-84	-84,55
B. Cropland	3182	2484	3467	3228	2975	2786	3176	3824	3259	2536	1848	2285	2360	1950	3087	2596	2788	2335	-46,74
C. Grassland	854	842	835	829	825	840	862	836	846	823	805	815	832	831	1008	873	798	763	-22,09
D. Wetlands	75	84	94	90	97	115	119	101	82	97	90	98	80	53	62	56	57	46	-54,94
E. Settlements	26	27	28	29	29	51	53	55	58	60	62	64	129	85	44	63	135	73	332,94
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
G. Harvested wood products	26	153	174	108	127	98	65	39	-75	-41	-72	-96	-67	-87	-146	-171	-174	-162	6716,40
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
5. Waste	1487	1521	1551	1561	1257	1246	1305	1293	1270	1228	1159	1153	1110	1089	1085	1070	1109	1131	-35,81
A. Solid waste disposal	1073	1117	1042	1064	936	909	954	907	877	838	772	774	743	704	689	653	619	593	-61,42
B. Biological treatment of solid waste	264	258	353	359	188	194	219	245	238	262	256	246	243	254	263	282	355	403	669,76
C. Incineration and open burning of waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43,39
D. Waste water treatment and discharge	126	122	133	114	110	120	109	116	132	106	111	114	107	113	116	118	115	118	-21,79
E. Other	23	23	22	24	22	23	23	24	23	22	19	19	17	18	16	17	19	17	-23,38
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
Memo items:																			
International bunkers	6430	5740	4794	5040	4793	4972	5773	5992	5501	3832	4515	4618	4047	4398	4972	4963	4824	4417	-8,52
Aviation	2366	2398	2073	2156	2470	2595	2601	2666	2662	2326	2428	2498	2523	2498	2707	2650	2850	2935	63,79
Navigation	4064	3342	2720	2884	2323	2377	3171	3326	2839	1506	2087	2120	1525	1901	2264	2313	1973	1482	-51,20
Multilateral operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0,00
CO_2 emissions from biomass	6485	7185	7646	8724	9459	10220	10591	11612	11826	12135	14464	14105	14477	14572	14592	15709	16784	18798	328,33
CO_2 captured	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Long-term storage of C in waste disposal sites	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0,00
Indirect N_2O	516	489	461	480	443	437	465	455	413	333	347	335	295	302	303	301	292	271	-53,00
Indirect CO_2 [3]	824	797	751	728	690	660	619	577	551	488	470	405	369	342	312	298	285	281	-75,13
Total CO_2 equivalent emissions without land use, land-use change and forestry	69966	71534	71145	76122	69994	65571	73334	68750	65154	62430	62568	57409	52853	54581	50435	47835	49869	47612	-31,16
Total CO_2 equivalent emissions with land use, land-use change and forestry	73566	75761	76342	80965	74567	70021	78113	71004	62798	64385	61551	54788	52117	54974	50500	51468	54371	50582	-31,74
Total CO_2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry	70790	72332	71897	76850	70684	66231	73953	69327	65705	62918	63038	57813	53221	54923	50747	48133	50154	47892	-31,87
Total CO_2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry	74390	76558	77093	81693	75258	70681	78732	71581	63349	64873	62020	55193	52485	55317	50812	51766	54657	50863	-32,39

TABLE 1(A): EMISSION TRENDS (CO_2) IN THE KINGDOM OF DENMARK (DENMARK, GREENLAND AND FAROE ISLANDS)

CTF: Table 1

(cont.) Emission trends (CO2)

CRF: TABLE 10 EMISSION TRENDS

CO_2

(Sheet 2 of 6)

Inventory 2017

Submission 2019 v1

DENMARK

Denmark, Greenland and the Faroe Islands under the UNFCCC

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1. Energy	52930	52930	63426	57566	59702	63617	60449	73783	64276	60244	57698	53454	55241	54767
A. Fuel combustion (sectoral approach)	52589	52589	62776	56889	59120	63039	59995	73285	63578	59721	56591	52731	54470	54093
1. Energy industries	26429	26429	35291	30359	31911	35889	32360	44684	35554	31907	28820	25822	27152	27336
2. Manufacturing industries and construction	5455	5455	5900	5729	5646	5785	5912	6061	6086	6066	6142	5939	6047	5706
3. Transport	10774	10774	11276	11482	11511	11919	12069	12331	12544	12556	12600	12502	12564	12736
4. Other sectors	9756	9756	9963	9116	9749	9124	9330	9956	9142	8904	8757	8263	8512	8124
5. Other	175	175	346	203	302	320	324	252	251	289	271	204	194	190
B. Fugitive emissions from fuels	341	341	650	677	582	578	454	498	698	523	1107	724	771	674
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	341	341	650	677	582	578	454	498	698	523	1107	724	771	674
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Industrial processes	1279	1279	1472	1604	1612	1652	1647	1762	1821	1867	1848	1865	1853	1870
A. Mineral industry	1082	1082	1260	1383	1401	1423	1422	1530	1604	1636	1613	1633	1629	1670
B. Chemical industry	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C. Metal industry	30	30	30	30	36	34	39	35	35	43	43	41	47	0
D. Non-energy products from fuels and solvent use	166	166	181	190	174	194	185	196	182	187	191	190	175	199
E. Electronic industry														
F. Product uses as ODS substitutes														
G. Other product manufacture and use	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Agriculture	619	619	512	403	350	412	537	418	483	264	274	268	207	237
A. Enteric fermentation														
B. Manure management														
C. Rice cultivation														
D. Agricultural soils														
E. Prescribed burning of savannas														
F. Field burning of agricultural residues														
G. Liming	566	566	463	357	307	367	496	393	470	252	265	261	201	233
H. Urea application	15	15	12	13	13	18	15	9	4	4	3	2	2	1
I. Other carbon-containing fertilizers	38	38	37	33	30	27	26	16	10	7	6	5	4	3
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4. Land use, land-use change and forestry [2]	4718	4718	4244	5181	3946	3389	3401	2816	3239	3225	3516	3386	4013	4984
A. Forest land	-574	-574	-577	-579	-582	-585	-588	-591	-595	-598	-601	-605	594	554
B. Cropland	4252	4252	3669	4794	3790	3143	3166	2556	2847	2753	2956	3065	2369	3353
C. Grassland	925	925	919	907	906	889	847	879	883	853	822	807	795	789
D. Wetlands	101	101	92	92	79	76	71	86	107	87	70	69	77	87
E. Settlements	17	17	18	18	19	20	21	22	23	23	24	25	26	27
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G. Harvested wood products	-2	-2	123	-51	-265	-153	-116	-135	-26	106	245	26	153	174
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5. Waste	23	23	23	25	23	23	25	26	25	24	24	24	24	23
A. Solid waste disposal	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA
B. Biological treatment of solid waste														
C. Incineration and open burning of waste	3	3	3	3	3	3	3	3	3	4	3	3	3	3
D. Waste water treatment and discharge														
E. Other	20	20	21	22	20	20	23	23	22	20	21	21	20	20
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Memo items:														
International bunkers	4786	4786	4319	4606	6031	6721	6986	6845	6485	6620	6469	6509	5817	4830
Aviation	1774	1774	1638	1696	1662	1821	1867	1962	2007	2157	2285	2342	2375	2053
Navigation	3012	3012	2682	2910	4369	4900	5119	4883	4479	4463	4185	4167	3442	2776
Multilateral operations	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO
CO_2 emissions from biomass	4408	4408	4784	5019	5222	5157	5390	5750	5943	5900	6205	6522	7223	7686
CO_2 captured	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA
Long-term storage of C in waste disposal sites	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Indirect N_2O														
Indirect CO_2 [3]	1129	1129	1177	1146	1127	1082	1062	1052	978	942	879	824	797	751
Total CO_2 equivalent emissions without land use, land-use change and forestry	54850	54850	65434	59599	61687	65704	62658	75989	66605	62398	59844	55611	57325	56898
Total CO_2 equivalent emissions with land use, land-use change and forestry	59568	59568	69678	64780	65633	69093	66060	78805	69844	65623	63360	58998	61338	61881
Total CO_2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry	55980	55980	66611	60745	62814	66786	63720	77041	67583	63340	60723	56435	58122	57649
Total CO_2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry	60697	60697	70855	65926	66760	70175	67122	79857	70822	66565	64239	59822	62135	62633

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt)															%
1. Energy	60070	54467	50889	58823	54064	50872	48928	49509	44291	39836	41626	37408	35097	36696	34539	-34,75
A. Fuel combustion (sectoral approach)	59400	53714	50341	58291	53520	50485	48667	49156	44039	39619	41383	37158	34849	36423	34299	-34,78
1. Energy industries	32087	26198	23002	30921	26296	24211	24152	24107	20141	16906	19084	15584	12923	14081	11602	-56,10
2. Manufacturing industries and construction	5702	5778	5485	5611	5365	4859	4021	4432	4370	4050	3909	3914	3861	3945	4075	-25,29
3. Transport	13205	13455	13676	14010	14561	14410	13641	13512	13213	12630	12428	12538	12808	13122	13328	23,70
4. Other sectors	8208	7933	7798	7511	7013	6787	6577	6875	6002	5803	5720	4890	5052	5062	4987	-48,88
5. Other	198	350	381	238	284	218	276	230	313	229	243	232	206	211	307	75,01
B. Fugitive emissions from fuels	670	752	548	531	544	387	261	353	252	217	243	250	247	273	240	-29,54
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
2. Oil and natural gas and other emissions from energy production	670	752	548	531	544	387	261	353	252	217	243	250	247	273	240	-29,54
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
2. Industrial processes	1733	1854	1800	1817	1821	1522	1063	1009	1190	1183	1190	1206	1222	1397	1506	17,80
A. Mineral industry	1542	1660	1567	1621	1621	1336	888	807	997	998	994	1023	1049	1231	1333	23,18
B. Chemical industry	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	139,97
C. Metal industry	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	-99,44
D. Non-energy products from fuels and solvent use	190	192	215	195	198	184	174	200	192	183	194	181	172	164	172	3,73
E. Electronic industry																
F. Product uses as ODS substitutes																
G. Other product manufacture and use	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	222,12
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
3. Agriculture	229	160	222	196	194	231	187	156	165	192	246	240	177	217	219	-64,58
A. Enteric fermentation																
B. Manure management																
C. Rice cultivation																
D. Agricultural soils																
E. Prescribed burning of savannas																
F. Field burning of agricultural residues																
G. Liming	226	158	220	194	192	229	181	153	162	188	244	238	166	212	214	-62,09
H. Urea application	1	1	0	1	1	0	2	1	1	1	1	1	1	2	2	-89,50
I. Other carbon-containing fertilizers	2	1	2	1	1	2	4	3	3	2	2	2	10	3	3	-91,72
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
4. Land use, land-use change and forestry [2]	4631	4362	4238	4568	2043	-2566	1743	-1227	-2833	-951	177	-150	3410	4278	2752	-41,67
A. Forest land	513	473	512	456	-2650	-6576	-1572	-3803	-5840	-4121	-2492	-4041	162	846	-137	-76,10
B. Cropland	3116	2864	2676	3068	3717	3154	2433	1746	2181	2256	1848	2985	2487	2672	2228	-47,60
C. Grassland	784	781	796	818	793	804	781	764	775	791	788	966	832	763	725	-21,63
D. Wetlands	83	89	107	109	90	71	85	77	84	65	38	46	40	40	30	-70,29
E. Settlements	27	28	50	51	53	56	58	60	62	125	81	40	60	131	68	310,52
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
G. Harvested wood products	108	127	98	65	39	-75	-41	-72	-96	-67	-87	-146	-171	-174	-162	6716,40
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
5. Waste	25	23	23	24	24	24	23	21	20	19	19	18	18	20	19	-17,43
A. Solid waste disposal	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0,00
B. Biological treatment of solid waste																
C. Incineration and open burning of waste	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	24,59
D. Waste water treatment and discharge																
E. Other	22	20	20	21	21	20	20	17	17	15	16	14	15	17	16	-22,71
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
Memo items:																
International bunkers	5064	4869	5030	5769	5994	5518	3896	4634	4767	4133	4427	5009	4957	4881	4488	-6,24
Aviation	2135	2446	2570	2576	2640	2636	2304	2404	2474	2498	2474	2681	2624	2822	2906	63,84
Navigation	2929	2424	2460	3193	3354	2882	1593	2230	2293	1635	1954	2329	2333	2058	1581	-47,50
Multilateral operations	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	0,00
CO_2 emissions from biomass	8762	9497	10257	10629	11654	11867	12173	14506	14145	14517	14612	14635	15753	16829	18844	327,48
CO_2 captured	NO,NA	NO,NA		NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Long-term storage of C in waste disposal sites	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0,00
Indirect N_2O																
Indirect CO_2 [3]	728	690	660	619	577	551	488	470	405	369	342	312	298	285	281	-75,13
Total CO_2 equivalent emissions without land use, land-use change and forestry	62057	56503	52934	60859	56103	52648	50201	50695	45666	41229	43082	38872	36514	38329	36283	-33,85
Total CO_2 equivalent emissions with land use, land-use change and forestry	66688	60865	57172	65427	58146	50082	51945	49467	42833	40278	43259	38722	39925	42608	39035	-34,47
Total CO_2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry	62785	57193	53594	61478	56681	53199	50689	51164	46071	41598	43424	39184	36813	38615	36564	-34,68
Total CO_2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry	67416	61555	57833	66046	58724	50633	52433	49937	43237	40647	43601	39034	40223	42893	39316	-35,23

TABLE 1(B): EMISSION TRENDS (CH_4) IN THE KINGDOM OF DENMARK (DENMARK, GREENLAND AND FAROE ISLANDS)

CTF: Table 1
(cont.) Emission trends (CH4)
CRF: TABLE 10 EMISSION TRENDS
CH_4
(Sheet 3 of 6)
Denmark, Greenland and the Faroe Islands under the UNFCCC

Inventory 2017
Submission 2019 v1
DENMARK

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[(1)]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014			2015	Change from base to latest reported year
	(kt)																													%
1. Energy	15,63	15,63	18,47	19,19	21,16	24,37	30,09	34,57	35,59	36,28	38,54	36,75	37,74	36,59	35,89	36,37	33,93	32,14	29,93	28,65	25,17	27,22	23,15	18,78	17,25	15,06	14,55	14,85	15,00	-4,01
A. Fuel combustion (sectoral approach)	10,73	10,73	11,78	12,36	14,43	17,45	23,16	27,23	26,74	27,92	27,52	26,88	27,56	26,92	26,43	26,10	24,33	22,85	21,20	20,77	18,70	20,91	17,88	14,15	12,95	10,76	10,49	10,86	11,03	2,77
1. Energy industries	0,64	0,64	0,98	1,38	3,00	6,09	11,42	14,60	13,92	15,31	15,41	14,70	15,59	15,15	14,41	14,10	12,45	11,54	9,62	10,13	8,85	11,02	9,24	6,40	5,64	4,05	3,45	3,96	4,06	535,42
2. Manufacturing industries and construction	0,33	0,33	0,35	0,33	0,34	0,34	0,40	0,77	0,77	0,87	0,86	1,07	1,13	1,03	1,00	1,01	0,87	0,73	0,52	0,56	0,51	0,57	0,53	0,37	0,34	0,39	0,55	0,55	0,72	115,78
3. Transport	3,23	3,23	3,35	3,36	3,30	3,24	3,09	2,93	2,79	2,64	2,45	2,26	2,06	1,92	1,81	1,67	1,51	1,37	1,24	1,05	0,89	0,82	0,71	0,62	0,55	0,51	0,49	0,47	0,45	-86,15
4. Other sectors	6,44	6,44	7,01	7,20	7,70	7,69	8,15	8,84	9,16	9,00	8,71	8,76	8,69	8,72	9,13	9,25	9,42	9,15	9,78	8,99	8,41	8,47	7,38	6,74	6,41	5,79	5,99	5,88	5,78	-10,30
5. Other	0,08	0,08	0,10	0,09	0,09	0,10	0,10	0,10	0,10	0,10	0,10	0,09	0,09	0,09	0,08	0,08	0,07	0,06	0,05	0,04	0,04	0,03	0,03	0,02	0,02	0,01	0,01	0,01	0,01	-85,76
B. Fugitive emissions from fuels	4,90	4,90	6,69	6,82	6,73	6,92	6,92	7,33	8,85	8,36	11,01	9,87	10,18	9,68	9,45	10,27	9,61	9,29	8,74	7,88	6,47	6,31	5,27	4,63	4,30	4,29	4,06	3,98	3,98	-18,86
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
2. Oil and natural gas and other emissions from energy production	4,90	4,90	6,69	6,82	6,73	6,92	6,92	7,33	8,85	8,36	11,01	9,87	10,18	9,68	9,45	10,27	9,61	9,29	8,74	7,88	6,47	6,31	5,27	4,63	4,30	4,29	4,06	3,98	3,98	-18,86
C. CO_2 transport and storage																														
2. Industrial processes	0,10	0,10	0,09	0,11	0,09	0,09	0,10	0,11	0,13	0,11	0,12	0,13	0,12	0,15	0,17	0,16	0,15	0,17	0,13	0,12	0,12	0,10	0,09	0,13	0,13	0,11	0,14	0,09	0,09	-5,98
A. Mineral industry																														
B. Chemical industry	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
D. Non-energy products from fuels and solvent use	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,02	0,02	0,02	0,01	0,01	0,02	0,02	0,01	0,02	0,02	0,02	0,02	0,02	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	59,74
E. Electronic industry																														
F. Product uses as ODS substitutes																														
G. Other product manufacture and use	0,09	0,09	0,08	0,10	0,08	0,07	0,09	0,10	0,12	0,10	0,11	0,12	0,10	0,14	0,16	0,14	0,12	0,15	0,11	0,10	0,10	0,08	0,07	0,11	0,11	0,09	0,12	0,07	0,07	-15,27
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
3. Agriculture	224,59	224,59	229,10	232,11	238,31	233,81	234,40	235,57	233,16	237,42	230,27	229,92	236,67	237,32	236,94	234,75	228,53	224,22	227,21	224,74	223,53	226,66	224,38	224,79	223,50	224,48	222,64	223,69	222,94	-0,73
A. Enteric fermentation	162,70	162,70	163,89	161,81	164,01	160,22	159,82	159,74	154,31	154,43	148,49	146,32	149,24	146,93	145,27	140,96	140,44	140,46	143,69	144,94	144,91	146,31	144,67	147,95	148,84	148,84	147,74	149,72	150,28	-7,63
B. Manure management	61,80	61,80	65,12	70,21	74,20	73,50	74,48	75,72	78,74	82,85	81,64	83,47	87,29	90,28	91,54	93,66	87,95	83,61	83,39	79,69	78,48	80,24	79,61	76,73	74,54	75,51	74,80	73,87	72,54	17,37
C. Rice cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
D. Agricultural soils	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	0,00
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
F. Field burning of agricultural residues	0,09	0,09	0,09	0,09	0,09	0,09	0,10	0,10	0,11	0,14	0,13	0,13	0,13	0,11	0,13	0,14	0,14	0,14	0,13	0,12	0,14	0,10	0,10	0,11	0,12	0,12	0,11	0,10	0,12	35,37
G. Liming																														
H. Urea application																														
I. Other carbon-containing fertilizers																														
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
4. Land use, land-use change and forestry	7,73	7,73	7,69	7,67	7,65	7,63	7,61	7,59	7,57	7,55	7,53	7,51	7,49	7,47	7,45	7,46	7,43	7,43	7,43	7,43	7,44	7,39	7,49	7,58	7,60	7,53	7,61	7,74	7,67	-0,79
A. Forest land	0,19	0,19	0,21	0,27	0,32	0,37	0,42	0,47	0,53	0,58	0,63	0,68	0,73	0,78	0,84	0,91	0,94	0,99	1,04	1,09	1,15	1,15	1,15	1,15	1,16	1,16	1,17	1,17	1,18	530,17
B. Cropland	5,31	5,31	5,24	5,18	5,12	5,06	4,99	4,93	4,87	4,81	4,74	4,68	4,62	4,56	4,49	4,43	4,37	4,31	4,25	4,18	4,12	4,06	4,17	4,15	4,09	4,05	4,22	4,52	4,29	-19,16
C. Grassland	2,17	2,17	2,14	2,12	2,09	2,07	2,04	2,02	1,99	1,97	1,94	1,91	1,89	1,86	1,84	1,81	1,79	1,76	1,74	1,71	1,68	1,66	1,61	1,68	1,75	1,70	1,58	1,40	1,56	-28,25
D. Wetlands	0,07	0,07	0,09	0,10	0,12	0,14	0,15	0,17	0,18	0,20	0,22	0,23	0,25	0,27	0,28	0,30	0,34	0,37	0,41	0,45	0,48	0,52	0,56	0,60	0,60	0,62	0,64	0,65	0,65	833,39
E. Settlements	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
G. Harvested wood products																														
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
5. Waste	65,08	65,08	65,35	64,72	64,34	61,23	57,87	56,71	53,64	50,85	51,83	49,59	51,35	48,87	50,22	44,82	44,03	46,31	44,87	43,36	42,33	39,81	39,80	38,46	37,30	37,36	36,95	37,93	38,78	-40,42
A. Solid waste disposal	61,62	61,62	61,63	60,85	60,18	56,91	53,43	51,78	48,22	45,20	45,73	43,10	44,88	41,87	42,74	37,65	36,56	38,34	36,48	35,28	33,69	31,07	31,14	29,91	28,33	27,74	26,30	24,96	23,89	-61,24
B. Biological treatment of solid waste	1,61	1,61	1,86	2,00	2,31	2,43	2,49	2,96	3,41	3,67	4,08	4,45	4,43	4,97	5,44	5,15	5,42	5,93	6,33	6,05	6,59	6,69	6,59	6,48	6,86	7,49	8,55	10,81	12,70	688,57
C. Incineration and open burning of waste	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,11	0,10	0,09	0,09	0,08	0,08	0,07	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	-28,74
D. Waste water treatment and discharge	1,64	1,64	1,65	1,65	1,65	1,68	1,73	1,74	1,80	1,78	1,82	1,85	1,85	1,86	1,87	1,85	1,89	1,88	1,89	1,86	1,89	1,91	1,91	1,93	1,96	1,99	1,96	2,01	2,05	24,37
E. Other	0,10	0,10	0,10	0,11	0,10	0,10	0,11	0,11	0,10	0,09	0,10	0,10	0,10	0,09	0,10	0,09	0,09	0,10	0,10	0,09	0,09	0,08	0,08	0,07	0,07	0,07	0,07	0,08	0,07	-29,01
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
Total CH_4 emissions without CH_4 from LULUCF	305,40	305,40	313,01	316,13	323,90	319,50	322,46	326,96	322,52	324,66	320,75	316,40	325,88	322,94	323,22	316,11	306,65	302,84	302,15	296,87	291,15	293,79	287,42	282,16	278,17	277,00	274,29	276,55	276,81	-9,36
Total CH_4 emissions with CH_4 from LULUCF	313,13	313,13	320,70	323,80	331,55	327,13	330,07	334,55	330,09	332,21	328,29	323,91	333,37	330,41	330,67	323,57	314,08	310,28	309,58	304,30	298,58	301,18	294,91	289,74	285,77	284,53	281,90	284,29	284,48	-9,15
Memo items:																														
International bunkers	0,07	0,07	0,06	0,07	0,10	0,11	0,12	0,12	0,11	0,11	0,11	0,11	0,09	0,07	0,08	0,07	0,07	0,09	0,09	0,08	0,05	0,07	0,07	0,05	0,06	0,07	0,07	0,06	0,05	-25,18
Aviation	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	59,89
Navigation	0,06	0,06	0,06	0,06	0,09	0,11	0,11	0,11	0,10	0,10	0,09	0,09	0,08	0,06	0,07	0,06	0,06	0,08	0,08	0,07	0,04	0,06	0,06	0,04	0,05	0,06	0,06	0,05	0,04	-33,64
Multilateral operations	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	0,00
CO_2 emissions from biomass																														
CO_2 captured																														
Long-term storage of C in waste disposal sites																														
Indirect N_2O																														
Indirect CO_2 [(3)]																														

TABLE 1(C): EMISSION TRENDS (N_2O) IN THE KINGDOM OF DENMARK (DENMARK, GREENLAND AND FAROE ISLANDS)

CTF: Table 1
(cont.) Emission trends (N2O)
CRF: TABLE 10 EMISSION TRENDS
N_2O
(Sheet 4 of 6)
Denmark, Greenland and the Faroe Islands under the UNFCCC

Inventory 2017
Submission 2019 v1
DENMARK

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(kt)										
1. Energy	1,23	1,23	1,53	1,51	1,48	1,52	1,50	1,67	1,72	1,58	1,89
A. Fuel combustion (sectoral approach)	1,05	1,05	1,17	1,14	1,17	1,21	1,26	1,40	1,33	1,29	1,28
1. Energy industries	0,29	0,29	0,37	0,34	0,36	0,39	0,38	0,51	0,44	0,42	0,40
2. Manufacturing industries and construction	0,19	0,19	0,21	0,20	0,19	0,19	0,24	0,24	0,24	0,25	0,24
3. Transport	0,34	0,34	0,35	0,37	0,37	0,39	0,40	0,40	0,41	0,41	0,40
4. Other sectors	0,22	0,22	0,23	0,22	0,23	0,22	0,23	0,23	0,23	0,22	0,22
5. Other	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
B. Fugitive emissions from fuels	0,18	0,18	0,36	0,37	0,32	0,31	0,24	0,27	0,39	0,28	0,62
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0,18	0,18	0,36	0,37	0,32	0,31	0,24	0,27	0,39	0,28	0,62
C. CO_2 transport and storage											
2. Industrial processes	3,42	3,42	3,14	2,78	2,63	2,66	2,98	2,76	2,80	2,67	3,14
A. Mineral industry											
B. Chemical industry	3,36	3,36	3,08	2,72	2,56	2,60	2,92	2,69	2,74	2,60	3,07
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Non-energy products from fuels and solvent use	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
E. Electronic industry											
F. Product uses as ODS substitutes											
G. Other product manufacture and use	0,06	0,06	0,06	0,06	0,06	0,06	0,07	0,07	0,06	0,07	0,07
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Agriculture	21,72	21,72	21,15	20,70	20,19	19,82	19,36	18,23	18,26	18,61	18,01
A. Enteric fermentation											
B. Manure management	3,29	3,29	3,32	3,42	3,40	3,26	3,15	3,15	3,19	3,30	3,21
C. Rice cultivation											
D. Agricultural soils	18,42	18,42	17,83	17,28	16,79	16,55	16,21	15,08	15,07	15,31	14,80
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field burning of agricultural residues	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
G. Liming											
H. Urea application											
I. Other carbon containing fertlizers											
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4. Land use, land-use change and forestry	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09
A. Forest land	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09
B. Cropland	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
C. Grassland	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
D. Wetlands	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
E. Settlements	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G. Harvested wood products											
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5. Waste	0,43	0,43	0,44	0,42	0,45	0,49	0,48	0,41	0,43	0,50	0,63
A. Solid waste disposal											
B. Biological treatment of solid waste	0,04	0,04	0,05	0,05	0,05	0,06	0,07	0,08	0,09	0,19	0,35
C. Incineration and open burning of waste	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
D. Waste water treatment and discharge	0,39	0,39	0,39	0,37	0,40	0,43	0,41	0,33	0,33	0,31	0,27
E. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total direct N_2O emissions without N_2O from LULUCF	26,80	26,80	26,26	25,41	24,76	24,50	24,33	23,07	23,21	23,36	23,66
Total direct N_2O emissions with N_2O from LULUCF	26,90	26,90	26,35	25,50	24,85	24,59	24,42	23,16	23,30	23,45	23,75
Memo items:											
International bunkers	0,14	0,14	0,12	0,13	0,17	0,19	0,19	0,19	0,18	0,19	0,18
Aviation	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,07	0,07	0,07	0,08
Navigation	0,08	0,08	0,07	0,07	0,11	0,12	0,13	0,12	0,11	0,11	0,11
Multilateral operations	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO
CO_2 emissions from biomass											
CO_2 captured											
Long-term storage of C in waste disposal sites											
Indirect N_2O	1,93	1,93	2,14	1,94	2,08	2,15	2,09	2,23	1,97	1,88	1,78
Indirect CO_2 [3]											

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt)																		%
1. Energy	1,64	1,70	1,62	1,68	1,67	1,52	1,60	1,58	1,48	1,35	1,46	1,34	1,28	1,32	1,29	1,33	1,37	1,38	12,37
A. Fuel combustion (sectoral approach)	1,24	1,26	1,25	1,30	1,25	1,22	1,31	1,29	1,26	1,22	1,27	1,22	1,17	1,19	1,15	1,18	1,22	1,23	17,54
1. Energy industries	0,38	0,40	0,41	0,44	0,39	0,36	0,42	0,36	0,35	0,36	0,38	0,33	0,31	0,33	0,30	0,28	0,30	0,29	0,38
2. Manufacturing industries and construction	0,24	0,23	0,22	0,21	0,22	0,20	0,23	0,23	0,22	0,17	0,19	0,18	0,16	0,15	0,15	0,15	0,14	0,15	-23,29
3. Transport	0,40	0,39	0,39	0,39	0,39	0,38	0,37	0,39	0,39	0,39	0,39	0,42	0,42	0,42	0,44	0,45	0,47	0,48	40,61
4. Other sectors	0,22	0,24	0,23	0,25	0,25	0,27	0,28	0,30	0,30	0,29	0,31	0,28	0,27	0,28	0,27	0,29	0,30	0,30	37,88
5. Other	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	129,32
B. Fugitive emissions from fuels	0,40	0,43	0,37	0,37	0,42	0,30	0,29	0,29	0,21	0,14	0,19	0,12	0,11	0,14	0,14	0,14	0,16	0,15	-18,15
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
2. Oil and natural gas and other emissions from energy production	0,40	0,43	0,37	0,37	0,42	0,30	0,29	0,29	0,21	0,14	0,19	0,12	0,11	0,14	0,14	0,14	0,16	0,15	-18,15
C. CO_2 transport and storage																			
2. Industrial processes	3,31	2,92	2,57	2,96	1,79	0,06	0,07	0,08	0,06	0,08	0,06	0,07	0,05	0,06	0,06	0,07	0,06	0,06	-98,10
A. Mineral industry																			
B. Chemical industry	3,24	2,86	2,50	2,89	1,71	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
D. Non-energy products from fuels and solvent use	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	249,02
E. Electronic industry																			
F. Product uses as ODS substitutes																			
G. Other product manufacture and use	0,07	0,07	0,07	0,07	0,08	0,06	0,07	0,08	0,06	0,07	0,06	0,07	0,05	0,06	0,06	0,07	0,06	0,06	6,88
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
3. Agriculture	17,71	17,33	17,43	16,63	16,83	16,50	16,07	16,60	16,50	15,94	15,50	15,63	15,42	15,28	15,80	15,74	16,11	16,39	-24,52
A. Enteric fermentation																			
B. Manure management	3,19	3,30	3,39	3,35	3,46	3,26	3,03	3,02	2,85	2,68	2,68	2,63	2,58	2,55	2,53	2,49	2,44	2,41	-26,81
C. Rice cultivation																			
D. Agricultural soils	14,51	14,02	14,04	13,28	13,37	13,23	13,04	13,58	13,65	13,25	12,82	13,00	12,84	12,73	13,26	13,24	13,67	13,98	-24,12
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
F. Field burning of agricultural residues	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	35,37
G. Liming																			
H. Urea application																			
I. Other carbon containing fertlizers																			
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
4. Land use, land-use change and forestry	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,11	0,11	0,10	3,75
A. Forest land	0,09	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	-11,13
B. Cropland	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,00	174,26
C. Grassland	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	369,78
D. Wetlands	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	-49,87
E. Settlements	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	4773,77
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
G. Harvested wood products																			
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
5. Waste	0,81	0,78	1,09	1,00	0,44	0,47	0,47	0,55	0,61	0,55	0,53	0,52	0,49	0,51	0,50	0,48	0,52	0,53	21,87
A. Solid waste disposal																			
B. Biological treatment of solid waste	0,51	0,50	0,77	0,75	0,20	0,20	0,24	0,29	0,29	0,33	0,30	0,27	0,27	0,28	0,26	0,23	0,28	0,29	607,24
C. Incineration and open burning of waste	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	-10,30
D. Waste water treatment and discharge	0,29	0,28	0,32	0,25	0,24	0,27	0,23	0,26	0,31	0,22	0,23	0,24	0,22	0,23	0,24	0,24	0,23	0,24	-38,79
E. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
Total direct N_2O emissions without N_2O from LULUCF	23,47	22,72	22,71	22,26	20,73	18,55	18,21	18,81	18,64	17,91	17,56	17,56	17,25	17,18	17,65	17,61	18,07	18,36	-31,49
Total direct N_2O emissions with N_2O from LULUCF	23,56	22,81	22,80	22,35	20,82	18,64	18,30	18,89	18,73	18,00	17,65	17,65	17,34	17,27	17,74	17,72	18,18	18,46	-31,37
Memo items:																			
International bunkers	0,19	0,17	0,14	0,15	0,14	0,15	0,17	0,17	0,16	0,12	0,14	0,14	0,12	0,13	0,15	0,15	0,15	0,14	0,63
Aviation	0,08	0,08	0,07	0,07	0,08	0,09	0,09	0,09	0,09	0,08	0,08	0,08	0,08	0,08	0,09	0,09	0,10	0,10	62,80
Navigation	0,10	0,09	0,07	0,07	0,06	0,06	0,08	0,08	0,07	0,04	0,05	0,06	0,04	0,05	0,06	0,06	0,05	0,04	-48,68
Multilateral operations	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	0,00
CO_2 emissions from biomass																			
CO_2 captured																			
Long-term storage of C in waste disposal sites																			
Indirect N_2O	1,73	1,64	1,55	1,61	1,49	1,46	1,56	1,53	1,39	1,12	1,16	1,12	0,99	1,01	1,02	1,01	0,98	0,91	-53,00
Indirect CO_2 [3]																			

TABLE 1(D): EMISSION TRENDS (HFCS, PFCS, SF6 AND NF3) IN THE KINGDOM OF DENMARK (DENMARK, GREENLAND AND FAROE ISLANDS)

CTF: Table 1

(cont.) Emission trends (HFCs, PFCs, SF6 and NF3)

CRF: TABLE 10 EMISSION TRENDS — Inventory 2017

HFCs, PFCs, SF_6, and NF_3 — Submission 2019 v1

(Sheet 5 of 6) — DENMARK

Denmark, Greenland and the Faroe Islands under the UNFCCC

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year(1)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt)																													%
Emissions of HFCs and PFCs - (kt CO_2 equivalent)	NO,NE,NA	NO,NE,NA	NO,NE,NA	3,83	110,03	157,45	258,52	401,50	403,91	543,94	694,00	796,43	794,09	828,02	842,11	894,70	942,94	968,03	1002,65	1000,02	1023,32	868,68	785,33	782,45	715,16	660,43	513,69	565,21	473,37	100,00
Emissions of HFCs - (kt CO_2 equivalent)	NO,NE,NA	NO,NE,NA	NO,NE,NA	3,83	110,03	157,38	257,89	399,41	398,72	532,46	678,26	773,87	766,17	800,01	817,52	874,17	924,17	946,88	981,46	981,58	1003,78	851,63	773,38	779,06	711,47	657,77	513,67	565,20	472,27	100,00
HFC-23	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00	0,00	0,00	0,00	0,00	0,00	0,00	NO,NA	0,00	NO,NA	NO,NA	NO,NA	0,00
HFC-32	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	100,00
HFC-41	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-43-10mee	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-125	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0,00	0,00	0,01	0,01	0,02	0,03	0,04	0,04	0,04	0,05	0,06	0,06	0,07	0,07	0,07	0,08	0,06	0,06	0,05	0,05	0,05	0,04	0,04	0,04	100,00
HFC-134	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-134a	NO,NE,NA	NO,NE,NA	NO,NE,NA	0,00	0,07	0,10	0,16	0,22	0,19	0,24	0,27	0,29	0,29	0,29	0,27	0,28	0,27	0,27	0,28	0,26	0,26	0,23	0,20	0,22	0,18	0,16	0,12	0,13	0,10	100,00
HFC-143	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-143a	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0,00	0,00	0,01	0,01	0,02	0,03	0,04	0,04	0,04	0,05	0,06	0,06	0,07	0,07	0,07	0,07	0,07	0,06	0,06	0,06	0,05	0,04	0,04	0,04	100,00
HFC-152	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-152a	NO,NA	NO,NA	NO,NA	0,00	0,03	0,05	0,04	0,03	0,02	0,01	0,04	0,02	0,01	0,01	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	100,00
HFC-161	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-227ea	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-236cb	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-236ea	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-236fa	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-245ca	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-245fa	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-365mfc	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Unspecified mix of HFCs(4) - (kt CO_2 equivalent)	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0,44	3,50	7,20	9,79	12,38	17,04	20,10	21,21	20,83	21,50	22,32	23,06	24,17	28,98	31,18	8,42	8,42	9,19	9,96	13,74	17,85	22,23	27,84	100,00
Emissions of PFCs - (kt CO_2 equivalent)	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,07	0,63	2,09	5,20	11,47	15,74	22,57	27,91	28,01	24,59	20,53	18,77	21,15	21,19	18,44	19,55	17,06	11,95	3,39	3,70	2,66	0,02	0,01	1,09	100,00
CF_4	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	100,00
C_2F_6	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
C_3F_8	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	NO,NA	NO,NA	0,00	NO,NA	NO,NA	NO,NA	0,00
C_4F_{10}	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
c-C_4F_8	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00	0,00	0,00	0,00	0,00	0,00	0,00	NO,NA	0,00	NO,NA	NO,NA	NO,NA	0,00
C_5F_{12}	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
C_6F_{14}	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
$C_{10}F_{18}$	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
c-C_3F_6	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Unspecified mix of PFCs(4) - (kt CO_2 equivalent)	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Unspecified mix of HFCs and PFCs - (kt CO_2 equivalent)	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Emissions of SF_6 - (kt CO_2 equivalent)	42,41	42,41	61,06	86,33	97,96	118,11	103,94	59,32	70,72	57,79	62,99	56,92	28,67	24,07	30,22	31,65	20,84	34,50	29,20	30,51	35,50	37,14	77,61	129,66	150,10	154,60	121,65	104,41	76,04	79,31
SF_6	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,01	0,00	0,00	79,31
Emissions of NF_3 - (kt CO_2 equivalent)	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
NF_3	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00

TABLE 1(DK IN EU): EMISSION TRENDS (SUMMARY) IN DENMARK IN THE EU(I.E WITHOUT GREENLAND AND FAROE ISLANDS)

CRF: TABLE 10 EMISSION TRENDS																														Inventory 2017
SUMMARY																														Submission 2019 v1
(Sheet 6 of 6)																														DENMARK
Denmark under the EU (i.e. without Greenland and the Faroe Islands)																														
GREENHOUSE GAS EMISSIONS	**Base year[(1)]**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Change from base to latest reported year**
	CO_2 equivalent (kt)																													**(%)**
CO_2 emissions without net CO_2 from LULUCF	53558	53558	64175	58365	60612	64674	61584	74832	65432	61202	58621	54279	55867	55530	60615	55069	51498	59418	54644	51231	48837	49169	44211	39836	41734	37535	35204	37019	34795	-35,03
CO_2 emissions with net CO_2 from LULUCF	58275	58275	68419	63545	64558	68063	64985	77648	68670	64426	62136	57664	59880	60513	65246	59430	55735	63985	56686	48664	50580	47940	41377	38883	41910	37384	38613	41297	37545	-35,57
CH_4 emissions without CH_4 from LULUCF	7596	7596	7787	7866	8061	7949	8022	8135	8023	8077	7980	7871	8109	8036	8043	7865	7629	7534	7516	7385	7242	7308	7149	7017	6918	6889	6822	6878	6885	-9,37
CH_4 emissions with CH_4 from LULUCF	7789	7789	7979	8057	8252	8140	8212	8324	8212	8266	8168	8059	8296	8223	8229	8051	7814	7720	7702	7571	7428	7493	7336	7207	7108	7077	7012	7072	7076	-9,15
N_2O emissions without N_2O from LULUCF	7965	7965	7804	7552	7357	7279	7228	6854	6894	6938	7029	6970	6748	6744	6611	6155	5503	5402	5580	5531	5315	5210	5210	5117	5098	5237	5226	5364	5450	-31,57
N_2O emissions with N_2O from LULUCF	7993	7993	7831	7579	7384	7306	7255	6881	6920	6964	7056	6997	6774	6770	6637	6181	5529	5428	5606	5557	5340	5237	5236	5144	5126	5266	5259	5395	5479	-31,45
HFCs	NO,NA	NO,NA	NO,NA	4	110	157	258	399	398	530	673	766	754	784	799	853	903	925	959	958	981	827	749	750	677	617	462	504	405	100,00
PFCs	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0	1	2	5	11	16	23	28	28	25	21	19	21	21	18	20	17	12	3	4	3	0	0	1	100,00
Unspecified mix of HFCs and PFCs	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
SF_6	42	42	61	86	98	118	104	59	71	58	63	57	29	24	30	31	21	34	29	30	35	37	77	129	150	154	121	104	75	77,92
NF_3	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Total (without LULUCF)	69161	69161	79827	73872	76238	80178	77197	90281	80821	76816	74382	69966	71534	71145	76122	69994	65571	73334	68750	65154	62430	62568	57409	52853	54581	50435	47835	49869	47612	-31,16
Total (with LULUCF)	74099	74099	84290	79271	80402	83784	80815	93313	84276	80256	78112	73566	75761	76342	80965	74567	70021	78113	71004	62798	64385	61551	54788	52117	54974	50500	51468	54371	50582	-31,74
Total (without LULUCF, with indirect)	70291	70291	81004	75018	77365	81260	78259	91333	81800	77758	75260	70790	72332	71897	76850	70684	66231	73953	69327	65705	62918	63038	57813	53221	54923	50747	48133	50154	47892	-31,87
Total (with LULUCF, with indirect)	75229	75229	85467	80417	81529	84866	81877	94365	85254	81198	78991	74390	76558	77093	81693	75258	70681	78732	71581	63349	64873	62020	55193	52485	55317	50812	51766	54657	50863	-32,39
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	**Base year[(1)]**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Change from base to latest reported year**
	CO_2 equivalent (kt)																													**(%)**
1. Energy	52388	52388	63079	57255	59594	63645	60570	73982	64499	60420	57997	53524	55227	54793	60019	54435	50747	58654	53817	50605	48591	49094	43809	39288	41099	36826	34540	36161	33829	-35,43
2. Industrial processes and product use	2344	2344	2472	2526	2604	2723	2901	3047	3132	3264	3538	3699	3537	3475	3472	3295	2764	2822	2856	2549	2124	1911	2052	2085	2042	2001	1829	2025	2010	-14,26
3. Agriculture	12668	12668	12506	12340	12290	12128	12129	11703	11716	11707	11359	11256	11249	11327	11069	11007	10813	10554	10783	10730	10487	10405	10395	10371	10350	10524	10397	10574	10642	-16,00
4. Land use, land-use change and forestry[(5)]	4938	4938	4463	5399	4164	3606	3618	3032	3454	3440	3730	3600	4226	5197	4843	4574	4450	4779	2254	-2355	1955	-1018	-2621	-736	393	65	3632	4502	2971	-39,84
5. Waste	1762	1762	1769	1750	1749	1682	1598	1549	1474	1425	1488	1487	1521	1551	1561	1257	1246	1305	1293	1270	1228	1159	1153	1110	1089	1085	1070	1109	1131	-35,81
6. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
Total (including LULUCF)[(5)]	74099	74099	84290	79271	80402	83784	80815	93313	84276	80256	78112	73566	75761	76342	80965	74567	70021	78113	71004	62798	64385	61551	54788	52117	54974	50500	51468	54371	50582	-31,74

Table 1(0, DK in EU): Emission Trends (GHGs) in Denmark in the EU(i.e without Greenland and Faroe Islands)

CRF: TABLE 10 EMISSION TRENDS
GHG CO_2 eq emissions
(Sheet 1 of 6)

Inventory 2015
Submission 2017 v2
DENMARK

Denmark under the EU (i.e. without Greenland and the Faroe Islands)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt CO_2 eq)																													%
Total (net emissions)[2]	74099	74099	84290	79271	80402	83784	80815	93313	84276	80256	78112	73566	75761	76342	80965	74567	70021	78113	71004	62798	64385	61551	54788	52117	54974	50500	51468	54371	50582	-31,74
1. Energy	52388	52388	63079	57255	59594	63645	60570	73982	64499	60420	57997	53524	55227	54793	60019	54435	50747	58654	53817	50605	48591	49094	43809	39288	41099	36826	34540	36161	33829	-35,43
A. Fuel combustion (sectoral approach)	51871	51871	62156	56298	58749	62800	59871	73221	63464	59604	56431	52434	54073	53767	59001	53301	49870	57804	52967	49958	48127	48526	43388	38921	40707	36428	34149	35742	33446	-35,52
1. Energy industries	26251	26251	35154	30227	31850	35936	32559	44984	35816	32188	29096	26051	27363	27574	32311	26404	23169	31070	26380	24287	24222	24104	20085	16900	19093	15554	12881	14054	11574	-55,91
2. Manufacturing industries and construction	5431	5431	5870	5728	5649	5791	5918	6069	6092	6065	6136	5927	6029	5685	5659	5742	5446	5579	5326	4820	3998	4419	4346	4021	3871	3881	3833	3909	4025	-25,89
3. Transport	10752	10752	11264	11465	11515	11942	12075	12336	12535	12543	12575	12469	12522	12688	13150	13377	13586	13912	14455	14291	13532	13405	13100	12524	12330	12445	12722	13012	13209	22,85
4. Other sectors	9266	9266	9524	8678	9435	8812	8996	9581	8772	8520	8354	7786	7968	7631	7686	7430	7290	7012	6526	6348	6113	6390	5563	5261	5172	4316	4515	4559	4333	-53,24
5. Other	170	170	343	199	300	319	323	250	249	287	269	201	191	188	195	348	379	232	280	211	263	209	295	216	241	232	198	208	306	79,26
B. Fugitive emissions from fuels	517	517	924	958	846	845	699	761	1035	816	1566	1090	1154	1026	1018	1134	877	850	850	647	464	568	421	367	392	398	391	419	383	-25,83
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
2. Oil and natural gas and other emissions from energy production	517	517	924	958	846	845	699	761	1035	816	1566	1090	1154	1026	1018	1134	877	850	850	647	464	568	421	367	392	398	391	419	383	-25,83
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
2. Industrial Processes	2344	2344	2472	2526	2604	2723	2901	3047	3132	3264	3538	3699	3537	3475	3472	3295	2764	2822	2856	2549	2124	1911	2052	2085	2042	2001	1829	2025	2010	-14,26
A. Mineral industry	1082	1082	1260	1383	1401	1423	1422	1530	1604	1636	1613	1633	1629	1670	1542	1660	1567	1621	1621	1336	888	807	997	998	994	1023	1049	1231	1333	23,18
B. Chemical industry	1003	1003	918	812	765	776	870	803	816	776	914	966	852	745	861	511	1	1	1	1	1	1	1	1	1	1	2	1	1	-99,86
C. Metal industry	60	60	60	60	70	77	73	44	49	58	59	61	47	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	-99,72
D. Non-energy products from fuels and solvent use	166	166	181	190	174	194	185	196	182	187	191	190	176	199	190	192	215	195	199	184	174	201	192	183	195	182	172	164	172	3,92
E. Electronic industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	5	9	6	11	13	11	5	4	5	NO	NO	1	100,00
F. Product uses as ODS substitutes	NO	NO	NO	4	110	157	258	401	403	542	688	789	782	812	823	873	922	941	971	970	990	832	750	748	677	615	462	504	405	100,00
G. Other product manufacture and use	33	33	52	78	84	95	92	72	79	64	72	60	51	48	56	58	43	58	54	51	60	58	100	148	171	175	144	125	97	193,67
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
3. Agriculture	12668	12668	12506	12340	12290	12128	12129	11703	11716	11707	11359	11256	11249	11327	11069	11007	10813	10554	10783	10730	10487	10405	10395	10371	10350	10524	10397	10574	10642	-16,00
A. Enteric fermentation	4039	4039	4070	4019	4074	3978	3967	3965	3829	3833	3685	3631	3703	3646	3604	3496	3483	3484	3565	3596	3596	3631	3590	3672	3694	3695	3667	3717	3731	-7,64
B. Manure management	2523	2523	2613	2769	2865	2806	2796	2827	2914	3049	2992	3034	3163	3262	3281	3368	3167	2989	2980	2836	2757	2800	2769	2681	2619	2639	2609	2571	2528	0,21
C. Rice cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
D. Agricultural soils	5485	5485	5308	5146	4998	4928	4825	4489	4486	4557	4404	4319	4173	4179	3951	3979	3937	3879	4041	4062	3943	3814	3867	3822	3788	3946	3939	4067	4160	-24,15
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
F. Field burning of agricultural residues	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	5	5	5	4	4	4	3	3	4	4	4	3	3	4	35,37
G. Liming	565	565	463	357	307	367	496	393	470	252	265	261	201	233	226	158	220	194	192	229	181	153	162	188	244	238	166	212	214	-62,09
H. Urea application	15	15	12	13	13	18	15	9	4	4	3	2	2	1	1	1	0	1	1	0	2	1	1	1	1	1	1	2	2	-89,50
I. Other carbon-containing fertilizers	38	38	37	33	30	27	26	16	10	7	6	5	4	3	2	1	2	1	1	2	4	3	3	2	2	2	10	3	3	-91,72
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
4. Land use, land-use change and forestry[2]	4938	4938	4463	5399	4164	3606	3618	3032	3454	3440	3730	3600	4226	5197	4843	4574	4450	4779	2254	-2355	1955	-1018	-2621	-736	393	65	3632	4502	2971	-39,84
A. Forest land	-543	-543	-545	-546	-548	-550	-552	-553	-556	-558	-560	-563	637	598	559	521	560	504	-2601	-6525	-1520	-3751	-5787	-4069	-2439	-3988	215	899	-84	-84,55
B. Cropland	4384	4384	3800	4924	3918	3269	3291	2679	2969	2873	3074	3182	2484	3467	3228	2975	2786	3176	3824	3259	2536	1848	2285	2360	1950	3087	2596	2788	2335	-46,74
C. Grassland	979	979	973	960	958	940	898	929	933	902	870	854	842	835	829	825	840	862	836	846	823	805	815	832	831	1008	873	798	763	-22,09
D. Wetlands	103	103	95	95	83	79	75	90	112	93	76	75	84	94	90	97	115	119	101	82	97	90	98	80	53	62	56	57	46	-54,94
E. Settlements	17	17	18	19	20	20	21	22	23	24	25	26	27	28	29	29	51	53	55	58	60	62	64	129	85	44	63	135	73	332,94
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
G. Harvested wood products	-2	-2	123	-51	-265	-153	-116	-135	-26	106	245	26	153	174	108	127	98	65	39	-75	-41	-72	-96	-67	-87	-146	-171	-174	-162	6716,40
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
5. Waste	1762	1762	1769	1750	1749	1682	1598	1549	1474	1425	1488	1487	1521	1551	1561	1257	1246	1305	1293	1270	1228	1159	1153	1110	1089	1085	1070	1109	1131	-35,81
A. Solid waste disposal	1536	1536	1536	1517	1500	1418	1331	1290	1201	1125	1138	1073	1117	1042	1064	936	909	954	907	877	838	772	774	743	704	689	653	619	593	-61,42
B. Biological treatment of solid waste	52	52	60	65	74	78	83	97	112	148	206	264	258	353	359	188	194	219	245	238	262	256	246	243	254	263	282	355	403	669,76
C. Incineration and open burning of waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43,39
D. Waste water treatment and discharge	150	150	150	143	152	162	158	136	136	130	120	126	122	133	114	110	120	109	116	132	106	111	114	107	113	116	118	115	118	-21,79
E. Other	23	23	23	25	23	23	25	26	24	22	23	23	23	22	24	22	23	23	24	23	22	19	19	17	18	16	17	19	17	-23,38
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
Memo items:																														
International bunkers	4828	4828	4357	4540	5939	6637	6913	6762	6403	6565	6404	6430	5740	4794	5040	4793	4972	5773	5992	5501	3832	4515	4618	4047	4398	4972	4963	4824	4417	-8,52
Aviation	1792	1792	1654	1713	1679	1840	1886	1982	2027	2179	2308	2366	2398	2073	2156	2470	2595	2601	2666	2662	2326	2428	2498	2523	2498	2707	2650	2850	2935	63,79
Navigation	3036	3036	2703	2827	4260	4798	5027	4779	4376	4386	4096	4064	3342	2720	2884	2323	2377	3171	3326	2839	1506	2087	2120	1525	1901	2264	2313	1973	1482	-51,20
Multilateral operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0,00
CO_2 emissions from biomass	4389	4389	4764	4998	5201	5137	5368	5726	5917	5869	6171	6485	7185	7646	8724	9459	10220	10591	11612	11826	12135	14464	14105	14477	14572	14592	15709	16784	18798	328,33
CO_2 captured	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Long-term storage of C in waste disposal sites	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0,00
Indirect N_2O	576	576	638	577	619	639	621	663	588	559	529	516	489	461	480	443	437	465	455	413	333	347	335	295	302	303	301	292	271	-53,00
Indirect CO_2[3]	1129	1129	1177	1146	1127	1082	1062	1052	978	942	879	824	797	751	728	690	660	619	577	551	488	470	405	369	342	312	298	285	281	-75,13
Total CO_2 equivalent emissions without land use, land-use change and forestry	69161	69161	79827	73872	76238	80178	77197	90281	80821	76816	74382	69966	71534	71145	76122	69994	65571	73334	68750	65154	62430	62568	57409	52853	54581	50435	47835	49869	47612	-31,16
Total CO_2 equivalent emissions with land use, land-use change and forestry	74099	74099	84290	79271	80402	83784	80815	93313	84276	80256	78112	73566	75761	76342	80965	74567	70021	78113	71004	62798	64385	61551	54788	52117	54974	50500	51468	54371	50582	-31,74
Total CO_2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry	70291	70291	81004	75018	77365	81260	78259	91333	81800	77758	75260	70790	72332	71897	76850	70684	66231	73953	69327	65705	62918	63038	57813	53221	54923	50747	48133	50154	47892	-31,87
Total CO_2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry	75229	75229	85467	80417	81529	84866	81877	94365	85254	81198	78991	74390	76558	77093	81693	75258	70681	78732	71581	63349	64873	62020	55193	52485	55317	50812	51766	54657	50863	-32,39

TABLE 1(A, DK IN EU): EMISSION TRENDS (CO_2) IN DENMARK IN THE EU(I.E WITHOUT GREENLAND AND FAROE ISLANDS)

CRF: TABLE 10 EMISSION TRENDS
CO_2
(Sheet 2 of 6)

Inventory 2015
Submission 2017 v2
DENMARK

Denmark under the EU (i.e. without Greenland and the Faroe Islands)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[(1)]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt)																													%
1. Energy	51640	51640	62170	56335	58631	62590	59378	72629	63106	59051	56478	52125	53787	53403	58632	53036	49457	57384	52608	49458	47568	47987	42839	38446	40282	36074	33790	35389	33054	-35,99
A. Fuel combustion (sectoral approach)	51299	51299	61520	55658	58048	62012	58924	72131	62408	58528	55371	51401	53016	52729	57962	52284	48908	56853	52064	49071	47306	47634	42587	38229	40039	35824	33542	35116	32814	-36,04
1. Energy industries	26150	26150	35020	30093	31668	35667	32160	44468	35338	31681	28591	25571	26855	27075	31819	25937	22753	30657	26032	23930	23895	23717	19756	16648	18855	15366	12712	13866	11386	-56,46
2. Manufacturing industries and construction	5366	5366	5801	5660	5584	5726	5836	5979	6002	5971	6043	5831	5933	5595	5573	5653	5364	5495	5247	4743	3934	4349	4280	3965	3820	3828	3774	3854	3964	-26,13
3. Transport	10573	10573	11078	11275	11325	11748	11883	12146	12345	12359	12397	12297	12356	12526	12991	13223	13439	13770	14312	14151	13397	13270	12961	12387	12193	12304	12577	12863	13058	23,50
4. Other sectors	9043	9043	9284	8434	9176	8556	8728	9294	8479	8234	8075	7505	7685	7348	7387	7128	6979	6704	6197	6040	5820	6091	5299	5016	4934	4097	4283	4327	4103	-54,63
5. Other	167	167	338	195	295	314	318	246	245	282	265	197	188	184	191	343	374	228	276	208	260	206	291	214	238	229	196	205	302	80,82
B. Fugitive emissions from fuels	341	341	650	677	582	578	454	498	698	523	1107	724	771	674	670	752	548	531	544	387	261	353	252	217	243	250	247	273	240	-29,54
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
2. Oil and natural gas and other emissions from energy production	341	341	650	677	582	578	454	498	698	523	1107	724	771	674	670	752	548	531	544	387	261	353	252	217	243	250	247	273	240	-29,54
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
2. Industrial processes	1278	1278	1472	1604	1611	1651	1647	1762	1821	1866	1848	1865	1853	1870	1733	1854	1799	1817	1821	1521	1063	1008	1190	1182	1190	1206	1222	1396	1506	17,80
A. Mineral industry	1082	1082	1260	1383	1401	1423	1422	1530	1604	1636	1613	1633	1629	1670	1542	1660	1567	1621	1621	1336	888	807	997	998	994	1023	1049	1231	1333	23,18
B. Chemical industry	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	139,97
C. Metal industry	30	30	30	30	36	34	39	35	35	43	43	41	47	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	-99,44
D. Non-energy products from fuels and solvent use	166	166	181	190	173	193	185	196	181	187	191	190	175	199	190	192	214	194	198	183	174	200	192	183	194	181	171	164	172	3,74
E. Electronic industry																														
F. Product uses as ODS substitutes																														
G. Other product manufacture and use	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	222,12
H. Other																														
3. Agriculture	619	619	512	403	350	412	537	418	483	264	274	268	207	237	229	160	222	196	194	231	187	156	165	192	246	240	177	217	219	-64,58
A. Enteric fermentation																														
B. Manure management																														
C. Rice cultivation																														
D. Agricultural soils																														
E. Prescribed burning of savannas																														
F. Field burning of agricultural residues																														
G. Liming	565	565	463	357	307	367	496	393	470	252	265	261	201	233	226	158	220	194	192	229	181	153	162	188	244	238	166	212	214	-62,09
H. Urea application	15	15	12	13	13	18	15	9	4	4	3	2	2	1	1	1	0	1	1	0	2	1	1	1	1	1	1	2	2	-89,50
I. Other carbon-containing fertilizers	38	38	37	33	30	27	26	16	10	7	6	5	4	3	2	1	2	1	1	2	4	3	3	2	2	2	10	3	3	-91,72
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
4. Land use, land-use change and forestry [(2)]	4717	4717	4244	5181	3946	3389	3401	2816	3238	3224	3515	3386	4013	4984	4630	4361	4238	4567	2042	-2567	1743	-1229	-2835	-953	176	-151	3409	4277	2750	-41,70
A. Forest land	-574	-574	-577	-579	-582	-585	-588	-591	-595	-598	-601	-605	594	554	513	473	512	456	-2650	-6575	-1572	-3803	-5840	-4121	-2492	-4041	162	846	-137	-76,11
B. Cropland	4252	4252	3669	4794	3790	3143	3166	2556	2847	2753	2956	3065	2369	3353	3116	2864	2676	3068	3717	3154	2433	1746	2181	2256	1848	2985	2487	2671	2228	-47,60
C. Grassland	925	925	919	907	905	888	847	878	883	853	822	806	794	789	783	780	795	818	792	803	781	763	774	789	787	965	831	762	724	-21,73
D. Wetlands	101	101	92	92	79	76	71	86	107	87	70	69	77	87	83	89	107	109	90	71	85	77	84	65	38	46	40	40	30	-70,29
E. Settlements	17	17	18	18	19	20	21	22	23	23	24	25	26	27	27	28	50	51	53	56	58	60	62	125	81	40	60	131	68	310,52
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
G. Harvested wood products	-2	-2	123	-51	-265	-153	-116	-135	-26	106	245	26	153	174	108	127	98	65	39	-75	-41	-72	-96	-67	-87	-146	-171	-174	-162	6716,40
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
5. Waste	20	20	21	22	20	20	23	23	22	20	21	21	20	20	22	20	20	21	21	20	20	17	17	15	16	14	15	17	16	-22,71
A. Solid waste disposal	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
B. Biological treatment of solid waste																														
C. Incineration and open burning of waste	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
D. Waste water treatment and discharge																														
E. Other	20	20	21	22	20	20	23	23	22	20	21	21	20	20	22	20	20	21	21	20	20	17	17	15	16	14	15	17	16	-22,71
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
Memo items:																														
International bunkers	4786	4786	4319	4500	5888	6580	6854	6703	6347	6508	6347	6373	5689	4751	4994	4749	4927	5721	5938	5451	3796	4474	4576	4009	4358	4926	4918	4779	4376	-8,58
Aviation	1774	1774	1637	1695	1662	1821	1867	1962	2006	2157	2284	2341	2373	2052	2134	2445	2569	2575	2639	2635	2303	2403	2473	2497	2472	2680	2623	2822	2906	63,80
Navigation	3012	3012	2682	2805	4226	4760	4987	4741	4341	4351	4063	4032	3315	2699	2861	2304	2358	3146	3299	2816	1494	2070	2103	1512	1885	2246	2295	1957	1470	-51,21
Multilateral operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0,00
CO_2 emissions from biomass	4389	4389	4764	4998	5201	5137	5368	5726	5917	5869	6171	6485	7185	7646	8724	9459	10220	10591	11612	11826	12135	14464	14105	14477	14572	14592	15709	16784	18798	328,33
CO_2 captured	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA		NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Long-term storage of C in waste disposal sites	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0,00
Indirect N_2O																														
Indirect CO_2 [(3)]	1129	1129	1177	1146	1127	1082	1062	1052	978	942	879	824	797	751	728	690	660	619	577	551	488	470	405	369	342	312	298	285	281	-75,13
Total CO_2 equivalent emissions without land use, land-use change and forestry	53558	53558	64175	58365	60612	64674	61584	74832	65432	61202	58621	54279	55867	55530	60615	55069	51498	59418	54644	51231	48837	49169	44211	39836	41734	37535	35204	37019	34795	-35,03
Total CO_2 equivalent emissions with land use, land-use change and forestry	58275	58275	68419	63545	64558	68063	64985	77648	68670	64426	62136	57664	59880	60513	65246	59430	55735	63985	56686	48664	50580	47940	41377	38883	41910	37384	38613	41297	37545	-35,57
Total CO_2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry	54687	54687	65352	59511	61739	65756	62646	75884	66410	62144	59500	55103	56665	56281	61343	55759	52158	60036	55221	51782	49325	49639	44616	40204	42077	37847	35502	37305	35075	-35,86
Total CO_2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry	59404	59404	69596	64691	65685	69145	66047	78700	69648	65368	63015	58488	60678	61265	65973	60120	56395	64604	57263	49214	51069	48410	41781	39252	42252	37696	38911	41582	37826	-36,32

TABLE 1(B, DK IN EU): EMISSION TRENDS (CH_4) IN DENMARK IN THE EU(I.E WITHOUT GREENLAND AND FAROE ISLANDS)

CRF: TABLE 10 EMISSION TRENDS — Inventory 2015
CH_4 — Submission 2017 v2
(Sheet 3 of 6) — DENMARK
Denmark under the EU (i.e. without Greenland and the Faroe Islands)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt)																													%
1. Energy	15,52	15,52	18,36	19,08	21,06	24,28	29,99	34,46	35,48	36,17	38,43	36,64	37,66	36,52	35,81	36,30	33,86	32,06	29,86	28,58	25,10	27,15	23,07	18,71	17,18	14,99	14,49	14,78	14,94	-3,79
A. Fuel combustion (sectoral approach)	10,62	10,62	11,67	12,26	14,34	17,36	23,06	27,13	26,64	27,82	27,42	26,77	27,48	26,84	26,35	26,03	24,25	22,77	21,12	20,69	18,63	20,84	17,80	14,08	12,88	10,69	10,43	10,80	10,96	3,18
1. Energy industries	0,63	0,63	0,97	1,37	2,99	6,08	11,42	14,59	13,91	15,30	15,40	14,69	15,57	15,14	14,40	14,08	12,44	11,53	9,60	10,12	8,84	11,01	9,22	6,39	5,63	4,04	3,44	3,95	4,05	543,63
2. Manufacturing industries and construction	0,33	0,33	0,35	0,33	0,34	0,34	0,40	0,77	0,77	0,87	0,86	1,07	1,13	1,03	1,00	1,01	0,87	0,73	0,51	0,55	0,50	0,57	0,53	0,37	0,34	0,39	0,54	0,55	0,72	116,25
3. Transport	3,17	3,17	3,29	3,30	3,25	3,19	3,03	2,87	2,74	2,58	2,39	2,20	2,04	1,91	1,79	1,65	1,49	1,35	1,22	1,03	0,88	0,80	0,69	0,60	0,54	0,50	0,48	0,46	0,43	-86,32
4. Other sectors	6,40	6,40	6,97	7,16	7,66	7,65	8,11	8,80	9,12	8,96	8,67	8,71	8,65	8,68	9,08	9,20	9,37	9,10	9,73	8,95	8,37	8,43	7,34	6,70	6,36	5,75	5,96	5,84	5,74	-10,39
5. Other	0,08	0,08	0,10	0,09	0,09	0,10	0,10	0,10	0,10	0,10	0,10	0,09	0,09	0,09	0,08	0,08	0,07	0,06	0,05	0,04	0,03	0,03	0,02	0,02	0,01	0,01	0,01	0,01	0,01	-86,06
B. Fugitive emissions from fuels	4,90	4,90	6,69	6,82	6,73	6,92	6,92	7,33	8,85	8,36	11,01	9,87	10,18	9,68	9,45	10,27	9,61	9,29	8,74	7,88	6,47	6,31	5,27	4,63	4,30	4,29	4,06	3,98	3,98	-18,86
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
2. Oil and natural gas and other emissions from energy production	4,90	4,90	6,69	6,82	6,73	6,92	6,92	7,33	8,85	8,36	11,01	9,87	10,18	9,68	9,45	10,27	9,61	9,29	8,74	7,88	6,47	6,31	5,27	4,63	4,30	4,29	4,06	3,98	3,98	-18,86
C. CO_2 transport and storage																														
2. Industrial processes	0,10	0,10	0,09	0,11	0,09	0,09	0,10	0,11	0,13	0,11	0,12	0,13	0,12	0,15	0,17	0,16	0,15	0,17	0,13	0,12	0,12	0,10	0,09	0,13	0,13	0,11	0,14	0,09	0,09	-5,98
A. Mineral industry																														
B. Chemical industry	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
D. Non-energy products from fuels and solvent use	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,02	0,02	0,02	0,01	0,01	0,02	0,02	0,01	0,02	0,02	0,02	0,02	0,02	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	59,74
E. Electronic industry																														
F. Product uses as ODS substitutes																														
G. Other product manufacture and use	0,09	0,09	0,08	0,10	0,08	0,07	0,09	0,10	0,12	0,10	0,11	0,12	0,10	0,14	0,16	0,14	0,12	0,15	0,11	0,10	0,10	0,08	0,07	0,11	0,11	0,09	0,12	0,07	0,07	-15,27
H. Other																														
3. Agriculture	223,42	223,42	227,97	231,01	237,23	232,66	233,23	234,39	231,96	236,24	229,12	228,77	235,50	236,17	235,78	233,59	227,37	223,08	226,06	223,62	222,40	225,53	223,26	223,65	222,37	223,36	221,55	222,58	221,84	-0,71
A. Enteric fermentation	161,58	161,58	162,81	160,75	162,97	159,12	158,70	158,62	153,16	153,30	147,39	145,23	148,13	145,83	144,16	139,84	139,33	139,37	142,59	143,86	143,83	145,23	143,60	146,86	147,75	147,78	146,69	148,66	149,23	-7,64
B. Manure management	61,75	61,75	65,07	70,17	74,16	73,45	74,43	75,67	78,69	82,80	81,59	83,42	87,24	90,22	91,49	93,60	87,90	83,57	83,34	79,64	78,43	80,20	79,56	76,68	74,49	75,46	74,75	73,82	72,49	17,39
C. Rice cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
D. Agricultural soils	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0,00
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
F. Field burning of agricultural residues	0,09	0,09	0,09	0,09	0,09	0,09	0,10	0,10	0,11	0,14	0,13	0,13	0,13	0,11	0,13	0,14	0,14	0,14	0,13	0,12	0,14	0,10	0,10	0,11	0,12	0,12	0,11	0,10	0,12	35,37
G. Liming																														
H. Urea application																														
I. Other carbon-containing fertilizers																														
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
4. Land use, land-use change and forestry	7,73	7,73	7,69	7,67	7,65	7,63	7,61	7,59	7,57	7,55	7,53	7,51	7,49	7,47	7,45	7,46	7,43	7,43	7,43	7,43	7,43	7,39	7,49	7,58	7,60	7,53	7,61	7,74	7,67	-0,79
A. Forest land	0,19	0,19	0,21	0,27	0,32	0,37	0,42	0,47	0,53	0,58	0,63	0,68	0,73	0,78	0,84	0,91	0,94	0,99	1,04	1,09	1,15	1,15	1,15	1,15	1,16	1,16	1,17	1,17	1,18	530,19
B. Cropland	5,31	5,31	5,24	5,18	5,12	5,06	4,99	4,93	4,87	4,81	4,74	4,68	4,62	4,56	4,49	4,43	4,37	4,31	4,25	4,18	4,12	4,06	4,17	4,15	4,09	4,05	4,22	4,52	4,29	-19,16
C. Grassland	2,17	2,17	2,14	2,12	2,09	2,07	2,04	2,02	1,99	1,96	1,94	1,91	1,89	1,86	1,84	1,81	1,79	1,76	1,74	1,71	1,68	1,66	1,61	1,68	1,75	1,70	1,58	1,40	1,56	-28,26
D. Wetlands	0,07	0,07	0,09	0,10	0,12	0,14	0,15	0,17	0,18	0,20	0,22	0,23	0,25	0,27	0,28	0,30	0,34	0,37	0,41	0,45	0,48	0,52	0,56	0,60	0,60	0,62	0,64	0,65	0,65	833,39
E. Settlements	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
G. Harvested wood products																														
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
5. Waste	64,80	64,80	65,07	64,43	64,05	60,94	57,57	56,41	53,33	50,55	51,54	49,31	51,07	48,59	49,95	44,55	43,77	46,04	44,61	43,10	42,07	39,55	39,54	38,20	37,04	37,10	36,69	37,67	38,52	-40,56
A. Solid waste disposal	61,45	61,45	61,45	60,67	60,00	56,73	53,25	51,59	48,02	45,01	45,53	42,91	44,68	41,68	42,54	37,46	36,37	38,14	36,29	35,09	33,50	30,88	30,96	29,72	28,14	27,55	26,11	24,77	23,71	-61,42
B. Biological treatment of solid waste	1,61	1,61	1,86	2,00	2,31	2,43	2,49	2,96	3,41	3,67	4,08	4,45	4,43	4,97	5,44	5,15	5,42	5,93	6,33	6,05	6,59	6,69	6,59	6,48	6,86	7,49	8,55	10,81	12,70	688,57
C. Incineration and open burning of waste	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	43,39
D. Waste water treatment and discharge	1,64	1,64	1,65	1,65	1,65	1,68	1,73	1,74	1,80	1,78	1,82	1,85	1,85	1,86	1,87	1,85	1,89	1,88	1,89	1,86	1,89	1,91	1,91	1,93	1,96	1,99	1,96	2,01	2,05	24,37
E. Other	0,10	0,10	0,10	0,11	0,10	0,10	0,11	0,11	0,10	0,09	0,10	0,10	0,10	0,09	0,10	0,09	0,09	0,10	0,10	0,09	0,09	0,08	0,08	0,07	0,07	0,07	0,07	0,08	0,07	-29,01
6. Other ***(as specified in summary 1.A)***	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
Total CH_4 emissions without CH_4 from LULUCF	303,84	303,84	311,49	314,63	322,43	317,96	320,89	325,38	320,91	323,08	319,20	314,85	324,35	321,44	321,71	314,60	305,14	301,36	300,66	295,40	289,68	292,32	285,96	280,69	276,72	275,56	272,87	275,13	275,38	-9,37
Total CH_4 emissions with CH_4 from LULUCF	311,58	311,58	319,17	322,29	330,08	325,59	328,49	332,97	328,48	330,63	326,73	322,37	331,85	328,91	329,16	322,05	312,57	308,79	308,09	302,84	297,12	299,71	293,45	288,27	284,32	283,09	280,48	282,87	283,05	-9,15
Memo items:																														
International bunkers	0,07	0,07	0,06	0,07	0,10	0,11	0,12	0,11	0,10	0,10	0,10	0,10	0,08	0,07	0,07	0,06	0,06	0,08	0,09	0,08	0,04	0,06	0,06	0,05	0,06	0,07	0,07	0,06	0,05	-32,84
Aviation	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	59,86
Navigation	0,06	0,06	0,06	0,06	0,09	0,10	0,11	0,10	0,10	0,10	0,09	0,09	0,08	0,06	0,07	0,05	0,06	0,08	0,08	0,07	0,04	0,05	0,05	0,04	0,05	0,06	0,06	0,05	0,04	-42,06
Multilateral operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0,00
CO_2 emissions from biomass																														
CO_2 captured																														
Long-term storage of C in waste disposal sites																														
Indirect N_2O																														
Indirect CO_2 [3]																														

TABLE 1(C, DK IN EU): EMISSION TRENDS (N_2O) IN DENMARK IN THE EU(I.E WITHOUT GREENLAND AND FAROE ISLANDS)

CRF: TABLE 10 EMISSION TRENDS — Inventory 2015
N_2O — Submission 2017 v2
(Sheet 4 of 6) — DENMARK
Denmark under the EU (i.e. without Greenland and the Faroe Islands)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt)																													%
1. Energy	1,21	1,21	1,51	1,49	1,47	1,50	1,48	1,65	1,70	1,56	1,87	1,62	1,67	1,60	1,65	1,65	1,49	1,57	1,55	1,45	1,33	1,44	1,32	1,25	1,30	1,26	1,30	1,35	1,35	11,89
A. Fuel combustion (sectoral approach)	1,03	1,03	1,15	1,12	1,15	1,19	1,24	1,38	1,31	1,27	1,26	1,22	1,24	1,23	1,28	1,23	1,19	1,28	1,26	1,24	1,19	1,25	1,19	1,14	1,16	1,13	1,16	1,19	1,20	17,09
1. Energy industries	0,29	0,29	0,37	0,34	0,36	0,39	0,38	0,51	0,44	0,41	0,40	0,38	0,40	0,40	0,44	0,39	0,36	0,42	0,36	0,35	0,36	0,38	0,33	0,31	0,33	0,29	0,28	0,30	0,29	0,34
2. Manufacturing industries and construction	0,19	0,19	0,20	0,20	0,19	0,19	0,24	0,24	0,24	0,24	0,24	0,23	0,23	0,22	0,20	0,21	0,20	0,22	0,22	0,21	0,17	0,18	0,18	0,16	0,15	0,14	0,15	0,14	0,15	-23,93
3. Transport	0,33	0,33	0,35	0,36	0,37	0,38	0,39	0,40	0,41	0,40	0,40	0,39	0,39	0,38	0,38	0,38	0,37	0,36	0,38	0,39	0,38	0,38	0,41	0,41	0,41	0,43	0,44	0,46	0,47	40,62
4. Other sectors	0,21	0,21	0,22	0,22	0,23	0,22	0,22	0,23	0,22	0,21	0,21	0,21	0,22	0,22	0,24	0,24	0,26	0,27	0,29	0,29	0,28	0,30	0,27	0,26	0,27	0,25	0,28	0,29	0,29	37,20
5. Other	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	131,67
B. Fugitive emissions from fuels	0,18	0,18	0,36	0,37	0,32	0,31	0,24	0,27	0,39	0,28	0,62	0,40	0,43	0,37	0,37	0,42	0,30	0,29	0,29	0,21	0,14	0,19	0,12	0,11	0,14	0,14	0,14	0,16	0,15	-18,15
1. Solid fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
2. Oil and natural gas and other emissions from energy production	0,18	0,18	0,36	0,37	0,32	0,31	0,24	0,27	0,39	0,28	0,62	0,40	0,43	0,37	0,37	0,42	0,30	0,29	0,29	0,21	0,14	0,19	0,12	0,11	0,14	0,14	0,14	0,16	0,15	-18,15
C. CO_2 transport and storage																														
2. Industrial processes	3,42	3,42	3,14	2,78	2,63	2,66	2,98	2,76	2,80	2,67	3,14	3,31	2,92	2,57	2,96	1,79	0,06	0,07	0,08	0,06	0,08	0,06	0,07	0,05	0,06	0,06	0,07	0,06	0,06	-98,10
A. Mineral industry																														
B. Chemical industry	3,36	3,36	3,08	2,72	2,56	2,60	2,92	2,69	2,74	2,60	3,07	3,24	2,86	2,50	2,89	1,71	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
D. Non-energy products from fuels and solvent use	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	249,02
E. Electronic industry																														
F. Product uses as ODS substitutes																														
G. Other product manufacture and use	0,06	0,06	0,06	0,06	0,06	0,06	0,07	0,07	0,06	0,07	0,07	0,07	0,07	0,07	0,07	0,08	0,06	0,07	0,08	0,06	0,07	0,06	0,07	0,05	0,06	0,06	0,07	0,06	0,06	6,88
H. Other																														
3. Agriculture	21,69	21,69	21,13	20,68	20,17	19,79	19,33	18,21	18,24	18,58	17,98	17,68	17,30	17,40	16,60	16,81	16,47	16,04	16,57	16,47	15,91	15,47	15,60	15,39	15,25	15,77	15,71	16,08	16,36	-24,56
A. Enteric fermentation																														
B. Manure management	3,28	3,28	3,31	3,41	3,39	3,26	3,14	3,14	3,18	3,29	3,20	3,18	3,29	3,38	3,34	3,45	3,25	3,02	3,01	2,84	2,67	2,67	2,62	2,57	2,54	2,52	2,48	2,43	2,40	-26,88
C. Rice cultivation																														
D. Agricultural soils	18,40	18,40	17,81	17,27	16,77	16,54	16,19	15,06	15,05	15,29	14,78	14,49	14,00	14,02	13,26	13,35	13,21	13,02	13,56	13,63	13,23	12,80	12,98	12,83	12,71	13,24	13,22	13,65	13,96	-24,15
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
F. Field burning of agricultural residues	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	35,37
G. Liming																														
H. Urea application																														
I. Other carbon containing fertlizers																														
J. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
4. Land use, land-use change and forestry	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,11	0,11	0,10	3,74
A. Forest land	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,09	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,08	-11,16
B. Cropland	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,00	174,26
C. Grassland	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	369,78
D. Wetlands	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	-49,87
E. Settlements	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	4773,77
F. Other land	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
G. Harvested wood products																														
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
5. Waste	0,41	0,41	0,41	0,39	0,43	0,46	0,46	0,39	0,40	0,48	0,60	0,78	0,75	1,06	0,98	0,41	0,44	0,45	0,53	0,58	0,52	0,51	0,50	0,47	0,49	0,48	0,46	0,50	0,51	25,38
A. Solid waste disposal																														
B. Biological treatment of solid waste	0,04	0,04	0,05	0,05	0,05	0,06	0,07	0,08	0,09	0,19	0,35	0,51	0,50	0,77	0,75	0,20	0,20	0,24	0,29	0,29	0,33	0,30	0,27	0,27	0,28	0,26	0,23	0,28	0,29	607,24
C. Incineration and open burning of waste	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	43,39
D. Waste water treatment and discharge	0,37	0,37	0,36	0,34	0,37	0,40	0,38	0,31	0,31	0,29	0,25	0,27	0,26	0,29	0,23	0,21	0,24	0,21	0,23	0,29	0,20	0,21	0,22	0,20	0,22	0,22	0,23	0,22	0,22	-39,17
E. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0,00
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00
Total direct N_2O emissions without N_2O from LULUCF	26,73	26,73	26,19	25,34	24,69	24,43	24,26	23,00	23,13	23,28	23,59	23,39	22,64	22,63	22,18	20,65	18,47	18,13	18,73	18,56	17,83	17,48	17,48	17,17	17,11	17,57	17,54	18,00	18,29	-31,57
Total direct N_2O emissions with N_2O from LULUCF	26,82	26,82	26,28	25,43	24,78	24,52	24,35	23,09	23,22	23,37	23,68	23,48	22,73	22,72	22,27	20,74	18,55	18,21	18,81	18,65	17,92	17,57	17,57	17,26	17,20	17,67	17,65	18,10	18,38	-31,45
Memo items:																														
International bunkers	0,14	0,14	0,12	0,13	0,16	0,18	0,19	0,19	0,18	0,18	0,18	0,18	0,16	0,14	0,15	0,14	0,15	0,17	0,17	0,16	0,12	0,13	0,14	0,12	0,13	0,15	0,15	0,14	0,13	-0,71
Aviation	0,06	0,06	0,06	0,06	0,06	0,06	0,06	0,07	0,07	0,07	0,08	0,08	0,08	0,07	0,07	0,08	0,09	0,09	0,09	0,09	0,08	0,08	0,08	0,08	0,08	0,09	0,09	0,10	0,10	62,76
Navigation	0,08	0,08	0,07	0,07	0,11	0,12	0,13	0,12	0,11	0,11	0,10	0,10	0,08	0,07	0,07	0,06	0,06	0,08	0,08	0,07	0,04	0,05	0,05	0,04	0,05	0,06	0,06	0,05	0,04	-51,05
Multilateral operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0,00
CO_2 emissions from biomass																														
CO_2 captured																														
Long-term storage of C in waste disposal sites																														
Indirect N_2O	1,93	1,93	2,14	1,94	2,08	2,15	2,09	2,23	1,97	1,88	1,78	1,73	1,64	1,55	1,61	1,49	1,46	1,56	1,53	1,39	1,12	1,16	1,12	0,99	1,01	1,02	1,01	0,98	0,91	-53,00
Indirect CO_2 [3]																														

TABLE 1(D, DK IN EU): EMISSION TRENDS (HFCS, PFCS, SF_6 AND NF_3) IN DENMARK IN THE EU(I.E WITHOUT GREENLAND AND FAROE ISLANDS)

CTF: Table 1

(cont.) Emission trends (HFCs, PFCs, SF6 and NF3)

CRF: TABLE 10 EMISSION TRENDS — Inventory 2017

HFCs, PFCs, SF_6, and NF_3 — Submission 2019 v1

(Sheet 5 of 6) — DENMARK

Denmark, Greenland and the Faroe Islands under the UNFCCC

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change from base to latest reported year
	(kt)																													%
Emissions of HFCs and PFCs - (kt CO_2 equivalent)	NO,NE,NA	NO,NE,NA	NO,NE,NA	3,83	110,03	157,45	258,52	401,50	403,91	543,94	694,00	796,43	794,09	828,02	842,11	894,70	942,94	968,03	1002,65	1000,02	1023,32	868,68	785,33	782,45	715,16	660,43	513,69	565,21	473,37	100,00
Emissions of HFCs - (kt CO_2 equivalent)	NO,NE,NA	NO,NE,NA	NO,NE,NA	3,83	110,03	157,38	257,89	399,41	398,72	532,46	678,26	773,87	766,17	800,01	817,52	874,17	924,17	946,88	981,46	981,58	1003,78	851,63	773,38	779,06	711,47	657,77	513,67	565,20	472,27	100,00
HFC-23	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00	0,00	0,00	0,00	0,00	0,00	0,00	NO,NA	0,00	NO,NA	NO,NA	NO,NA	0,00
HFC-32	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	100,00
HFC-41	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-43-10mee	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-125	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0,00	0,00	0,01	0,01	0,02	0,03	0,04	0,04	0,04	0,05	0,06	0,06	0,07	0,07	0,07	0,08	0,06	0,06	0,05	0,05	0,05	0,04	0,04	0,04	100,00
HFC-134	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-134a	NO,NE,NA	NO,NE,NA	NO,NE,NA	0,00	0,07	0,10	0,16	0,22	0,19	0,24	0,27	0,29	0,29	0,29	0,27	0,28	0,27	0,27	0,28	0,26	0,26	0,23	0,20	0,22	0,18	0,16	0,12	0,13	0,10	100,00
HFC-143	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-143a	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0,00	0,00	0,01	0,01	0,02	0,03	0,04	0,04	0,04	0,05	0,06	0,06	0,07	0,07	0,07	0,07	0,07	0,06	0,06	0,06	0,05	0,04	0,04	0,04	100,00
HFC-152	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-152a	NO,NA	NO,NA	NO,NA	0,00	0,03	0,05	0,04	0,03	0,02	0,01	0,04	0,02	0,01	0,01	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	100,00
HFC-161	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-227ea	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-236cb	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-236ea	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-236fa	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-245ca	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-245fa	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
HFC-365mfc	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Unspecified mix of HFCs[4] - (kt CO_2 equivalent)	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	NO,NE,NA	0,44	3,50	7,20	9,79	12,38	17,04	20,10	21,21	20,83	21,50	22,32	23,06	24,17	28,98	31,18	8,42	8,42	9,19	9,96	13,74	17,85	22,23	27,84	100,00
Emissions of PFCs - (kt CO_2 equivalent)	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,07	0,63	2,09	5,20	11,47	15,74	22,57	27,91	28,01	24,59	20,53	18,77	21,15	21,19	18,44	19,55	17,06	11,95	3,39	3,70	2,66	0,02	0,01	1,09	100,00
CF_4	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	100,00
C_2F_6	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
C_3F_8	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	NO,NA	NO,NA	0,00	NO,NA	NO,NA	NO,NA	0,00
C_4F_{10}	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
$c\text{-}C_4F_8$	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00	0,00	0,00	0,00	0,00	0,00	0,00	NO,NA	0,00	NO,NA	NO,NA	NO,NA	0,00
C_5F_{12}	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
C_6F_{14}	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
$C_{10}F_{18}$	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
$c\text{-}C_3F_6$	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Unspecified mix of PFCs[4] - (kt CO_2 equivalent)	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Unspecified mix of HFCs and PFCs - (kt CO_2 equivalent)	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
Emissions of SF_6 - (kt CO_2 equivalent)	42,41	42,41	61,06	86,33	97,96	118,11	103,94	59,32	70,72	57,79	62,99	56,92	28,67	24,07	30,22	31,65	20,84	34,50	29,20	30,51	35,50	37,14	77,61	129,66	150,10	154,60	121,65	104,41	76,04	79,31
SF_6	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,01	0,00	0,00	79,31
Emissions of NF_3 - (kt CO_2 equivalent)	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00
NF_3	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0,00

TABLE 1(GL): EMISSION TRENDS (SUMMARY) IN GREENLAND (I.E NOT EU TERRITORY)

TABLE 1(0, GL): EMISSION TRENDS (GHGS) IN GREENLAND (I.E NOT EU TERRITORY)

TABLE 1(A, GL): EMISSION TRENDS (CO_2) IN GREENLAND (I.E NOT EU TERRITORY)

TABLE 1(B, GL): EMISSION TRENDS (CH_4) IN GREENLAND (I.E NOT EU TERRITORY)

TABLE 1(C, GL): EMISSION TRENDS (N_2O) IN GREENLAND (I.E NOT EU TERRITORY)

TABLE 1(D, GL): EMISSION TRENDS (HFCS, PFCS, SF_6 AND NF_3) IN GREENLAND (I.E NOT EU TERRITORY)

See Chapter VII.B.

TABLE 1(FO): EMISSION TRENDS (SUMMARY) IN FAROE ISLANDS (I.E NOT EU TERRITORY)

TABLE 1(0, FO): EMISSION TRENDS (GHGS) IN FAROE ISLANDS (I.E NOT EU TERRITORY)

TABLE 1(A, FO): EMISSION TRENDS (CO_2) IN FAROE ISLANDS (I.E NOT EU TERRITORY)

TABLE 1(B, FO): EMISSION TRENDS (CH_4) IN FAROE ISLANDS (I.E NOT EU TERRITORY)

TABLE 1(C, FO): EMISSION TRENDS (N_2O) IN FAROE ISLANDS (I.E NOT EU TERRITORY)

TABLE 1(D, FO): EMISSION TRENDS (HFCS, PFCS, SF_6 AND NF_3) IN FAROE ISLANDS (I.E NOT EU TERRITORY)

See Chapter VII.C.

TABLE 2(A): DESCRIPTION OF QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET: BASE YEAR

Table 2(a)

Description of quantified economy-wide emission reduction target: base year [a]

Party	Denmark*	
Base year /base period	1990*	
	% of base year/base period	% of 1990 [b]
Emission reduction target	20 *	20 *
Period for reaching target	Base year - 2020*	

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Optional.

* Under the assumption that Denmark's quantified economy-wide emission reduction target is Denmark's commitment as part of the joint target for the EU and its 28 Member States. As the Faroe Islands and Greenland are not included in the EU territory, the commitments of Denmark as a member of the EU do not apply to the Faroe Island and Greenland.

Legally binding target trajectories for the period 2013-2020 are enshrined in both the EU-ETS Directive (Directive 2003/87/EC and respective amendments) and the Effort Sharing Decision (Decision No 406/2009/EC). These legally binding trajectories not only result in a 20% GHG reduction in 2020 compared to 1990 but also define the EU's annual target pathway to reduce EU GHG emissions from 2013 to 2020. The Effort Sharing Decision sets annual national emission targets for all Member States for the period 2013-2020 for those sectors not covered by the EU emissions trading system (ETS), expressed as percentage changes from 2005 levels. In March 2013 and August 2017, the Commission formally adopted, respectively revised for 2017-2020, the national annual limits throughout the period for each Member State. By 2020, the national targets will collectively deliver a reduction of around 10% in total EU emissions from the sectors covered compared with 2005 levels. The emission reduction to be achieved from the sectors covered by the EU ETS will be 21% below 2005 emission levels.

TABLE 2(B): DESCRIPTION OF QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET: GASES AND SECTORS COVERED

Table 2(b)

Description of quantified economy-wide emission reduction target: gases and sectors covered [a]

Gases covered		Base year for each gas (year):
CO2	Yes	1990
CH4	Yes	1990
N2O	Yes	1990
HFCs	Yes	1990
PFCs	Yes	1990
SF6	Yes	1990
NF3	No	NA
Other gases	No	NA
Sectors covered [b]		
Energy	Yes	
Transport [c]	Yes	
Industrial processes [d]	Yes	
Agriculture	Yes	
LULUCF	No	
Waste	Yes	
Other (specify)	Aviation: Yes*	

Abbreviations: LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] More than one selection will be allowed. If Parties use sectors other than those indicated above, the explanation of how these sectors relate to the sectors defined by the IPCC should be provided.

[c] Transport is reported as a subsector of the energy sector.

[d] Industrial processes refer to the industrial processes and solvent and other product use sectors.

* In principle, the EU ETS should cover CO2 emissions of all flights arriving at, and departing from, airports in all EU Member States, Norway, Iceland and Liechtenstein and closely related territories. However, since 2012, flights to and from aerodromes from other countries have not been included in the EU ETS.This exclusion was taken in order to facilitate negotiation of a global agreement to address aviation emissions in the forum of the International Civil Aviation Organisation (ICAO). The EU has decided on a reduced scope in the 2013–2016 period (Regulation (EU) No 421/2014 of the European Parliament and of the Council of 16 April 2014).

It should be noted that only CO2 from aviation is included, and that it is only relevant to include these emissions reported by aviation entities on the level of EU total CO2 emissions from aviation under the EU ETS as CO2-emissions from aviation entities registered in the Danish quota register (based on fuel used by these entities) are different from CO2 emissions from domestic and international aviation reported by Denmark under the UNFCCC (based on fuel sold to aircrafts starting from Danish airports). However, in accordance with guidance from the European Commission, the latter is included in table 4 as a proxy for the former.

TABLE 2(C): DESCRIPTION OF QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET: GLOBAL WARMING POTENTIAL VALUES (GWP)

Table 2(c)	
Description of quantified economy-wide emission reduction target: global warming potential values (GWP) [a]	
Gases	GWP values [b]
CO2	AR4*
CH4	AR4*
N2O	AR4*
HFCs	AR4*
PFCs	AR4*
SF6	AR4*
NF3	NA
Other gases [c]	NA

Abbreviations: GWP = global warming potential

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Please specify the reference for the GWP: Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) or the Fourth Assessment Report of the IPCC.

[c] Specify.

* as adopted in UNFCCC reporting guidelines for national GHG inventories of Annex I Parties and as adopted under the EU Monitoring Mechanism Regulation.

TABLE 2(D): DESCRIPTION OF QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET: APPROACH TO COUNTING EMISSIONS AND REMOVALS FROM THE LULUCF SECTOR

Table 2(d)			
Description of quantified economy-wide emission reduction target: approach to counting emissions and removals from the LULUCF sector [a]			
Role of LULUCF	LULUCF in base year level and target	Included	
		Excluded	Excluded
	Contribution of LULUCF is calculated using	Land-based approach	NA
		Activity-based approach	NA
		Other (specify)	NA

Abbreviation: LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

TABLE 2(E)I: DESCRIPTION OF QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET: MARKET-BASED MECHANISMS UNDER THE CONVENTION

Table 2(e)I

Description of quantified economy-wide emission reduction target: market-based mechanisms under the Convention [a]

	Possible scale of contributions (estimated kt CO2 eq)
CERs	NE*
ERUs	NE**
AAUs [b]	NE***
Carry-over units [c]	NO****
Other mechanism units under the Convention (specify) [d]	NA*****

Abbreviations: AAU = assigned amount unit, CER = certified emission reduction, ERU = emission reduction unit.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] AAUs issued to or purchased by a Party.

[c] Units carried over from the first to the second commitment periods of the Kyoto Protocol, as described in decision 13/CMP.1 and consistent with decision XX /CMP.8.

[d] As indicated in paragraph 5(e) of the guidelines contained in annex I of decision 2/CP.17.

* The use of these units under the ETS Directive and the Effort Sharing Decision is subject to the limits specified above which do not separate between CERs and ERUs, but include additional criteria for the use of CERs.

** The use of these units under the ETS Directive and the Effort Sharing Decision is subject to the limits specified above which do not separate between CERs and ERUs, but include additional criteria for the use of CERs.

*** AAUs for the period 2013-2020 have not yet been determined. The EU expects to achieve its 20% target for the period 2013-2020 with the implementation of the ETS Directive and the ESD Decision in the non-ETS sectors which do not allow the use of AAUs from non-EU Parties.

**** The time-period of the Convention target is from 1990-2020, no carry-over units will be used to achieve the 2020 target.

***** There are general provisions in place in the EU legislation that allow for the use of such units provided that the necessary legal arrangements for the creation of such units have been put in place in the EU which is not the case at the point in time of the provision of this report.

The 2020 Climate and Energy Package allows Certified Emission Reductions (CERs) and Emission Reduction Units (ERUs) to be used for compliance purposes, subject to a number of restrictions in terms of origin and type of project and up to an established limit. In addition, the legislation foresees the possible recognition of units from new market mechanisms. Under the EU ETS the limit does not exceed 50% of the required reduction below 2005 levels. In the sectors not covered by the ETS, annual use shall not exceed to 3 % of each Member States' non-ETS greenhouse gas emissions in 2005. A limited number of Member States may use an additional 1%, from projects in LDCs or SIDS subject to conditions.

Table 2(e)II: Description of quantified economy-wide emission reduction target: other market-based mechanisms

Table 2(e)II	
Description of quantified economy-wide emission reduction target: other market-based mechanisms [a]	
	Possible scale of contributions
(Specify)	(estimated kt CO_2 eq)
NA	None

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

TABLE 2(F): DESCRIPTION OF QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET: ANY OTHER INFORMATION

Table 2(f)
Description of quantified economy-wide emission reduction target: any other information [a,b]
In December 2009, the European Council reiterated the conditional offer of the EU to move to a 30% reduction by 2020 compared to 1990 levels as part of a global and comprehensive agreement for the period beyond 2012, provided that other developed countries commit themselves to comparable emission reductions and that developing countries contribute adequately according to their responsibilities and respective capabilities.
[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets. [b] This information could include information on the domestic legal status of the target or the total assigned amount of emission units for the period for reaching a target. Some of this information is presented in the narrative part of the biennial report.

TABLE 3: PROGRESS IN ACHIEVEMENT OF QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET: INFORMATION ON MITIGATION ACTIONS AND THEIR EFFECTS (ALL INFORMATION IN TABLE 3 WILL BE AVAILABLE IN THE CTF ON THE UNFCCC WEBSITE)

Table 3: Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO2 eq)**		Source of estimates
										2020	2030	
TD-1b: Mineral-oil Tax Act	Yes*	Energy, Transport	CO2, CH4, N2O	Demand management/reduction (Energy consumption)	Economic, Fiscal	Implemented	Tax on mineral oil products in Denmark. The Mineral-oil Tax Act entered into force on 1 January 1993. Before this, the tax on petrol was regulated via the Petrol Tax Act, which entered into force on 1 January 1983, and the Act on Taxation of Gas Oil and Diesel Oil, Heating Oil, Heating Tar, and Crude Oil was regulated via the Act on Taxation of certain Oil Products, which entered into force on 3 October 1977. Tax rates from recent years are shown in Table 4.6. From 1 June 1999 a tax differentiation between light diesel and diesel low in sulphur was introduced, to encourage the use of diesel low in sulphur, which is less polluting than light diesel. This was accomplished and a change took place soon after to the effect that almost all diesel sold was low in sulphur. The purpose of further differentiation from 1 January 2005 favouring sulphur-free diesel was likewise to encourage the use of this type of diesel in favour of diesel low in sulphur, and this has been successful. In addition, tax differentiation has been introduced in order to achieve environmental goals other than direct reductions in greenhouse gas emissions. Thus tax differentiation has been introduced with a view to phasing out lead in petrol. The rate of tax to achieve this environmental goal is shown in Table 4.7.	1993	Government: Ministry of Taxation	1200 and IE(G1 and G4)	1200 and IE(G1 and G4)	Estimates in 2019 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).
TD-2: Gas Tax Act	Yes*	Energy	CO2, CH4, N2O	Demand management/reduction (Energy consumption)	Economic, Fiscal	Implemented	Tax on consumption of natural gas and town gas in Denmark.	1996	Government: Ministry of Taxation	IE (G1, G2 and G4)	IE (G1, G2 and G4)	
TD-3: Coal Tax Act	Yes*	Energy	CO2, CH4, N2O	Demand management/reduction (Energy consumption)	Economic, Fiscal	Implemented	Tax rated after the calorific value of coal, coke, furnace coke, coke gravel, crude coke, lignite briquettes and lignite, tall oil, wood tar, vegetable pitch etc.	1982	Government: Ministry of Taxation	IE (G1, G2 and G4)	IE (G1, G2 and G4)	
TD-4: Electricity Tax	Yes*	Energy	CO2, CH4, N2O	Demand management/reduction (Energy consumption)	Economic, Fiscal	Implemented	Tax on consumption of electricity. The electricity tax was introduced on 1 April 1977. With effect from 1 January 2013, the tax on electricity used for heating was reduced considerably, to take into account, that an increasing amount of renewable energy was being used in electricity production. It has been estimated that this will lead to an emission reduction outside the emissions trading scheme of 0.15 million tonnes CO2 in 2015 and 0.29 million tonnes in 2018. Table 4.10 shows the development in electricity tax rates since 2002.	1977	Government: Ministry of Taxation	IE (G1, G2 and G4)	IE (G1, G2 and G4)	
TD-5: CO2 tax on energy products	Yes*	Energy	CO2	Demand management/reduction (Energy consumption)	Economic, Fiscal	Implemented	Tax on energy products depending on their contribution to CO2 emissions. The CO2 tax on energy products was introduced on 1 March 1992 and was imposed on different types of energy products relative to their CO2 emissions. From 1 January 2010 a structural change in the CO2 tax was implemented as an adaption to the EU Emissions Trading Scheme. The tax rate was increased to DKK 150 /tonne of CO2 indexed as mentioned below, cf. table 4.11. Table 4.12 shows examples of the different types of CO2 taxes converted into consumer units. In addition to this, there are CO2 taxes on heating tar, crude oil, coke, crude oil coke, lignite briquettes and lignite, LPG, and other gases. As of 1 January 2008 the CO2 taxes follow a yearly regulation of 1.8% in the period 2008-2015, similar to the energy taxes. From 2016 the tax is regulated with the consumer price index two years prior.	1992	Government: Ministry of Taxation	410 and IE (G1 and G4)	410 and IE (G1 and G4)	
TD-6(changed): Green Owner Tax - a fuel-efficiency-dependent annual tax on motor vehicles	Yes*	Transport	CO2, CH4, N2O	Demand management/reduction (Energy consumption), Low carbon fuels/electric cars (Transport)	Economic, Fiscal	Implemented	Car owners have to pay half-yearly taxes which are differentiated in accordance with the fuel efficiency of the cars, expressed in kilometres per litre. The energy consumption of electric cars is converted to a petrol fuel efficiency on the basis of the energy content of petrol. Examples of classes from 2018 for passenger cars are shown in Table 4.13.A and 4.13.B. From July the 1st 2018 the owner ship tax for cars registered in Denmark from October 3th 2017 is increased by 250 DKK half-yearly and there is introduced new classes in the ownership tax for the most energy efficient cars. Hydrogen cars are not subject to registration tax nor annual circulation taxes before 2022. From 2022 there is a phase-in scheme of registration tax in 2022-2025 similar to the phase-in scheme for electric cars.	1997	Government: Ministry of Taxation	IE (G1, G4 and G5)	IE (G1, G4 and G5)	
TD-7(changed): Registration Tax - a fuel-efficiency-dependant registration tax on passenger cars and vans	Yes*	Transport	CO2, CH4, N2O	Demand management/reduction (Energy consumption), Low carbon fuels/electric cars (Transport)	Economic, Fiscal	Implemented	The registration tax on motorised vehicles is calculated on basis of the value of the vehicle. It is furthermore integrated in the design of the registration tax that cars are granted deductions in the registration tax with reference to their specific energy efficiency and safety equipment. Cars with high energy efficiencies, such as electric vehicles, are granted large reductions in the registration tax. Passenger cars, light commercial vehicles and motorbikes are due to pay the registration tax. The registration tax on electric vehicles is gradually introduced annually until 2023 when it is fully phased in. Furthermore a deduction dependant on battery capacity is given during the phase-in scheme. There is also a tax base deduction for electric and plug-in hybrid cars that amount to DKK 40,000 in 2019 and DKK 77,500 in 2020. In total, this means that electric cars with a value of up to DKK 400,000 (including VAT) currently on the Danish market will pay DKK 0 in registration tax in 2019 and 2020 and a low registration tax for more expensive electric vehicles. In addition, the part of the registration tax that will be phased in for plug-in hybrid cars, will be DKK 0 in 2019 and 2020 for most of the plug-in hybrid cars on the Danish market today.	2000	Government: Ministry of Taxation	IE (G1 and G4)	IE (G1 and G4)	
TD-8: Tax on HFCs, PFCs and SF6 - equivalent to the CO2 tax	Yes*	Transport	HFCs, PFCs, SF6	Reduction of emissions of fluorinated gases (Industrial processes)	Economic, Fiscal	Implemented	Tax on HFCs, SF6 and PFCs. The tax is differentiated in accordance with the global warming potential of the substance with DKK 0.15 per kilogramme of CO2 equivalents as the general principle and with DKK 600 per kilogramme as a general upper limit.	2001	Government: Ministry of Taxation	IE (G1 and G6)	IE (G1 and G6)	
TD-9: Tax on methane from natural gas fired power plants - equivalent to the CO2 tax	Yes*	Energy	CH4, CO2	Reduction of losses (Energy supply), Control of fugitive emissions from energy production (Energy supply), Methane reduction ()	Economic, Fiscal	Implemented	Tax on methane emissions from natural gas fired power plants - equal in terms of CO2 equivalents to the CO2 tax. As of 1 January 2011 a tax on methane emissions - equal in terms of CO2 equivalents to the CO2 tax - from natural gas fired power plants was introduced. This is expected to reduce methane emissions from gas engines through behavioural changes such as changing from motor operation to boiler operation and establishing mitigation measures. Consumption is also expected to fall as the price of heat will increase. These behavioural changes will result in falls in the emissions of unburned methane from power stations. In addition, CO2 emissions will fall and consumption of natural gas will fall. In total, a decline of 0.06 million tonnes CO2 equivalent emissions in 2 out of 5 years is expected, corresponding to an average annual reduction effect of approximately 0.02 million tonnes CO2 equivalent per year in 2008-12.	2011	Government: Ministry of Taxation	**30**	**30**	Estimates in 2019 - based on The 2013 Analysis of the Effects of Selected Measures for the National Audit Office, Danish Energy Agency, December 2013 (http://www.ens.dk/sites/ens.dk/files/energistyrelsen/Nyheder/kyoto-samlenotat_9._december.pdf (an English translation is included in Denmark's 7th National Communication, Annex B3))

Table 3: Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)**		Source of estimates
										2020	2030	
EN-1: EU-CO_2-emission trading scheme for electricity and district heat production and certain industrial processes (incl. Business) and aviation from 2012	Yes*	Energy, Industry/Industrial processes, Cross-cutting	CO_2	Switch to less carbon-intensive fuels (Energy supply), Increase in renewable energy (Energy supply), Efficiency improvement in the energy and transformation sector (Energy supply), Control of fugitive emissions from energy production (Energy supply)	Regulatory, Economic	Implemented	A key instrument for reaching the goals for emission reductions is the EU Emission Trading Scheme (EU ETS), which is a CO_2 allowance scheme for energy production and energy-intensive industries as described in section 4.3.1. The EU Member States have devised this trading scheme for greenhouse gas emissions in order to fulfil the international climate commitments set out in the Kyoto Protocol, in particular with the aim of reducing CO_2 emissions from energy production and energy-intensive industries. The allowances scheme entered into force on 1 January 2005. The 2005-2007 period was used as a testing phase. The EU ETS Directive has been revised a number of times. The allowance allocation for 2008-2012 was determined on the basis of the national allocation plan from July 2006, submitted the European Commission. The EU ETS 2008-2012 has been an important measure in Denmark's fulfilment of its climate obligations under the first commitment period of the Kyoto Protocol. The scheme aligns well with government policy for the energy area on liberalisation of the energy markets and management of environment efforts by the market. The installations subject to the allowance regulations account for a little less than half of Danish emissions of greenhouse gases. Almost all major Danish installations with considerable emissions are covered by the ETS. Most of these are generators of power and heat, the rest are industrial enterprises plus a few production units within the offshore sector. Both the statutory and the administrative basis for the scheme have been established. The necessary legal basis was adopted by the Danish Folketing in June 2004 and the 2008-2012 national allocation plan was approved by the European Commission on 31 August 2007. According to the national allocation plan for the period 2008-2012 an average annual allowance of 24.5 million tonnes CO_2 has been allocated. According to the allocation plan this should correspond to a drop in annual emissions of about 5 million tonnes per year in 2008-2012, or a reduction of about 17% compared with emissions expected in the national allocation plan for the period. This level was set by balancing environmental considerations against competitiveness and jobs: • Electricity and heat producers were allocated about 15.8 million EAUs. The allowance for electricity generation is allocated as "per kWh", while for heat production allowances are allocated according to emissions in the base years 1998-2004. • The other 133 installations (industry and offshore) have been allocated allowances corresponding to emissions in the base years 1998-2004. A total of 8.2 million tonnes CO_2 per year have been allocated to industry and offshore. • A special reserve of 0.5 million tonnes CO_2 per year has been allocated with free allowances for new installations and significant extensions to existing units. Allowances not allocated by the end of the commitment period or returned due to closures have been auctioned. The period 2008 – 2012 was finalized in 2013 with the final surrendering of allowances and credits by companies participating in the EU ETS as shown in section 4.3.1. The new EU Climate and Energy Agreement from December 2008 extended the ETS system to 2013-2020 in order for the EU to reduce CO_2 emissions by 20% in 2020. At the same time allocation was centralised and auctioning is to be used more extensively from 2013. The allowances have been calculated for this period in accordance with the EU benchmarking decision 2011/278/EU. Annex 1f contains an overview of the installations and aviation operators covered and their allowance allocation for 2013-2020. However, the current low allowances price has made it more difficult to initiate the necessary transition and green investments after 2012. Developments in allowances prices have particular significance for Danish emissions and they affect the need to initiate other, new mitigation initiatives. The low allowances price makes the situation relatively more expensive for countries like Denmark, who want to take the lead. Therefore, efforts to increase the level of ambition in EU climate policy are key in the Danish government's climate change policy to achieve the national target.	2005	Government: Danish Energy Agency and entities uner the EU ETS	IE (G1, G3 and G4)	IE (G1, G3 and G4)	
EN-2: Biomass Agreement (Agreement on the use of biomass in electricity production)	Yes*	Energy	CO_2	Increase in renewable energy (Energy supply)	Economic, Voluntary Agreement	Implemented	In 2017, biomass accounted for approximately 54% of renewable-energy production, mostly in the form of straw, wood pellets, wood chip and biodegradable waste for incineration. Approximately 82% of the biomass was imported, mainly in the form of wood pellets (54 PJ), biofuels (10.4 PJ), wood chips (5.5 PJ), fire wood (2.6 PJ) and biodegradable waste for incineration (2.2 PJ). The energy production from biomass has more than doubled since 1990 - primarily due to the policy agreement from 1993 (the Biomass Agreement: requires power plants to use 1.4 million tonnes of straw and wood, equivalent to almost 20 PJ per year) and the policy agreement from February 2008 on the increased use of straw and chips at the large co-generation plants (up to 700,000 tonnes in 2011). At the same time, the consumption of biomass continues to rise as a source of energy for the supply of heat in district-heating plants and in smaller installations for households, enterprises and institutions. Although it was demonstrated in Denmark in the mid-1990s that biogas plants can be established with reliable operation and with an acceptable economy biogas still only accounted for 6.5% of renewable-energy production in 2017. Liquid biofuels, such as animal and vegetable oils, biodiesel and bioethanol, is used only on a small scale. Liquid biofuels from bio-waste by the so-called second generation technologies are now at a low level.	1993	Government: The electricity producers	1100 and IE (G1 and G3)	1100 and IE (G1 and G3)	Estimates in 2019 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).
EN-3: Price supplement and subsidies for renewable energy production	Yes*	Energy	CO_2	Increase in renewable energy (Energy supply)	Economic	Implemented	The increasing use of renewable energy sources is reducing emissions of CO_2 from fossil fuels. The long term goal for the Danish government is to be independent of fossil fuels by 2050. The initiatives in the political energy agreement concluded by the government and a broad majority in the Parliament in March 2012 cover these crucial energy policy areas for the period until 2020. The parties to the current energy agreement have agreed by 2018 to commence discussions on additional initiatives for the period after 2020. The expected headline results for 2020 are the following: more than 40% renewable energy in final energy consumption; approximately 50% of electricity consumption to be supplied by wind power; approximately 8% reduction in gross energy consumption in relation 2010; and 34% reduction in greenhouse gas emissions in relation to 1990. Renewable energy sources are promoted with economic measures, including use of energy and CO_2 taxes on fossil fuels and through the Public Service Obligation Schemes (PSO), which have been a supplement to the price of electricity paid by all consumers until 2017. The Danish PSO levy will be phased out during a period of 5 years (2017-2022), and the financing of support to renewables will gradually shift to the State Budget.	2008	Government: Danish Energy Agency and entities responsible for energy production	IE (G1 and G3)	IE (G1 and G3)	
EN-4: Tenders for offshore wind turbines	Yes*	Energy	CO_2	Increase in renewable energy (Energy supply)	Regulatory	Implemented	The 2012 Energy Agreement includes a target of applying another 1900 MW of new capacity from onshore and offshore wind by the end of 2021. Most of the new capacity will come from offshore wind power. In this respect the Danish Energy Agency was responsible for tendering 1350 MW new offshore capacity: The Horns Rev 3 tender of 400 MW in the North Sea, which was inaugurated on 22 August 2019 , the Kriegers Flak tender of 600 MW in the Baltic Sea with expected commissioning in the period 2019-21 and the so-called near shore tender of 350 MW – Vesterhav Nord and Syd - with expected commissioning in 2023. Also following from the 2012 Energy Agreement the Nissum Bredning test project (28MW) was inaugurated on 12 May 2018 . As a result, wind energy is expected to cover 50 % of Danish electricity consumption in 2020. The 2018 Energy Agreement includes the establishment of three new offshore wind farms 2018-2030 that will supply at least 2,400 MW of green electricity to the energy system – more than the total combined electricity consumption of all Danish households. A variety of factors will be considered before choosing the location of the offshore wind farms, including cost, the surrounding environment, and seabed conditions. A cost-effective expansion of wind energy is essential. Therefore, a sound procurement process will allow for maximum competition to achieve the lowest possible price. In recognition of the significant aesthetic impact that offshore wind turbines can have on the coastal landscape, the energy agreement expands the power of municipalities to reject offshore wind turbines from 8 km to 15 km off the shore.	2013	Government: Danish Energy Agency and entities responsible for energy production	IE (G1 and G3)	IE (G1 and G3)	
EN-5(expired): Scrapping scheme for old wind turbines	Yes*	Energy	CO_2	Increase in renewable energy (Energy supply)	Economic	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	The scrapping scheme has supported the taking down of old and unfavourable placed wind turbines and has supported the expansion of wind power.	2008	Government: Danish Energy Agency	IE (G1 and G3)	IE (G1 and G3)	
EN-6: Energy development and demonstration	Yes*	Energy	CO_2, CH_4, N_2O	Research and development (), Research and development (), Research and development ()	Information	Implemented	Danish support for new energy technologies has been comprehensive and relatively stable. A long list of direct and indirect support schemes and policies have, in combination, created a domestic market which has given Danish companies a boost. This boost has enabled many companies to become international market leaders. Danish companies continue to enjoy commercial success within the energy-related marketplace. R&D activities include energy savings, more efficient energy conversion, renewable energy technologies and efforts within System Integration and Smart Energy. Research and development activities in the field of energy are not motivated solely by climate issues, but are relevant to climate issues, since they contribute to determining the overall framework for the CO_2 intensity of energy production and consumption in the future. There is a broad political commitment to support R&D activities through public funding and the Danish Government has in its manifesto by November 2016 stated that Denmark is committed to an ambitious green transition for the national energy supply. This calls for comprehensive R&D efforts for the development of improved and new sustainable energy technologies. Denmark is one of the partners in the public-private initiative Mission Innovation comprising 22 countries and the European Commission. The aim of Mission Innovation, that was founded in relation to the COP21 in Paris 2015, is to strengthen the multilateral R&D efforts within clean energy technologies to promote a continuous cost effective green transition of the energy systems. Thus Denmark as one of the partners has chosen to strengthen the dedicated public investments in clean energy research, development and demonstration focusing on reduction of technology costs and CO_2 emissions and with an emphasis on innovative projects that can be replicated and scaled up with the involvement of private investors. Denmark will seek to double these efforts departing from a baseline of the average funding to the Danish Energy Technology Development and Demonstration Programme (EUDP) of the years 2015-2016 and until 2020 where DKK 580 million will be allocated. The EUDP programme was established in 2008 and since then the programme has supported more than 600 projects with a total of DDK 3 billion. On average, 45-50% of the activities under the Programme are financed by the EUDP and hence the private investments in the supported projects are of the same size as the public support leading to approximately to DKK 6 billion in total investments. The Danish Parliament has dedicated DKK 400 million for EUDP for the fiscal year 2018. A minor programme is administrated on behalf of the power distribution companies by the Danish power association Dansk Energi. The objective is to support research and development within energy-efficient use of electricity through development of energy-efficient products and processes in buildings, industry etc. The annual funds for this programme are DKK 25 million. Activities relating to strategic research and innovation in general are since 2014 administrated by Danish Innovation Fond. The Fund covers all sorts of research and innovation projects and is not limited to energy matters. However, for 2017 and 2018 DKK at least 100 million /year will be earmarked for R&D within new and clean energy technologies. In 2018, the energy and climate research was strengthened with the 2018 Energy Agreement. The parties to the 2018 Energy Agreement intend to phase in additional state funding for energy and climate research, going from 580m DKK in 2020 to a target of 1 billion DKK annually from 2024. These funds will be earmarked for research, development and demonstration of new technology. Intensifying energy and climate research as we move towards 2030 will ensure continued efforts to develop the technologies that will help Denmark's energy system transition	2008	Government: EUDP Secretariat c/o Danish Energy Agency	IE (G1)	IE (G1)	

Table 3: Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)**		Source of estimates
										2020	2030	
BU-1: Agreements on energy efficiency with business	Yes*	Energy	CO_2	Efficiency improvement in industrial end-use sectors (Energy consumption)	Voluntary Agreement, Economic	Implemented	In connection with the implementation of the CO_2 tax also a subsidy for CO_2 tax discount for energy intensive industries was introduced. However, a condition for getting the CO_2 tax discount is an agreement on improvements in energy efficiency between the company and the Danish Energy Agency. The first implementation period was 1993-2013. After one year expiration the voluntary agreement scheme was reintroduced in 2015. The electricity intensive companies get a subsidy for their PSO tax on electricity.	1993	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	
BU-2: Savings activities by elec. grid, gas, oil and district heating companies (consump. of final energy excl. Transp.)	Yes*	Energy	CO_2	Demand management/reduction (Energy consumption)	Information	Implemented	The energy companies carry out campaigns and energy saving activities aimed at energy consumers. And the energy companies are obliged to realise savings in final consumption. In their efforts there are no geographical or sector limitations. The target for the savings is 10.1 PJ for the period 2016-2020. The effort is financed by the consumers via the consumers' energy bills.	2006	Government: Danish Energy Agency	60 and IE (G1 and G4)	60 and IE (G1 and G4)	Estimates in 2017 - based on The 2013 Analysis of the Effects of Selected Measures for the National Audit Office, Danish Energy Agency, December 2013 (http://www.ens.dk/sites/ens.dk/files/energistyrelsen/Nyheder/kyoto-samlenotat_9._december.pdf (an English translation is included in Denmark's 7th National Communication, Annex B3))
BU-6: Circular on energy-efficiency in state institutions	Yes*	Energy	CO_2	Efficiency improvement in services/ tertiary sector (Energy consumption)	Regulatory	Implemented	"The circular require state institutions to: □ Focus on energy efficiency in their behaviour □ Buy energy efficient products □ Operate state buildings in an energy efficient manner □ Report on, and make public, figures on consumption of energy and water and energy labelling of buildings"	2005	Government: The Danish Energy Agency is responsible for the circular. The individual ministries and state institutions are responsible for the implementation of the circular.	IE (G1 and G4)	IE (G1 and G4)	
BU-7(expired): Campaigns and promotion of efficient appliances (including elec. heating, conversion and efficient appliances in households)	Yes*	Energy	CO_2	Efficiency improvement of appliances (Energy consumption)	Information	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	The task of the Electricity Saving Trust included the promotion of efficient electric appliances etc. and electric heating conversion in households and the public sector. The Trust were making use of measures such as national campaigns, efforts to influence the market, voluntary agreements and efforts to raise awareness on the consumption. The budget was approx. DKK 90-100 mill. annually.	1997	Government: The Minister for Climate and Energy / The Danish Energy Authority	IE (G1 and G4)	IE (G1 and G4)	
BU-8(expired): Renewables for the industry	Yes*	Energy	CO_2	Increase in renewable energy (Energy supply)	Economic	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	Businesses will be able to get support from a DKK 3.75 billion fund to convert to renewable energy sources or district heating in accordance with the following objectives: • Support businesses to replace fossil fuels with renewable energy – such as wind, solar, biogas or biomass – to power manufacturing, • Support businesses to replace fossil fuels by district heating. E.g. horticulture will be able to change from coal-fired boilers to district heating, • Support businesses to invest in energy-efficiency measures. The estimated effect of this "Renewables for industry" initiative is a reduction of 1 million tonnes of CO_2 per year from 2020 and onwards.	2013	Government: Danish Energy Agency, other state authorities, enterprises	1000	IE (G1)	The estimate for 2020 shown here is a former separate estimate for this measure. Although this measure has expired it is still included in the list as some effect of the implementation carried out before expiration remain. But this has not been quantified separately. The separate estimate shown here is not included in the calculation of the total effect of all measures.
BU-9: Mandatory Energy Audit for large Enterprises	Yes*	Energy	CO_2	Efficiency improvement in industrial end-use sectors (Energy consumption)	Regulatory	Implemented	Large enterprises in Denmark are by law required to have a mandatory energy audit every fourth year. The law is no. 345 of 8th of april 2014 "Lov om ændring af lov om fremme af besparelser i energiforbruget, lov om varmeforsyning, lov om kommunal fjernkølig og forskellige andre love". The law transposes the energy efficiency directive article 8. Denmark has defined large enterprise in accordance with the EU definitions saying that enterprises that do not fall under the category of micro, small and medium-sized enterprises, in accordance with the Commission's recommendation 2003/361/EC of 6 May 2003 concerning the definition of micro, small and medium-sized. Enterprises with ISO 50,001 or ISO 14,001 are exempt. The deadline for the first energy audits was the 5th of December 2015 and afterwards every fourth year. The scope of the energy audit is buildings, processes and transport. There is no requirement of implementing the energy saving proposals from the energy audits.	2014	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	
BU-10 (expired): The center for energy savings in enterprises	Yes*	Energy	CO_2	Efficiency improvement in industrial end-use sectors (Energy consumption)	Information	Implemented	Reducing energy consumption by increasing energy efficiency and promoting energy saving is a very important element for Danish energy policy. Among the grid and distribution companies (electricity, natural gas, oil and heating), the electricity companies have been working with energy savings since the early 1990s and the natural gas and district heating companies have been working with energy savings since 2000. Since 2006, several political agreements have been reached to significantly strengthen the energy savings efforts in Denmark.	2014	Government: Danish Eneergy Agency	IE (G1 and G4)	IE (G1 and G4)	

Table 3: Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)**		Source of estimates
										2020	2030	
TR-1a: EU demands on vehicle manufactures to deliver fuel efficient cars and vans	Yes*	Transport	CO_2	Efficiency improvements of vehicles (Transport)	Regulatory	Implemented	The EU's requirements on average CO_2 emissions for passenger cars and vans, i.e. the mechanism imposing fines on manufacturers if they fail to comply with the CO_2 targets.	2000	Other: European Commission	600 and IE (G1, G4 and G5)	600 and IE (G1, G4 and G5)	Estimates in 2019 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).
TR-1b(expired): Information campaign on fuel consumption of new cars	Yes*	Transport	CO_2	Demand management/reduction (Transport), Improved behaviour (Transport)	Information	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	DKK 14 million was allocated for a campaign aimed at raising public awareness about energy labelling of new cars and vans.	2000	Government: Denmark`s Road Safety and Transport Agency	IE (G1, G4 and G5)	IE (G1, G4 and G5)	
TR-2(expired): Energy-correct driving technique	Yes*	Transport	CO_2	Improved behaviour (Transport)	Information	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	DKK 28 million was allocated to campaigns to promote energy-efficient driving. Experience shows that most people are able to save between 5% and 15% fuel by adopting a more energy-efficient driving style.	2000	Government: Ministry of Justice	IE (G1, G4 and G5)	IE (G1, G4 and G5)	
TR-3(expired): Initiative on enforcing speed limits	Yes*	Transport	CO_2	Improved behaviour (Transport)	Information, Economic	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	As of February 1, 2015 the number of mobile speed enforcement devices (mobile cameras) was increased from 25 to 100 nationwide. The effect on GHG emissions is uncertain, but it has previously been estimated that increased enforcement of speed limits could result in a reduction of approximately 55.000 tonnes CO_2 annually.	2014	Government: Ministry of Justice	IE (G1, G4 and G5)	IE (G1, G4 and G5)	
TR-4(expired): Establishment of intermodal installations	Yes*	Transport	CO_2	Modal shift to public transport or non-motorized transport (Transport), Improved behaviour (Transport)	Economic	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	Promotion of the establishment of intermodal installations has been a general transport policy for many years. In 2009, as a result of a broad political agreement regarding transport policy in Denmark, funds were allocated to several activities in the transport sector. This includes: • DKK 200 million for projects on energy-efficient transport, where the following project has focus on the promotion of the establishment of intermodal installations: o Rail-truck container transfer systems to promote multi-modal transport	2014	Government: Ministry of Transport and Energy, municipalities, Danish State Railways (DSB)	IE (G1 and G4)	IE (G1 and G4)	
TR-5(expired): Promotion of environmentally friendly goods transport	Yes*	Transport	CO_2	Modal shift to public transport or non-motorized transport (Transport), Demand management/reduction (Transport), Improved behaviour (Transport)	Economic, Information	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	Promotion of environmentally friendly goods transport has been a general transport policy for many years. In 2009, as a result of a broad political agreement regarding transport policy in Denmark, funds were allocated to several activities in the transport sector. This includes: • DKK 200 million for projects on energy-efficient transport, where the following projects have focus on promotion of environmentally friendly goods transport - solely or partly: o Off-peak delivery scheme for goods using low-noise equipment o City logistics for goods transport o Lightweight materials for pressurized equipment, containers etc. o Mobility Management o Intelligent Transport Systems	2014	Government: Danish Environmental Protection Agency, Haulage contractors	IE (G1 and G4)	IE (G1 and G4)	
TR-6(expired): Reduced travel times for public transport	Yes*	Transport	CO_2	Modal shift to public transport or non-motorized transport (Transport), Demand management/reduction (Transport)	Regulatory	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	In 2013, the Danish government decided to allocate DKK 27.5 billion to improve the rail infrastructure in Denmark substantially. The upgrade is expected to be finalized by 2025 and will reduce travel times substantially. A CO_2 reduction of around 100,000 tonnes per year is expected.	2014	Government: Ministry of Transport and Energy and Danish State Railways (DSB)	IE (G1 and G4)	IE (G1 and G4)	
TR-7: Spatial planning	Yes*	Transport	CO_2	Low carbon fuels/electric cars (Transport), Demand management/reduction (Transport), Improved transport infrastructure (Transport)	Regulatory	Implemented	Spatial planning on state, regional and local level is also taking into account the objective to limit the growth in demand for passenger and freight transport and thereby reduce the number of vehicle kilometres driven and GHGs emitted. For example, spatial planning, in terms of urbanization and increased focus on minimising distances between residential areas/city centres and stations, help to reduce the need for transport.	2000	Local: Municipalities	IE (G1 and G4)	IE (G1 and G4)	
TR-8: EU requirements regarding biofuels	Yes*	Transport	CO_2	Low carbon fuels/electric cars (Transport)	Regulatory	Implemented	From 2012 all petrol and diesel for transport sold in Denmark must contain an average of 5.75% of biofuels, which must live up to the EU sustainability criteria. According to the Energy Agreement of March 2012 a 10 per cent target is foreseen by 2020, however this will depend on further analysis of alternative instruments carried out by 2017. This will probably lead to a lower blending mandate.	2012	Government: Danish Energy Agency	290 and IE (G1 and G3)	290 and IE (G1 and G3)	Estimates in 2019 - based on The 2013 Analysis of the Effects of Selected Measures for the National Audit Office, Danish Energy Agency, December 2013 (http://www.ens.dk/sites/ens.dk/files/energistyrelsen/Nyheder/kyoto-samlenotat_9._december.pdf (an English translation is included in Denmark's 7th National Communication, Annex B3))
TR-9(expired): Transport infrastructure projects in the fields of electric vehicles, gas and hydrogen	Yes*	Transport	CO_2	Low carbon fuels/electric cars (Transport), Improved transport infrastructure (Transport)	Economic	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	In the agreement DKK 70 million has been allocated to transport infrastructure projects in the fields of electric vehicles, gas and hydrogen. An ongoing pilot scheme for electric vehicles has been prolonged until 2015 with an additional funding of DKK 15 million on top of the DKK 35 million from the former Energy Agreement.	2014	Government: Ministry of Transport	IE (G1)	IE (G1)	
TR-10: Electrification of parts of the rail infrastructure	Yes*	Transport	CO_2	Improved transport infrastructure (Transport)	Economic	Adopted	In 2013, the former government decided to allocate the future proceeds from a change in the oil industry taxation to improve the rail infrastructure in Denmark. The upgrade is expected to reduce travel times substantially. In 2017 changed to been seen as also including the measure formerly reported as TR-6.	2014	Government: Ministry of Transport	IE (G1)	IE (G1)	
TR-11(expired): Investments in a new metro line and bicycle transport facilities.	Yes*	Transport	CO_2	Improved transport infrastructure (Transport)	Economic	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	DKK 328 million to the establishment of a metro line to the new Nordhavn area in Copenhagen – and DKK 1 billion to improve and promote Danish cycle transport facilities.	2014	Government: Ministry of Transport, Local:Municipality of Copenhagen	IE (G1)	IE (G1)	
TR-12: Investment in a tunnel under the Femern Belt	Yes*	Transport	CO_2	Improved transport infrastructure (Transport)	Economic	Adopted	The tunnel under the Femern Belt will reduce CO_2-emissions by potentially 200.000 tonnes per year. This is mainly because of the following effects: 1.Goods will shift from road to rail. 2. The travel distance from Copenhagen to Hamburg will be shortened. 3.The ferries between Denmark and Germany will cease to operate.	2028	Government: Ministry of Transport	-300	200	Estimates for the construction phase (emissions of 300 kt CO_2eq/year) and operation phase (reduktion of 198.5 kt CO_2eq/year) in the 2013 EIA for the project, Chapter 19 (https://www.trm.dk/da/publikationer/2013/vvm-for-femern-baelt).

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										2020	2030	
HO-1(changed): Minimum energy requirements for buildings	Yes*	Energy	CO2, CH4, N2O	Efficiency improvements of buildings (Energy consumption)	Regulatory, Information	Implemented	Denmark has a long experience with energy efficiency and energy savings in buildings. From 1990 to 2017 energy consumption for heating has been reduced by 16.1% per m2. The goal is to reduce energy consumption in new buildings by 75% by 2020 relative to 2006. All new buildings must, according to the Danish building code, be constructed as nearly zero-energy buildings (NZEB). The benefits of reducing energy consumption are tangible: less fossil fuel is consumed and the environment has improved substantially. Strict and progressively tightened building regulations since 1977 have ensured a stable demand for energy-efficient building technologies. Energy labelling of buildings when built, sold or rented Energy labelling of buildings must be implemented after finishing the construction of a building and on the sale or rental of the building - primarily heating consumption. This applies in principle for all buildings, irrespective of size, apart from production facilities, factories etc. The energy performance is expressed by a numeric indicator of primary energy in kWh/m2 per year based on the primary energy factor. Regular energy labelling of large buildings and public buildings	1997	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	
HO-2: Energy labelling of electric appliances	Yes*	Energy	CO2	Efficiency improvement of appliances (Energy consumption)	Information	Implemented	Minimum energy requirements and energy labelling of appliances: Energy labelling (A-G) of white goods, lighting, air con etc. is compulsory within the EU. The European Community also has mandatory energy requirements for some 20 energy-consuming products, such as electric motors, circulators, white goods etc. There are also voluntary labelling schemes (Energy Star, Energy Arrow, windows, boilers) for a number of products. Danish authorities play an active role both in negotiation of the requirements and in securing compliance with the compulsory requirements - e.g. through market surveillance. The Danish Energy Agency offers advice on its website to end-users in order to promote energy-efficient appliances and products. Information initiative towards private households: In March 2012 the Centre for Energy Savings was replaced by an information initiative placed at the Energy Agency. The main target of this initiative is to promote energy-efficient products and solutions. The measures of the initiative will be information campaigns, web-based information for private households etc.	1992	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	
HO-3: Substitution of individual oil-based furnaces	Yes*	Energy	CO2	Switch to less carbon-intensive fuels (Energy supply), Efficiency improvements of buildings (Energy consumption)	Economic, Information	Implemented	In 2010-2012 DKK 400 mill. have been allocated to support the substitution of individual oil based furnaces for modern, low emitting heating solutions, including systems based on renewable energy such as heat pumps and solar heating. As of September 2013 the measure has been continued as an information effort without subsidies.	2010	Government: Danish Energy Agency	20 and IE (G1 and G4)	20 and IE (G1 and G4)	Estimates in 2019 - based on The 2013 Analysis of the Effects of Selected Measures for the National Audit Office, Danish Energy Agency, December 2013 (http://www.ens.dk/sites/ens.dk/files/energistyrelsen/Nyheder/kyoto-samlenotat_9._december.pdf (an English translation is included in Denmark's 7th
HO-4: Better Houses	Yes*	Energy	CO2	Efficiency improvements of buildings (Energy consumption)	Information	Implemented	"BetterHouses" is a scheme (voluntary and market-driven system) from the Danish Energy Agency focusing on energy renovation of buildings. The aim is to make it easier for owners of buildings, mostly homeowners, to energy renovate by creating a "one stop shop" for energy renovation, where the owner only has to contact one certified building contractor and to get an overall counselling on energy renovation of the entire building. Skilled workmen are educated under the BetterHouses program to be advisors on energy renovation. The Danish Energy agency approves the BetterHouses firms and professionals like architects, engineers, craftsmen, energy consultants and building designers can take training courses to become BetterHouses advisors. The training is carried out at academies of higher education. A Better Houses advisor can manage the process and can follow the project all the way from plan to completed renovation.	2014	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	
HO-5: Strategy for Energy renovation of buildings	Yes*	Energy	CO2	Efficiency improvements of buildings (Energy consumption)	Information, Education, Research	Implemented	Strategy for energy renovation of buildings: The former Government adopted in May 2014 a strategy for energy renovation of buildings. The strategy contains initiatives which will promote the renovation of the Danish building stocks and insures that energy efficiency measures are implemented on the buildings. It is expected, that the effect of the strategy on energy consumption will be a reduction of net energy consumption for heating and hot water with 35 pct. in 2050 compared with 2014. The strategy includes following initiatives: • Revision and upgrade of building regulations and energy requirements that applies to renovation and retrofitting of existing buildings • Information to building owners, construction companies, financial institutions etc. on energy how to improve energy efficiency • Revision of the energy certificates scheme to improve the efficiency of the scheme • Promotion of the ESCO-concept (ESCO: Energy Service Companies) • Promotion of energy efficiency in public buildings • Measures to improve professional training to craftsmen and engineers in the building sector • Development and demonstration of new technologies.	2014	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	
HO-6: Heat pumps as an energy service	Yes*	Energy	CO2	Efficiency improvements of buildings (Energy consumption), Increase in renewable energy (Energy supply)	Economic	Implemented	In this initiative, which has been deployed since 2016, energy companies install, finance, run and maintain heat pumps installed in smaller residential and commercial buildings. Customers have no up-front investment cost but pay for the supplied heat much as they would for district heating. This has increased the number of heat pump installations, and heat pumps in the scheme tend to operate more efficiently, because they are run by professionals rather than building owners. The initiative is targeting mainly areas without supply of natural gas or district heating. The 2018 Energy Agreement focuses on the remaining oil-fired boilers and barriers to promote the use of heat pumps. There are currently app. 80000 oil-fired boilers heating Danish homes. To reduce this number, annual funding of 20m DKK from 2021-2024 will be allocated for a support scheme to promote the replacement of oil-fired boilers with heat pumps. Furthermore it was decided that no new consumer obligations will be permitted as from January 2019, while the consequences of repealing existing consumer obligations will be analysed before the parties to the agreement make a decision on such repeals.	2016	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	

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										2020	2030	
IP-1: Regulation of use of HFCs, PFCs and SF6 (phasing out most of the uses)	Yes*	Industry/Industrial processes	HFCs, PFCs, SF6	Reduction of emissions of fluorinated gases (Industrial processes)	Regulatory	Implemented	Import, sale and use of the substances or new products containing the substances is forbidden from 1 January 2006 with some exceptions.	2006	Government: Danish Environmental Protection Agency	IE (G1 and G6)	IE (G1 and G6)	

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										2020	2030	
AG-1(expired): Action Plan for the Aquatic Environment I+II and Action Plan for Sustainable Agriculture	Yes*	Agriculture	N_2O	Reduction of fertilizer/manure use on cropland (Agriculture)	Regulatory	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	The action plans contain several measures e.g. with the objective to increase the area with winter green fields and better utilisation of manure.	1987	Government: State, Local: Municipalities	**1900**	**1900**	Estimates in 2019 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2))
AG-2(expired): Action Plan for the Aquatic Environment III	Yes*	Agriculture	N_2O	Reduction of fertilizer/manure use on cropland (Agriculture)	Economic, Regulatory	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	The plan contain several measures, where the most import in relation to greenhouse gas emissions are: Establishment of 4000 ha wetlands in 2004 and 2005. Making the rules on catch crops more rigorous. Making the rules on exploitation of N in animal manure more rigorous. Additional environmentally friendly measures in crop farming.	2004	Government: State, Local: Municipalities	IE (G1)	IE (G1)	
AG-4a/4b/4c/4d/4e: Reduced emissions of ammonia	Yes*	Agriculture	N_2O	Reduction of fertilizer/manure use on cropland (Agriculture), Improved animal waste management systems (Agriculture)	Regulatory	Implemented	1) Optimisation of manure handling in sheds for cattle, pigs, poultry and fur animals. 2) Rules on covering storage facilities for solid manure and slurry tanks. 3) Ban on overall surface spreading and reduction of the time from field application of manure to incorporation. 4) Ban on ammonia treatment of straw.	2001	Government: State, Local: Municipalities	IE (G1)	IE (G1)	
AG-4f: Environmental Approval Act for Livestock Holdings	Yes*	Agriculture	N_2O, CH_4	Reduction of fertilizer/manure use on cropland (Agriculture), Improved livestock management (Agriculture), Improved animal waste management systems (Agriculture)	Regulatory	Implemented	The measures covered by the Environmental Approval Act for Livestock Holdings are: • 300 m buffer zones around ammonia sensistive areas where no extension of livestock farms can take place if such an extension would lead to increased ammonia deposition in natural areas vulnerable to ammonia. • Demand for reduction of ammonia emissions relative to production facility with lowest ammonia emission norm: 2007: 15%, 2008: 20%, 2009: 25% • Demands for injection of animal slurry on black soil and grass within buffer zones (1 km from vulnerable natural areas). • Demand for fixed cover on most new containers for solid manure and slurry tanks (depending on distance to neighbours and vulnerable natural areas). • Reduced number of Livestock Unit per hectare (LU/ha) when in nitrate vulnerable areas with low denitrification capacity • Regulation of phosphorous surplus on manure spreading areas	2007	Government:State, Local:Municipalities	IE (G1)	IE (G1)	
AG-6: Biogas plants	Yes*	Agriculture, Energy	CO_2, CH_4	Improved animal waste management systems (Agriculture), Increase in renewable energy (Energy supply), Switch to less carbon-intensive fuels (Energy supply)	Economic	Implemented	The Energy Policy Agreement continued funding biogas for CHP and introduced subsidy equality so that biogas sold to the natural gas grid receives the same subsidy as biogas used at CHP plants. In addition the agreement also introduced a new subsidy when biogas is used in industrial processes or as a fuel for transport. Implementation of the latter awaits approval by the European Commission under the EU state aid legislation.	1987	Government: State	**240**	**207**	2020: "Biogasproduktions konsekvenser for drivhusgasudledning i landbruget" Rapport nr. 197 DCE, 2016 (http://dce.au.dk/udgivelser/vr/nr-151-200/abstracts/nr-197-biogasproduktions-konsekvenser-for-drivhusgasudledning-i-landbruget/); 2030: Preliminary estimate (to be published, in Danish).
AG-9(expired): Agreement on Green Growth	Yes*	Agriculture, Energy	N_2O, CO_2, CH_4	Reduction of fertilizer/manure use on cropland (Agriculture), Increase in renewable energy (Energy supply), Switch to less carbon-intensive fuels (Energy supply)	Economic, Regulatory	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	The Green Growth Agreement contains targets with respect to discharges of nitrogen and phosphorus to the aquatic environment, protection of nature and biodiversity, development of renewable energy in the agricultural sector including biogas plant, reduction of harmful pesticides, development of the organic sector and strengthened initiatives within R&D within the agricultural and food sectors.	2009	Government: State	500	0	The estimate for 2020 shown here is a former separate estimate for this measure. As this measure has been replaced by measure no. AG-12, only the effect estimated under AG-12 is included in the calculation of the total effect of all measures.
AG-11(expired): Agreement on Green Growth 2.0	Yes*	Agriculture, Energy	CO_2, CH_4, N_2O	Increase in renewable energy (Energy supply), Reduction of pesticides use (), Reduction of tax on productive farmland (), Conversion to organic farming ()	Economic, Regulatory	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	The agreement contains a series of initiatives to improve agriculture and food sector growth conditions and thus help to secure employment on farms, in the food industry and downstream industries. The initiatives also contribute to support Denmark's target of 30 per cent renewable energy by 2020 and fulfilment of Denmark's climate goals through further development of bioenergy.	2010	Government: Ministry of Environment and Food	0	0	Notat nr. 2, Vedrørende effekter af forskellige tiltag i forbindelse med Grøn Vækst, Aarhus Universitet (http://pure.au.dk/portal/files/38211855/010511_DJF_DMU_notat_2_inkl_Baselinegruppens_kommentarer_og_sp_rgsm_l.pdf , in Danish)
AG-12: Political Agreement on a Food and Agricultural Package	Yes*	Agriculture	N_2O, CO_2	Improve the ability of the food and agricultural industry to increase primary production and exports, as well as to contribute to creating growth and jobs, in due interaction with protection of nature and the environment. ()	Economic, Regulatory	Implemented	The agreement includes a diverse package of measures to make a shift in the way environmental regulation of the agricultural sector is carried out, from a general regulation to a targeted approach, and within five focus areas: Sustainable basis (The activity includes RDP measures for new environmental technology in farming, organic farming, nature protection and efforts to reduce nitrates leaching to the water environment, including set aside of low-lying farmland with climate focus or subsidy for conversion of arable land on organic soils to nature)/ Increased commodity basis/ Strengthened competitiveness/Development of future food production/ Visionary export efforts. Net neutral effect on total greenhouse gas emissions is expected when including the effect in the LULUCF sector.	2016	Government: Ministry of Environment and Food	**-122**	**-122**	Answer to question no. 391 (ord. part) asked by the parliament's Committee for Environment and Food on 15 Januar 2016 (http://www.ft.dk/samling/20151/almdel/mof/spm/391/svar/1299227/1598927/index.htm , in Danish)
AG-13: Agreement on Nature (the Nature Package)	Yes*	Agriculture, Forestry/LULUCF	CO_2, CH_4, N_2O	Protection of biodiversity through increased involvement of farmers in land use planning, simplification of related legislation etc. (), Protection of biodiversity through increased involvement of farmers in land use planning, simplification of related legislation etc. ()	Regulatory	Implemented	Political agreement aiming, amongst other goals, towards an increased protection of biodiversity. The agreement states initiatives within the following areas: Converting forests for biodiversity purpose, continued agreements for nature, nature and biodiversity, urban nature and outdoors recreation, open land management and the farmer's role as resource manager, modern nature conservation, and simplification of legislation.	2016	Government: Ministry of Environment and Food	IE (G1)	IE (G1)	

Table 3: Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)**		Source of estimates
										2020	2030	
LU-1: Ban on burning straw on fields	Yes*	Forestry/LULUCF	CO_2	Conservation of carbon in agricultural soils and reduction of air pollution. ()	Economic	Implemented	One of the measures with an effect on return of carbon to the soil has been the ban on burning of straw residues on fields. The ban has resulted in greater return of carbon to the soil, and therefore increased carbon storage in the soil, as well as increased use of straw as a fuel. Both uses will result in a net reduction in CO_2 emissions. Not burning straw prevents the methane and nitrous oxide emissions associated with the burning. On the other hand, there are some emissions of nitrous oxide in connection with the return of nitrogen to the soil when the straw is mulched. The measure works by regulating behaviour, and the ban was introduced from 1990. The measure was implemented in the form of a statutory order under the Environmental Protection Act, and compliance is monitored by the local authorities. The objectives are conservation of carbon in agricultural soils and reduction of air pollution.	1989	Government: State, Local: Municipalities	IE (G7)	IE (G7)	
LU-2: Planting of windbreaks	Yes*	Forestry/LULUCF	CO_2	Enhancing carbon sequestration through planting of windbreaks ()	Economic	Implemented	Planting of windbreaks is another measure which will increase sequestration in woody biomass. The objective of planting windbreaks has been primarily to reduce wind erosion and ensure greater biodiversity. Planting of windbreaks has been supported under conditions described in the Statutory Order on Subsidies for Planting Windbreaks and Biotope-improving Measures (Statutory Order no. 1101 of 12/12/2002). Support has been granted under the EU Rural Districts Programme. For the period 2017-2019 windbreaks will be supported under the political agreement "Naturpakken" and will focus primarily on ensuring greater biodiversity. Since the end of the 1960s about 1,000 km of tree-lined windbreaks have been planted with government subsidies. It is also estimated that about 30% more has been planted without subsidies. Estimates indicate that planting of windbreaks leads to CO_2 sequestration in woody biomass of about 130,000 tonnes CO_2/year.	1960	Government: Ministry of Environment and Food	IE (G7)	IE (G7)	
LU-3: Subsidies scheme for private afforestation on agricultural land (increase the forest area in Denmark)	Yes*	Forestry/LULUCF	CO_2	Afforestation and reforestation (LULUCF), Strengthening protection against natural disturbances (LULUCF)	Economic	Implemented	Private owners of agricultural land can get grants for establishment of broadleaves or conifer forests, nursing of these in the first 3 years, establishment of fences, mapping and or accounting of the area - if the forest will be established in an area planned for afforestation.	1991	Government: Danish Environmental Protection Agency	IE (G7)	IE (G7)	
LU-4: Public afforestation (state and municipalities)	Yes*	Forestry/LULUCF	CO_2	Afforestation and reforestation (LULUCF), Strengthening protection against natural disturbances (LULUCF)	Regulatory, Voluntary Agreement	Implemented	State forests are established with resilient tree-species as a collaboration between state, municipalities and (often) waterworks. On-going implementation through annual budgets.	1989	Government: Danish Environmental Protection Agency, Local: Municipalities	IE (G7)	IE (G7)	
LU-5: Subsidy for conversion of arable land on organic soils to nature	Yes*	Forestry/LULUCF, Agriculture	CO_2, N_2O	Reduction of fertilizer/manure use on cropland (Agriculture), Prevention of drainage or rewetting of wetlands (LULUCF)	Economic	Implemented	Payment of farmers to revert soils with high organic contents. From 2014 to 2017 is planned to give economic subsides to convert 2500 hectares of organic lowland areas into rewetted natural habitats and reduce emissions of greenhouse gases. The organic soils will be registered with no tillage, no fertilisation and no pesticide application. On-going implementation. The initiative is extended to 2020.	2015	Government: Ministry of Environment and Food	IE (G7)	IE (G7)	

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO2 eq)**		Source of estimates
										2020	2030	
WA-1: A ban of landfill of combustible waste.	Yes*	Waste management/waste	CH4	Reduced landfilling (Waste), Waste incineration with energy use (Waste), Enhanced recycling (Waste)	Regulatory	Implemented	In 1996 the Statutory Order on Waste was amended to introduce an obligation for municipalities to assign combustible waste to incineration (corresponding to a stop for disposal of combustible waste at landfills) from 1 January 1997. As a result of this, large quantities of combustible waste that used to be disposed of at landfills are now either recycled or used as fuel in Danish incineration plants.	1997	Local: Municipalities	**333**	**333**	Estimates in 2019 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2
WA-2: The waste tax	Yes*	Waste management/waste	CH4	Reduced landfilling (Waste)	Economic, Fiscal	Implemented	A tax is imposed on waste for incineration or landfilling. The taxes are DKK 475 per tonne for landfilling and DKK 60,9/GJ for incineration.	1987	Government: Ministry of Taxation	IE (G1)	IE (G1)	
WA-3: Weight-and-volume-based packaging taxes	Yes*	Waste management/waste	CO2, CH4	Demand management / reduction (Waste)	Economic, Fiscal	Implemented	Weight-and-volume-based taxes (e.g. on various packaging, carrier bags and PVC film) encourage a reduction in packaging consumption and thus the quantities of waste. The weight-based tax is based on an index that reflects the environmental burden of the materials used.	2014	Government: Ministry of Taxation	IE (G1)	IE (G1)	
WA-4: Subsidy programme – Enterprise Scheme (special scheme for businesses)	Yes*	Waste management/waste	CH4	Demand management / reduction (Waste)	Economic	Implemented	In 2005 the Programme for Cleaner Products etc. was replaced by the Danish government's "Enterprise Scheme" which refunds CO2 taxes to business. The waste part of this programme was aimed exclusively at enterprises. A total of DKK 33 million for the five-year period 2004 to 2008 was earmarked for the waste part of the scheme. The subsidies were to be used to reduce the environmental impact of waste. Two projects with reduction of methane emissions were supported: a. To address the obstacles and to improve the method, another biocover-project was initiated in 2007 as part of the Enterprise Scheme. The project was performed on another landfill (i.e. not the landfill in the biocover-pilotproject 2005-2006 carried out with support from Danish EPA and the EU LIFE programme), and was taking the identified difficulties into account. A reduction of the methane emission of 79-93 % was reported in the project. b. In 2007 subsidies from the enterprise scheme were also given for establishing methane recovery and test pumping at 11 landfill sites. The results were reported in 2011 and showed a reduction of the emission of methane over a five year period equalling 84,435 tonnes of CO2 equivalents. In 2015 no money is assigned to the Entreprise Scheme, and it is expected, that this will also be the case in 2016.	2004	Government: Ministry for the Environment	IE (G1)	IE (G1)	
WA-5: Increased recycling of waste plastic packaging	Yes*	Waste management/waste	CO2	Enhanced recycling (Waste)	Regulatory	Implemented	The goal in the EU Packaging Directive of increasing the collection of plastic packaging waste for recycling to 22.5% was met in 2008 through an amendment to the Statutory Order on Waste requiring municipalities to improve the possibilities of people and enterprises to separate and deliver plastic packaging waste for recycling. This meant an increase in recycling of about 12,000 tonnes in 2012 compared to 2008.	1994	Government: Danish Environmental Protection Agency	IE (G1)	IE (G1)	
WA-6: Implementation of the EU landfill directive	Yes*	Waste management/waste	CH4	Improved landfill management (Waste)	Regulatory	Implemented	On the basis of the EU Landfill Directive, demands on the establishment and operation of landfills in Denmark have been tightened with Statutory Orders No. 650 of 29 June 2001, No. 252 of 31 March 2009, No. 719 of 24 June 2011 and No. 1049 of 28th of August 2013 on landfills. According to the Statutory Orders on landfills, methane in landfills for mixed waste must be monitored. From landfills where significant amounts of biodegradable waste are disposed of, methane gas must be managed in an environmentally-sound way.	1999	Government: Danish Environmental Protection Agency, Local: Municipalities	IE (G1)	IE (G1)	
WA-7(expired): Support for (construction of facilities for) gas recovery at landfill sites	Yes*	Waste management/waste	CO2, CH4	Enhanced CH4 collection and use (Waste)	Economic	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	Methane is recovered at landfills. The methane collected acts as fuel in CHP production. Waste, measures no longer in place, but replaced with the general price supplement (EN-3).	1984	Government: Danish Energy Authority	**205**	**205**	Estimates in 2019 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2
WA-8(expired): Subsidy programme for cleaner products	Yes*	Waste management/waste	CH4	Demand management / reduction (Waste)	Economic	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish greenhouse gas emissions)	Under the subsidy programme for cleaner products 1999-2003 it was possible to get grants for projects targetted at reducing the environmental impact from management of waste generated throughout the life cycle of products as well as for projects with the objective to limit environmental problems in connection with waste management. In 2005 this programme was replaced by the Danish government's "Enterprise Scheme" (see WA-4).	1999	Government: Ministry for the Environment	IE (G1)	IE (G1)	
WA-9: Subsidy programme for biocovers on landfills	Yes*	Waste management/waste	CH4	Improved landfill management (Waste)	Economic	Implemented	Biocovers is a technique that uses compost as a cover on landfills. The microorganisms in the compost increases the oxidation of methane in the top layer.	2017	Government: Danish Environmetal Protection Agency	**300**	**179**	Estimates by the Danish Energy Agency, August 2019 - based on "Virkemiddelkatalog, Tværministeriel arbejdsgruppe, August 2013, Klima-, Energi- og Bygningsministeriet" (https://ens.dk/sites/ens.dk/files/Analyser/virkemiddelkatalog_-_potentialer_og_omkostninger_for_klimatiltag.pdf)

Table 3: Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO2 eq)**		Source of estimates
										2020	2030	
G1: Group of all policies and measures except in the LULUCF sector	Yes*	Combined (TD-b1, -2, -3, -4, -5, -6, -7, -8, -9; EN-1, -2, -3, -4, -5, -6; BU-1, -2, -6, -7, -8, -9, -10; TR-1a, -1b, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12; HO-1, -2, -3, -4, -5, -6; IP-1; AG-1, -2, -4a-f, -6, -9, -11, -12, -13; WA-1, -2, -3, -4, -5,-6, -7, -8, -9)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	**50671**	**75288**	Calculated as the sum of the effects estimated for G3, G4, TD-9, TR-12, G6, AG-1, AG-6, AG-12, WA-1, WA-7 and WA9.
G2(former TD-1a): Energy taxes except on mineral oil	Yes*	Combined (TD-2, TD-3 and TD-4)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	1000	1000	Estimates in 2019 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).
G3: All RE mitigation actions (Renewable Energy) since 1990	Yes*	Combined (EN-2, EN-3, EN-4, EN-5, BU-8 and TR-8)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	**29702**	**58325**	Estimated in September 2019 based on the energy projection from August 2019. The methodology is described in Denmark's 7th National Comminication, Annex B4.
G4: All EE mitigation actions (Energy Efficiency) since 1990	Yes*	Combined (TD-b1, -2, -3, -4, -5, -6, -7; EN-1; BU-1, -2, -6, -7, -9, -10; TR-1a, -1b, -2, -3, -4, -5, -6, -7, -10, -11, -12; HO-1, -2, -3, -4, -5, -6)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	**17583**	**13231**	Estimated in September 2019 based on the energy projection from August 2019. The methodology is described in Denmark's 7th National Comminication, Annex B4.
G5: Energy effciency in transport by passenger cars	Yes*	Combined (TD-6, TR-1a, TR-1b, TR2 and TR-3)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	550	550	Estimates in 2019 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).
G6: F-gas taxes and regulation	Yes*	Combined (TD-8 and IP-1)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	**800**	**800**	Estimates in 2019 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).
G7: LULUCF activities	No	Combined (LU-1, -2, -3, -4 and -5)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	1335	1356	Estimates by DCE, 2019 (http://dce2.au.dk/pub/SR345.pdf).

TABLE 4: REPORTING ON PROGRESS

Table 4				
Reporting on progress [a, b]				
Year [c]	**Total emissions excluding LULUCF (kt CO2 eq)**	**Contribution from LULUCF** [d] **(kt CO2 eq)**	**Quantity of units from market based mechanisms under the Convention (number of units and kt CO2 eq)**	**Quantity of units from other market based mechanisms (number of units and kt CO2 eq)**
	(a) total GHG emissions, excluding emissions and removals from the LULUCF sector; *	*(b) emissions and/or removals from the LULUCF sector based on the accounting approach applied taking into consideration any relevant decisions of the Conference of the Parties and the activities and/or land that will be accounted for;*	*(c) total GHG emissions, including emissions and removals from the LULUCF sector.*	
Base year/base period (specify) 1990	72.064,78	NA	NA	NA
2010	65.441,48	NA	NA	NA
2011	60.286,20	NA	NA	NA
2012	55.718,56	NA	NA	NA
2013	57.395,76	NA	NA	NA
2014	53.426,95	NA	NA	NA
2015	50.756,74	NA	NA	NA
2016	52.975,89	NA	NA	NA
2017	50.798,17	NA	NA	NA
2018				
2019				
2020				

Abbreviation: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] For the base year, information reported on the emission reduction target shall include the following: (a) total GHG emissions, excluding emissions and removals from the LULUCF sector; (b) emissions and/or removals from the LULUCF sector based on the accounting approach applied taking into consideration any relevant decisions of the Conference of the Parties and the activities and/or land that will be accounted for; (c) total GHG emissions, including emissions and removals from the LULUCF sector. For each reported year, information reported on progress made towards the emission reduction targets shall include, in addition to the information noted in paragraphs 9(a–c) of the UNFCCC biennial reporting guidelines for developed country Parties, information on the use of units from market-based mechanisms.

[c] Parties may add additional rows for years other than those specified below.

[d] Information in this column should be consistent with the information reported in table 4(a)I or 4(a)II, as appropriate. The Parties for which all relevant information on the LULUCF contribution is reported in table 1 of this common tabular format can refer to table 1.

* To be seen as Denmark's contribution to progress towards the joint EU28 target for 2020. The estimates shown are therefore Denmark's (i.e. without Greenland and the Faroe Islands) total GHG emissions (without LULUCF and with indirect CO2 emissions) including CO2 from international aviation. On guidance from the European Commission the latter ("inventory CO2 from international aviation" based on fuel sold to aircrafts starting from Danish airports) is included in this table 4 as a proxy for CO2 from international aviation activities reported by aviation entities registered in the Danish quota register ("entity CO2 from international and domestic aviation" based on fuel used by Danish entities). The data without CO2 from international aviation is in kt CO2eq.: 70,290.77(1990)/63,038.22(2010)/57,813.29(2011)/53,221.49(2012)/54,923.36(2013)/50,747.05(2014)/48,133.41(2015)/50,154.30(2016)/47,892.35(2017).

TABLE 4(A)I: REPORTING ON PROGRESS - IN ACHIEVING THE QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGETS – FURTHER INFORMATION ON MITIGATION ACTIONS RELEVANT TO THE CONTRIBUTION OF THE LAND USE, LAND-USE CHANGE AND FORESTRY SECTOR IN 2016

Table 4(a)I

Progress in achieving the quantified economy-wide emission reduction targets – further information on mitigation actions relevant to the contribution of the land use, land-use change and forestry sector in 20XX-3 = 2019-3 = 2016 [a, b]

	Net GHG emissions/removals from LULUCF categories [c] (kt CO2 eq)	Base year/period or reference level value [d] (kt CO2 eq)	Contribution from LULUCF for reported year (kt CO2 eq)	Cumulative contribution from LULUCF [e] (kt CO2 eq)	Accounting approach [f]
Total LULUCF	NA*	NA*	NA*	NA*	NA*
A: Forest land	NA*	NA*	NA*	NA*	NA*
1. Forest land remaining forest land	NA*	NA*	NA*	NA*	NA*
2. Land converted to forest land	NA*	NA*	NA*	NA*	NA*
3. Other (please specify) [g]	NA*	NA*	NA*	NA*	NA*
B. Cropland	NA*	NA*	NA*	NA*	NA*
1. Cropland remaining cropland	NA*	NA*	NA*	NA*	NA*
2. Land converted to cropland	NA*	NA*	NA*	NA*	NA*
3. Other (please specify) [g]	NA*	NA*	NA*	NA*	NA*
C. Grassland	NA*	NA*	NA*	NA*	NA*
1. Grassland remaining grassland	NA*	NA*	NA*	NA*	NA*
2. Land converted to grassland	NA*	NA*	NA*	NA*	NA*
3. Other (please specify) [g]	NA*	NA*	NA*	NA*	NA*
D. Wetlands	NA*	NA*	NA*	NA*	NA*
1. Wetlands remaining wetlands	NA*	NA*	NA*	NA*	NA*
2. Land converted to wetlands	NA*	NA*	NA*	NA*	NA*
3. Other (please specify) [g]	NA*	NA*	NA*	NA*	NA*
E. Settlements	NA*	NA*	NA*	NA*	NA*
1. Settlements remaining settlements	NA*	NA*	NA*	NA*	NA*
2. Land converted to settlements	NA*	NA*	NA*	NA*	NA*
3. Other (please specify) [g]	NA*	NA*	NA*	NA*	NA*
F. Other land	NA*	NA*	NA*	NA*	NA*
1. Other land remaining other land	NA*	NA*	NA*	NA*	NA*
2. Land converted to other land	NA*	NA*	NA*	NA*	NA*
3. Other [g]	NA*	NA*	NA*	NA*	NA*
G. Other (please specify) [g]	NA*	NA*	NA*	NA*	NA*
Harvested wood products	NA*	NA*	NA*	NA*	NA*

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Parties that use the LULUCF approach that is based on table 1 do not need to complete this table, but should indicate the approach in table 2. Parties should fill in a separate table for each year, namely 20XX-3 and 20XX-2, where 20XX is the reporting year.

[c] For each category, enter the net emissions or removals reported in the most recent inventory submission for the corresponding inventory year. If a category differs from that used for the reporting

[d] Enter one reference level or base year/period value for each category. Explain in the biennial report how these values have been calculated.

[e] If applicable to the accounting approach chosen. Explain in this biennial report to which years or period the cumulative contribution refers to.

[f] Label each accounting approach and indicate where additional information is provided within this biennial report explaining how it was implemented, including all relevant accounting parameters (i.e. natural disturbances, caps).

[g] Specify what was used for the category "other". Explain in this biennial report how each was defined and how it relates to the categories used for reporting under the Convention or its Kyoto Protocol.

* Not Applicable as LULUCF is excluded from the joint EU28 2020-target under the UNFCCC.

TABLE 4(A)I: REPORTING ON PROGRESS - IN ACHIEVING THE QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGETS – FURTHER INFORMATION ON MITIGATION ACTIONS RELEVANT TO THE CONTRIBUTION OF THE LAND USE, LAND-USE CHANGE AND FORESTRY SECTOR IN 2017

Table 4(a)I

Progress in achieving the quantified economy-wide emission reduction targets – further information on mitigation actions relevant to the contribution of the land use, land-use change and forestry sector in 20XX-2 = 2019-2 = 2017 [a, b]

	Net GHG emissions/removals from LULUCF categories [c] (kt CO2 eq)	Base year/period or reference level value [d] (kt CO2 eq)	Contribution from LULUCF for reported year (kt CO2 eq)	Cumulative contribution from LULUCF [e] (kt CO2 eq)	Accounting approach [f]
Total LULUCF	NA*	NA*	NA*	NA*	NA*
A: Forest land	NA*	NA*	NA*	NA*	NA*
1. Forest land remaining forest land	NA*	NA*	NA*	NA*	NA*
2. Land converted to forest land	NA*	NA*	NA*	NA*	NA*
3. Other (please specify) [g]	NA*	NA*	NA*	NA*	NA*
B. Cropland	NA*	NA*	NA*	NA*	NA*
1. Cropland remaining cropland	NA*	NA*	NA*	NA*	NA*
2. Land converted to cropland	NA*	NA*	NA*	NA*	NA*
3. Other (please specify) [g]	NA*	NA*	NA*	NA*	NA*
C. Grassland	NA*	NA*	NA*	NA*	NA*
1. Grassland remaining grassland	NA*	NA*	NA*	NA*	NA*
2. Land converted to grassland	NA*	NA*	NA*	NA*	NA*
3. Other (please specify) [g]	NA*	NA*	NA*	NA*	NA*
D. Wetlands	NA*	NA*	NA*	NA*	NA*
1. Wetlands remaining wetlands	NA*	NA*	NA*	NA*	NA*
2. Land converted to wetlands	NA*	NA*	NA*	NA*	NA*
3. Other (please specify) [g]	NA*	NA*	NA*	NA*	NA*
E. Settlements	NA*	NA*	NA*	NA*	NA*
1. Settlements remaining settlements	NA*	NA*	NA*	NA*	NA*
2. Land converted to settlements	NA*	NA*	NA*	NA*	NA*
3. Other (please specify) [g]	NA*	NA*	NA*	NA*	NA*
F. Other land	NA*	NA*	NA*	NA*	NA*
1. Other land remaining other land	NA*	NA*	NA*	NA*	NA*
2. Land converted to other land	NA*	NA*	NA*	NA*	NA*
3. Other [g]	NA*	NA*	NA*	NA*	NA*
G. Other (please specify) [g]	NA*	NA*	NA*	NA*	NA*
Harvested wood products	NA*	NA*	NA*	NA*	NA*

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-

[b] Parties that use the LULUCF approach that is based on table 1 do not need to complete this table, but should indicate the approach in table 2. Parties should fill in a separate table for each year,

[c] For each category, enter the net emissions or removals reported in the most recent inventory submission for the corresponding inventory year. If a category differs from that used for the reporting

[d] Enter one reference level or base year/period value for each category. Explain in the biennial report how these values have been calculated.

[e] If applicable to the accounting approach chosen. Explain in this biennial report to which years or period the cumulative contribution refers to.

[f] Label each accounting approach and indicate where additional information is provided within this biennial report explaining how it was implemented, including all relevant accounting parameters (i.e.

[g] Specify what was used for the category "other". Explain in this biennial report how each was defined and how it relates to the categories used for reporting under the Convention or its Kyoto Protocol.

* Not Applicable as LULUCF is excluded from the joint EU28 2020-target under the UNFCCC.

TABLE 4(A)II: REPORTING ON PROGRESS - IN ACHIEVEMENT OF THE QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGETS – FURTHER INFORMATION ON MITIGATION ACTIONS RELEVANT TO THE COUNTING OF EMISSIONS AND REMOVALS FROM THE LAND USE, LAND-USE CHANGE AND FORESTRY SECTOR IN RELATION TO ACTIVITIES UNDER ARTICLE 3, PARAGRAPHS 3 AND 4, OF THE KYOTO PROTOCOL

Table 4(a)II

Progress in achievement of the quantified economy-wide emission reduction targets – further information on mitigation actions relevant to the counting of emissions and removals from the land use, land-use change and forestry sector in relation to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol [a,b,c]

INFORMATION TABLE ON ACCOUNTING FOR ACTIVITIES UNDER ARTICLES 3.3 AND 3.4 OF THE KYOTO PROTOCOL: 2013-2020

Commitment period accounting: NA
Annual accounting: NA
Number of the reported year in the commitment period: 0

GREENHOUSE GAS SOURCE AND SINK ACTIVITIES	Base year[d]	Net emissions/removals[e]									Accounting Parameters[h]	Accounting Quantity[i]
		2013	2014	2015	2016	2017	2018	2019	2020[f]	Total[g]		
	(kt CO2 eq)											
A. Article 3.3 activities												
A.1. Afforestation and Reforestation												
A.1.1. Units of land not harvested since the beginning of the commitment period[j]		NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*			
A.1.2. Units of land harvested since the beginning of the commitment period[j]												
A.2. Deforestation		NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*			
B. Article 3.4 activities												
B.1. Forest Management (if elected)		NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*			
3.3 offset[k]												
Forest management cap[l]											NA*	
B.2. Cropland Management (if elected)	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*			
B.3. Grazing Land Management (if elected)	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*			
B.4. Revegetation (if elected)	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*			

Note: 1 kt CO2 eq equals 1 Gg CO2 eq.

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and forestry.

a Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

b Developed country Parties with a quantified economy-wide emission reduction target as communicated to the secretariat and contained in document FCCC/SB/2011/INF.1/Rev.1 or any update to that document, that are Parties to the Kyoto Protocol, may use table 4(a)II for reporting of accounting quantities if LULUCF is contributing to the attainment of that target.

c Parties can include references to the relevant parts of the national inventory report, where accounting methodologies regarding LULUCF are further described in the documentation box or in the biennial reports.

d Net emissions and removals in the Party's base year, as established by decision 9/CP.2.

e All values are reported in the information table on accounting for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, of the CRF for the relevant inventory year as reported in the current submission and are automatically entered in this table.

f Additional columns for relevant years should be added, if applicable.

g Cumulative net emissions and removals for all years of the commitment period reported in the current submission.

h The values in the cells "3.3 offset" and "Forest management cap" are absolute values.

i The accounting quantity is the total quantity of units to be added to or subtracted from a Party's assigned amount for a particular activity in accordance with the provisions of Article 7, paragraph 4, of the Kyoto Protocol.

j In accordance with paragraph 4 of the annex to decision 16/CMP.1, debits resulting from harvesting during the first commitment period following afforestation and reforestation since 1990 shall not be greater than the credits accounted for on that unit of land.

k In accordance with paragraph 10 of the annex to decision 16/CMP.1, for the first commitment period a Party included in Annex I that incurs a net source of emissions under the provisions of Article 3 paragraph 3, may account for anthropogenic greenhouse gas emissions by sources and removals by sinks in areas under forest management under Article 3, paragraph 4, up to a level that is equal to the net source of emissions under the provisions of Article 3, paragraph 3, but not greater than 9.0 megatonnes of carbon times five, if the total anthropogenic greenhouse gas emissions by sources and removals by sinks in the managed forest since 1990 is equal to, or larger than, the net source of emissions incurred under Article 3, paragraph 3.

l In accordance with paragraph 11 of the annex to decision 16/CMP.1, for the first commitment period of the Kyoto Protocol only, additions to and subtractions from the assigned amount of a Party resulting from Forest management under Article 3, paragraph 4, after the application of paragraph 10 of the annex to decision 16/CMP.1 and resulting from forest management project activities undertaken under Article 6, shall not exceed the value inscribed in the appendix of the annex to decision 16/CMP.1, times five.

Documentation box:

* Not Applicable as LULUCF is excluded from the joint EU28 2020-target under the UNFCCC.

TABLE 4(B): REPORTING ON PROGRESS - IN ACHIEVEMENT OF THE QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGETS – FURTHER INFORMATION ON THE USE (I.E: RETIREMENT) OF KYOTO PROTOCOL UNITS (AAUS, ERUS, CERS TCERS AND LCERS) AND OTHER UNITS

Table 4(b)

Reporting on progress [a, b, c]

Units of market based mechanisms			*Year*	
			20XX-3 = 2016	**20XX-2** = 2017
Kyoto Protocol units [d]	***Kyoto Protocol units***	*(number of units)*	NA*	NA*
		(kt CO2 eq)	NA*	NA*
	AAUs	*(number of units)*	NA*	NA*
		(kt CO2 eq)	NA*	NA*
	ERUs	*(number of units)*	NA*	NA*
		(kt CO2 eq)	NA*	NA*
	CERs	*(number of units)*	NA*	NA*
		(kt CO2 eq)	NA*	NA*
	tCERs	*(number of units)*	NA*	NA*
		(kt CO2 eq)	NA*	NA*
	lCERs	*(number of units)*	NA*	NA*
		(kt CO2 eq)	NA*	NA*
Other units [d,e]	***Units from market-based mechanisms***	*(number of units)*		
		(kt CO2 eq)		
	Units from other market-based	*(number of units)*		
		(kt CO2 eq)		
Total		*(number of units)*	NA*	NA*
		(kt CO2 eq)	NA*	NA*

Note: 20XX is the latest reporting year.

Abbreviations: AAUs = assigned amount units, CERs = certified emission reductions, ERUs = emission reduction units, lCERs = long-term certified emission reductions, tCERs = temporary certified emission reductions.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] For each reported year, information reported on progress made towards the emission reduction target shall include, in addition to the information noted in paragraphs 9(a-c) of the reporting guidelines, on the use of units from market-based mechanisms.

[c] Parties may include this information, as appropriate and if relevant to their target.

[d] Units surrendered by that Party for that year that have not been previously surrendered by that or any other Party.

[e] Additional columns for each market-based mechanism should be added, if applicable.

* Not Applicable

TABLE 5: SUMMARY OF KEY VARIABLES AND ASSUMPTIONS USED IN THE PROJECTIONS ANALYSIS

Table 5												
Summary of key variables and assumptions used in the projections analysis [a]												
		Historical [b]*						**Projected****				
Key underlying assumptions	**Unit**	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
GDP growth rate	% p.a.	1.5	3.0	3.7	2.3	1.9	1.6	1.6	1.4	1.5	1.5	1.5
Population	thousands	5135	5216	5330	5411	5535	5660	5859	5995	6121	6223	6303
Population growth	% p.a.	0.10	0.37	0.30	0.24	0.44	0.59	0.54	0.45	0.38	1.67	1.29
International oil price***	USD / boe	23.73	17.02	28.50	54.52	79.50	45.30	66.06	73.12	80.16	87.51	93.35
International coal price***	USD / boe	10.25	10.73	8.78	15.30	23.58	14.09	19.42	18.08	18.87	19.10	19.35
International gas price***	USD / boe	NA	10.82	15.72	42.82	38.03	29.47	41.80	37.77	42.69	47.30	50.65
EU ETS Carbon price	EUR(2010)/tCO2	NA	NA	NA	22.00	15.00	7.79	16.08	19.42	24.75	32.03	41.45

[a] Parties should include key underlying assumptions as appropriate.

[b] Parties should include historical data used to develop the greenhouse gas projections reported.

* In general the starting point for the GHG projection is the latest historic GHG inventory with the future delevelopment projected on the basis of the projected parameters only - such as projected GDP, projected fuel prices etc. (i.e. not historical parameters). Therefore the historic parameters shown here for 1990-2015 are shown only to follow the recommendation from the review of Denmark's BR2, although this is not in line with the purpose of the table: "include historical data used to develop the greenhouse gas projections reported".

** The key variables shown here for 2020-2040 are used for the 'with existing measures' (WEM) scenario. The results are shown in table 6(a).

*** Calculated from EUR/GJ with an exchange rate of 1.1086475 USD/EUR and a conversion factor of 6.1 GJ/boe (the higher heating value).

TABLE 6(A): INFORMATION ON UPDATED GREENHOUSE GAS PROJECTIONS UNDER A 'WITH MEASURES' SCENARIO

Table 6(a)

Information on updated greenhouse gas projections under a 'with measures' scenario [a] [*]

	GHG emissions and removals [b] (kt CO2 eq)							GHG emission projections (kt CO2 eq)	
	Base year	1990	1995	2000	2005	2010	20XX[c]-3 =2017	2020[#]	2030
Sector [d,e]									
Energy**	42765	42765	49557	41879	37821	36159	20901	17560	12138
Transport	10752	10752	12075	12469	13586	13405	13209	13368	12750
Industry/industrial processes***	2344	2344	2901	3699	2764	1911	2010	2003	2073
Agriculture	12668	12668	12129	11256	10813	10405	10642	10428	10477
Forestry/LULUCF****	4938	4938	3618	3600	4450	-1018	2971	2630	3504
Waste management/waste	1762	1762	1598	1487	1246	1159	1131	672	672
Other (specify: Memo item: International bunkers)	**4828**	**4828**	**6913**	**6430**	**4972**	**4515**	**4417**	**4458**	**4638**
Memo item: International bunkers	**4828**	**4828**	**6913**	**6430**	**4972**	**4515**	**4417**	**4458**	**4638**
Memo item: International Aviation	1792	1792	1886	2366	2595	2428	2935	2976	3156
Memo item: International Navigation	3036	3036	5027	4064	2377	2087	1482	1482	1482
Gas									
CO2 emissions including net CO2 from LULUCF****	53558	53558	61584	54279	51498	49169	34795	31864	26213
CO2 emissions excluding net CO2 from LULUCF	58275	58275	64985	57664	55735	47940	37545	34324	29528
CH4 emissions including CH4 from LULUCF****	7596	7596	8022	7871	7629	7308	6885	6277	6462
CH4 emissions excluding CH4 from LULUCF	7789	7789	8212	8059	7814	7493	7076	6443	6644
N2O emissions including N2O from LULUCF****	7965	7965	7228	6970	5503	5210	5450	5301	5085
N2O emissions excluding N2O from LULUCF	7993	7993	7255	6997	5529	5237	5479	5306	5091
HFCs	NO,NA	NO,NA	258	766	903	827	405	334	191
PFCs	NO,NA	NO,NA	1	23	19	17	1	0	0
SF6	42	42	104	57	21	37	75	20	21
NF3	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NA,NO	NA,NO
Other (specify)	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NA,NO	NA,NO
Total with LULUCF [f] ****	**75229**	**75229**	**81877**	**74390**	**70681**	**62020**	**50863**	**46661**	**41614**
Total without LULUCF	**70291**	**70291**	**78259**	**70790**	**66231**	**63038**	**47892**	**44030**	**38110**

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] In accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", at a minimum Parties shall report a 'with measures' scenario, and may report 'without measures' and 'with additional measures' scenarios. If a Party chooses to report 'without measures' and/or 'with additional measures' scenarios they are to use tables 6(b) and/or 6(c), respectively. If a Party does not choose to report 'without measures' or 'with additional measures' scenarios then it should not include tables 6(b) or 6(c) in the biennial report.

[b] Emissions and removals reported in these columns should be as reported in the latest GHG inventory and consistent with the emissions and removals reported in the table on GHG emissions and trends provided in this biennial report. Where the sectoral breakdown differs from that reported in the GHG inventory Parties should explain in their biennial report how the inventory sectors relate to the sectors reported in this table.

[c] 20XX is the reporting due-date year (i.e. 2014 for the first biennial report).

[d] In accordance with paragraph 34 of the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", projections shall be presented on a sectoral basis, to the extent possible, using the same sectoral categories used in the policies and measures section. This table should follow, to the extent possible, the same sectoral categories as those listed in paragraph 17 of those guidelines, namely, to the extent appropriate, the following sectors should be considered: energy, transport, industry, agriculture, forestry and waste management.

[e] To the extent possible, the following sectors should be used: energy, transport, industry/industrial processes, agriculture, forestry/LULUCF, waste management/waste, other sectors (i.e. cross-cutting), as appropriate.

[f] Parties may choose to report total emissions with or without LULUCF, as appropriate.

* Denmark without Greenland and the Faroe Islands. CO2 and totals are with indirect CO2 emissions. The memo items are not included in the totals.

** The IPCC category "Energy" excluding the subcategory "Transport". Indirect CO2 is included under Energy, CO2 and totals.

*** The IPCC category "Industrial processes and product use".

**** Not Applicable for the assessment of Denmark's contribution to progress towards the joint EU28 2020 under the UNFCCC as LULUCF is excluded from this target.

\# To be seen as Denmark's projected contribution to the joint EU28 target for 2020 (i.e. without Greenland and the Faroe Islands and without LULUCF, but with indirect CO2 emissions), however without CO2 from international aviation. When including "inventory CO2 from international aviation" (based on fuel sold to aircrafts starting from Danish airports) as a proxy for CO2 from international aviation activities reported by aviation entities registered in the Danish quota register ("entity CO2 from international and domestic aviation" based on fuel used by Danish entities) in accordance with guidance from the European Commission, the "Total without LULUCF, with indirect (with CO2 from international aviation)" is in kt CO2eq.: 47,989.55(2020).

TABLE 6(B): INFORMATION ON UPDATED GREENHOUSE GAS PROJECTIONS UNDER A 'WITHOUT MEASURES' SCENARIO

Table 6(b)

Information on updated greenhouse gas projections under a 'without measures' scenario [a *]

	GHG emissions and removals [b] (kt CO2 eq)							GHG emission projections (kt CO2 eq)	
	Base year	1990	1995	2000	2005	2010 [#]	20XX[c]-3 =2015	2020	2030
Sector [d,e]									
Energy**	NE	NE	NE	NE	NE	NE	NE	NE	NE
Transport	NE	NE	NE	NE	NE	NE	NE	NE	NE
Industry/industrial processes***	NE	NE	NE	NE	NE	NE	NE	NE	NE
Agriculture	NE	NE	NE	NE	NE	NE	NE	NE	NE
Forestry/LULUCF	NE	NE	NE	NE	NE	NE	NE	NE	NE
Waste management/waste	NE	NE	NE	NE	NE	NE	NE	NE	NE
Other (specify: Memo item: International bunkers)	NE	NE	NE	NE	NE	NE	NE	NE	NE
Other (specify: Memo item: International bunkers)	NE	NE	NE	NE	NE	NE	NE	NE	NE
Memo item: International Aviation	NE	NE	NE	NE	NE	NE	NE	NE	NE
Memo item: International Navigation	NE	NE	NE	NE	NE	NE	NE	NE	NE
Gas									
CO2 emissions including net CO2 from LULUCF	NE	NE	NE	NE	NE	NE	NE	NE	NE
CO2 emissions excluding net CO2 from LULUCF	NE	NE	NE	NE	NE	NE	NE	NE	NE
CH4 emissions including CH4 from LULUCF	NE	NE	NE	NE	NE	NE	NE	NE	NE
CH4 emissions excluding CH4 from LULUCF	NE	NE	NE	NE	NE	NE	NE	NE	NE
N2O emissions including N2O from LULUCF	NE	NE	NE	NE	NE	NE	NE	NE	NE
N2O emissions excluding N2O from LULUCF	NE	NE	NE	NE	NE	NE	NE	NE	NE
HFCs	NE	NE	NE	NE	NE	NE	NE	NE	NE
PFCs	NE	NE	NE	NE	NE	NE	NE	NE	NE
SF6	NE	NE	NE	NE	NE	NE	NE	NE	NE
NF3	NE	NE	NE	NE	NE	NE	NE	NE	NE
Other (specify: Total F-gases****)	NE	NE	NE	NE	NE	NE	NE	NE	NE
Total with LULUCF [f]	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Total without LULUCF	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] In accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", at a minimum Parties shall report a 'with measures' scenario, and may report 'without measures' and 'with additional measures' scenarios. If a Party chooses to report 'without measures' and/or 'with additional measures' scenarios they are to use tables 6(b) and/or 6(c), respectively. If a Party does not choose to report 'without measures' or 'with additional measures' scenarios then it should not include tables 6(b) or 6(c) in the biennial report.

[b] Emissions and removals reported in these columns should be as reported in the latest GHG inventory and consistent with the emissions and removals reported in the table on GHG emissions and trends provided in this biennial report. Where the sectoral breakdown differs from that reported in the GHG inventory Parties should explain in their biennial report how the inventory sectors relate to the sectors reported in this table.

[c] 20XX is the reporting due-date year (i.e. 2014 for the first biennial report).

[d] In accordance with paragraph 34 of the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", projections shall be presented on a sectoral basis, to the extent possible, using the same sectoral categories used in the policies and measures section. This table should follow, to the extent possible, the same sectoral categories as those listed in paragraph 17 of those guidelines, namely, to the extent appropriate, the following sectors should be considered: energy, transport, industry, agriculture, forestry and waste management.

[e] To the extent possible, the following sectors should be used: energy, transport, industry/industrial processes, agriculture, forestry/LULUCF, waste management/waste, other sectors (i.e. cross-cutting), as appropriate.

[f] Parties may choose to report total emissions with or without LULUCF, as appropriate.

* Denmark without Greenland and the Faroe Islands. CO2 and totals are with indirect CO2 emissions. The memo items are not included in the totals.

** The IPCC category "Energy" excluding the subcategory "Transport".

*** The IPCC category "Industrial processes and product use".

**** Total F-gases: HFCs + PFCs + SF6

Annual average of estimates for the period 2008-2012

TABLE 6(C): INFORMATION ON UPDATED GREENHOUSE GAS PROJECTIONS UNDER A 'WITH ADDITIONAL MEASURES' SCENARIO

Table 6(c)

Information on updated greenhouse gas projections under a 'with additional measures' scenario [a] *

	GHG emissions and removals [b] (kt CO2 eq)							GHG emission projections (kt CO2 eq)	
	Base year	1990	1995	2000	2005	2010	20XX[c]-3 =2015	2020	2030
Sector [d,e]									
Energy**	42765	42765	49557	41879	37821	36159	20901	NE#	NE
Transport	10752	10752	12075	12469	13586	13405	13209	NE#	NE
Industry/industrial processes***	2344	2344	2901	3699	2764	1911	2010	NE#	NE
Agriculture	12668	12668	12129	11256	10813	10405	10642	NE#	NE
Forestry/LULUCF****	4938	4938	3618	3600	4450	-1018	2971	NE#	NE
Waste management/waste	1762	1762	1598	1487	1246	1159	1131	NE#	NE
Other (specify)	4828,46	4828,46	6913,37	6429,72	4972,17	4514,89	4416,91		
Memo item: International bunkers	**4828**	**4828**	**6913**	**6430**	**4972**	**4515**	**4417**	**NE#**	**NE**
Memo item: International Aviation	1792	1792	1886	2366	2595	2428	2935	**NE#**	**NE**
Memo item: International Navigation	3036	3036	5027	4064	2377	2087	1482	**NE#**	**NE**
Gas									
CO2 emissions including net CO2 from LULUCF****	53558	53558	61584	54279	51498	49169	34795	NE#	NE
CO2 emissions excluding net CO2 from LULUCF	58275	58275	64985	57664	55735	47940	37545	NE#	NE
CH4 emissions including CH4 from LULUCF****	7596	7596	8022	7871	7629	7308	6885	NE#	NE
CH4 emissions excluding CH4 from LULUCF	7789	7789	8212	8059	7814	7493	7076	NE#	NE
N2O emissions including N2O from LULUCF****	7965	7965	7228	6970	5503	5210	5450	NE#	NE
N2O emissions excluding N2O from LULUCF	7993	7993	7255	6997	5529	5237	5479	NE#	NE
HFCs	NO,NA	NO,NA	258	766	903	827	405	NE#	NE
PFCs	NO,NA	NO,NA	1	23	19	17	1	NE#	NE
SF6	42	42	104	57	21	37	75	NE#	NE
NF3	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NE#	NE
Other (specify)	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA		
Total with LULUCF [f] ****	**75229**	**75229**	**81877**	**74390**	**70681**	**62020**	**50863**	NE#	NE
Total without LULUCF	**70291**	**70291**	**78259**	**70790**	**66231**	**63038**	**47892**	NE#	NE

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] In accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", at a minimum Parties shall report a 'with measures' scenario, and may report 'without measures' and 'with additional measures' scenarios. If a Party chooses to report 'without measures' and/or 'with additional measures' scenarios they are to use tables 6(b) and/or 6(c), respectively. If a Party does not choose to report 'without measures' or 'with additional measures' scenarios then it should not include tables 6(b) or 6(c) in the biennial report.

[b] Emissions and removals reported in these columns should be as reported in the latest GHG inventory and consistent with the emissions and removals reported in the table on GHG emissions and trends provided in this biennial report. Where the sectoral breakdown differs from that reported in the GHG inventory Parties should explain in their biennial report how the inventory sectors relate to the sectors reported in this table.

[c] 20XX is the reporting due-date year (i.e. 2014 for the first biennial report).

[d] In accordance with paragraph 34 of the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", projections shall be presented on a sectoral basis, to the extent possible, using the same sectoral categories used in the policies and measures section. This table should follow, to the extent possible, the same sectoral categories as those listed in paragraph 17 of those guidelines, namely, to the extent appropriate, the following sectors should be considered: energy, transport, industry, agriculture, forestry and waste management.

[e] To the extent possible, the following sectors should be used: energy, transport, industry/industrial processes, agriculture, forestry/LULUCF, waste management/waste, other sectors (i.e. cross-cutting), as appropriate.

[f] Parties may choose to report total emissions with or without LULUCF, as appropriate.

* Denmark without Greenland and the Faroe Islands. CO2 and totals are with indirect CO2 emissions. The memo items are not included in the totals.

** The IPCC category "Energy" excluding the subcategory "Transport".

*** The IPCC category "Industrial processes and product use".

**** Not Applicable for the assessment of Denmark's contribution to progress towards the joint EU28 2020 under the UNFCCC as LULUCF is excluded from this target.

The overall climate and energy objective of the Danish Government is to implement measures to ensure that Denmark can meet its greenhouse gas reduction obligations under the EU's Climate and Energy Package and thereby contribute to the acheivement of the EU28 joint target for 2020 under the UNFCCC and to the achievement of the EU28+Iceland joint target under the second commitment period of the Kyoto Protocol. As the overall result of the latest "with measures" projection - with the effect of all adopted and implemented policies and measures - is that Denmark will achieve its greenhouse gas emission reduction target under the EU Climate and Energy Package, there has not been a need for adopting additional measures and prepare a "with additional measures" projection.

TABLE 7: PROVISION OF PUBLIC FINANCIAL SUPPORT: SUMMARY INFORMATION IN 2017 AND 2018

Table 7

Provision of public financial support: summary information in 20XX-3 [a]

Year: 2017

Allocation channels	Domestic currency					USD [b]				
	Core/ general [c,1]	limate-specific [d,2]				Core/ general [c,1]	mate-specific [d,2]			
		Mitigation	Adaptation	Cross-cutting [e]	Other [f]		Mitigation	Adaptation	Cross-cutting [e]	Other [f]
Total contributions through multilateral channels:	**1.448.541.795**	**49.353.933**	**129.293.573**	**210.325.997**	**0**	**219.376.313**	**7.474.471**	**19.581.035**	**31.853.097**	**0**
Multilateral climate change funds [g]	100.000.000	0	60.000.000	151.233.268	0	15.144.631	0	9.086.779	22.903.721	0
Other multilateral climate change funds [h]	0	0	0	1.500.000	0	0	0	0	227.169	0
Multilateral financial institutions, including regional development banks	953.261.298	45.860.785	40.893.573	35.340.309	0	144.367.908	6.945.447	6.193.181	5.352.159	0
Specialized United Nations bodies	395.280.497	3.493.148	28.400.000	22.252.420	0	59.863.774	529.024	4.301.075	3.370.047	0
Total contributions through bilateral, regional and other channels		**365.062.556**	**225.217.681**	**372.877.993**	**0**		**55.287.378**	**34.108.387**	**56.470.997**	**0**
Tot al		**414.416.489**	**354.511.255**	**583.203.989**	**0**		**62.761.849**	**53.689.422**	**88.324.094**	**0**
Total climate specific finance		**1.352.131.733**					**204.775.365**			

Note: Explanation of numerical footnotes is provided in the documentation box after tables 7, 7(a) and 7(b).

Abbreviation: USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 20XX-3 and 20XX-2, where 20XX is the reporting year.

[b] Parties should provide an explanation on methodology used for currency exchange for the information provided in table 7, 7(a) and 7(b) in the documentation box.

[c] This refers to support to multilateral institutions that Parties cannot specify as climate-specific.

[d] Parties should explain in their biennial reports how they define funds as being climate-specific.

[e] This refers to funding for activities which are cross-cutting across mitigation and adaptation.

[f] Please specify.

[g] Multilateral climate change funds listed in paragraph 17(a) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

[h] Other multilateral climate change funds as referred in paragraph 17(b) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

Exchange rate: USD 1 = DKK 6,603

Source: OECD (https://data.oecd.org/conversion/exchange-rates.htm)

Table 7

Provision of public financial support: summary information in 20XX-3 [a]

Year: 2018

Allocation channels	Domestic currency					USD [b]				
	Core/ general [c,1]	Climate-specific [d,2]				Core/ general [c,1]	Climate-specific [d,2]			
		Mitigation	Adaptation	Cross-cutting [e]	Other [f]		Mitigation	Adaptation	Cross-cutting [e]	Other [f]
Total contributions through multilateral channels:	**1.633.705.762**	**104.448.876**	**186.567.909**	**96.813.007**	**0**	**258.702.417**	**16.539.806**	**29.543.612**	**15.330.642**	**0**
Multilateral climate change funds [g]	450.000.000	617.442	51.780.022	0	0	71.258.907	97.774	8.199.528	0	0
Other multilateral climate change funds [h]	0	40.142.404	0	0	0	0	6.356.675	0	0	0
Multilateral financial institutions, including regional development banks	857.244.332	43.789.030	103.837.887	73.750.900	0	135.747.321	6.934.130	16.443.054	11.678.686	0
Specialized United Nations bodies	326.461.430	19.900.000	30.950.000	23.062.107	0	51.696.188	3.151.227	4.901.029	3.651.957	0
Total contributions through bilateral, regional and other channels		**482.321.359**	**231.232.548**	**372.840.406**	**0**		**76.377.096**	**36.616.397**	**59.040.444**	**0**
Total climate specific by funding type (total for mitigation, adaptation, crosscutting, other)		**586.770.235**	**417.800.458**	**469.653.413**	**0**		**92.916.902**	**66.160.009**	**74.371.087**	**0**
Total climate specific finance		**1.474.224.105**					**233.447.998**			

Note: Explanation of numerical footnotes is provided in the documentation box after tables 7, 7(a) and 7(b).

Abbreviation: USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 20XX-3 and 20XX-2, where 20XX is the reporting year.

[b] Parties should provide an explanation on methodology used for currency exchange for the information provided in table 7, 7(a) and 7(b) in the documentation box.

[c] This refers to support to multilateral institutions that Parties cannot specify as climate-specific.

[d] Parties should explain in their biennial reports how they define funds as being climate-specific.

[e] This refers to funding for activities which are cross-cutting across mitigation and adaptation.

[f] Please specify.

[g] Multilateral climate change funds listed in paragraph 17(a) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

[h] Other multilateral climate change funds as referred in paragraph 17(b) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

Exch 6,315

Source: OECD (https://data.oecd.org/conversion/exchange-rates.htm)

TABLE 7(A): PROVISION OF PUBLIC FINANCIAL SUPPORT: CONTRIBUTION THROUGH MULTILATERAL CHANNELS IN 2017 AND 2018

Table 7(a)

Provision of public financial support: contribution through multilateral channels in 20XX-3 = 2017 [a]

Donor funding	Total amount: Core /general [d,1] DKK	Total amount: Core /general [d,1] USD	Total amount: Climate-specific [e,2] DKK	Total amount: Climate-specific [e,2] USD	Status [b,3] Committed Disbursed	Funding source [4] ODA OOF Other [f]	Financial instrument [5] Grant Concessional loan Non-concessional loan Equity Other [f]	Type of support [6] Mitigation Adaptation Cross-cutting [g] Other [f]	Sector [c,7] Energy Transport Industry Agriculture Forestry Water and sanitation Cross-cutting Other [f] Not applicable
Total contributions through multilateral channels	**1.448.541.794,97**	**219.376.313,03**	**388.973.502,72**	**58.908.602,56**					
Multilateral climate change funds	**100.000.000,00**	**15.144.631,23**	**212.733.267,81**	**32.217.668,91**					
1. Global Environment Facility	100.000.000,00	15.144.631,23			disbursed	ODA	grant		Environmental policy and administrative management / 41010
2. Least Developed Countries Fund, assigned as "adaptation" as a result of "OECD" figures			60.000.000,00	9.086.778,74	disbursed	ODA	grant	adaptation	Environmental policy and administrative management / 41010
3. Special Climate Change Fund									
4. Adaptation Fund									
5. Green Climate Fund			150.000.000,00	22.716.946,84	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010
6. UNFCCC Trust Fund for Supplementary Activities			1.233.267,81	186.773,86	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010
7. Other (Multilateral Fund for the Implementation of the Montreal Protocol)			1.500.000,00	227.169,47	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010
Multilateral financial institutions, including regional development banks	**953.261.297,63**	**144.367.908,17**	**122.094.667,20**	**18.490.787,10**					
1. World Bank									
2. International Finance Corporation			10.000.000,00	1.514.463,12	disbursed	ODA	grant	Cross-cutting	Multisector aid / 43010
3. African Development Bank									
4. Asian Development Bank	85.356.000,00	12.926.851,43			disbursed	ODA	grant		Multisector aid / 43010
5. European Bank for Reconstruction and Development									
6. Inter-American Development Bank			149.371,40	22.621,75	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010
7. Other (African Union)			889.544,24	134.718,19	disbursed	ODA	grant	Adaptation	Civilian peace-building, conflict prevention and resolution / 15220
8. Other (GGGI)			20.340.309,15	3.080.464,81	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010
9. Other (IEA)			27.000.000,00	4.089.050,43	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110 Environmental policy and administrative management / 41010
10. Other (IGAD)			4.029,14	610,20	disbursed	ODA	grant	Adaptation	Agricultural land resources / 31130
11. Other (World Bank (IDA))	621.200.000,00	94.078.449,19			disbursed	ODA	capital subscription		Sectors not specified / 99810
12. Other (World Bank (IDA-MDRI))	98.130.000,00	14.861.426,62			disbursed	ODA	grant		Relief of multilateral debt / 60030
13. Other (World Bank (IBRD))	24.000.000,00	3.634.711,49	18.711.413,27	2.833.774,54	disbursed	ODA	grant	Mitigation	Wind energy / 23240 Environmental policy and administrative management / 41010
14. Other (World Bank (IBRD))			40.000.000,00	6.057.852,49	disbursed	ODA	grant	Adaptation	Basic drinking water supply and basic sanitation / 14030 Food aid/Food security programmes / 52010
15. Other (World Bank (IBRD))			5.000.000,00	757.231,56	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120
16. Other (African Development Bank)	678.962,82	102.826,42			disbursed	ODA	grant		Multisector aid / 43010
17. Other (African Development Bank (AFDF))	123.896.334,81	18.763.643,01			disbursed	ODA	grant capital subscription		Relief of multilateral debt / 60030
Specialized United Nations bodies	**395.280.497,34**	**59.863.773,64**	**54.145.567,71**	**8.200.146,56**					
1. United Nations Development Programme	175.000.000,00	26.503.104,65	2.571.852,00	389.497,50	disbursed	ODA	grant	Mitigation	Civilian peace-building, conflict prevention and resolution / 15220 Sectors not specified / 99810 Energy policy and administrative management / 23110
2. United Nations Environment Programme									
3. Other (FAO)			12.000.000,00	1.817.355,75	disbursed	ODA	grant	Adaptation	Civilian peace-building, conflict prevention and resolution / 15220
4. Other (IFAD)			9.364.000,00	1.418.143,27	disbursed	ODA	grant	Cross-cutting	Agricultural policy and administrative management / 31110
5. Other (UN)			1.500.000,00	227.169,47	disbursed	ODA	grant	Cross-cutting	Multisector aid / 43010
6. Other (UNECE)			921.296,00	139.526,88	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110
7. Other (UN-OHRLLS)			524.000,00	79.357,87	disbursed	ODA	grant	Cross-cutting	Business support services and institutions / 25010
8. Other (UNIDO)	1.091,59	165,32			disbursed	ODA	grant		Industrial development / 32120
9. Other (UNIDO)			10.000.000,00	1.514.463,12	disbursed	ODA	grant	Adaptation	Civilian peace-building, conflict prevention and resolution / 15220
10. Other (WFP)	210.279.405,75	31.846.040,55			disbursed	ODA	grant		Sectors not specified / 99810
11. Other (WMO)			1.110.224,75	168.139,44	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010
12. Other (United Nations Environment Programme)	10.000.000,00	1.514.463,12	6.400.000,00	969.256,40	disbursed	ODA	grant	Adaptation	Water sector policy and administrative management / 14010
13. Other (United Nations Environment Programme)			9.754.194,96	1.477.236,86	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010

Note: Explanation of numerical footnotes is provided in the documentation box after tables 7, 7(a) and 7(b).

Abbreviations: ODA = official development assistance

[a] Parties should fill in a separate table for each year, namely 20XX-3 and 20XX-2, where 20XX is the reporting year.

[b] Parties should explain, in their biennial reports, the methodologies used to specify the funds as disbursed and committed. Parties will provide the information for as many status categories as appropriate in the following order of priority: disbursed and committed.

[c] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under "Other".

[d] This refers to support to multilateral institutions that Parties cannot specify as climate-specific.

[e] Parties should explain in their biennial reports how they define funds as being climate-specific.

[f] Please specify.

[g] This refers to funding for activities which are cross-cutting across mitigation and adaptation.

Exchange rate, USD 1 = DKK 6,603

Source: OECD (https://data.oecd.org/conversion/exchange-rates.htm)

Table 7(a)

Provision of public financial support: contribution through multilateral channels in 20XX-2 = 2018 [a]

Donor funding	Total amount: Core /general [d,1] DKK	Total amount: Core /general [d,1] USD	Total amount: Climate-specific [e,2] DKK	Total amount: Climate-specific [e,2] USD	Status [b,3] (Committed / Disbursed)	Funding source [4] (ODA / OOF / Other [f])	Financial instrument [5] (Grant / Concessional loan / Non-concessional loan / Equity / Other [f])	Type of support [6] (Mitigation / Adaptation / Cross-cutting [g] / Other [f])	Sector [c,7] (Energy / Transport / Industry / Agriculture / Forestry / Water and sanitation / Cross-cutting / Other [f] / Not applicable)
Total contributions through multilateral channels	**1.633.705.761,62**	**258.702.416,73**	**387.829.791,73**	**61.414.060,45**					
Multilateral climate change funds	**450.000.000,00**	**71.258.907,36**	**92.539.868,28**	**14.653.977,56**					
1. Global Environment Facility	450.000.000,00	71.258.907,36			disbursed	ODA	grant		Environmental policy and administrative management / 41010
2. Least Developed Countries Fund, assigned as "adaptation" as a result of "OECD" figures			51.780.022,00	8.199.528,42	disbursed	ODA	grant	Adaptation	Environmental policy and administrative management / 41010
3. Special Climate Change Fund									
4. Adaptation Fund									
5. Green Climate Fund									
6. UNFCCC Trust Fund for Supplementary Activities			617.442,28	97.773,92	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010
7. Other (Multilateral Fund for the Implementation of the Montreal Protocol)			10.142.404,00	1.606.081,39	disbursed	ODA	grant	Mitigation	Biosphere protection / 41020
8. Other (Strategic Climate Fund)			30.000.000,00	4.750.593,82	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110
Multilateral financial institutions, including regional development banks	**857.244.331,95**	**135.747.320,97**	**221.377.816,64**	**35.055.869,62**					
1. World Bank									
2. International Finance Corporation			20.393.548,00	3.229.382,11	disbursed	ODA	grant	Cross-cutting	Multisector aid / 43010
3. African Development Bank									
4. Asian Infrastructure Investment Bank	79.535.540,00	12.594.701,50			disbursed	ODA	grant		Multisector aid / 43010
5. Inter-American Development Bank			149.864,50	23.731,51	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010
6. Other (GGGI)			40.000.000,00	6.334.125,10	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010
7. Other (IEA)			10.000.000,00	1.583.531,27	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010
8. Other (IGAD)			7.037.887,24	1.114.471,46	disbursed	ODA	grant	Adaptation	Civilian peace-building, conflict prevention and resolution / 15220
9. Other (IRENA)			20.540.619,75	3.252.671,38	disbursed	ODA	grant	Mitigation	Sectors not specified / 99810 Energy policy and administrative management / 23110
10. Other (MRC)			107.351,87	16.999,50	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010
11. Other (OECD)			10.000.000,00	1.583.531,27	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110
12. Other (OECD Development Centre)	1.366.371,39	216.369,18			disbursed	ODA	grant		Research/scientific institutions / 43082
13. Other (World Bank (IDA)	572.800.000,00	90.704.671,42			disbursed	ODA	grant		Sectors not specified / 99810
14. Other (World Bank (IDA-MDRI)	102.770.000,00	16.273.950,91			disbursed	ODA	grant		Relief of multilateral debt / 60030
15. Other (World Bank (IBRD))			80.000.000,00	12.668.250,20	disbursed	ODA	grant	Adaptation	Basic drinking water supply and basic sanitation / 14030 Food aid/Food security programmes / 52010
16. Other (World Bank (IBRD))			13.250.000,00	2.098.178,94	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120
17. Other (World Bank (IBRD-ESMAP))			16.800.000,00	2.660.332,54	disbursed	ODA	grant	Adaptation	Energy policy and administrative management / 23110
18. Other (World Bank (IBRD-ESMAP))			3.000.000,00	475.059,38	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110
19. Other (African Development Bank)	679.364,56	107.579,50	98.545,28	15.604,95	disbursed	ODA	grant	Mitigation	Multisector aid / 43010 Energy generation, renewable sources – multiple technologies / 23210
20. Other (African Development Bank (AfDF))	100.093.056,00	15.850.048,46			disbursed	ODA	grant		Sectors not specified / 99810
Specialized United Nations bodies	**326.461.429,67**	**51.696.188,39**	**73.912.106,81**	**11.704.213,27**					
1. United Nations Development Programme									
2. United Nations Environment Programme									
3. Other (FAO)	9.149.400,00	1.448.836,10			disbursed	ODA	grant		Agricultural policy and administrative management / 31110
4. Other (IFAD)			2.965.000,00	469.517,02	disbursed	ODA	grant	Cross-cutting	Agricultural policy and administrative management / 31110
5. Other (IPCC)			2.000.000,00	316.706,25	disbursed	ODA	grant	Cross-cutting	Environmental research / 41082
7. Other (UNCCD)	312.029,67	49.410,87			disbursed	ODA	grant		Environmental policy and administrative management / 41010
6. Other (UNICEF)			1.250.000,00	197.941,41	disbursed	ODA	grant	Adaptation	Civilian peace-building, conflict prevention and resolution / 15220
8. Other (WFP)	207.000.000,00	32.779.097,39			disbursed	ODA	grant		Food aid/Food security programmes / 52010
9. Other (WMO)			97.106,81	15.377,17	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010
10. Other (United Nations Development Programme)	110.000.000,00	17.418.844,02	21.700.000,00	3.436.262,87	disbursed	ODA	grant	Adaptation	Civilian peace-building, conflict prevention and resolution / 15220 Agricultural policy and administrative management / 31110
11. Other (United Nations Development Programme)			18.000.000,00	2.850.356,29	disbursed	ODA	grant	Cross-cutting	Multisector aid / 43010 Rural development / 43040
12. Other (United Nations Environment Programme)			8.000.000,00	1.266.825,02	disbursed	ODA	grant	Adaptation	Water resources conservation (including data collection) / 14015
13. Other (United Nations Environment Programme)			19.900.000,00	3.151.227,24	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110

Note: Explanation of numerical footnotes is provided in the documentation box after tables 7, 7(a) and 7(b).

Abbreviations: ODA = official development assistance, OOF = other official flows.

[a] Parties should fill in a separate table for each year, namely 20XX-3 and 20XX-2, where 20XX is the reporting year.

[b] Parties should explain, in their biennial reports, the methodologies used to specify the funds as disbursed and committed. Parties will provide the information for as many status categories as appropriate in the following order of priority: disbursed and committed.

[c] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under "Other".

[d] This refers to support to multilateral institutions that Parties cannot specify as climate-specific.

[e] Parties should explain in their biennial reports how they define funds as being climate-specific.

[f] Please specify.

[g] This refers to funding for activities which are cross-cutting across mitigation and adaptation.

Exchange rate, USD 1 = DKK 6,315

Source: OECD (https://data.oecd.org/conversion/exchange-rates.htm)

TABLE 7(B): PROVISION OF PUBLIC FINANCIAL SUPPORT: CONTRIBUTION THROUGH BILATERAL, REGIONAL AND OTHER CHANNELS IN 2017 AND 2018

Table 7(b)

Provision of public financial support: contribution through bilateral, regional and other channels in 20XX-3 = 2017 [a]

Recipient country/ region/project/programme [b]	Total amount		Status [c,3]	Funding source [4]	Financial instrument [5]	Type of support [6]	Sector [d,7]	Recipient country/ region/project/programme [b]	Additional Information [e]
Project/programme/activity	Climate-specific [f,2]		Committed Disbursed	ODA OOF Other [8]	Grant Concessional loan Non-concessional loan Equity Other [8]	Mitigation Adaptation Cross-cutting [h] Other [8]	Energy Transport Industry Agriculture Forestry Water and sanitation Cross-cutting Other [8]	Recipient country or region	
	DKK	USD							
Afghanistan	9.000.000	1.363.017	disbursed	ODA	grant	Cross-cutting	Material relief assistance and services / 72010	Afghanistan	CRS 2013001248
Afghanistan	24.991.698	3.784.901	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Afghanistan	CRS 2014001300
Africa	2.402.579	363.862	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Africa	CRS 2011001498aa
Africa	1.200.000	181.736	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Africa	CRS 2011001498ab
Africa South of Sahara	250.000	37.862	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Africa South of Sahara	CRS 2017001051
Asia	5.500.000	832.955	disbursed	ODA	grant	Adaptation	Environmental policy and administrative management / 41010	Asia	CRS 2015001246
Bangladesh	46.542	7.049	disbursed	ODA	grant	Cross-cutting	Basic drinking water supply and basic sanitation / 14030	Bangladesh	CRS 2010001681
Bangladesh	100.879	15.278	disbursed	ODA	grant	Adaptation	Basic drinking water supply and basic sanitation / 14030	Bangladesh	CRS 2010001680
Bangladesh	755.010	114.343	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bangladesh	CRS 2014001221aa
Bangladesh	769.315	116.510	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bangladesh	CRS 2014001221ab
Bangladesh	446.630	67.640	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bangladesh	CRS 2014001221ac
Bangladesh	5.382	815	disbursed	ODA	grant	Adaptation	Environmental policy and administrative management / 41010	Bangladesh	CRS 2015001187
Bangladesh	120.000	18.174	disbursed	ODA	grant	Adaptation	Water supply and sanitation - large systems / 14020	Bangladesh	CRS 2017001193
Bangladesh	27.063.085	4.098.604	disbursed	ODA	grant	Adaptation	Rural development / 43040	Bangladesh	CRS 2016001117
Bangladesh	1.000.000	151.446	disbursed	ODA	grant	Cross-cutting	Sectors not specified / 99810	Bangladesh	CRS 2016001275
Bolivia	2.046.432	309.925	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Bolivia	CRS 2013001378aa
Bolivia	14.543.782	2.202.602	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Bolivia	CRS 2013001378ab
Bolivia	1.345.759	203.810	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Bolivia	CRS 2013001378ac
Bolivia	20.604.696	3.120.505	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Bolivia	CRS 2013001378ad
Bolivia	123.010	18.629	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bolivia	CRS 2013001340ab
Bolivia	13.851.704	2.097.790	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bolivia	CRS 2013001340ac
Bolivia	1.028.582	155.775	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bolivia	CRS 2013001340ad
Bolivia	1.285.584	194.697	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bolivia	CRS 2013001340ae
Bolivia	754.523	114.270	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bolivia	CRS 2013001340af
Bolivia	512.500	77.616	disbursed	ODA	grant	Mitigation	Wind energy / 23240	Bolivia	CRS 2016001201aa
Bolivia	133.971.000	20.289.414	disbursed	ODA	interest subsidy	Mitigation	Wind energy / 23240	Bolivia	CRS 2016001201ab
Bolivia	455.555	68.992	disbursed	ODA	grant	Cross-cutting	Sectors not specified / 99810	Bolivia	CRS 2016001175
Brazil	11.760	1.781	disbursed	ODA	equity	Mitigation	Solar energy / 23230	Brazil	CRS 2017320033
Burkina Faso	330.836	50.104	disbursed	ODA	grant	Cross-cutting	Forestry research / 31282	Burkina Faso	CRS 2015001132
Burkina Faso	3.871.465	586.319	disbursed	ODA	grant	Adaptation	Agricultural development / 31120	Burkina Faso	CRS 2012001507aa
Burkina Faso	1.849.708	280.131	disbursed	ODA	grant	Adaptation	Agricultural development / 31120	Burkina Faso	CRS 2012001507ab
Burkina Faso	8.141.464	1.232.995	disbursed	ODA	grant	Adaptation	Agricultural development / 31120	Burkina Faso	CRS 2012001508
Burkina Faso	38.811.695	5.877.888	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Burkina Faso	CRS 2015001306
China	13.033.000	1.973.800	disbursed	ODA	equity	Mitigation	Solar energy / 23230	China	CRS 2016320080
China	1.253.618	189.856	disbursed	ODA	equity	Mitigation	Wind energy / 23240	China	CRS 2017320019
China	4.478.000	678.177	disbursed	ODA	equity	Mitigation	Wind energy / 23240	China	CRS 2016320081
China	1.191.520	180.451	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	China	CRS 2016001142
China	359.122	54.388	disbursed	ODA	grant	Mitigation	Water transport / 21040	China	CRS 2017001123
Egypt	751.362	113.791	disbursed	ODA	grant	Cross-cutting	Small and medium-sized enterprises (SME) development / 32130	Egypt	CRS 2014001172
Ethiopia	543.450	82.303	disbursed	ODA	grant	Cross-cutting	Agro-industries / 32161	Ethiopia	CRS 2016001216
Ethiopia	8.622.107	1.305.786	disbursed	ODA	grant	Mitigation	Wind energy / 23240	Ethiopia	CRS 2016001197ab
Ethiopia	39.504	5.983	disbursed	ODA	grant	Mitigation	Wind energy / 23240	Ethiopia	CRS 2016001197aa
Georgia	83.629	12.665	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	Georgia	CRS 2015001245aa
Georgia	1.306.814	197.912	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	Georgia	CRS 2015001245ab
Ghana	783.040	118.589	disbursed	ODA	grant	Adaptation	Agricultural development / 31120	Ghana	CRS 2012001384

Table 7(b)

Provision of public financial support: contribution through bilateral, regional and other channels in 20XX-3 - 2017 [a]

Recipient country/ region/project/programme [b]	Total amount		Status [c,3]	Funding source [4]	Financial instrument [5]	Type of support [6]	Sector [d,7]	Recipient country/ region/project/programme [b]	Additional Information [e]
Project/programme/activity	Climate-specific [f,2]		Committed Disbursed	ODA OOF Other [g]	Grant Concessional loan Non-concessional loan Equity Other [g]	Mitigation Adaptation Cross-cutting [h] Other [g]	Energy Transport Industry Agriculture Forestry Water and sanitation Cross-cutting Other [g]	Recipient country or region	
	DKK	USD							
Ghana	38.150	5.778	disbursed	ODA	grant	Cross-cutting	Education facilities and training / 11120	Ghana	CRS 2012001203aa
India	2.469.946	374.064	disbursed	ODA	equity	Mitigation	Sanitation - large systems / 14022	India	CRS 2016320082
Indonesia	43.365.117	6.567.487	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Indonesia	CRS 2012001357
Indonesia	16.134.106	2.443.451	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Indonesia	CRS 2012001386
Indonesia	870.151	131.781	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Indonesia	CRS 2012001387ab
Indonesia	865.924	131.141	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Indonesia	CRS 2012001387aa
Indonesia	250.881	37.995	disbursed	ODA	grant	Cross-cutting	Security system management and reform / 15210	Indonesia	CRS 2014001161
Indonesia	103.076	15.611	disbursed	ODA	grant	Mitigation	Small and medium-sized enterprises (SME) development / 32130	Indonesia	CRS 2013001134
Indonesia	59.133	8.955	disbursed	ODA	grant	Mitigation	Small and medium-sized enterprises (SME) development / 32130	Indonesia	CRS 2012001442
Indonesia	19.440	2.944	disbursed	ODA	grant	Mitigation	Small and medium-sized enterprises (SME) development / 32130	Indonesia	CRS 2014001199
Indonesia	139.582	21.139	disbursed	ODA	grant	Mitigation	Small and medium-sized enterprises (SME) development / 32130	Indonesia	CRS 2013001352
Indonesia	1.356.911	205.499	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	Indonesia	CRS 2015001286
Interregional	980.000	148.417	disbursed	ODA	equity	Mitigation	Energy generation, non-renewable sources – unspecified / 23310	Interregional	CRS 2017320032
Interregional	1.000.000	151.446	disbursed	ODA	grant	Adaptation	Higher education / 11420	Interregional	CRS 2011001447
Interregional	7.400.000	1.120.703	disbursed	ODA	grant	Cross-cutting	Research/scientific institutions / 43082	Interregional	CRS 2012001278
Interregional	2.746.617	415.965	disbursed	ODA	grant	Cross-cutting	Research/scientific institutions / 43082	Interregional	CRS 2011001193
Interregional	10.250.000	1.552.325	disbursed	ODA	grant	Cross-cutting	Research/scientific institutions / 43082	Interregional	CRS 2014001185
Interregional	6.250.000	946.539	disbursed	ODA	grant	Cross-cutting	Research/scientific institutions / 43082	Interregional	CRS 2014001184
Interregional	1.476.477	223.607	disbursed	ODA	grant	Cross-cutting	Higher education / 11420	Interregional	CRS 2012001404
Interregional	21.750	3.294	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Interregional	CRS 2012001178
Interregional	3.750.000	567.924	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2015001091
Interregional	1.094.378	165.740	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Interregional	CRS 2014001384ab
Interregional	10.366.000	1.569.892	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Interregional	CRS 2014001384aa
Interregional	500.000	75.723	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2017001088
Interregional	2.500.000	378.616	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2014001234
Interregional	500.000	75.723	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Interregional	CRS 2014001292
Interregional	11.900.000	1.802.211	disbursed	ODA	grant	Mitigation	Sectors not specified / 99810	Interregional	CRS 2017001029
Interregional	29.700.000	4.497.955	disbursed	ODA	grant	Adaptation	Sectors not specified / 99810	Interregional	CRS 2017001018
Interregional	10.700.000	1.620.476	disbursed	ODA	grant	Adaptation	Sectors not specified / 99810	Interregional	CRS 2017001026
Interregional	7.400.000	1.120.703	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	Interregional	CRS 2017001042
Interregional	46.750.000	7.080.115	disbursed	ODA	grant	Adaptation	Sectors not specified / 99810	Interregional	CRS 2017001028
Interregional	7.500.000	1.135.847	disbursed	ODA	grant	Mitigation	Business support services and institutions / 25010	Interregional	CRS 2016001144
Interregional	47.565	7.203	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2015001064
Interregional	10.312	1.562	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2015001215
Interregional	359.405	54.430	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2015001149
Interregional	6.000.000	908.678	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Interregional	CRS 2016001111
Interregional	1.704.000	258.065	disbursed	ODA	grant	Mitigation	Wind energy / 23240	Interregional	CRS 2016001213
Interregional	57.500.000	8.708.163	disbursed	ODA	grant	Adaptation	Material relief assistance and services / 72010	Interregional	CRS 2017001016
Interregional	1.150.000	174.163	disbursed	ODA	grant	Adaptation	Agro-industries / 32161	Interregional	CRS 2016001204
Interregional	3.300.000	499.773	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	Interregional	CRS 2016001200
Interregional	214.977	32.557	disbursed	ODA	grant	Cross-cutting	Energy policy and administrative management / 23110	Interregional	CRS 2017001134ab
Interregional	9.600.000	1.453.885	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	Interregional	CRS 2017001134aa
Interregional	250.000	37.862	disbursed	ODA	grant	Mitigation	Formal sector financial intermediaries / 24030	Interregional	CRS 2017001317
Interregional	1.600.000	242.314	disbursed	ODA	grant	Cross-cutting	Sectors not specified / 99810	Interregional	CRS 2017001253
Interregional	7.500.000	1.135.847	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Interregional	CRS 2017001228
Interregional	1.415.746	214.410	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2017001055
Interregional	9.750.000	1.476.602	disbursed	ODA	grant	Mitigation	Multisector aid / 43010	Interregional	CRS 2017001247
Interregional	9.500.000	1.438.740	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Interregional	CRS 2013001290
Kenya	2.372.110	359.247	disbursed	ODA	equity	Mitigation	Wind energy / 23240	Kenya	CRS 2016320083
Kenya	990.227	149.966	disbursed	ODA	grant	Adaptation	Environmental policy and administrative management / 41010	Kenya	CRS 2012001327

Table 7(b)

Provision of public financial support: contribution through bilateral, regional and other channels in 20XX-3 = 2017 [a]

Recipient country/ region/project/programme [b]	Total amount		Status [c,3]	Funding source [4]	Financial instrument [5]	Type of support [6]	Sector [d,7]	Recipient country/ region/project/programme [b]	Additional Information [e]
Project/programme/activity	Climate-specific [f,2]		Committed Disbursed	ODA OOF Other [g]	Grant Concessional loan Non-concessional loan Equity Other [g]	Mitigation Adaptation Cross-cutting [h] Other [g]	Energy Transport Industry Agriculture Forestry Water and sanitation Cross-cutting Other [g]	Recipient country or region	
	DKK	USD							
Kenya	248.506	37.635	disbursed	ODA	grant	Adaptation	Environmental policy and administrative management / 41010	Kenya	CRS 2012001328
Kenya	1.964	297	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Kenya	CRS 2009002460ab
Kenya	208.450	31.569	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Kenya	CRS 2009002472ab
Kenya	116.304	17.614	disbursed	ODA	grant	Mitigation	Sectors not specified / 99810	Kenya	CRS 2009002474
Kenya	224.134	33.944	disbursed	ODA	grant	Cross-cutting	Sectors not specified / 99810	Kenya	CRS 2014001385
Kenya	5.202.186	787.852	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Kenya	CRS 2015001217aa
Kenya	4.924.186	745.750	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Kenya	CRS 2015001217ab
Kenya	17.351.541	2.627.827	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Kenya	CRS 2015001217ac
Kenya	173.159	26.224	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Kenya	CRS 2015001218aa
Kenya	2.132.584	322.972	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Kenya	CRS 2015001217ad
Kenya	8.828.339	1.337.019	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Kenya	CRS 2015001218ab
Kenya	1.242.444	188.163	disbursed	ODA	grant	Mitigation	Industrial development / 32120	Kenya	CRS 2016001141
Kenya	330.004	49.978	disbursed	ODA	grant	Adaptation	Food crop production / 31161	Kenya	CRS 2016001214
Malaysia	1.022.500	154.854	disbursed	ODA	grant	Mitigation	Energy education/training / 23181	Malaysia	CRS 2015001182
Mali	2.034	308	disbursed	ODA	grant	Mitigation	Energy generation, non-renewable sources – unspecified / 23310	Mali	CRS 2013001146
Mali	5.874.381	889.653	disbursed	ODA	grant	Cross-cutting	Business support services and institutions / 25010	Mali	CRS 2013001256
Mali	4.962.340	751.528	disbursed	ODA	grant	Cross-cutting	Business support services and institutions / 25010	Mali	CRS 2013001257
Mali	467.911	70.863	disbursed	ODA	grant	Cross-cutting	Business support services and institutions / 25010	Mali	CRS 2013001258
Mali	173.647	26.298	disbursed	ODA	grant	Mitigation	Water supply and sanitation - large systems / 14020	Mali	CRS 2009002330aa
Mali	903.724	136.866	disbursed	ODA	grant	Mitigation	Water supply and sanitation - large systems / 14020	Mali	CRS 2009002330ab
Mexico	85.683	12.976	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Mexico	CRS 2013001337ab
Mexico	12.162.589	1.841.979	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Mexico	CRS 2013001337aa
Mongolia	1.412.679	213.945	disbursed	ODA	equity	Mitigation	Wind energy / 23240	Mongolia	CRS 2017320031
Mozambique	1.934.053	292.905	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Mozambique	CRS 2010001416
Mozambique	10.991.922	1.664.686	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Mozambique	CRS 2014001325aa
Mozambique	10.671.670	1.616.185	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Mozambique	CRS 2014001326aa
Mozambique	3.341.300	506.027	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Mozambique	CRS 2014001326ab
Mozambique	1.797.343	272.201	disbursed	ODA	grant	Adaptation	Environmental policy and administrative management / 41010	Mozambique	CRS 2016001184
Myanmar (Burma)	110.143	16.681	disbursed	ODA	grant	Adaptation	Fishery development / 31320	Myanmar (Burma)	CRS 2016001157
Myanmar (Burma)	4.851.033	734.671	disbursed	ODA	grant	Mitigation	Business support services and institutions / 25010	Myanmar (Burma)	CRS 2016001190aa
Myanmar (Burma)	8.759.711	1.326.626	disbursed	ODA	grant	Mitigation	Business support services and institutions / 25010	Myanmar (Burma)	CRS 2016001190ab
Myanmar (Burma)	1.250.583	189.396	disbursed	ODA	grant	Mitigation	Business support services and institutions / 25010	Myanmar (Burma)	CRS 2016001190ac
Myanmar (Burma)	1.200.000	181.736	disbursed	ODA	grant	Mitigation	Energy generation, renewable sources – multiple technologies / 23210	Myanmar (Burma)	CRS 2017001197
Nepal	342.145	51.817	disbursed	ODA	grant	Cross-cutting	Small and medium-sized enterprises (SME) development / 32130	Nepal	CRS 2013001129
Nepal	379.758	57.513	disbursed	ODA	grant	Cross-cutting	Small and medium-sized enterprises (SME) development / 32130	Nepal	CRS 2014001100
Nepal	437.869	66.314	disbursed	ODA	grant	Cross-cutting	Energy policy and administrative management / 23110	Nepal	CRS 2012001363
Niger	351.683	53.261	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Niger	CRS 2014001138aa
Niger	5.000.000	757.232	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Niger	CRS 2014001138ab
Niger	1.231.743	186.543	disbursed	ODA	grant	Cross-cutting	Basic drinking water supply and basic sanitation / 14030	Niger	CRS 2012001158
Niger	294.156	44.549	disbursed	ODA	grant	Cross-cutting	Basic drinking water supply and basic sanitation / 14030	Niger	CRS 2012001160
Niger	1.198.966	181.579	disbursed	ODA	grant	Cross-cutting	Basic drinking water supply and basic sanitation / 14030	Niger	CRS 2012001171
Niger	145.160	21.984	disbursed	ODA	grant	Cross-cutting	Basic drinking water supply and basic sanitation / 14030	Niger	CRS 2012001172
North and Central America	21.000	3.180	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	North and Central America	CRS 2005001445
Serbia	157	24	disbursed	ODA	grant	Cross-cutting	Agricultural services / 31191	Serbia	CRS 2010001510
Serbia	8.926	1.352	disbursed	ODA	grant	Cross-cutting	Agricultural services / 31191	Serbia	CRS 2010001512
Somalia	25.000.000	3.786.158	disbursed	ODA	grant	Adaptation	Urban development and management / 43030	Somalia	CRS 2017001304
South Africa	11.077.576	1.677.658	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	South Africa	CRS 2012001288
South Africa	860.425	130.308	disbursed	ODA	grant	Adaptation	Water sector policy and administrative management / 14010	South Africa	CRS 2016001102
South Africa	624.981	94.651	disbursed	ODA	grant	Adaptation	Small and medium-sized enterprises (SME) development / 32130	South Africa	CRS 2016001278
South Sudan	828.474	125.469	disbursed	ODA	grant	Adaptation	Civilian peace-building, conflict prevention and resolution / 15220	South Sudan	CRS 2016001221ab

Table 7(b)

Provision of public financial support: contribution through bilateral, regional and other channels in 20XX-3 = 2017 [a]

Recipient country/ region/project/programme [b]	Total amount		Status [c,3]	Funding source [4]	Financial instrument [5]	Type of support [6]	Sector [d,7]	Recipient country/ region/project/programme [b]	Additional Information [e]
Project/programme/activity	Climate-specific [f,2]		Committed Disbursed	ODA OOF Other [g]	Grant Concessional loan Non-concessional loan Equity Other [g]	Mitigation Adaptation Cross-cutting [h] Other [g]	Energy Transport Industry Agriculture Forestry Water and sanitation Cross-cutting Other [g]	Recipient country or region	
	DKK	USD							
Tanzania	7.000	1.060	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Tanzania	CRS 2007001286
Tanzania	7.001.855	1.060.405	disbursed	ODA	grant	Mitigation	Business support services and institutions / 25010	Tanzania	CRS 2013001365
Turkey	10.517	1.593	disbursed	ODA	grant	Mitigation	Urban development and management / 43030	Turkey	CRS 2015001163
Turkey	817.215	123.764	disbursed	ODA	grant	Mitigation	Energy conservation and demand-side efficiency / 23183	Turkey	CRS 2017001111
Uganda	934.660	141.551	disbursed	ODA	grant	Cross-cutting	Small and medium-sized enterprises (SME) development / 32130	Uganda	CRS 2012001213
Uganda	27.504.439	4.165.446	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Uganda	CRS 2013001353
Uganda	2.425.320	367.306	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Uganda	CRS 2013001354
Uganda	528.106	79.980	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Uganda	CRS 2013001355aa
Uganda	3.720.050	563.388	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Uganda	CRS 2013001355ab
Uganda	33.733.374	5.108.795	disbursed	ODA	grant	Mitigation	Agricultural development / 31120	Uganda	CRS 2014001147
Uganda	6.417.870	971.963	disbursed	ODA	grant	Cross-cutting	Rural development / 43040	Uganda	CRS 2014001149aa
Uganda	8.569.405	1.297.805	disbursed	ODA	grant	Cross-cutting	Rural development / 43040	Uganda	CRS 2014001149ab
Uganda	4.662.604	706.134	disbursed	ODA	grant	Cross-cutting	Rural development / 43040	Uganda	CRS 2014001149ac
Uganda	343.485	52.020	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Uganda	CRS 2014001151
Uganda	500.000	75.723	disbursed	ODA	grant	Cross-cutting	Small and medium-sized enterprises (SME) development / 32130	Uganda	CRS 2016001286
Uganda	192.554	29.162	disbursed	ODA	grant	Adaptation	Water sector policy and administrative management / 14010	Uganda	CRS 2017001221
Ukraine	62.007	9.391	disbursed	ODA	grant	Mitigation	Energy generation, renewable sources – multiple technologies / 23210	Ukraine	CRS 2014001401aa
Ukraine	4.475.494	677.797	disbursed	ODA	grant	Mitigation	Energy generation, renewable sources – multiple technologies / 23210	Ukraine	CRS 2014001401ab
Vietnam	6.437.876	974.993	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Vietnam	CRS 2012001287ab
Vietnam	1.168.016	176.892	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Vietnam	CRS 2012001287aa
Vietnam	635.083	96.181	disbursed	ODA	grant	Mitigation	Small and medium-sized enterprises (SME) development / 32130	Vietnam	CRS 2013001197
Vietnam	190.490	28.849	disbursed	ODA	grant	Mitigation	Small and medium-sized enterprises (SME) development / 32130	Vietnam	CRS 2014001245
Vietnam	602.662	91.271	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	Vietnam	CRS 2008001366
Vietnam	36.091	5.466	disbursed	ODA	grant	Cross-cutting	Multisector aid / 43010	Vietnam	CRS 2015001175
Zambia	46.045	6.973	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Zambia	CRS 2008001475
Zambia	15.630	2.367	disbursed	ODA	grant	Cross-cutting	Water resources conservation (including data collection) / 14015	Zambia	CRS 2011001445

Note: Explanation of numerical footnotes is provided in the documentation box after tables 7, 7(a) and 7(b).

Abbreviations: ODA = official development assistance, OOF = other official flows; USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 20XX-3 and 20XX-2, where 20XX is the reporting year.

[b] Parties should report, to the extent possible, on details contained in this table.

[b] Parties should explain, in their biennial reports, the methodologies used to specify the funds as disbursed and committed. Parties will provide the information for as many status categories as appropriate in the following order of priority: disbursed and committed.

[d] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under "Other".

[e] Parties should report, as appropriate, on project details and the implementing agency.

[f] Parties should explain in their biennial reports how they define funds as being climate-specific.

[g] Please specify.

[h] This refers to funding for activities which are cross-cutting across mitigation and adaptation.

Exchange rate 2017: USD 1 = DKK 6,603
Source: OECD (https://data.oecd.org/conversion/exchange-rates.htm)

Table 7(b)

Provision of public financial support: contribution through bilateral, regional and other channels in 20XX-3 = 2018 [a]

Recipient country/ region/project/programme [b]	Total amount		Status [c,3]	Funding source [4]	Financial instrument [5]	Type of support [6]	Sector [d,7]	Recipient country/ region/project/programme [b]	Additional Information [e]
Project/programme/activity	Climate-specific [f,2]		Committed Disbursed	ODA OOF Other [g]	Grant Concessional loan Non-concessional loan Equity Other [g]	Mitigation Adaptation Cross-cutting [h] Other [g]	Energy Transport Industry Agriculture Forestry Water and sanitation Cross-cutting Other [g]	Recipient country or region	
	DKK	USD							
Afghanistan	25.260.303	4.000.048	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Afghanistan	CRS 2014001300aa
Africa South of Sahara	2.388.475	378.222	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Africa South of Sahara	CRS 2011001498
Asia	2.000.000	316.706	disbursed	ODA	grant	Adaptation	Environmental policy and administrative management / 41010	Asia	CRS 2015001246
Bangladesh	314	50	disbursed	ODA	grant	Adaptation	Disaster prevention and preparedness / 74010	Bangladesh	CRS 2010001415
Bangladesh	51.724	8.191	disbursed	ODA	grant	Adaptation	Basic drinking water supply and basic sanitation / 14030	Bangladesh	CRS 2010001680
Bangladesh	500.000	79.177	disbursed	ODA	grant	Adaptation	Water supply and sanitation - large systems / 14020	Bangladesh	CRS 2017001193
Bangladesh	3.498.711	554.032	disbursed	ODA	grant	Adaptation	Rural development / 43040	Bangladesh	CRS 2017001302ab
Bangladesh	1.858.910	294.364	disbursed	ODA	grant	Cross-cutting	Rural development / 43040	Bangladesh	CRS 2016001117aa
Bangladesh	1.107.359	175.354	disbursed	ODA	grant	Cross-cutting	Rural development / 43040	Bangladesh	CRS 2016001117ab
Bolivia	2.160.406	342.107	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Bolivia	CRS 2013001378aa
Bolivia	6.802.108	1.077.135	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Bolivia	CRS 2013001378ab
Bolivia	2.189.313	346.685	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Bolivia	CRS 2013001378ac
Bolivia	15.492	2.453	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Bolivia	CRS 2013001378ad
Bolivia	518.351	82.083	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bolivia	CRS 2013001340aa
Bolivia	889.917	140.921	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bolivia	CRS 2013001340ab
Bolivia	7.720.743	1.222.604	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bolivia	CRS 2013001340ac
Bolivia	484.256	76.683	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bolivia	CRS 2013001340ad
Bolivia	307.843	48.748	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bolivia	CRS 2013001340ae
Bolivia	14.000	2.217	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Bolivia	CRS 2013001340af
Bolivia	1.494.152	236.604	disbursed	ODA	grant	Mitigation	Wind energy / 23240	Bolivia	CRS 2016001201aa
Bolivia	102.279.153	16.196.224	disbursed	ODA	grant	Mitigation	Wind energy / 23240	Bolivia	CRS 2016001201ab
Bolivia	16.950	2.684	disbursed	ODA	grant	Cross-cutting	Sectors not specified / 99810	Bolivia	CRS 2016001175
Burkina Faso	2.855.579	452.190	disbursed	ODA	grant	Adaptation	Agricultural development / 31120	Burkina Faso	CRS 2012001507aa
Burkina Faso	8.642.365	1.368.546	disbursed	ODA	grant	Adaptation	Agricultural development / 31120	Burkina Faso	CRS 2012001507ab
Burkina Faso	1.871.683	296.387	disbursed	ODA	grant	Adaptation	Agricultural development / 31120	Burkina Faso	CRS 2012001508
Burkina Faso	636.612	100.810	disbursed	ODA	grant	Adaptation	Business support services and institutions / 25010	Burkina Faso	CRS 2017001259
Burkina Faso	46.130.088	7.304.844	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Burkina Faso	CRS 2015001306aa
Burkina Faso	5.190.000	821.853	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Burkina Faso	CRS 2015001306ab
China	1.034.545	163.823	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	China	CRS 2016001142
China	446.529	70.709	disbursed	ODA	grant	Mitigation	Water transport / 21040	China	CRS 2017001123
China	1.000.000	158.353	disbursed	ODA	grant	Cross-cutting	Energy policy and administrative management / 23110	China	CRS 2017001325
China	659.640	104.456	disbursed	ODA	grant	Adaptation	Urban development and management / 43030	China	CRS 2018001149
Ethiopia	1.333.500	211.164	disbursed	ODA	grant	Cross-cutting	Agro-industries / 32161	Ethiopia	CRS 2016001216
Ethiopia	1.040.084	164.701	disbursed	ODA	grant	Mitigation	Wind energy / 23240	Ethiopia	CRS 2016001197ab
Ethiopia	750.000	118.765	disbursed	ODA	grant	Mitigation	Wind energy / 23240	Ethiopia	CRS 2018001099
Ethiopia	788.485	124.859	disbursed	ODA	grant	Adaptation	Information and communication technology (ICT) / 22040	Ethiopia	CRS 2018001129
Georgia	30.000.000	4.750.594	disbursed	ODA	grant	Mitigation	Energy conservation and demand-side efficiency / 23183	Georgia	CRS 2018001130
Ghana	372.066	58.918	disbursed	ODA	grant	Adaptation	Agricultural development / 31120	Ghana	CRS 2012001384
Ghana	28.071	4.445	disbursed	ODA	grant	Cross-cutting	Education facilities and training / 11120	Ghana	CRS 2012001203aa
Ghana	245.112	38.814	disbursed	ODA	grant	Cross-cutting	Education facilities and training / 11120	Ghana	CRS 2012001203ab
India	1.039.220	164.564	disbursed	ODA	grant	Adaptation	Water supply - large systems / 14021	India	CRS 2018001115
India	143.339	22.698	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	India	CRS 2018001224
Indonesia	36.568.526	5.790.740	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Indonesia	CRS 2012001357
Indonesia	4.085.511	646.953	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	Indonesia	CRS 2012001359aa
Indonesia	832.002	131.750	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	Indonesia	CRS 2012001359ab
Indonesia	525.427	83.203	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Indonesia	CRS 2012001386
Indonesia	649.469	102.845	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Indonesia	CRS 2012001371
Indonesia	161.896	25.637	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Indonesia	CRS 2012001387aa
Indonesia	1.038.396	164.433	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Indonesia	CRS 2012001387ab
Indonesia	18.876	2.989	disbursed	ODA	grant	Mitigation	Small and medium-sized enterprises (SME) development / 32130	Indonesia	CRS 2014001199

Table 7(b)

Provision of public financial support: contribution through bilateral, regional and other channels in 20XX-3 = 2018 [a]

Recipient country/ region/project/programme [b]	Total amount		Status [c,3]	Funding source [4]	Financial instrument [5]	Type of support [6]	Sector [d,7]	Recipient country/ region/project/programme [b]	Additional Information [e]
Project/programme/activity	Climate-specific [f,2]		Committed Disbursed	ODA OOF Other [g]	Grant Concessional loan Non-concessional loan Equity Other [g]	Mitigation Adaptation Cross-cutting [h] Other [g]	Energy Transport Industry Agriculture Forestry Water and sanitation Cross-cutting Other [g]	Recipient country or region	
	DKK	USD							
Indonesia	105.325	16.679	disbursed	ODA	grant	Mitigation	Small and medium-sized enterprises (SME) development / 32130	Indonesia	CRS 2013001352
Indonesia	2.782.501	440.618	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	Indonesia	CRS 2015001286
Indonesia	548.229	86.814	disbursed	ODA	grant	Mitigation	Waste management / disposal / 14050	Indonesia	CRS 2018001156
Interregional	2.000.000	316.706	disbursed	ODA	grant	Cross-cutting	Research/scientific institutions / 43082	Interregional	CRS 2012001278
Interregional	9.500.000	1.504.355	disbursed	ODA	grant	Cross-cutting	Research/scientific institutions / 43082	Interregional	CRS 2014001185
Interregional	6.250.000	989.707	disbursed	ODA	grant	Cross-cutting	Research/scientific institutions / 43082	Interregional	CRS 2014001184
Interregional	1.156.620	183.154	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Interregional	CRS 2014001384
Interregional	2.500.000	395.883	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2014001234
Interregional	5.000.000	791.766	disbursed	ODA	grant	Mitigation	Multisector aid / 43010	Interregional	CRS 2018001293
Interregional	10.500.000	1.662.708	disbursed	ODA	grant	Mitigation	Business support services and institutions / 25010	Interregional	CRS 2016001144
Interregional	7.178	1.137	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2015001064
Interregional	20.000.000	3.167.063	disbursed	ODA	grant	Cross-cutting	Agricultural financial services / 31193	Interregional	CRS 2015001256
Interregional	15.500.000	2.454.473	disbursed	ODA	grant	Cross-cutting	Research/scientific institutions / 43082	Interregional	CRS 2017001318
Interregional	1.993.285	315.643	disbursed	ODA	grant	Mitigation	Wind energy / 23240	Interregional	CRS 2016001213
Interregional	550.000	87.094	disbursed	ODA	grant	Adaptation	Agro-industries / 32161	Interregional	CRS 2016001204
Interregional	2.500.000	395.883	disbursed	ODA	grant	Adaptation	Civilian peace-building, conflict prevention and resolution / 15220	Interregional	CRS 2018001220
Interregional	15.000.000	2.375.297	disbursed	ODA	grant	Mitigation	Sectors not specified / 99810	Interregional	CRS 2018001008
Interregional	27.000.000	4.275.534	disbursed	ODA	grant	Adaptation	Social/ welfare services / 16010	Interregional	CRS 2018001016
Interregional	54.000.000	8.551.069	disbursed	ODA	grant	Adaptation	Multisector aid for basic social services / 16050	Interregional	CRS 2018001019
Interregional	34.000.000	5.384.006	disbursed	ODA	grant	Adaptation	Sectors not specified / 99810	Interregional	CRS 2018001084
Interregional	64.000.000	10.134.600	disbursed	ODA	grant	Adaptation	Material relief assistance and services / 72010	Interregional	CRS 2018001085
Interregional	68.700.000	10.878.860	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	Interregional	CRS 2017001134aa
Interregional	4.913.097	778.004	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	Interregional	CRS 2017001134ab
Interregional	7.500.000	1.187.648	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2017001336
Interregional	99.500.000	15.756.136	disbursed	ODA	grant	Mitigation	Energy generation, renewable sources – multiple technologies / 23210	Interregional	CRS 2017001182
Interregional	20.600.000	3.262.074	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2017001335
Interregional	1.935.395	306.476	disbursed	ODA	grant	Adaptation	Research/scientific institutions / 43082	Interregional	CRS 2018001073 Rows 82-84 detail the climate-relevant portions within the pooled disbursement "FFU Windows 1 and 2 2018" (CRS ID: 2018001073). See sheet "FFU Windows 1 and 2 2018" for a breakdown of the pooled provision.
Interregional	314.817	49.852	disbursed	ODA	grant	Mitigation	Research/scientific institutions / 43082	Interregional	CRS 2018001073 Rows 82-84 detail the climate-relevant portions within the pooled disbursement "FFU Windows 1 and 2 2018" (CRS ID: 2018001073). See sheet "FFU Windows 1 and 2 2018" for a breakdown of the pooled provision.
Interregional	79.026	12.514	disbursed	ODA	grant	Cross-cutting	Research/scientific institutions / 43082	Interregional	CRS 2018001073 Rows 82-84 detail the climate-relevant portions within the pooled disbursement "FFU Windows 1 and 2 2018" (CRS ID: 2018001073). See sheet "FFU Windows 1 and 2 2018" for a breakdown of the pooled provision.
Interregional	63.001	9.976	disbursed	ODA	grant	Cross-cutting	Sectors not specified / 99810	Interregional	CRS 2017001253
Interregional	2.852.803	451.750	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Interregional	CRS 2018001106aa
Interregional	1.146.245	181.512	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Interregional	CRS 2018001106ab
Interregional	500.000	79.177	disbursed	ODA	grant	Cross-cutting	Administrative costs (non-sector allocable) / 91010	Interregional	CRS 2018001332
Interregional	221.264	35.038	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2017001055
Interregional	500.000	79.177	disbursed	ODA	grant	Cross-cutting	Democratic participation and civil society / 15150	Interregional	CRS 2018001095
Interregional	10.000.000	1.583.531	disbursed	ODA	grant	Cross-cutting	Democratic participation and civil society / 15150	Interregional	CRS 2018001253
Interregional	3.500.000	554.236	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2018001052
Interregional	669.000	105.938	disbursed	ODA	grant	Adaptation	Sectors not specified / 99810	Interregional	CRS 2018001194
Interregional	9.000.000	1.425.178	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Interregional	CRS 2018001289
Interregional	2.000.000	316.706	disbursed	ODA	grant	Cross-cutting	Multisector aid / 43010	Interregional	CRS 2018001300
Interregional	9.533.385	1.509.641	disbursed	ODA	grant	Adaptation	Sectors not specified / 99810	Interregional	CRS 2018001028 Rows 96-98 detail the climate-relevant portions within the pooled disbursement "CISU Pool Schemes 2018" (CRS ID: 2018001028). See sheet "CISU Pool Schemes 2015-2018" for a breakdown of the pooled provision.
Interregional	12.547.771	1.986.979	disbursed	ODA	grant	Mitigation	Sectors not specified / 99810	Interregional	CRS 2018001028 Rows 96-98 detail the climate-relevant portions within the pooled disbursement "CISU Pool Schemes 2018" (CRS ID: 2018001028). See sheet "CISU Pool Schemes 2015-2018" for a breakdown of the pooled provision.
Interregional	717.191	113.569	disbursed	ODA	grant	Cross-cutting	Sectors not specified / 99810	Interregional	CRS 2018001028 Rows 96-98 detail the climate-relevant portions within the pooled disbursement "CISU Pool Schemes 2018" (CRS ID: 2018001028). See sheet "CISU Pool Schemes 2015-2018" for a breakdown of the pooled provision.
Kenya	893.821	141.539	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Kenya	CRS 2009002460
Kenya	139.191	22.041	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Kenya	CRS 2009002472
Kenya	76.881	12.174	disbursed	ODA	grant	Mitigation	Sectors not specified / 99810	Kenya	CRS 2009002474
Kenya	250.200	39.620	disbursed	ODA	grant	Cross-cutting	Sectors not specified / 99810	Kenya	CRS 2014001385
Kenya	16.673.787	2.640.346	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Kenya	CRS 2015001217aa
Kenya	5.112.070	809.512	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Kenya	CRS 2015001217ab
Kenya	19.601.207	3.103.912	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Kenya	CRS 2015001217ac

Table 7(b)

Provision of public financial support: contribution through bilateral, regional and other channels in 20XX-3 – 2018 [a]

Recipient country/ region/project/programme [b]	Total amount		Status [c,3]	Funding source [4]	Financial instrument [5]	Type of support [6]	Sector [d,7]	Recipient country/ region/project/programme [b]	Additional Information [e]
Project/programme/activity	Climate-specific [f,2]		Committed Disbursed	ODA OOF Other [g]	Grant Concessional loan Non-concessional loan Equity Other [g]	Mitigation Adaptation Cross-cutting [h] Other [g]	Energy Transport Industry Agriculture Forestry Water and sanitation Cross-cutting Other [g]	Recipient country or region	
	DKK	USD							
Kenya	1.195.203	189.264	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Kenya	CRS 2015001217ad
Kenya	8.249.820	1.306.385	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Kenya	CRS 2015001218ab
Kenya	275.472	43.622	disbursed	ODA	grant	Mitigation	Industrial development / 32120	Kenya	CRS 2016001141
Kenya	230.390	36.483	disbursed	ODA	grant	Adaptation	Food crop production / 31161	Kenya	CRS 2016001214
Kenya	74.767	11.840	disbursed	ODA	grant	Adaptation	Basic drinking water supply and basic sanitation / 14030	Kenya	CRS 2017001258aa
Kenya	253.138	40.085	disbursed	ODA	grant	Adaptation	Basic drinking water supply and basic sanitation / 14030	Kenya	CRS 2017001258ab
Mali	19.744.269	3.126.567	disbursed	ODA	grant	Cross-cutting	Business support services and institutions / 25010	Mali	CRS 2013001256
Mali	5.006.035	792.721	disbursed	ODA	grant	Cross-cutting	Business support services and institutions / 25010	Mali	CRS 2013001257
Mali	1.436.732	227.511	disbursed	ODA	grant	Cross-cutting	Business support services and institutions / 25010	Mali	CRS 2013001258
Mali	295.105	46.731	disbursed	ODA	grant	Adaptation	Water supply and sanitation - large systems / 14020	Mali	CRS 2015001112
Mali	375.210	59.416	disbursed	ODA	grant	Adaptation	Human rights / 15160	Mali	CRS 2017001246
Mexico	996.825	157.850	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Mexico	CRS 2013001337
Mozambique	432.752	68.528	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Mozambique	CRS 2010001416
Mozambique	1.916.327	303.456	disbursed	ODA	grant	Cross-cutting	Environmental policy and administrative management / 41010	Mozambique	CRS 2010001461
Mozambique	1.682.643	266.452	disbursed	ODA	grant	Adaptation	Environmental policy and administrative management / 41010	Mozambique	CRS 2016001184
Myanmar (Burma)	97.098	15.376	disbursed	ODA	grant	Adaptation	Fishery development / 31320	Myanmar (Burma)	CRS 2016001157
Myanmar (Burma)	11.216.595	1.776.183	disbursed	ODA	grant	Mitigation	Business support services and institutions / 25010	Myanmar (Burma)	CRS 2016001190aa
Myanmar (Burma)	3.790.000	600.158	disbursed	ODA	grant	Mitigation	Business support services and institutions / 25010	Myanmar (Burma)	CRS 2016001190ab
Myanmar (Burma)	1.263.933	200.148	disbursed	ODA	grant	Mitigation	Business support services and institutions / 25010	Myanmar (Burma)	CRS 2016001190ac
Myanmar (Burma)	7.901.623	1.251.247	disbursed	ODA	grant	Adaptation	Forestry development / 31220	Myanmar (Burma)	CRS 2017001278
Nepal	131.968	20.897	disbursed	ODA	grant	Cross-cutting	Energy policy and administrative management / 23110	Nepal	CRS 2012001363
Niger	11.439.722	1.811.516	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Niger	CRS 2014001138aa
North and Central America	1.083.334	171.549	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	North and Central America	CRS 2005001445
Somalia	148.084	23.450	disbursed	ODA	grant	Adaptation	Urban development and management / 43030	Somalia	CRS 2017001304ab
South Africa	1.689.115	267.477	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	South Africa	CRS 2012001288
South Africa	1.371.934	217.250	disbursed	ODA	grant	Adaptation	Water sector policy and administrative management / 14010	South Africa	CRS 2016001102
South Africa	624.981	98.968	disbursed	ODA	grant	Adaptation	Small and medium-sized enterprises (SME) development / 32130	South Africa	CRS 2016001278
South Africa	530.657	84.031	disbursed	ODA	grant	Cross-cutting	Urban development and management / 43030	South Africa	CRS 2018001098
South Sudan	643.844	101.955	disbursed	ODA	grant	Adaptation	Civilian peace-building, conflict prevention and resolution / 15220	South Sudan	CRS 2016001221ab
Tanzania	26.724.962	4.231.981	disbursed	ODA	grant	Mitigation	Business support services and institutions / 25010	Tanzania	CRS 2013001365
Tanzania	792.682	125.524	disbursed	ODA	grant	Mitigation	Business support services and institutions / 25010	Tanzania	CRS 2017001260
Turkey	2.065.885	327.139	disbursed	ODA	grant	Mitigation	Energy conservation and demand-side efficiency / 23183	Turkey	CRS 2017001111
Uganda	3.800.611	601.839	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Uganda	CRS 2013001353
Uganda	1.784.385	282.563	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Uganda	CRS 2013001354
Uganda	425.117	67.319	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Uganda	CRS 2013001355aa
Uganda	62.500	9.897	disbursed	ODA	grant	Cross-cutting	Water sector policy and administrative management / 14010	Uganda	CRS 2013001355ab
Uganda	51.617.189	8.173.743	disbursed	ODA	grant	Mitigation	Agricultural development / 31120	Uganda	CRS 2014001147
Uganda	9.477.636	1.500.813	disbursed	ODA	grant	Cross-cutting	Rural development / 43040	Uganda	CRS 2014001149aa
Uganda	4.960.516	785.513	disbursed	ODA	grant	Cross-cutting	Rural development / 43040	Uganda	CRS 2014001149ab
Uganda	3.939.087	623.767	disbursed	ODA	grant	Cross-cutting	Rural development / 43040	Uganda	CRS 2014001149ac
Uganda	2.152.665	340.881	disbursed	ODA	grant	Cross-cutting	Agricultural development / 31120	Uganda	CRS 2014001151
Uganda	28.284	4.479	disbursed	ODA	grant	Mitigation	Agricultural development / 31120	Uganda	CRS 2009002325
Uganda	429.552	68.021	disbursed	ODA	grant	Adaptation	Water sector policy and administrative management / 14010	Uganda	CRS 2017001221
Ukraine	635.966	100.707	disbursed	ODA	grant	Mitigation	Energy generation, renewable sources – multiple technologies / 23210	Ukraine	CRS 2014001401
Ukraine	8.130.366	1.287.469	disbursed	ODA	grant	Mitigation	Energy policy and administrative management / 23110	Ukraine	CRS 2018001066
Vietnam	882.226	139.703	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Vietnam	CRS 2012001287aa
Vietnam	58.003	9.185	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Vietnam	CRS 2012001287ab
Vietnam	12.683	2.008	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Vietnam	CRS 2008001365
Vietnam	237.635	37.630	disbursed	ODA	grant	Mitigation	Environmental policy and administrative management / 41010	Vietnam	CRS 2008001367

Note: Explanation of numerical footnotes is provided in the documentation box after tables 7, 7(a) and 7(b).

Abbreviations: ODA = official development assistance, OOF = other official flows; USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 20XX-3 and 20XX-2, where 20XX is the reporting year.

[b] Parties should report, to the extent possible, on details contained in this table.

[b] Parties should explain, in their biennial reports, the methodologies used to specify the funds as disbursed and committed. Parties will provide the information for as many status categories as appropriate in the following order of priority: disbursed and committed.

[d] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under "Other".

[e] Parties should report, as appropriate, on project details and the implementing agency.

[f] Parties should explain in their biennial reports how they define funds as being climate-specific.

[g] Please specify.

[h] This refers to funding for activities which are cross-cutting across mitigation and adaptation.

Exchange rate 2018: USD 1 = DKK 6,315

Source: OECD (https://data.oecd.org/conversion/exchange-rates.htm)

Documentation box:

1: Core/general

Only core funding to the multilateral institutions listed on the most recent OECD-DAC list of June 2019 (http://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/annex2.htm) is reported under the "Core/general" heading. Core funding provided to listed multilateral institutions has been identified based on information on individual grants in CRS++ (Type of Aid set as "B02 - Core contributions to multilateral institutions").

In addition to the institutions listed in the CTF, core funding provided for other multilateral institutions with climate related project portfolios have been included, specifically support for: the Multilateral Fund for the Implementation of the Montreal Protocol, United Nations Industrial Development Organisation, United Nations Convention to Combat Desertification, the Asian Infrastructure Investment Bank, the OECD Development Centre, the Food and Agriculture Organisation, and World Food Programme. The figures reported are 100% of the total amounts of grants to multilateral institutions. Denmark is not providing any estimates concerning the climate-related share for core funding to the multilateral institutions. This also applies to the funding to GEF Trust Fund. It is expected that the European Commission will option co-efficient from OECD to calculated imputed shares of these core contributions.

The reported funding for AfDB includes funding for AFDF and the reported funding for ASDB includes funding for AsDF. Core funding to the World Bank has been divided into support provided to specific institutions, including the International Development Association and International Bank for Reconstruction and Development and the Multilateral Debt Relief Initiative.

2: Climate specific

The core/general and climate-specific data are mutually exclusive. Thus, what is reported as climate specific is not included in the core/general. Likewise, the categories “mitigation”, “adaptation”, “cross-cutting” and “other” are mutually exclusive. Mitigation and adaptation support are defined in the MMR in line with the OECD DAC definitions. Cross-cutting activities are those that involve both mitigation and adaptation components. Total amount for climate-specific contributions through bilateral, regional and other channels is here given as 50% of contributions to projects with a Rio-marker 1 (significant) for adaptation and/or mitigation. 100% is given for projects with Rio-marker 2 (principal). In cases where mitigation is the principal objective and adaptation is a significant objective the project and 100% of its related funding were attributed to mitigation (and vice versa if adaptation is seen to be the principal objective while mitigation is a significant objective). Thus, Denmark reports the contribution of such projects as 100% funding for the principal objective and 0% funding for the significant objective, as the total climate-specific funding cannot exceed 100%.

Denmark separates climate-specific multilateral funding not provided as core funding (“Multi-bi” funding) from the climate-specific funding from bilateral, regional and other channels. This separation is based on OECD DAC channel codes and the multilateral funds are reported in Table 7(a). Multilateral funding is defined as all funding with channel codes "40000 - Multilateral Organisations".

Denmark reports core funding for the institutions listed as climate-specific in table 7(a) as climate-specific multilateral funding. These institutions are the Least Developed Countries Fund, Special Climate Change Fund, Adaptation Fund, Green Climate Fund, UNFCCC Trust Fund for Supplementary Activities, and Other multilateral climate change funds (including the Multilateral Fund for the Implementation of the Montreal Protocol and the Strategic Climate Fund).

In addition, core/general commitments and disbursements provided to: the World Meteorological Organisation, Intergovernmental Panel on Climate Change, Global Green Growth Institute and International Renewable Energy Agency, have been considered as climate-specific, based on assessments of these contributions. Following this, these projects had their climate objective ("mitigation", "adaptation" or "cross-cutting") assigned with regards to existing Rio marker allocations, or after a specific assessment of the provision if no Rio markers were assigned.

Climate-specific funding to a number of non-UN institutions have been included in Table 7(a) under Multilateral financial institutions, including regional development banks "7. Other". These are collectively identified as "Other (Other multilateral institution)", and include support provided to: the African Union, Intergovernmental Authority on Development, International Energy Agency, Mekong River Commission, Organisation for Economic Cooperation and Development, the Global Green Growth Institute, and the International Renewable Energy Agency.

Denmark separates climate-specific bilateral and multilateral funding based on OECD DAC channel codes. The multilateral funds are reported in CTF Table 7(a) and the bilateral funds are reported in CTF Table 7(b).

3: Status

MULTILATERAL: The figures refer to actual disbursements. BILATERAL: The figures refer to actual disbursements.

4: Funding source

The 2017 and 2018 reporting relates to ODA only.

5: Financial instrument

The 2017 and 2018 reporting relates grants, including interest grants and capital subscriptions to multilateral institutions, as well as equity acquisitions.

Denmark's Fourth Biennial Report is limited to include figures on grants and equity. Finance identified by the CRS++ category "Type of Finance" as "110 - Standard grant", "210 - Interest subsidy", and "310 - Capital subscription on deposit basis" have been classified as grants, while finance identified as "510 - Common equity" have been classified as equity.

6: Type of support

The types of support that can be reported in table 7(a) and 7(b) are “Mitigation”, “adaptation”, “cross-cutting” and “other”. Here the Rio-markers are used. Contributions relating to programmes, projects and activities assigned a positive Rio-marker for either mitigation or adaptation are reported under the relevant heading. Mitigation seeks to limit climate change by reducing the emissions of GHGs or by enhancing sink opportunities. Adaptation aims to lessen the adverse impacts of climate change. Cross-cutting is used for funding for activities which are cross-cutting across mitigation and adaptation. Contributions relating to programmes, projects and activities assigned a positive Rio-marker for both mitigation and adaptation are reported as cross-cutting.

For multilateral institutions receiving both core funding and climate-specific funding, the type of support refers only to the climate-specific part of the funding.

For multilateral institutions receiving several different types of support, the amounts have been specified on individual lines in Table 7(a).

7: Sector

All contribution has been assigned a purpose code as defined by DAC-DCD. The purpose codes reported here follow the list of CRS purpose codes taking effect in 2018 reporting on 2017 flows. The sectors reported are the sectors where each purpose code belong.

For multilateral institutions receiving both core funding and climate-specific funding, the sector refers to the climate-specific funding only. If only one sector is provided it refers to the climate-specific funding.

For multilateral institutions receiving support for more than one sector, the percentage attributed to each sector is specified in Table 7(a).

Each Party shall provide an indication of what new and additional financial resources they have provided, and clarify how they have determined that such resources are new and additional. Please provide this information in relation to table 7(a) and table 7(b).

According to the reporting requirements, Annex II parties shall clarify how they have determined if resources are new and additional. For the purpose of this report, newly committed (for reporting on commitments) or disbursed (for reporting of disbursements) finance for climate change adaptation or mitigation activities within the reporting period and was not reported to UNFCCC in the previous report are considered new and additional.
Denmark sees the achievement of climate change and broader sustainable development goals as closely linked and strongly interdependent, and seeks to identify and support activities in developing countries that address multiple objectives as identified in partnership with these countries.

TABLE 8: PROVISION OF TECHNOLOGY DEVELOPMENT AND TRANSFER SUPPORT

Table 8

Provision of technology development and transfer support [a,b]

Recipient country and/or region	Targeted area	Measures and activities related to technology transfer	Sector [c]	Source of the funding for technology transfer	Activities undertaken by	Status	Additional information [d]
	Mitigation		Energy	Private	Private	Implemented	
	Adaptation		Transport	Public	Public	Planned	
	Mitigation and adaptation		Industry	Private and public	Private and public		
			Agriculture				
			Water and sanitation				
			Other				
Bangladesh	Adaptaion	The contribution through Danida to the "Climate Resilient Rural Infrastructure Project II" engagement seeks to target high poverty areas vulnerable to tidal surge flooding, not covered by other similar projects. The primary objective, relevant to technology transfer, is to develop climate resilient infrastructure including cyclone shelters, social service institutions, markets, canals for storm water drainage and fish landing stations. Alongside these hard technology provisions a portion of the grant is provided to local government Union Parashads (UPs) to plan and implement climate interventions.	Other (Rural development)	Public	Public	Implemented	This contribution through Danida is to the "Climate Resilient Rural Infrastructure Project II" engagement (DKK million 10) of the "The Climate Adaptation and Resilience Engagaments (CARE)" programme, part of the "Bangladesh Country Programme 2016-2021".
Bangladesh	Mitigation and adaptation	The "Agriculture and Food Security Project in the Chittagong Hill Tracts (AFSP III)" engagement provides an example of both soft and hard technology transfer. Through the consideration of inclusive agricultural growth and employment in rural areas through better skills, organisation and market access. The project utilises Farmer Field Schools (FFS), in an Integrated Farm Management (IFM) approach to improve agricultural productivity and off-farm income through technology, methodological and practice transfers. The project seeks to enhance and develop the endogenous technologies and capacities already in use by farmers through its stated objectives of: increased uptake of climate resilient technology, increased use of decentralised agricultural extension services and increased yields and productivity. The project planning integrates experience and results from past cooperation. Danida has worked with agricultural extension in Bangladesh for over two decades. In the past decade important results have been achieved by reaching out to some three million people in half a million households. An evaluation carried out in 2011 concluded that FFS supported by Danida have been an effective way to increase productivity, income and food security by spreading knowledge and technology. Yearly incomes have increased by 38% for participating households. Gender data also showed positive impacts. It was found that the rate of female participation was high and in case of Barisal and Noakhali it reached 61 % and 72 % respectively. Furthermore, an independent evaluation of AFSP III is underway to analyse the outcomes and impact of theAgriculture and Food Security Project in terms of results, based on the original theories of change, logical frameworks and results frameworks and with a particular emphasis on the adoption of the farming techniques and practices as well as marketing knowledge promoted through the components. The evaluation will result in recommendations for the future as inputs for the design of a new country programme for Danida in Bangladesh (from 2021-26).	Agricultural development	Public	Public	Implemented	This contribution is through the UNDP to the "Agriculture and Food Security Project in the Chittagong Hill Tracts (AFSP III)" engagement of the Thematic Programme "Agricultural Growth and Employment Programme", as part of the Bangladesh Country Programme 2016-2021.

Table 8

Provision of technology development and transfer support [a,b]

Recipient country and/or region	Targeted area	Measures and activities related to technology transfer	Sector [c]	Source of the funding for technology transfer	Activities undertaken by	Status	Additional information [d]
	Mitigation		Energy	Private	Private	Implemented	
	Adaptation		Transport	Public	Public	Planned	
	Mitigation and adaptation		Industry	Private and public	Private and public		
			Agriculture				
			Water and sanitation				
			Other				
Bangladesh	Adaptation	The "Climate Resilient WaSH Support for Rohingya Refugees and Vulnerable Local Communities in Cox's Bazar District" engagement provides an example of both soft and hard technology transfer. The activity supports the autonomous financial organisation "Hygiene, Sanitation and Water Supply" (HYSAWA), whose mandate is to increase resilience to climate impacts in vulnerable communities, and to imrove access to climate resilient water and sanitation facilities. Concretely, the project will invest in climate adapted water, sanitation and hygiene infrastructure including deep wells and latrines. This transfer of hard technology is supplemented by support targeting capacity building and training related to sanitation and hygiene. The project seeks to enhance and develop the endogenous technologies and capacities associated with water, sanitation and hygiene infrastructure through the installation and rehabilliation of 2,500 climate adaptive water points, in an approach that is implemented by local government institutions. Danida has previously worked with HYSAWA in Bangladesh. The activity will therefore build on past experience and learnings to adapt proven models of engagement.	Other (Rural development)	Public	Public	Implemented	This contribution is provided through "Hygiene, Sanitation and Water Supply" (HYSAWA) to the "The "Climate Resilient WaSH Support for Rohingya Refugees and Vulnerable Local Communities in Cox's Bazar District"" engagement of the Thematic Programme "Climate Resilience and Sustainable Energy Programme", as part of the Bangladesh Country Programme 2016-2021.
Bangladesh	Mitigation	The "Partnership for Cleaner Textile II" engagement provides an example of soft technology transfer. The objective of the development cooperation among the parties is to Deepen Cleaner Production (CP) interventions and enhance competitiveness of the sector through a programmatic approach across the entire value chain of the textile sector of Bangladesh including textile mills, wet dyeing and finishing units and garment factories. Concretely, the project seeks to reduce sectoral emissions through increased resource efficiency, achieved through the catalyzation of resource efficient technology uptake and the provision of technological and financial information.The project inherently seeks to enhance and develop the endogenous technologies and capacities associated with existing textile infrastructure through recommended procedures/firm-level policies/practices/standards. Danida has previously worked with HYSAWA in Bangladesh. The activity will therefore build on past experience and learnings to adapt proven models of engagement. By partnering with the IFC in the implementation, the project actively seeks to engage the private sector operative in Bangladesh. The mitigation effect of the activity is stated to reduce GHG emissions by 241,160 Tonnes CO2eq per year.	Energy generation, renewable sources - multiple technologies	Private and public	Private and public	Implemented	This contribution is through the IFC to the "Partnership for Cleaner Textile II" engagement of the Thematic Programme "Climate Resilience and Sustainable Energy Programme", as part of the Bangladesh Country Programme 2016-2021.
Global	Mitigation and adaptation	The Strategic Sector Cooperation Initiative aims at mobilizing the competencies of Danish public authorities directly in long-term strategic cooperation with counterpart authorities in developing and growth economies. Through this cooperation the Danish authorities promote Danish societal solutions that have been developed through partnerships between the public and private sector – for example through soft technology transfer and capacity building on green economy, urbanisation, agriculture and climate change mitigation and adaptation. Strategic Sector Cooperation focuses on concrete development challenges and responds to current needs of the partner country. A primary aim of the initiative is to contribute to inclusive, sustainable growth and development in partner countries by supporting conducive framework conditions for the fulfilment of the SDGs. Relevant to climate change adaptation, the SSC project "Sustainable Urban Water management/Strategic Sector Cooperation project in Udaipur, India" seeks to help strengthen water management in the City of Udaipur. The project will focus on capacity building and exchange of knowledge through concrete cooperation on planning an implementation of river and lake restoration, integrated water cycle management, improved sewage water treatment plants and efficiency of the provision of drinking water. With the overall objective of the project being to contribute to improved management of the water resources through introduction of integrated planning approaches and demonstration of new technologies. Århus municipality and Århus Water will contribute with learned expertise in integrated planning processes, protection of surface- and groundwater resources and improved storm water management. SSC initiatives focused on mitigation look to disseminate knowledge on the development of diverse and integrated renewable energy sectors, through knowledge and expertise transfer. For example, in India through the development of a Danish-Indian knowledge center for wind energy development in the country. And in Turkey utilising Danish experiences and lessons learned to support the Turkish government's low carbon transition objectives using waste heat from power plants and industry, geothermal energy, waste-to-heat methods and an off-shore wind energy roadmap.	Energy Other (Energy conservation and demand-side efficiency) Other (Urban development and management)	Public	Public	Implemented	Climate relevant Strategic Sector Cooperation Initiatvies from 2017 to 2018 include: - "SSC on Sustainable Urban Development in Beijing" (DKK million 8.5) - "Energy Sector, India Off shore Wind Power" (DKK million 8.5), - "Sustainable Urban Water management/SSC project in Udaipur, India" (DKK million 8) - "Offshore wind and efficient and low carbon heating, Turkey" (DKK million 3) - "SSC in Circular Economy and Waste management betw. DK and Indonesia" (DKK million 10) - "SSC on sustainable and smart cities between Aarhus and Tshwane " (DKK million 7) - "SSC between Denmark and China on maritime safety and green shipbuilding" (DKK million 3.4) - "Sino-Danish Offshore Wind Cooperation ("Quality Offshore")" (DKK million 2) - "Efficient and low carbon heating cooling, SSC DK/Turkey" (DKK million 4.3) - "SSC Preparation Project on Energy Cooperation between Denmark and India" (DKK million 1)

Table 8

Provision of technology development and transfer support [a,b]

Recipient country and/or region	Targeted area	Measures and activities related to technology transfer	Sector [c]	Source of the funding for technology transfer	Activities undertaken by	Status	Additional information [d]
	Mitigation		Energy	Private	Private	Implemented	
	Adaptation		Transport	Public	Public	Planned	
	Mitigation and adaptation		Industry	Private and public	Private and public		
			Agriculture				
			Water and sanitation				
			Other				
Ethiopia	Mitigation	The "DBF Ethiopia Assela wind farm" project will result in the installation of a 100 MW wind farm, delivering on average 330 GWh of electricity a year to the national grid avoiding the release of 175,890 ton of CO2 annually. The activity also aims to improve the endogenous capacity of Ethiopian Electric Power (EEP) to operate and manage wind farms, and multiple sources of renewable energy, and actively engages private finance through a blended finance approach. The activity is in line with Ethiopian development policy. The Government of Ethiopia has a goal to become a middle-income country by 2025 based on carbon neutral growth. Developing renewable energy sources is central to this. The Government of Ethiopia wants to avoid excessive dependence on hydropower during recurrent national drought. Hence, wind energy is important (together with solar and geothermal energy). However, inadequate regulatory framework and low tariffs in the Ethiopian energy sector makes the wind sector too risky for private investors and therefore wind projects cannot be financed on commercial terms. The project will tender, and build, a 100 MW wind farm at Iteya, including a substation and connection to the national grid. Alongside the transfer of physical technology, focus is given the to the increased ability for Ethiopia to optimize inputs from different energy sources in the grid. On-going Danish support, including the participation of Danish energy authorities, aims at helping Ethiopia to overcome this challenge. EEP has some, but limited capacity to operate wind farms - solid training of 20 EEP staff members, 5 years technical assistance and spare parts from the contractor on top of the 2-year guarantee period help to mitigate these challenges. Further technical assistance will be provided to EEP during the tender and construction phase to ensure adherence to IFC standards with regards to land acquisition and compensation processes. Both examples will help to disseminate knowledge, learning and expertise from the Danish experience, as examples of soft technology transfer. The project would have significant positive impact on SDG 7 (access to energy equivalent of an estimated 500.000 households), SDG 8 (supporting economic growth and decent job creation during construction and operation of the wind mill farm as well as indirect job creation) SDG 9 (quality, reliable, sustainable and resilient infrastructure), SDG 13 (strengthening climate change mitigation and resilience) and SDG 17 (mobilising private finance and transferring of environmentally sound technologies).	Energy	Private and public	Private and public	Planned	The "DBF Ethiopia Assela wind farm" project is provided through Danida Business Finance (DBF). It aims to diversify the renewable energy portfolio in Ethiopia, currently dependent on hydro-power, by increasing energy system resilience and output in the national Ethiopian context of progress towards middle-income country classification through carbon neutral growth by 2025.
Ethiopia	Adaptation	As a platform, blueLab will provide four pillars of technology support to youth entrepreneurs relating to: (1) 3-D printing, (2) Blockchain, (3) the Internet of Things and (4) Mobile commerce. blueLab seeks to provide technical support, learning opportunities, and equipment to allow the prototyping and making of products, for start-ups in the Ethiopian agricultural sector. By incubating national start-ups the activity seeks to develop the endogenous capacity of the Ethiopian agricultural sector to sustainably develop modern practices. Concretely, the project aims at demonstrable progress toward Ethiopian agricultural transformation, climate resilience and sustainability, and improved farmer livelihoods.	Other (Information and communication technology (ICT). Computer hardware and software; internet access; IT training.)	Public	Private and public	Implemented	The "blueMoon - Agri-Tech Incubation and Innovation Lab 2018-2021" (DKK million 7)activity aims to support blueMoon's "blueLab", an Agri-Tech start-up incubator, to support the transformation of agriculture and related agri-business in Ethiopia through enhancing blueMoon's innovation reach and ability to apply a digital lens to all incubated startups in its program. The project comprises a DKK million 7 commitment.
Global	Mitigation and adaptation	The UNEP DTU Partnership (UDP) is an international research and advisory institution on energy, climate and sustainable development that has received Danish Government core funding since it was established in 1990. The UDP supports UN Environment in facilitating a shift towards cleaner and more efficient energy systems and support more climate resilient sustainable development in developing countries through internationally leading research, policy analysis and capacity development. As a UN Environment Collaborating Centre, UDP specifically supports the planning and implementation of UN Environment's Programme of Work and Medium Term Strategy. The Copenhagen Centre on Energy Efficiency, which is one of the thematic programmes within UDP, also functions as an Energy Efficiency-Hub for SEforALL. Focus in all UDPs activities is on capacity building and technology transfer, and includes; •Technology Transfer Partnerships for SDG and Climate Action •Strengthening markets and value chains for renewable energy in NDCs •Scalable and replicable models for private sector adaptation and mitigation action, and the mobilization of private finance •Transparency of NDC and SDG actions •Emissions and adaptation gap reports. Denmark has provided funding to both UNEP DTU thematic objectives: (1) "SDG 7.1. and 13: Ensure universal access to affordable, reliable, sustainable and modern energy for all and urgent action to combat climate change and its impact" (DKK million 38) and; (2) ""SDG7.3: Double the global rate of improvement in energy efficiency" (DKK million 40).	Energy	Public	Private and public	Implemented	UNEP-DTU Partnership (UDP) 2018-21 (DKK million 78)

Table 8

Provision of technology development and transfer support [a,b]

Recipient country and/or region	Targeted area	Measures and activities related to technology transfer	Sector [c]	Source of the funding for technology transfer	Activities undertaken by	Status	Additional information [d]
	Mitigation		Energy	Private	Private	Implemented	
	Adaptation		Transport	Public	Public	Planned	
	Mitigation and adaptation		Industry	Private and public	Private and public		
			Agriculture				
			Water and sanitation				
			Other				
Global	Mitigation	SEforALL seeks to enable universal access to sustainable energy, and thus the organisation as a whole targets SDG 7 (affordable clean energy), including the underlying targets of the goal concerning renewable energy and energy access and efficiency. The stated impact indicators are: (i) global population without access to electricity and clean cooking, (ii) rate of improvement of global energy intensity and (iii) rate of deployment of renewable energy. SEforALL aims to increase access to public and private finance in areas with great need for sustainable energy, and is an example Danish contribution to soft technology dissemination. The Danish contribution to SEforALL is in support of 5 interventions stated in the SEforALL Workplan for 2019 (total budget in parenthasis): (1) "Electricity for all in Africa"; (2) "Growing Big Markets for Clean Fuels"; (3) "Cooling for All"; (4) "Energizing Finance" and (5) "Gender and the People-Centered Accelerator".	Energy	Public	Private and public	Implemented	Support for SEforALL (DKK million 10)
Global	Mitigation	The strategic objectives of the activity are: to support partner countries in their efforts to achieve low-carbon development, implement the Paris Agreement on Climate Change and realise NDCs; to meet SDG7 target 7.2: by 2030; increase substantially the share of RE in the global energy mix; target 7.3 double the global rate of improvement in EE; as well as SDG13 target 13.2: Integrate climate change measures into national policies, strategies and planning. Long-term planning and solid energy scenarios are key to ensuring the right policies and investments, which can speed up the transition to renewable energy. With a mandate from 158-member countries and the EU, IRENA encourages governments to adopt enabling policies for RE investments, provides practical tools and policy advice to accelerate RE deployment and EE, and facilitates knowledge sharing and technology transfer. The project focuses on long term planning, supported by activities producing regional analysis and energy transition system dynamics. The dissemination of this research, and the learnings from it, seek to inform and increased ambitions in RE/energy transition targets.	Energy	Public	Public	Implemented	Voluntary Contribution to IRENA 2018-21 (DKK million 40)
Global	Mitigation	The objective of the Climate Investment Funds (CIF) Technical Assistance Facility is to focus on upstream policy and regulatory framework and other enabling environment activities that will further enable increased RE and EE. Through the enhancement of energy-focused policy and regulatory framework for private investments and financial sector and investment regulation increasingly conducive to financing of clean energy investment. The TA Facility will address barriers to scaling up markets for clean energy, which include: A lack of a supportive enabling environments; Real and perceived risks; Capacity constraints that limit both the supply of investable projects with appropriate risk-return characteristics; The supply of finance to realize investable projects, constraining the wider scale up of clean energy technologies. The CIF is well-placed to address these barriers. Among manyfeatures, the CIF has a long and relevant track record of funding activities focused on technical assistance, testing business models and supporting pipeline development through the MDBs in the Renewable Energy and Energy Efficiency space. The $8 Bn CIF accelerates climate action and unlocks finance in developing and middle income countries and represents an efficient channel for working with the MDBs and for increasing collaboration and alignment among MDBs. The TA Facility's focus is most similar to the CIF Clean Technology Fund (CTF), a window focused on energy, with 85 CTF projects (USD 4.6 billion in CTF funding) now reporting on results. Results as of 2017 cover: - 9.3 MtCO2e/year reduced from 30 projects and USD 1.5 billion (target: 61 MtCO2e/year) - USD 19 billion in co-financing leveraged from 59 projects with USD 3.6 billion CTF funds (target: US 47 billion) - 3.95 GW installed RE capacity from 22 projects and USD 1,5 billion (target: 25 GW) - 3.28 GWh/year energy savings from 14 projects and USD 558 million (target: 10.6 GWH/year)	Energy	Public	Private and public	Implemented	CIF Technical Assistance Facility for Clean Energy Investment Mobilization (DKK million 90)

Table 8							
Provision of technology development and transfer support [a,b]							
Recipient country and/or region	**Targeted area**	**Measures and activities related to technology transfer**	**Sector [c]**	**Source of the funding for technology transfer**	**Activities undertaken by**	**Status**	**Additional information [d]**
	Mitigation		Energy	Private	Private	Implemented	
	Adaptation		Transport	Public	Public	Planned	
	Mitigation and adaptation		Industry	Private and public	Private and public		
			Agriculture				
			Water and sanitation				
			Other				
Georgia and Ukraine	Mitigation	The main objective of the Programme is to promote commercial investments in sustainable energy through the mobilising of private capital, technologies and know-how in Ukraine and Georgia. The implementing partner for the intervention is the Investment Fund for Developing Countries (IFU). IFU will establish a Neighbourhood Energy Investment Fund (NEIF) to pursue investment opportunities in the two countries. A Project Development Facility attached to the NEIF will assist in developing possible investment projects and also support energy efficiency measures amongst companies under the IFU port folio in Ukraine and Georgia. IFU will build on its relevant experiences in Ukraine. In the energy sector, the current Danish involvement in Georgia is four engagements: Neighbourhood Energy Facility though the Danish Investment Fund for Developing Countries (IFU), Nordic Environment Finance Cooperation (NEFCO), European Bank for Reconstruction and Development (EBRD/E5P) and the Georgian Ministry of Energy/NIRAS. With a view to focussing the efforts and development managerial synergies, it is envisaged that the engagements can be narrowed down to two development engagement that cover both Ukraine and Georgia, namely: 1) Support the policy level in creating an enabling environment for private sector sustainable energy investments; 2) Facilitation of Danish investments for energy efficiency and promotion of renewable energy to meet national targets and be a catalyst for further investments (national or foreign). As the traditional energy sector is well covered by donors, the activity focuses on non-hydro renewable energy solutions and energy efficiency. Attention should be paid to opportunities for engaging the private sector, through the creation of an enabling environment to incentivise investments in both renewable energy solutions and energy efficiency as well as for tackling the energy supply shortcomings by creating a level playing field through incentivising policies.	Energy	Public	Private and public	Implemented	Neighbourhood Energy Investment Fund (NEIF)
Uganda	Mitigation and adaptation	The Northern Uganda Resilience Initiative (NURI) forms 1 of 3 engagements of the Uganda Programme on Sustainable and Inclusive Development of the Economy (UPSIDE), of the Danish Country Programme for Uganda for 2018-2022. UPSIDE is a private sector development programme the objective of which is "sustainable and inclusive economic growth". The NURI activity "Water resources management in the Upper Nile Water Management Zone" (DKK million 35) aims to improve climate change resilience in Northern Uganda through water resource management (WRM), helping to provide an enabling enviroment to small-scale farming and refugee and host communities.To achieve this the project, alongside governance capacity building activities, aims to construct or renovate the agriculture-related physical and natural water infrastructure outlined in the Ugandan Ministry for Water and Environment's micro-catchement plans. Including multi-purpose dams and retention structures, and further support to communities for preparing, implementing and monitoring maintenance plans.	Other (Water sector policy and administrative management)	Public	Private	Implemented	Northern Uganda Resilience Initiative (NURI) (DKK million 250) as part of the Uganda Programme on Sustainable and Inclusive Development of the Economy (UPSIDE), of the Danish Country Programme for Uganda for 2018-2022.
Global	Mitigation and adaptation	The objective of the partnership is to catalyze and scale-up the private sector's contribution to the United Nations Sustainable Development Goals by supporting innovative business models and new technological solutions to address climate changes, and by supporting first-of-a kind projects in markets in fragile and conflict-affected situations (FCS) to establish new models of investment and transform markets. The Strategic Partnership Agreement provides an example of Danish finance which seeks to promote private-sector engagement in soft technology transfer through business advisory services. The strategic partnership focuses on following elements: 1. In Energy, advancing energy generation, access, delivery and efficiency by supporting energy innovations, new technologies and business models, and financing that supports these innovations. 2. In Agriculture, advancing access to finance among smallholder farmers through support for new agrifinance and risk management products as well as supporting climate smart agriculture. 3. In Manufacturing, advancing the sustainability of value chains, including by mobilizing private sector investment in innovations that advance productivity and resource efficiency (i.e. use of water and energy and recycling) to address climate change. 4. In FCS, support fast growing SMEs in fragile markets, with a specific focus on helping scale up IFC's SME Ventures program. This includes macro and ecosystem development to support first-movers, build capacity of fund managers, and scale-up and build capacity of SMEs.	Other (Multisector aid)	Public	Private and public	Implemented	Strategic Partnership Agreement between the Ministry of Foreign Affairs of Denmark and the International Finance Corporation 2017-2019.

Table 8

Provision of technology development and transfer support [a,b]

Recipient country and/or region	Targeted area	Measures and activities related to technology transfer	Sector [c]	Source of the funding for technology transfer	Activities undertaken by	Status	Additional information [d]
	Mitigation		Energy	Private	Private	Implemented	
	Adaptation		Transport	Public	Public	Planned	
	Mitigation and adaptation		Industry	Private and public	Private and public		
			Agriculture				
			Water and sanitation				
			Other				
Global	Mitigation	The objective of this Danish development engagement is for the International Energy Agency (IEA) to support a core group of six of the largest developing countries' energy transition in a low-carbon, sustainable direction, aiming to achieve efficient high-impact and cost-effective improvements in energy efficiency at national and sector levels. The "Energy Efficiency in Emerging Economies, Phase II" project has a strong focus on soft technology transfer to developing country energy sectors, and a further focus on private sector engagement. Concretely, the project aims to: - Increase knowledge and use of new digital technologies and approaches for monitoring and evaluation of existing and future energy efficiency policies. - Increase knowledge and awareness of best practice policies for supporting energy efficient technologies and systems, including the use of digitalisation for policy design, implementation and evaluation. - Increase number of technical government staff trained on energy modelling including energy efficiency modelling for end-use sectors. - Increase knowledge and use of new digital technologies and approaches for data collection and analysis on energy efficiency.	Other (Environmental policy and administrative management)	Public	Private and public	Implemented	IEA's Energy Efficiency in Emerging Economies, Phase II (E4 Phase II) (DKK million 25)
Global	Mitigation	The activity "SDG Investment Fund" has the thematic objective: Contribute to the achievement of the SDGs in developing countries by enhancing development relevant, inclusive and sustainable investments in affordable and clean energy, climate, industry, food and other SDG key areas through the mobilisation of Danish and foreign public and private capital, technology and knowhow based on international standards for responsible business conduct. The activity provides an example of Danish development aid which contributes to the transfer of both hard and soft technologies, whilst promoting the engagement of the private-sector. The expected key results are: - Establishment of DKK 6 billion SDG investment fund of which 50% is provided by private institutional investors. The Fund is envisaged to promote investments of at least DKK 30 billion. - Creation of decent jobs - 30,000 direct and 30,000 – 60,000 indirect jobs - Comprehensive production of renewable energy and related reduction in greenhouse gas emission - Considerable annual tax contributions from the investment projects - Transfer of modern technology - Compliance with international standards for responsible business conduct and documentation of sustainability as a business opportunity.	Energy	Public and private	Public and private	Implemented	SDG Investment Fund
Mexico, China, Viet Nam and South Africa	Mitigation	With the prospect of creating results for the longer term and building on the existing momentum, Denmark allocated DKK 115 million from the Climate Envelope 2017 to cooperation with Mexico, China, Viet Nam and South Africa in the new 3-year programme, the DEA Energy Partnership Programme (DEPP) Phase II. The programme looks to build the capacity of the national governments with regards to renewable energy sector planning, integration and policy. Whilst also providing access to Danish renewable energy technology solutions. The intention is to assist the four countries with their transition to a low carbon economy and support them in implementation of the Paris agreement. The support is based on Denmark's long standing experience on energy transition away from a fossil fuel economy. Also, the DEPP builds on a well tested government-to-government modality of cooperation featured by: A Memorandum of Understanding outlining shared government goals for the cooperation; provision of technical advisory support including from the DEA and the Danish power system operator and offering counterparts wider access to acquaint with Danish experience, expertise and technology solutions; daily programme presences in-country through Denmark's embassy and through the posting of international Long-Term Advisors with key-partner institutions and; wider anchoring of programme objectives and results through high-level participation in programme steering and high-level policy dialogues. To programmes objectives relate to: - National and local government level policies, plans and regulation that reflect additional renewable energy and increased energy efficiency and the countries are on track to meet their GHG-targets as per their contribution to the Paris agreement. - Implementation aspects of renewable energy and energy efficiency are strengthened leading to tangible energy savings and to more efficient integration of renewable energy into power grids, hence tangible GHG-emissions reductions. - Enabling environment and framework conditions for renewable energy and energy efficiency creates a level playing field and incentives for private sector.	Energy	Public	Public	Implemented	Danish Energy Agency Energy Partnership Programme (DEPP) 2017-20 (DKK million 115)
Global	Adaptation	The activity supports the UN Environment initiative by promoting effective management of water resources (Integrated Water Resource Management (IWRM)) through helping identify and address key challenges at global, regional and national levels. Key results include: - Improving the information and knowledge on key sustainable water resource management challenges at country and basin level as a basis for action. - New tools and technologies such as knowledge products or specific technical solutions (e.g. decision support systems, information management systems etc.) developed and tested in collaboration with partners. -Tools and technologies are disseminated and implemented with the support of leveraged resources. These could be short and long term capacity building or support for on the ground implementation. -New partnerships especially with the private sector developed. Stronger link and synergy with the Danish private and public resource base.	Other (Water sector policy and administrative management)	Public	Public	Implemented	Support for UN Environment's work on IWRM - UNEP-DHI Centre (DKK million 6.4)

[a] To be reported to the extent possible.
[b] The tables should include measures and activities since the last national communication or biennial report.
[c] Parties may report sectoral disaggregation, as appropriate.
[d] Additional information may include, for example, funding for technology development and transfer provided, a short description of the measure or activity and co-financing arrangements.

TABLE 9: PROVISION OF CAPACITY-BUILDING SUPPORT

Table 9

Provision of capacity-building support [a]

Recipient country/ region	Targeted area	Programme or project title	Description of programme or project [b,c]
	Mitigation Adaptation Technology development and transfer Multiple areas		
Bangladesh	Adaptation and Mitigation	This contribution is through the UNDP to the "Agriculture and Food Security Project in the Chittagong Hill Tracts (AFSP III)" engagement of the Thematic Programme "Agricultural Growth and Employment Programme", as part of the Bangladesh Country Programme.	The "Agriculture and Food Security Project in the Chittagong Hill Tracts (CHT) (AFSP III)" engagement seeks to promote: (1) Increased pro-poor inclusive agricultural growth and sustainable employment creation for marginal and small farm households with enhanced food security in CHT; and (2) Hill District Councils with enhanced capacity to manage transferred agricultural services in line with CHT Peace Accord. The project utilises Farmer Field Schools (FFS), in an Integrated Farm Management (IFM) approach to improve agricultural productivity and off-farm income through technology, methodological and practice transfers. With regard to the CHT, a programmatic framework for support to the area has been drafted by UNDP. The framework attempts to be inclusive of all communities as it addresses new and remaining challenges of development in CHT. Moreover, it supports sustainable development in the CHT with a strong focus on building institutions. Finally, it improves the efficiency of support by attempting to draw on the full range of capacity of relevant agencies of the UN and Development Partners. The framework is structured around three pillars: 1) Sustainable livelihoods and food security; 2) Effective and equitable coverage of basic services and practices; and 3) Improved governance and cohesion. The project explicitly addresses the existing needs for capacity-building in the target area, in the Chittagong Hill Tracts. The Chittagong Hill Tracts lag behind the rest of Bangladesh. The area is poorer and access to social services like education, health as well as water and sanitation is below the national level. This reflects a long lasting post-conflict situation where issues from the 1997 Peace Accord remain outstanding. The Peace Accord set up a number of particular public institutions like the Hill District Councils (HDC) that are responsible for public services in the area. Extension departments along with other line departments have formally been transferred to the Hill District Councils, but resources continue to be managed by head offices in Dhaka. The situation means that the HDCs have limited institutional capacity to do their work and cross-cutting coordination with other relevant government institutions could be stronger.
Bangladesh	Adaptation, Technology development and transfer	This contribution through Danida, in collaboration with the Swizz Development Cooperation (SDC), to the "The "Climate Resilient WaSH Support for Rohingya Refugees and Vulnerable Local Communities in Cox's Bazar District"" engagement of the Thematic Programme "Climate Resilience and Sustainable Energy Programme", as part of the Bangladesh Country Programme 2016-2021.	The "Climate Resilient WaSH Support for Rohingya Refugees and Vulnerable Local Communities in Cox's Bazar District" engagement supports the autonomous financial organisation "Hygeine, Sanitation and Water Supply" (HYSAWA), whose mandate is to increase resilience to climate impacts in vulnerable communities, and to imrove access to climate resilient water and sanitation facilities. The project seeks to build the capacity of local government to provide people-oriented public services, specifically through the Union Parishads, to improve water, sanitation and hygiene infrastructure through the installation and rehabilliation of 2,500 climate adaptive water points. The approach also seeks to build the communities' capacity in relation to climate resilience through community level awareness and planning, alongside the further integration of climate resilience considerations into the Local Resilience Plan and the Union Parishad's Local Resilience Plan. The project explicitly addresses the existing needs for capacity-building in the target area, Cox's Bazar. Cox's Bazar lags behind the rest of Bangladesh in concern of water, sanitation and hygiene, which has been recently exacerbated by an influx of refugees which has almost tripled the the area's population. Both access to improved drinking water sources and sanitation are well below the national avergae, increasing risks of disease proliferation. The area is poorer and access to social services like education, health as well as water and sanitation is below the national level. Furthermore, the area's vulnerability to cyclones, monsoons and landslides impacts access to safe drinking water and sanitation facilities.
Bangladesh	Mitigation	This contribution is through the IFC to the "Partnership for Cleaner Textile II" engagement of the Thematic Programme "Climate Resilience and Sustainable Energy Programme", as part of the Bangladesh Country Programme 2016-2021.	The "Partnership for Cleaner Textile II" engagement objective is to Deepen Cleaner Production (CP) interventions and enhance competitiveness of the sector through a programmatic approach across the entire value chain of the textile sector of Bangladesh including textile mills, wet dyeing and finishing units and garment factories. Concretely, the project seeks to build the sector's capacity to reduce its emissions through increased resource efficiency, achieved through the catalyzation of resource efficient technology uptake and the provision of technological and financial information. Climate mitigation is addressed by improving access to renewable and efficient energy within the private textile industry. This is done through a partnership with the World Bank International Finance Cooperation, providing private businesses with capacity building to improve energy and water consumption in the textile production. Through firm and sector level advisory provision the activity seeks to address the market failures identified in the areas of energy supply, water use and pollution, and addresses the knowledge and information gap prevailing in the sector with regards to resource efficiency. The overall aim is to create a global knowledge base and support knowledge transfer within the sector. The engagement responds to the existing capacity-building needs of Bangladesh, where climate change mitigation forms a national strategic priority, formulated in the Bangladesh Climate Change Strategy and Action Plan. Sustainable energy use remains of critical importance to the Bangladesh economy. Availability and the rising price of gas is a significant and growing constraint on the growth of industrial activity.
Global	Mitigation and Adaptation	Strategic Sector Cooperation Initiatives	The Strategic Sector Cooperation Initiative aims at mobilizing the competencies of Danish public authorities directly in long-term strategic cooperation with counterpart authorities in developing and growth economies. Through this cooperation the Danish authorities promote Danish societal solutions that have been developed through partnerships between the public and private sector – for example through soft technology transfer and capacity building on green economy, urbanisation, agriculture and climate change mitigation and adaptation. Strategic Sector Cooperation focuses on concrete development challenges and responds to current needs of the partner country. A primary aim of the initiative is to contribute to inclusive, sustainable growth and development in partner countries by supporting conducive framework conditions for the fulfilment of the SDGs. Relevant to climate change adaptation, the SSC project "Sustainable Urban Water management/Strategic Sector Cooperation project in Udaipur, India" seeks to help strengthen water management in the City of Udaipur. The project will focus on capacity building and exchange of knowledge through concrete cooperation on planning an implementation of river and lake restoration, integrated water cycle management, improved sewage water treatment plants and efficiency of the provision of drinking water. With the overall objective of the project being to contribute to improved management of the water resources through introduction of integrated planning approaches and demonstration of new technologies. Århus municipality and Århus Water will contribute with learned expertise in integrated planning processes, protection of surface- and groundwater resources and improved storm water management. SSC initiatives focused on mitigation focus on capacity building in the renewable energy sector, through knowledge and expertise transfer. For example, in India through the development of a Danish-Indian knowledge center for wind energy development in the country. And in Turkey utilising Danish experiences and lessons learned to support the Turkish government's low carbon transition objectives using waste heat from power plants and industry, geothermal energy, waste-to-heat methods and an off-shore wind energy roadmap.

Table 9

Provision of capacity-building support [a]

Recipient country/ region	Targeted area	Programme or project title	Description of programme or project [b,c]
	Mitigation Adaptation Technology development and transfer Multiple areas		
Ethiopia	Mitigation, Technology development and transfer	DBF Ethiopia Assela wind farm	The "DBF Ethiopia Assela wind farm" project will result in the installation of a 100 MW wind farm, delivering on average 330 GWh of electricity a year to the national grid avoiding the release of 175,890 ton of CO_2 annually. In terms of capacity building the activity aims to improve the endogenous capacity of Ethiopian Electric Power (EEP) to operate and manage wind farms, and multiple sources of renewable energy, and actively engages private finance through a blended finance approach. The activity is in line with Ethiopian development policy. The Government of Ethiopia has a goal to become a middle-income country by 2025 based on carbon neutral growth. Developing renewable energy sources is central to this. The Government of Ethiopia wants to avoid excessive dependence on hydropower during recurrent national drought. Hence, wind energy is important (together with solar and geothermal energy). However, inadequate regulatory framework and low tariffs in the Ethiopian energy sector makes the wind sector too risky for private investors and therefore wind projects cannot be financed on commercial terms. A capacity building focus seeks to increase the ability for Ethiopia to optimize inputs from different energy sources in the grid. On-going Danish support, including the participation of Danish energy authorities, aims at helping Ethiopia to overcome this challenge. EEP has some, but limited capacity to operate wind farms - solid training of 20 EEP staff members, 5 years technical assistance and spare parts from the contractor on top of the 2-year guarantee period help to mitigate these challenges. Further technical assistance will be provided to EEP during the tender and construction phase to ensure adherence to IFC standards with regards to land acquisition and compensation processes. Both examples will help to disseminate knowledge, learning and expertise from the Danish experience.
Ethiopia	Adaptation	blueMoon - Agri-Tech Incubation and Innovation Lab 2018-2021	The "blueMoon - Agri-Tech Incubation and Innovation Lab 2018-2021" activity aims to support blueMoon's "blueLab", an Agri-Tech start-up incubator, to support the transformation of agriculture and related agri-business in Ethiopia through enhancing blueMoon's innovation reach and ability to apply a digital lens to all incubated startups in its program. As a platform, blueLab will provide four pillars of technology support to youth entrepreneurs relating to: (1) 3-D printing, (2) Blockchain, (3) the Internet of Things and (4) Mobile commerce. blueLab seeks to build the capacity of the Agri-Tech sector in Ethiopia through the provision of technical support, learning opportunities, and equipment allowing the prototyping and making of products for start-ups in the Ethiopian agricultural sector. By incubating national start-ups the activity seeks to develop the endogenous capacity of the Ethiopian agricultural sector to sustainably develop modern practices. Concretely, the project aims at demonstrable progress toward Ethiopian agricultural transformation, climate resilience and sustainability, and improved farmer livelihoods.
Ethiopia	Adaptation and Mitigation	Climate Resilient Forest Livelihoods (CRFL)	The "Climate Resilient Forest Livelihoods" (CRFL) will pursue sustainable management of forest resources in the Kaffa Biosphere Reserve through the promotion of participatory forest management, where communities are empowered and motivated to manage and conserve their forests through: capacity development on sustainable forest management, secured access to forest resources of economic and livelihoods importance, and legal recognition of their forest access and rights. CRFL will commence with an inception phase, where: a) the capacity development needs will be assessed and a capacity development plan developed to guide the technical advisory and capacity development to be provided under CRFL, and b) the potential of various livelihoods options will be analysed. Since the Zonal and local Government has the responsibility for promoting forest conservation and livelihoods improvements, further development of their capacity in this regard is an important element of the thematic programme. Moreover, the programme will support the Ministry of Environment, Forest, and Climate Change (EFCCC) at federal level and Southern Nations, Nationalities and Peoples Region's Government (SNNPR) Regional Government and Kaffa Zonal Administration through a social inclusion advisor strengthening their capacity to address social issues within the overall framework for the promotion of inclusive and sustainable forest management. Therefore, through institutional capacity building the project seeks to enhance and develop the endogenous capacity in Ethiopia with regards to sustainable forest management and resource use. The engagement, utilising participatory forest management, responds to the existing capacity-building needs of Ethiopia. Forest coverage in Ethiopia is estimated to be approximately 12.29 million hectares and is subjected to forest degradation and deforestation (about 1.0-1.5 per cent annually) due to unsustainable use of natural resources and recurrent droughts. Deforestation and degradation contribute significantly to the country's carbon emission. Moreover, rural poor depending on forest resources are losing livelihood and income opportunities as a result of forest degradation, especially affecting poor households with small landholdings. The unsustainable use of forests in Ethiopia is thus negatively affecting communities' resilience to climate related shocks even further. The new Forest Development, Conservation and Utilization Proclamation (Proclamation No.1065/2018) highlights the necessity of community development and establishes the rights and obligations of community forest developers, whereas the National Guideline for Participatory Forest Management specifies the steps for participatory forest management implementation. The project partners with The Government of Ethiopia established "Climate Resilient Green Economy Facility" (CRGE Facility). Which is the single entry point for all stakeholders involved in Ethiopia's transformation to become a middle-income country through carbon neutral growth by 2025, through engagement with development partners, private sector, and civil society. Furthermore, in partnership with the Danida Market Development Partnership project "DMDP 2018 - NABU Ethiopia", these two projects will aim to develop and enhance inclusive income and employment generation, income diversification, alongside local and international market development through the involvement of the private sector. Denmark has under the Greening Agricultural Transformation in Ethiopia (GATE) programme supported the CRGE Facility in 2015-2018 with funds from the Danish Climate Envelope. This engagement had two implementing partners, the EFCCC and the Ministry of Agriculture and Natural Resources (MoANR). Learnings from this experience have been integrated into the current engagement. This thematic programme is fully aligned with the Government's standard structure and procedures, giving the Southern Nations, Nationalities and Peoples Region's Government (SNNPR) Regional Government a more central role in programme delivery.
Global	Adaptation and Mitigation	CISU. Support to climate action	CISU is an independent association with more than 270 Danish CSOs members. It supports its members by providing training courses, advice, online guidance on all aspects of Civil Society work. CISU represents its members and seeks to promote improvements in the framework conditions for CS. It is furthermore administrator of various funds incl. the Civil Society Fund, CSF – a fund for Danish CSOs in partnership with CSOs in developing countries. The objective of theactivity is to increase climate resilience, particularly for vulnerable and marginalised groups. This will be achieved through capacity building of Danish CSOs, partners, their members and target groups for climate action on the ground and for advocacy towards duty bearers to hold them to account on climate issues. This will be achieved through capacity building of Danish CSOs, partners, their members and target groups for climate action on the ground and for advocacy towards duty bearers to hold them to account on climate issues. To enhance and develop national and community-level climate change policies, planning frameworks and information systems – especially with a view to adaptation. And to increase Danish CS Organisation's capacity to work with climate capacity building and advocacy with partners is strengthened. An external review of the fund in 2017 concluded that there is a significant achievement of objectives across the projects supported by CISU. Results feature within advocacy, where projects have promoted the voice of the poor on a variety of environmental and climate challenges, though the actual changes resulting of the advocacy is not captured well by the monitoring. Capacity building results are also prominent e.g. in the form of enhanced ability of right holders to hold duty bearers to account their constituencies. Strengthened CS incl. their partnerships, networks, target group involvement etc. is another result area.

Table 9

Provision of capacity-building support [a]

Recipient country/ region	Targeted area	Programme or project title	Description of programme or project [b,c]
	Mitigation Adaptation Technology development and transfer Multiple areas		
Global	Mitigation	CIF TA Facility for Clean Energy Investment Mobilization	The objective of the Climate Investment Funds (CIF) Technical Assistance Facility is to focus on upstream policy and regulatory framework and other enabling environment activities that will further enable increased RE and EE. Through the enhancement of energy-focused policy and regulatory framework for private investments and financial sector and investment regulation increasingly conducive to financing of clean energy investment The TA Facility will address barriers to scaling up markets for clean energy, which include: A lack of a supportive enabling environments; Real and perceived risks; Capacity constraints that limit both the supply of investable projects with appropriate risk-return characteristics; The supply of finance to realize investable projects, constraining the wider scale up of clean energy technologies. The CIF is well-placed to address these barriers, with a long track record of funding activities focused on technical assistance, testing business models and supporting pipeline development through the MDBs in the Renewable Energy and Energy Efficiency space. The TA Facility's focus is most similar to the CIF Clean Technology Fund (CTF), a window focused on energy, with 85 CTF projects (USD 4.6 billion in CTF funding) now reporting on results. Results as of 2017 cover: - 9.3 MtCO2e/year reduced from 30 projects and USD 1.5 billion (target: 61 MtCO2e/year) - USD 19 billion in co-financing leveraged from 59 projects with USD 3.6 billion CTF funds (target: US 47 billion) - 3.95 GW installed RE capacity from 22 projects and USD 1,5 billion (target: 25 GW) - 3.28 GWh/year energy savings from 14 projects and USD 558 million (target: 10.6 GWH/year)
Global	Adaptation and Mitigation	UNEP-DTU Partnership (UDP) 2018-21 (DKK million 78)	The UNEP DTU Partnership (UDP) is an international research and advisory institution on energy, climate and sustainable development that has received Danish Government core funding since it was established in 1990. The UDP supports UN Environment in facilitating a shift towards cleaner and more efficient energy systems and support more climate resilient sustainable development in developing countries through internationally leading research, policy analysis and capacity development. As a UN Environment Collaborating Centre, UDP specifically supports the planning and implementation of UN Environment's Programme of Work and Medium Term Strategy. The Copenhagen Centre on Energy Efficiency, which is one of the thematic programmes within UDP, also functions as an Energy Efficiency-Hub for SEforALL. Focus in all UDPs activities is on capacity building and technology transfer, and includes; •Technology Transfer Partnerships for SDG and Climate Action •Strengthening markets and value chains for renewable energy in NDCs •Scalable and replicable models for private sector adaptation and mitigation action, and the mobilization of private finance •Transparency of NDC and SDG actions •Emissions and adaptation gap reports. Denmark has provided funding to both UNEP DTU thematic objectives: (1) "SDG 7.1. and 13: Ensure universal access to affordable, reliable, sustainable and modern energy for all and urgent action to combat climate change and its impact" (DKK million 38) and; (2) ""SDG7.3: Double the global rate of improvement in energy efficiency" (DKK million 40). The UDP is a recognised Centre of Excellence in the international climate change architecture working in close partnership with both the Parties and the Secretariat to the UN Climate Convention (UNFCCC) on the post-Paris follow up, including supporting countries on implementation of their Nationally Determined Contributions for example through engagement on Technology Action Plans and support to build national institutional capacity to manage transparency and reporting on the NDCs.
Global	Mitigation	Support for SEforALL	SEforALL seeks to enable universal access to sustainable energy, and thus the organisation as a whole targets SDG 7 (affordable clean energy), including the underlying targets of the goal concerning renewable energy and energy access and efficiency. The stated impact indicators are: (i) global population without access to electricity and clean cooking, (ii) rate of improvement of global energy intensity and (iii) rate of deployment of renewable energy. SEforALL looks to build capacity in non-Annex I countries through the brokering of partnerships between business, government and civil society. To help enable: (a) the creation of more enabling policy environments, (b) the faster scaling and replicating of innovative approaches and business models, and (c) the stronger alignment of country-level initiatives.
Global	Mitigation	Voluntary Contribution to IRENA 2018-21	The strategic objectives of the activity are: to support partner countries in their efforts to achieve low-carbon development, implement the Paris Agreement on Climate Change and realise NDCs; to meet SDG7 target 7.2: by 2030; increase substantially the share of RE in the global energy mix; target 7.3 double the global rate of improvement in EE; as well as SDG13 target 13.2: Integrate climate change measures into national policies, strategies and planning. Long-term planning and solid energy scenarios are key to ensuring the right policies and investments, which can speed up the transition to renewable energy. With a mandate from 158-member countries and the EU, IRENA encourages governments to adopt enabling policies for RE investments, provides practical tools and policy advice to accelerate RE deployment and EE, and facilitates South-South cooperation among practitioners and policy makers on long-term energy planning facilitated through a series of workshops and support to collaborative platforms, and a network of practitioners established for sustained peer-to-peer exchange. Local capabilities on energy planning enhanced through regional and country-specific capacity building and technical advisory activities. Furthermore the exchange of best practices among practitioners and policy makers forms an integral part of the project design. Aided through both: reporting on the implementation of regional and global workshops and support to collaborative platforms; Regional and country-specific capacity building and technical advisory activities; and collaboration on clean energy investment strategies agreed with 2-3 countries. Target institutions and priorities in capacity building identified.

Table 9

Provision of capacity-building support [a]

Recipient country/ region	Targeted area	Programme or project title	Description of programme or project [b,c]
	Mitigation Adaptation Technology development and transfer Multiple areas		
Global	Mitigation	OECD - Clean Energy Finance Investment Mobilisation Programme	The objective of the activity is rooted in capacity building, aiming towards accelerated clean energy finance and investment in the power and buildings sectors Achieved through: (1) Strengthened domestic policy frameworks and enabling conditions for clean energy finance and investment; and (2) Increased private sector activity in development and financing of "bankable" clean energy investments. The activity seeks to utilise the OECD's expertise The OECD's analytical capacity and expertise in identifying and sharing best practice will leverage the OECD's convening power and make OECD expertise available to countries with a view to supporting policy and regulatory frameworks and other measures that are key in mobilising private investments in clean energy. The activity seeks to enable: (i) stronger and more coherent core climate and energy policies; (ii) increasing alignment between domestic climate goals (including clean energy deployment objectives) and broader policy and regulatory frameworks impacting investment; and (iii) improving the risk-return profile of renewable energy and energy efficiency investments. National efforts to decarbonise the energy sector are more likely to succeed with the political and technical support and co-ordination of key ministries beyond energy ministries. These include finance and planning as well as energy and environment ministries, and financial regulators, who must be convinced of the net economic and social benefits as well as the political feasibility of strengthening policy frameworks to accelerate clean energy investment and low-carbon growth.
Global	Adaptation and Mitigation	Strategic Partnership Agreements with Danish and International Civil Society Organisations: - CARE Denmark (2018: DKK million 216 (adaptation)); - Forests of the World (Verdens Skove) (2017: DKK million 11.9 (adaptation and mitigation); - SustainableEnergy (VedvarendeEnergi) (2017: DKK million 7.3 (adaptation and mitigation)); - Danish Church Aid (2017: DKK million 93.5 (adaptation); 2018: DKK million 432 (adaptation)); - Red Cross Denmark (2017: DKK million 174.4 (adaptation); 2018:DKK million 784 (adaptation)); - Caritas Denmark (2017: DKK million 21.4 (adaptation)) - and the World Wildlife Fund for Nature (2018: DKK million 60 (mitigation))	Through Strategic Partnership Agreements (SPAs) (formerly referred to as Framework Agreements, Denmark contributes to numerous Danish Civil Society Organisations (CSOs). The CSOs mentioned in Column C have climate-relevant activities primarily focused on adaptation, with the WWF, SustainableEnergy and Forests of the World also pursuing mitigation targets relating to sustainable forests. The Ministry of Foreign Affairs (MFA) establishes Strategic Partnerships with professional CSOs that have a strong focus on strategic alignment and results within Danish development and humanitarian priorities as outlined in the Danish Strategy for Development Cooperation and Humanitarian Action. Principally important for climate-related capacity building are those activities undertaken with support from the civil society development budget line of the Danish Finance Act (the "Lot CIV"). The purpose of Strategic Partnerships under Lot CIV is to strengthen civil society in the global South so that it has the independence, space, diversity and capacity to influence and promote the realisation of the Sustainable Development Goals with a particular focus on poor, marginalised and vulnerable groups. The objectives of projects under Lot CIV are: - Capacity development processes that enable partners in the global South to effectively combat poverty, vulnerability, inequality, build community resilience, crisis preparedness and ability to adapt to climate change and build legitimacy, constituency and internal democracy, and accountability in organisations and movements; - Promoting an enabling environment for civil society in the global South including i) basic legal guarantees such as the right to assembly, association and registration, ii) appropriate measures for CSOs' financial viability and sustainability and iii) appropriate spaces for participation in local, national and international decision-making processes; - Global, regional and local advocacy efforts which involve and empower relevant local civil society actors and are informed by evidence and based on knowledge of the processes and stakeholders that need to be influenced. Such efforts include holding duty bearers accountable for implementing the SDGs in priority countries as well as at the global level; - Strategic service delivery designed to reinforce advocacy, legitimacy of partners in the global South, innovation, learning, and capacity development of change agents and partner organisations in relation to the promotion of the SDGs Additionally, SPAs can leverage external financing to amplify results. With strategic partners given flexibility to allocate funds towards co-financing and mobilisation of funding from other institutional donors, provided that the engagement reasonably falls within the overall objectives of the relevant lot and that the strategic partner can demonstrate a value-added beyond the transfer of funds.
Uganda	Adaptation, Mitigation, Technology transfer	Northern Uganda Resilience Initiative (NURI) (DKK million 250) as part of the Uganda Programme on Sustainable and Inclusive Development of the Economy (UPSIDE), of the Danish Country Programme for Uganda for 2018-2022.	Northern Uganda Resilience Initiative (NURI), which itself forms 1 of 3 engagements of the Uganda Programme on Sustainable and Inclusive Development of the Economy (UPSIDE), of the Danish Country Programme for Uganda for 2018-2022. UPSIDE is a private sector development programme the objective of which is "sustainable and inclusive economic growth". The NURI supports enhanced resilience and equitable economic development in supported areas of Northern Uganda, including for refugees and host communities. In terms of capacity building the initiative provides training in Climate Smart Agriculture to small-scale farmers. In another example, the NURI activity "Water resources management in the Upper Nile Water Management Zone" (DKK million 35) aims to improve climate change resilience in Northern Uganda through water resource management (WRM) to provide an enabling environment to small-scale farming and refugee and host communities. To achieve this the project aims to increase the endogenous capacity of national implementing partners, the Ministry of Water and Environment's Directorate for Water Resources Management and the Upper Nile Water Management Zone, to: - Develop community-driven, micro-catchement management plans and implementation mechanisms to increase efficiency of water resource usage; - Develop effective community agreements and bylaws on natural resource management that emphasise water management - Develop the capacity of Catchment Management Organisations and District Local Governments in relation to WRM The activity also focuses on technology transfer, and aims to construct or renovate the agriculture-related physical and natural water infrastructure outlined in the Ugandan Ministry for Water and Environment's micro-catchement plans. Including multi-purpose dams and retention structures, and further support to communities for preparing, implementing and monitoring maintenance plans.
Uganda	Mitigation and adaptation	Agricultural Business Initiative (aBi) (DKK million 230) as part of the Uganda Programme on Sustainable and Inclusive Development of the Economy (UPSIDE), of the Danish Country Programme for Uganda for 2018-2022.	The Agricultural Business Initiative (aBi) forms 1 of 3 engagements of the Uganda Programme on Sustainable and Inclusive Development of the Economy (UPSIDE), of the Danish Country Programme for Uganda for 2018-2022. UPSIDE is a private sector development programme the objective of which is "sustainable and inclusive economic growth". aBi seeks increased income and employment through environmentally and socially responsible investments in improved productivity, quality and value addition in agri-businesses and among smallholder farmers in supported agricultural value chains. Concretely, aBi will pursue private sector led agri-business development through a combined value chain focus on increased and improved primary production (supply side) and improvements in processing capacity (demand side). In terms of capacity building the activity supports the development of demonstration plots, training of farmers in good agricultural practices, post-harvest handling, quality aspects and other value addition interventions. And seeks to increase the endogenous capacity of small-scale farmers to access finance and markets by increasing the size of lending portfolios oriented toward agriculture by aBi partner financial institutions, leading to increased access to finance for agri-business and smallholder farmers. UPSIDE recognises the agricultural sector, and specifically private sector actors within it, as being the primary drivers of sustainable and inclusive economic growth in Uganda. The overall rationale behind UPSIDE is that environmentally improved production, processing and trade coupled closely with interventions to improve pro-poor market linkages and targeted capacity and business development of value chain actors, will at outcome level enhance resilience and equitable economic development in Northern Uganda.

Table 9

Provision of capacity-building support [a]

Recipient country/ region	Targeted area	Programme or project title	Description of programme or project [b,c]
	Mitigation Adaptation Technology development and transfer Multiple areas		
Global	Mitigation	DBF Project Development Facility	The purpose of the Danida Business Finance Project Development Facility is to build the capacity of authorities in developing countries to enable them to prepare sustainable infrastructure project proposals with a potential for financing with a concessional loan under the Danida Business Finance scheme. And therefore also to engage the private-sector in sustainable infrastructure development projects. An additional outcome will be capacity development of sector authorities in developing countries notably in terms of formulation, preparation and implementation of sustainable infrastructure projects with a Life-cycle cost prospective. The Facility aims to ensure the increased ownership of projects from recipient governments Sustainable infrastructure projects benefit from Danish technology and expertise in climate-relevant sectors such as wind energy and water and sanitation initiatives. This activity was paired with an external evaluation of the Investment Fund for Developing Countries (IFU), to assess its contribution to development and commercial outcomes through its investments in developing countries.
Mexico, China, Viet Nam and South Africa	Mitigation, Technology development and transfer	Danish Energy Agency Energy Partnership Programme (DEPP) 2017-20 (DKK million 115)	With the prospect of creating results for the longer term and building on the existing momentum, Denmark allocated DKK 115 million from the Climate Envelope 2017 to cooperation with Mexico, China, Viet Nam and South Africa in the new 3-year programme, the DEA Energy Partnership Programme (DEPP) Phase II. The programme looks to build the capacity of the national governments with regards to renewable energy sector planning, integration and policy. Whilst also providing access to Danish renewable energy technology solutions. The intention is to assist the four countries with their transition to a low carbon economy and support them in implementation of the Paris agreement. The support is based on Denmark's long standing experience on energy transition away from a fossil fuel economy. Also, the DEPP builds on a well tested government-to-government modality of cooperation featured by: A Memorandum of Understanding outlining shared government goals for the cooperation; provision of technical advisory support including from the DEA and the Danish power system operator and offering counterparts wider access to acquaint with Danish experience, expertise and technology solutions; daily programme presences in-country through Denmark's embassy and through the posting of international Long-Term Advisors with key-partner institutions and; wider anchoring of programme objectives and results through high-level participation in programme steering and high-level policy dialogues. To programmes objectives relate to: - National and local government level policies, plans and regulation that reflect additional renewable energy and increased energy efficiency and the countries are on track to meet their GHG-targets as per their contribution to the Paris agreement. - Implementation aspects of renewable energy and energy efficiency are strengthened leading to tangible energy savings and to more efficient integration of renewable energy into power grids, hence tangible GHG-emissions reductions. - Enabling environment and framework conditions for renewable energy and energy efficiency creates a level playing field and incentives for private sector.
China, Indonesia, Ethiopia and Vietnam	Adaptation and Mitigation	C40 Cities Climate Action Planning (DKK million 15)	The objective of this project is to provide support to five C40 megacities in China, Indonesia, Ethiopia and Vietnam to follow a trajectory that results in reduced emissions and increased resilience against the risk of climate change. Cities are offered resources to build their capacity to achieve these goals, of which the most important are: - City Advisers and climate best practice from C40 networks: A key focus of this project is to embed a City Adviser in each city to act as a focal point for long-term climate action planning, engage internal and external stakeholders, facilitate knowledge transfer and capacity development, and ensure sustainability after the project duration. Through their City Adviser, each city will be able to access assistance and best practice examples through the C40 Cities networks, which are key to the delivery of the plans. - Regional planning academies and 'peer-to-peer' review workshops: Cities will be able to participate in regional 1.5 degree planning workshops that provide an important opportunity for them to learn from one another, in particular from cities that have gone through the pilot stage and are ready to share their knowledge and experience. -Tools and frameworks: C40 is developing various tools and frameworks to support the Deadline2020 programme, including the "1.5 degree planning and assessment framework" that clearly identifies the elements of a Paris compliant Climate Action Plan, as well as a "City Delivery Roadmap" showing cities how they can do it. - Consultancy support for addressing specific city needs and knowledge gaps: Cities would be offered the services of a global and local consultancy procured by C40 to support the city in either general support (assessing baseline scenario, scenario modelling, prioritizing actions, developing or reviewing plans) or targeted support (more in-depth support in a specific area).
Global	Mitigation	Danish Contribution to ESMAP 2017-2020 (DKK million 45)	Denmark is a long-time supporter of the Energy Sector Management Assistance Programme (ESMAP), an assistance programme administered by the World Bank (WB). ESMAP provides analytical advisory services to low- and middle-income countries to reduce poverty and boost growth, through environmentally sustainable energy solutions. ESMAP builds capacity in client countries through targeted technical assistance, knowledge generation and dissemination, pre-investment project preparation, and implementation support. ESMAP tackles questions related to energy in all its forms in both rural and urban settings. It influences billions in loans for development projects, leverages public and private financing, working with global agendas on energy and climate in country partnership programs and beyond. Practically, ESMAP works in every WB client country supporting improved energy sector performance and governance, enhancing access to modern energy services and technology, increasing the efficiency of energy use, and/or promoting renewable energy.

Table 9

Provision of capacity-building support [a]

Recipient country/ region	Targeted area	Programme or project title	Description of programme or project [b,c]
	Mitigation Adaptation Technology development and transfer Multiple areas		
Global	Mitigation	IEA's Energy Efficiency in Emerging Economies, Phase II (E4 Phase II) (DKK million 25)	The objective of this Danish development engagement is for the International Energy Agency (IEA) to support a core group of six of the largest developing countries' energy transition in a low-carbon, sustainable direction, aiming to achieve efficient high-impact and cost-effective improvements in energy efficiency at national and sector levels. The "Energy Efficiency in Emerging Economies, Phase II" project has a strong focus on endogenous capacity building in developing country energy sectors, and a further focus on private sector enagement. Concretely, the project aims to: - Strengthen the design of national or regional energy efficiency policies in support of national and international climate goals. - Increase capacity to implement national or regional energy efficiency policies in support of national and international climate goals, including energy efficiency-renewable energy integration. - Disseminate best-practice examples of using market based instruments to drive private sector financing and investment in energy efficiency. - Increase knowledge and capacity at national and local level to undertake monitoring and evaluation of existing and future energy efficiency policies and programmes for all end-use sectors. - Increase the adoption and implementation of tools and frameworks for monitoring progress and best practice evaluation methodologies for energy efficiency policies or programmes at the national and local levels. -Increase the number of government staff and other key stakeholders with access to comprehensive in-person training on energy efficiency policies, including sectoral training and training for municipal stakeholder.
Myanmar	Adaptation and Mitigation	Climate Adaptation in Coastal Communities of Myanmar	The "Climate Adaptation in Coastal Communities of Myanmar" activity is part of the Thematic Programme "Inclusive and Sustainable Economic Growth" of the Denmark-Myanmar Country Programme 2016-2020. This project seeks to enhance the capacity of the Forest Department of Myanmar, at central and local levels, to advocate for, establish and enforce Protected Forest Areas (PPFs) with mangroves. Thereby increasing the resilience of coastal communities to climate change. To achieve this goal the activity seeks to increase access to technical support and to alternative sustainable livelihood opportunities, empowering communities to conserve,restore and sustainably manage mangrove forests.
Georgia and Ukraine	Mitigation	Neighbourhood Energy Investment Fund (NEIF)	The main objective of the Programme is to promote commercial investments in sustainable energy through the mobilising of private capital, technologies and know-how in Ukraine and Georgia. The implementing partner for the intervention is the Investment Fund for Developing Countries (IFU). IFU will establish a Neighbourhood Energy Investment Fund (NEIF) to pursue investment opportunities in the two countries. A Project Development Facility attached to the NEIF will assist in developing possible investment projects and also support energy efficiency measures amongst companies under the IFU port folio in Ukraine and Georgia. IFU will build on its relevant experiences in Ukraine. In the energy sector, the current Danish involvement in Georgia is four engagements: Neighbourhood Energy Facility though the Danish Investment Fund for Developing Countries (IFU), Nordic Environment Finance Cooperation (NEFCO), European Bank for Reconstruction and Development (EBRD/E5P) and the Georgian Ministry of Energy/NIRAS. With a view to focussing the efforts and development managerial synergies, it is envisaged that the engagements can be narrowed down to two development engagement that cover both Ukraine and Georgia, namely: 1) Support the policy level in creating an enabling environment for private sector sustainable energy investments; 2) Facilitation of Danish investments for energy efficiency and promotion of renewable energy to meet national targets and be a catalyst for further investments (national or foreign). As the traditional energy sector is well covered by donors, the activity focuses on non-hydro renewable energy solutions and energy efficiency. Attention should be paid to opportunities for engaging the private sector, through the creation of an enabling environment to incentivise investments in both renewable energy solutions and energy efficiency as well as for tackling the energy supply shortcomings by creating a level playing field through incentivising policies.
Global	Mitigation	SDG Investment Fund	The activity "SDG Investment Fund" has the thematic objective: Contribute to the achievement of the SDGs in developing countries by enhancing development relevant, inclusive and sustainable investments in affordable and clean energy, climate, industry, food and other SDG key areas through the mobilisation of Danish and foreign public and private capital, technology and knowhow based on international standards for responsible business conduct. The activity provides an example of Danish development aid which contributes to the transfer of both hard and soft technologies, whilst promoting the engagement of the private-sector. The expected key results are: - Establishment of DKK 6 billion SDG investment fund of which 50% is provided by private institutional investors. The Fund is envisaged to promote investments of at least DKK 30 billion. - Creation of decent jobs - 30,000 direct and 30,000 – 60,000 indirect jobs - Comprehensive production of renewable energy and related reduction in greenhouse gas emission - Considerable annual tax contributions from the investment projects - Transfer of modern technology - Compliance with international standards for responsible business conduct and documentation of sustainability as a business opportunity.

[a] To be reported to the extent possible.

[b] Each Party included in Annex II to the Convention shall provide information, to the extent possible, on how it has provided capacity-building support that responds to the existing and emerging capacity-building needs identified by Parties not included in Annex I to the Convention in the areas of mitigation, adaptation and technology development and transfer.

[c] Additional information may be provided on, for example, the measure or activity and co-financing arrangements.

Annex 1

Denmark's existing Policies And Measures (PAMs)
- included in the With Existing Measures (WEM or "frozen policy") scenario, August 2019

Contents

4 Policies and measures

- including those in accordance with Article 2 of the Kyoto Protocol, and domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures

4.1 CLIMATE POLICY AND THE POLICY-MAKING PROCESS

Since the Brundtland Commission's report, “Our Common Future”, from 1987, Denmark's climate policy has developed in collaboration with the different sectors of society, and in line with international climate policy, and results from related scientific research.

Thus, since the end of the 1980s a considerable number of measures to reduce emissions of greenhouse gases have been implemented.

Some of the measures have been implemented with reduction of greenhouse gas emissions as the main objective, others were aimed at achieving environmental improvements for society in general, e.g. by introducing environmental taxes and involving the public in the debate and decisions concerning the environment.

Since 2001, focus has also been on efforts to reduce emissions and meet the near-term international greenhouse gas emission reduction targets – i.e. for 2008-2012 under the first commitment period of the Kyoto Protocol and the EU Burden Sharing, for 2013-2020 under the second commitment period of the Kyoto Protocol and the EU Effort Sharing Decision and for 2021-2030 under the Paris Agreement and the EU burden sharing of the EU National Determined Contribution through the EU Effort Sharing Regulation – with view to meet the long-term target: a climate-neutral society by 2050.

Denmark’s international climate targets are described in Box 4.1.

Box 4.1 International climate targets

Since 1990 Denmark has undertaken or committed itself to several targets with respect to reducing greenhouse gas emissions:

- In accordance with the Climate Convention, to reduce total emissions of greenhouse gases in Denmark, Greenland and the Faroe Islands to the 1990 level by 2000. This target was achieved for total emissions excluding the land-use sector (LULUCF). Due to windfalls total emissions including LULUCF brought the Realm to within 1% of the target.
- As a contribution to stabilisation in the EU, Denmark committed itself to reducing CO_2 emissions in 2000 by 5% compared to the adjusted level for 1990. This target was fulfilled.
- In relation to the Kyoto Protocol, for the period 2008-2012 the EU committed itself to reducing emissions of greenhouse gases on average to 8% below the level in the base year; 1990 for CO_2, methane, and nitrous oxide and either 1990 or 1995 for industrial greenhouse gases. Denmark committed itself to a reduction of 21% as an element of the burden-sharing agreement within the EU. Both Denmark and the EU reached these targets.
- In relation to the period 2013-2020, the EU reached an agreement in December 2008 on a climate and energy package and on a regulation on CO_2 from new vehicles. According to this package the EU is committed to reducing its overall emissions to at least 20% below 1990 levels by 2020. Under the EU burden sharing of the joint EU target for 2020, Denmark is committed to a reduction in non-ETS emissions in the period 2013-2020, rising to 20% by 2020 relative to 2005. The EU is also committed to reducing its ETS emissions to 21% below 2005 levels by 2020. The EU has also set itself the target of increasing the share of renewables in energy use to 20% by 2020. Under burden sharing for this EU target, Denmark is committed to reaching a 30% share of renewables in energy use by 2020.
- In relation to the period 2021-2030, the European Council agreed on the 2030 climate and energy framework in October 2014 and endorsed four important targets of which targets for energy efficiency and renewable energy were revised in 2018: (1) a binding EU target of at least 40% less greenhouse gas emissions by 2030, compared to 1990, (2) a target, binding at EU level, of at least 32% renewable energy consumption in 2030, (3) an indicative target at EU level of at least 32.5% improvement in energy efficiency in 2030 and (4) support the completion of the internal energy market by achieving the existing electricity interconnection target of 10% as a matter of urgency no later than 2020, in particular for the Baltic states and the Iberian Peninsula, and the objective of arriving at a 15% target by 2030. The agreement on the 2030 framework, specifically the EU domestic greenhouse gas reduction target of at least 40%, formed the basis of the EU's contribution to the Paris Agreement. The EU’s so-called Intended Nationally Determined Contribution (INDC) was formally approved at an Environment Council meeting in March 2015. In May 2018 the EU member states reached an agreement on the effort sharing for the period 2021-2030, for which the formal implementation is pending. Under the EU burden sharing of the joint EU target for 2030 under the Paris Agreement, Denmark is – in the effort sharing of the joint EU target for non-ETS emissions in 2030 – committed to a reduction in non-ETS emissions in the period 2021-2030 of 39% by 2030 relative to 2005. The EU is also committed to reducing its ETS emissions to achieve the 40% below 1990 levels by 2030 in total greenhouse gas emissions. The EU has also set itself the target of increasing the share of renewables in energy use to 32% by 2030. Denmark will allocate funds that sets a course towards a Renewable Energy share of approximately 55% in energy use by 2030.

The following sections contain more information about Denmark’s climate relevant action plans until now and the climate policy framework until 2030 which is the Energy Agreement from June 2018.

This section is followed by sector by sector descriptions of Denmark’s climate policies and measures.

4.1.1 National action plans

In 1988 the government issued the Government's Action Plan for Environment and Development. The plan was a follow-up on the Brundtland Report and was based in principle on striving for environmentally sustainable development. One of the main messages in the plan was the need to integrate environmental considerations into decisions and administration within such sectors as transport, agriculture and energy.

In the years since then, a number of ministries have prepared sector action plans in which the environment is an integral element. The sector action plans deal with the entire development in a sector combined with solutions to environmental problems caused by the sector. The sector plans for energy, transport, forestry, agriculture, the aquatic environment, waste, and development assistance are important examples.

The plans from the 1990s all contained specific environmental objectives and, usually, deadlines for achieving them. In addition, there were a number of concrete initiatives that are intended to lead to achievement of the objectives. Progress has been evaluated regularly to check whether the implementation of the plans resulted in achievement of the objectives. The results of the evaluations have been presented in political reports from the sector ministries or in special follow-up reports.

The evaluations and follow-up have often given rise to the preparation of new action plans, either because additional initiatives have been necessary in order to achieve the objectives or because the development of society or developments within the area in question have made it necessary to change both objectives and initiatives. Major sector plans, strategies and agreements that have been of importance for the reduction of greenhouse gas emissions are:

- The NPO Action Plan on pollution from livestock manure (1985)
- Action Plan for the Aquatic Environment I (1987)
- Energy 2000 (1990)
- Action plan for sustainable development in the agricultural sector (1991)
- Strategy for sustainable forest management (1994)
- Strategy 2000 - Danish strategy in the development assistance area (1995)
- Energy 21 (1996)
- Action plan for reduction of the transport sector's CO_2 emissions (1996)
- National sub-strategy for Danish environmental and energy research (1996)
- Action Plan for the Aquatic Environment II (1998)
- Action Plan II - Ecology in Development (1999)
- Waste 21 (1999)
- Action plan for reduction of industrial greenhouse gas emissions (2000)
- Reduction of the transport sector's CO_2 emissions - possibilities, policies and measures (2000)
- Reduction of the transport sector's CO_2 emissions - the government's action plan (2001)
- Denmark's national forest programme (2002)
- Denmark's National Strategy for Sustainable Development (2002)
- National Climate Strategy for Denmark (2003)
- Waste Strategy 2005-2008 (2003)
- Action Plan for the Aquatic Environment III (2004)
- 1st National Allocation Plan 2005-2007 under the EU-ETS (2004)
- Energy Strategy 2025 (2005)
- Action Plan for Strengthened Energy-saving Efforts (2005)
- 2nd National Allocation Plan 2008-2012 under the EU-ETS (2007)
- Political agreement on Energy (2008)
- Political agreement on a Green Transport Vision for Denmark (2009)
- Political agreement on a Tax Reform (2009)
- Growth with Consideration – the government’s strategy for sustainable development (2009)
- Strategy for reducing energy consumption in buildings (2009)
- Political agreement on a Green Growth Plan (2009)

- Waste Strategy 2009-2012 – Part I (2009)
- Waste Strategy 2009-2012 – Part II (2010)
- Energy Strategy 2050 (2011)
- Our Future Energy (2011)
- Political Agreement on Energy (2012)
- The Danish Climate Policy Plan – Towards a low carbon society (2013)
- The Agricultural Package (2016)
- The Energy Agreement (2018)
- The Climate and Air proposal “Together for a greener future” (2018)
- The political understanding “A fair direction for Denmark” (2019)
- The agreement on a new Climate Act (2019)

The sector plans deal with different aspects of the climate problem. In the energy and transport sectors, the main environmental concern has been the emissions of the greenhouse gas CO_2. The plans in these sectors were therefore to a great extent concerned with reducing CO_2.

The frameworks for the Danish energy sector, however, have changed quite significantly over a short period of time. The goal of Danish energy policy today is to create well-functioning energy markets within frameworks that secure cost-effectiveness, security of supply, environmental concerns and efficient use of energy under conditions of a fully liberalised energy sector. Electricity production from Danish power plants is controlled by market forces and traded freely across national borders.

The introduction of CO_2 quota regulation as a common EU instrument has therefore been of absolute importance to Denmark meeting its climate commitments. From 2005, quota regulation through the EU emissions trading scheme (EU ETS) has been the key instrument to ensuring that the Danish energy sector can contribute to the reductions requisite to fulfilling Denmark’s climate commitments.

The other sector plans are not primarily focused on reducing greenhouse gas emissions, in part because the sectors are battling with other major environmental problems. The main concern in the agricultural sector has been pollution of the aquatic environment. In the waste sector it has been reduction of the volume of waste, and in the industrial sector, reduction of emissions/discharges of harmful substances to the atmosphere/aquatic environment, the use of toxic substances, etc.

However, the implementation of the sector plans has to a great extent also resulted in reduction of greenhouse gas emissions. For example, the reduction in nitrogen emissions from the agricultural sector, which is the result of the aquatic environment plans, is at the same time reducing emissions of the greenhouse gas nitrous oxide. The initiatives to reduce waste quantities mean fewer landfill sites and thus less formation and emissions of methane, and the on-going increase in forested area will mean increased removals of CO_2.

In addition, the energy and transport plans meant that changes were made in the energy and transport sectors. The initiatives in the energy sector have resulted in reduced energy consumption despite significant economic growth and, with that, reduced CO_2 emissions.

On the environment policy front, Denmark has participated actively in improving environmental protection in Europe through the EU cooperation and through bilateral environmental assistance to Central and Eastern European countries. On a number of points, the EU's environmental regulation has put Europe ahead of the rest of world environmentally. There are also many examples of EU rules having helped to strengthen environmental protection in Denmark. With the adoption of the Amsterdam Treaty, sustainable development became a main objective for the EU, and integrating environmental considerations in the EU's sector policies became an obligation.

4.1.2 Denmark's Climate Policy

4.1.2.1 The 2018 Energy Agreement

On 29 June 2018 an Energy Agreement on future Danish energy policy until 2024 - and for some elements until 2030 - was reached with all Parties in the parliament[52].

The 2018 Energy Agreement is an agreement on allocating funding that sets a course towards a share of renewable energy of approximately 55% by 2030. The agreement will also give Denmark a share of renewable energy in electricity above 100% of consumption, while ensuring that at least 90% of district heating consumption is based on energy sources other than coal, oil or gas by 2030.

The parties to the agreement have also agreed that Denmark will work towards net zero emissions, in accordance with the Paris Agreement, and advocate for the adoption of a target of net zero emissions in the EU and Denmark by 2050 at the latest.

The agreement includes the following initiatives:

E1) World class offshore wind

E2) Renewable energy on market conditions

E3) Reduction of taxes on electricity and restructuring of surplus heat utilisation

E4) Targeted energy savings (E4a) and Support schemes to promote replacement of oil-fired boilers in favour of individual heat pumps (E4b)

E5) Modernisation of the heating sector and mitigating the impacts of eliminating the “base subsidy”

E6) Strengthened energy and climate research

E7) Denmark leading the way in exports of green energy solutions

E8) A smart and flexible energy system

E9) Funding for green transport

E10) Reserve for additional investments in RE from 2025 onwards

The elements in the 2018 Energy Agreement are described in greater detail in the sector chapters below.

4.1.2.2 Additional measures in 2019

In October 2018, the former government published its Climate and Air proposal “Together for a greener future”.

The climate and air proposal included additional initiatives of which the following have been adopted, implemented or are under implementation as of 1 November 2019:

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[52] https://en.efkm.dk/energy-and-raw-materials/energy-proposal/

- A commission for the transition to green cars must show the way (Commission established in February 2019) [C2 in draft NECP].
- No registration tax in 2019 and 2020 on green cars priced below 400,000 DKK (implemented) [C3 in draft NECP].
- Greater powers for municipalities to grant parking discounts for low-emission cars (Statutory order issued in February 2019) [C6 in draft NECP].
- Ensuring parking spaces with charging stations for low-emission cars (under implementation, meetings with stakeholders have been held) [C7 in draft NECP].
- Denmark's municipalities can grant low-emission cars permission to drive in bus lanes (Statutory order issued in March 2019) [C8 in draft NECP].
- An end to carbon emissions and air pollution from busses in Denmark's cities by 2030 – starting with the first step in 2020, where new buses must be CO_2-neutral (an introductory meeting with stakeholders has been held) [C10 in draft NECP].
- Clean air in Denmark's big cities – bringing environmental zones up to date (Act adopted in May 2019) [C11 in draft NECP].
- Petrol and diesel out of taxi operations by 2030 (12a on increased energy efficiency demands for new taxis: Statutory order issued in August 2019 / 12b on guaranteed licence for zero emission taxis (300 out of 750 until 1 January 2021): Act adopted in May 2019 with entering into force as of 1 July 2019) [C12 in draft NECP].
- Benefits for green taxis (13a on change to the relevant statutory order: adopted in March 2019 / 13b on green taxi priorities at Copenhagen Airport: Working group with airport authorities established) [C13 in draft NECP].
- Higher scrapping premium for old diesel cars (implemented 1 February – 1 July 2019)[53] [C14 in draft NECP].
- All new asphalt on national roads must be climate-friendly, if an ongoing pilot project can confirm the expected effects and durability of the asphalt (the results of an analysis are expected in 2019) [C16 in draft NECP].
- More environmentally-friendly cruise tourism in the Baltic Sea (funds have been allocated for four years: in total DKK 10 Million and one conference has been held) [C18 in draft NECP].
- Improvement of biogas plants (efforts initiated in 2019) [C21 in draft NECP].
- Stronger research efforts in agriculture. A DKK 90 million) [C23 in draft NECP] research programme has been established in 2019 for the period 2019-21. Extra DKK 30 million has been allocated to this initiative in 2022. Furthermore, DKK 40 mio. has been allocated to climate research in agriculture in 2020 as part of the Danish Green Development and Demonstration Programme (GUDP)).
- Promotion of precision agriculture (preparation of a pilot project in 2019) [C24 in draft NECP]. In the ongoing pilot projects on precision farming and fertilizer, efforts will also be made to calculate the possible side effects in relation to reducing greenhouse gases. The relevant outcome will be integrated in future work on climate.]
- Strategy for development of the natural gas system (under elaboration) [C30 in draft NECP].
- Analysis to improve the monitoring and accounting of carbon dioxide storage in soils and forests (work on such an analysis started in May 2019) [C35 in draft NECP].

The elements implemented or under implementation are described in greater detail in the sector chapters below.

53 https://mst.dk/service/nyheder/nyhedsarkiv/2019/jan/nu-fordobles-skrotpraemien-for-gamle-dieselbiler/ and https://mst.dk/service/nyheder/nyhedsarkiv/2019/jun/stop-for-ansoegninger-til-forhoejet-skrotpraemie-for-gamle-dieselbiler-pr-1-juli/

4.1.2.3 "A fair direction for Denmark" - the political understanding of 25 June 2019 and the agreement of 6 December 2019 on a new Climate Act

The Government's objective for 2030 is to reduce greenhouse gases by 70%, relative to 1990 levels and the long-term objective for Denmark is to obtain net-zero emissions no later than 2050.

On December 6, 2019 the Government reached an agreement on a new Climate Act with 8 out of the 10 parties in the Danish Parliament. The agreement includes the following key elements[54]:

- the Climate Act is legally binding,
- a target to reduce greenhouse gas emissions by 70 percent by 2030 compared to the 1990 level,
- commitment to reach net zero emissions by 2050 at the latest,
- a mechanism for setting milestone targets every five year with a ten-year perspective,
- during the Government's forthcoming Climate Action Plan in 2020, an indicative milestone target will be set for 2025,
- the milestone targets will be implemented into Danish law,
- emissions are calculated in accordance with the UN greenhouse gas inventory rules,
- the Government will develop annual Climate Programmes that will outline concrete policies to reduce emissions,
- a strengthening of the Danish Council on Climate Change (Klimarådet) with tasks such as:
    - presentation of professional assessments of whether the initiatives in the Government's Climate Programme is sufficient to reduce emissions
    - recommendations on climate initiatives,
    - doubling of the council's annual budget[55],
    - more experts are added to the council,
    - the council's political independence is strengthened as is can now elect its own chairperson and members,
- a new climate dialogue forum in relation to the Council on Climate Change with representatives from business organisations, think thanks, green organisations, worker's organisations and ministries,
- separate report on Denmark's impact on international emissions, including those pertaining to international shipping and aviation. Furthermore, reductions from electricity produced from renewable sources and the effects of Denmark's bilateral energy cooperation can be included in the separate report. Finally, the separate report will shed light on the impacts of consumption,
- formulation of a yearly global climate strategy to ensure that Denmark keeps on its ambitious work at the global scene.
- a citizens' initiative in relation to the Government's forthcoming Climate Action Plan in 2020.

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[54] For more information on the agreement on the Climate Act see: https://kefm.dk/media/12965/aftale-om-klimalov-af-6-december-2019.pdf

[55] As part of the agreement on the Finance Act 2020, 10m in 2020 and 15m annually in the period 2021-2023 was allocated to the strengthening of the Council on Climate Change.

The Climate Act is expected to be adopted by the Parliament in spring 2020.

Moreover, on 2 December 2019 the Government reached agreement with the Red-Green Alliance, the Social Liberal Party, the Socialist People's Party and the Alternative on the Finance Act 2020. With the Finance Act the parties agreed to implement a range of initiatives which will strengthen the effort for a better environment, create more nature and which is expected to reduce greenhouse gas emissions by approximately 0.5 million ton CO2- equivalents in the year 2030 on national level [56].

The Government has furthermore taken steps to ensure that climate, environment and nature will be considered across all relevant policy areas. A permanent government committee on green transition has been established to ensure that effects on climate, environment and nature is taken into account in government proposals and bills.

Moreover, Denmark has established a position among the world's elite in renewable energy through decades of committed efforts. With the Energy Agreement from June 2018 the parties have allocated funding that sets a course towards an RE (renewable energy) share of approximately 55% by 2030. The agreement will also give Denmark an RE share in electricity above 100% of consumption, while ensuring that at least 90% of district heating consumption is based on energy sources other than coal, oil or gas by 2030.

The Government (the Social Democrats) with the Red-Green Alliance, the Social Liberal Party and the Socialist People's Part have in the political understanding between the parties "A fair direction for Denmark" set the following climate and energy relevant objectives:

- **"Introduce binding targets.** During the first parliamentary year, the Government will present a proposal for a climate act with binding sub-targets and binding long-term targets, including:
  - A goal to reduce greenhouse gases by 70% by 2030, relative to 1990 levels. This is a very ambitious goal, and it will be particularly difficult to realise the last part of the goal, i.e. from 65% to 70%. This will require currently unknown methods and, therefore, also a close collaboration with the Danish Council on Climate Change and other experts.
  - That the Danish Council on Climate Change assists a the Government in making decisions on reduction targets and methods which ensure that Denmark complies with the Paris Accord temperature targets.
  - That an annual follow-up target assessment is performed, and that this follow-up is linked to the national budget process. [57]

- **Transport sector transition.** As part of a green mobility plan, a wide range of initiatives are required to ensure a significant increase in the number of electric vehicles on the roads and the required transport sector transition:
  - A stop to sales of all new diesel and petrol cars as of 2030 and enhanced low emissions zones.
  - It will be investigated whether the Commission for Green Transition of passenger cars can advance its work so that the final report is available before the end of 2020. As soon as possible thereafter, a political

[56] See the agreement on the Finance Act here: https://www.fm.dk/nyheder/pressemeddelelser/2019/12/finanslovsaftale-prioriterer-velfaerd-og-et-mere-groent-danmark

[57] Cf. above as a follow-up on the political understanding an agreement on the climate act was reached on 6 December 2019.

agreement must be reached to provide a sense of security to the industry and car owners and to ensure that the green transition can be undisturbed.
  - The Government will negotiate an infrastructure agreement, which will consider climate and environmental issues to a much higher degree. This requires investments in public transportation and cycling, among other things.
  - Implementing initiatives to ensure more sustainable aviation."

- **Secure climate contributions from agriculture.** Agricultural support shall be used as an active tool to provide farmers the incentive to transition to a more sustainable production and thereby supporting the green transition of the industry. The Government has decided to implement a pilot scheme for multifunctional land distribution which will contribute with experience and knowledge for a major land reform. It is important that it is designed in a way that contributes to solving multiple challenges at the same time and engages stakeholders.

- **"Adopt a climate action plan.** The climate act will be followed by a climate action plan, which will contribute to ensuring that national reduction targets are met. In addition to describing which initiatives, cf. above, will be required for the transport industry and agriculture, the action plan will also include the following elements:
  9) Energy efficiency measures, including energy saving requirements for public sector buildings;
  10) a national strategy for sustainable construction;
  11) a unified strategy for electrification of the transport sector, industry and society in general;
  12) increased funding for green research and demonstration programmes;
  13) investigating the potential for Denmark to prepare a common strategy with the North Sea nations for a significant expansion and exploitation of the offshore wind potential;
  14) investigating the potential for Denmark to construct the first energy island by 2030, with a minimum of 10 GW connected;
  15) support afforestation;
  16) climate adaptation, including stronger coordination of coast protection efforts.

- **Assume the responsibility for more ambitious targets in the EU and enhance green diplomacy**. EU started off as a coal and steel union. The Danish Government will propose the objective that a future EU will be a climate union. This means, among other things, that Denmark will be working towards increasing the EU climate targets in 2030, that the EU will be climate neutral by 2050 and that the future EU budget will focus more on climate. Denmark will also, together with other ambitious nations, push for an expansion of sustainable energy in the EU so that the EU becomes self-reliant in terms of energy. The Government will also strengthen green diplomacy, thereby increasing Denmark's international commitment. The Government will implement a new development policy strategy with climate assistance as a central element.

- **Create greater biodiversity and more woodlands.** There is a need for more untouched woodlands and more cohesive nature areas where nature is allowed to spread out on more natural terms than is currently the case. A biodiversity package will improve conditions for biodiversity in Denmark. The plan will include clear targets for the proportion of the area of Denmark to be laid out as nature zones (including untouched woodlands and national nature parks) as well as specific initiatives to ensure that targets are reached.

- **Strengthen green calculation models**. Climate and green transition considerations shall be integrated in the Ministry of Finance's calculation models, and the effort to develop greener calculation models will be secured and enhanced. A dialogue will be entered into with Statistics Denmark about strengthening the effort to produce green national accounts and GDP.

- **Increase organic foods targets and strengthen initiatives against food waste**. The Government will increase the ambitions for more organic foods in Denmark, starting with an aim to double organic farming acreage, the export of organic foods and the consumption of organic foods by Danes by 2030, and to implement initiatives to reduce food waste.

- **Include stakeholders.** With the purpose of qualifying and anchoring Denmark's green efforts, the Government will include stakeholders in the work on an on-going basis, including independent experts, popular movements and interest organisations. This will be the case, e.g., for areas such as promoting a strategy for circular economy, transitioning to a more energy-efficient society, smarter waste sorting and transitioning public sector procurements so that they support the green transition to a higher degree.[58]"

4.1.2.4 Denmark's climate policy and the EU climate policy

Danish climate policy is based on two pillars – the European and the national.

The EU is a player in international climate negotiations. In 2008, the EU Climate and Energy Package established EU targets for 2020 of a 20% reduction in greenhouse gases compared with 1990, 20% renewable energy and 20% energy-efficiency improvements cf. Box 4.1.The implementation of the Paris Agreement requires an ambitious common EU approach for the period after 2020. The need for a common EU approach was highlighted by the European Council in May 2013. After more than two years of negotiations the final elements of the "Clean Energy for all Europeans" package was adopted in 2018. The package is set to deliver on the EU targets for 2030 of a 40% reduction in greenhouse gases compared to 1990 levels, at least a 32% share of renewable energy consumption and an indicative target for an improvement in energy efficiency at EU level of at least 32.5% (compared to projections) cf. Box 4.1.

[58] The involvement of stakeholders include the Government's launch of climate partnerships with Denmark's leading private sector organizations on 13 November 2019. The aim is to pave the way for the sustainable solutions of the future.

4.2 LEGISLATIVE ARRANGEMENTS AND ENFORCEMENT AND ADMINISTRATIVE PROCEDURES

The legal basis for the division of powers into the legislative, executive, and judicial power is the Danish Constitution, *Danmarks Riges Grundlov*[59].

The Constitution includes the legal basis for how the Regent acts on behalf of the Realm in international affairs, and the Regent cannot act without the consent of the Folketing in any way that increases or restricts the area of the Realm, or enter into obligations requiring cooperation of the Folketing or which in some other way are of great significance to the Realm. Neither can the Regent, without the consent of the Folketing, cancel an international agreement entered into with the consent of the Folketing.

After a motion from the government, the Folketing thus gave its consent in 2002, allowing Her Majesty Queen Margrethe the Second, on behalf of the Realm and with territorial reservations for the Faroe Islands, to ratify the Kyoto Protocol. This was on 31 May 2002.

Denmark's implementation of the Kyoto Protocol in the first commitment period 2008-2012 has been effectuated by following up on the national Climate Strategy, sector-policy strategies with climate considerations, and concrete initiatives contributing to limiting or reducing greenhouse gas emissions, and implementation of the other parts of the Kyoto Protocol. The legislation necessary to do this has been adopted in pursuance of the Constitution regulations concerning legislative powers.

Pursuant to the Constitution, the Regent is the ultimate authority, cf. paragraphs 12-14:

"12. Subject to the limitations laid down in this Constitutional Act, the King shall have supreme authority in all the affairs of the Realm, and shall exercise such supreme authority through the Ministers.

13. The King shall not be answerable for his actions; his person shall be sacrosanct. The Ministers shall be responsible for the conduct of government; their responsibility shall be defined by statute.

14. The King shall appoint and dismiss the Prime Minister and the other Ministers. He shall decide upon the number of Ministers and upon the distribution of the duties of government among them. The signature of the King to resolutions relating to legislation and government shall make such resolutions valid, provided that the signature of the King is accompanied by the signature or signatures of one or more Ministers. A Minister who has signed a resolution shall be responsible for the resolution."

With this background, the Regent delegates responsibility for various functions to government ministers through Royal resolutions. This makes the various ministers for different areas responsible for, e.g. making proposals for new/amended legislation made necessary by the Kyoto Protocol, enforcement of legislation and initiation of necessary administrative procedures.

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[59] The Danish Constitution (Danmarks Riges Grundlov) (http://www.retsinfo.dk/_GETDOCI_/ACCN/A19530016930-REGL /: http://www.folketinget.dk/pdf/constitution.pdf)

The total set of regulations (in Danish) can be accessed via Retsinformation[60] (online legal information system). Legislation concerning measures of importance to Denmark's commitments under the Kyoto Protocol will be enforced pursuant to the current legal basis, including pursuant to any penalty clause. Enforcement could also involve the judicial power.

As regards the institutional arrangements for the implementation the Kyoto Protocol concerning activities in connection with participation in the mechanisms under Articles 6, 12, and 17 of the Kyoto Protocol, these tasks have been delegated to the Danish Energy Agency (DEA) under the Ministry of Energy, Utilities and Climate. The DEA is also responsible for legislation and administration of the EU emission trading scheme. The supplementary regulations regarding the approval and use of JI/CDM credits and the Registry are now regulated in Statutory Order No. 118 dated 28 February 2008 with later amendments (https://www.retsinformation.dk/Forms/R0710.aspx?id=144489).

Among the national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraph 3, and the elected activities under Article 3, paragraph 4, also contribute to the conservation of biodiversity and sustainable use of natural resources is The Forest Act (Consolidating Act No. 315 of 28 March 2019), and the implementation thereof by the Danish Environmental Protection Agency under the Ministry of Environment and Food. Preservation of areas designated as forest reserve land and protection of natural habitats and habitats for species are among the foremost objectives of the Forest Act.

Furthermore, activities under Article 3, paragraph 3, and the elected activities under Article 3, paragraph 4 have to be implemented in accordance with Natura 2000, which are the Special Areas of Conservation (SAC) designated according to the European Union’s Habitats Directive and the Special Protection Areas (SPA) designated according to the European Union’s Birds Directive. The Danish Ramsar Sites are included in the Special Protection Areas.

The Ministry of Environment and Food of Denmark, has the overall responsibility for the implementation of the Habitats Directive and the Birds Directive. The implementation includes the designation of 262 Special Area of Conservation, 113 Special Protection Areas and 28 Ramsar Sites. The rules for administration of the Danish Natura 2000 are laid down in Executive Order No. 1595 of 6 December 2018 on the Designation and Administration of Internationally Protected Sites and the Protection of Certain Species. Similar rules are integrated in other ministries legislation e.g. fisheries and constructions in marine areas.

4.3 POLICIES AND MEASURES AND THEIR EFFECTS

In this section, the individual measures relevant to Denmark’s climate policy are described. An overview of Denmark’s portfolio of climate relevant policies and measures is contained in Chapter 3 of the NECP (Table 8 with existing policies and measures).

Sections 4.3.1-4.3.4 includes descriptions of the cross-sectoral policies and measures, allowance regulation, the Kyoto Protocol mechanisms, taxes and duties and the national green climate fund. Sections 4.3.5-4.3.9 contains descriptions of policies and

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[60] http://www.retsinfo.dk/

measures in the following IPCC source/sink and sector categories: Energy (including Transport), Industrial Processes and Product Use, Agriculture, LULUCF (Land-use, Land-use change and Forestry) and Waste.

Table 4.1 shows how the allocation to be used in connection with the annual emission inventories (the CRF/IPCC format) is aggregated into the sectors included in this Chapter on policies and measures.

Table 4.1 Aggregation of source, sink and sector categories in the CRF/IPCC format into the sectors included in this chapter

Sectors in this chapter and Chapter 5	Sources/Sectors in the CRF/IPCC format	
Energy - with subsections on:	1.	Fuel combustion activities (1A) and Fugitive emissions from fuels (1B)
Business	1A2+ 1A4a+ 1A4c.	Manufacturing Industries and Construction Commercial/Institutional Agriculture, Forestry and Fisheries
Households	1A4b	Residential
Transport	1A3.	Transport (national)
Industrial Processes and Product Use	2.	Industrial processes and Product Use
Agriculture	3.	Agriculture
LULUCF	4.	Land-use, Land-use Changes and Forestry (LULUCF).
Waste	5.	Waste

Table 4.2 and Figure 4.8 show the main result of this aggregation, including indirect CO_2 emissions, for the historic greenhouse gas inventories in 1990, KP2 base year estimate for 1990/95[61] and 2017 as well as the August 2019 projections of annual emissions in 2020, 2025, 2030, 2035 and 2040 in the “with existing measures” (WEM) scenario[62] – with and without emissions and removals in connection with land use, land-use change and forestry (LULUCF)[63].

In accordance with the reporting guidelines, the following sector sections in this chapter are subdivided by gas.

The effects of existing policies and measures

Regarding the greenhouse-gas-reducing effects of existing measures, a major ex-post analysis of Denmark's efforts in 1990-2001 to reduce emissions of CO_2 and other greenhouse gases, and associated costs was finalised and published in March 2005 in the report, “Denmark's CO_2 emissions - the effort in the period 1990-2001 and the associated costs”[64], hereafter *the Effort Analysis*. The results of the *Effort Analysis* are described in Denmark’s 7th National Communication under the UNFCCC[65] (Annex B2).

Prior to this analysis, quantitative estimates of the effect of separate measures on greenhouse gas emissions were often limited to ex-ante estimates before the measure in question was adopted. In a few cases, the implementation of a measure was

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[61] Under the second commitment period of the Kyoto Protocol, Denmark's base year is 1990 for CO_2, methane and nitrous oxide, and 1995 for the industrial gases (HFCs, PFCs, SF_6 and NF_3 – however with no emissions of the latter) cf. Article 3.8 of the Protocol from the inventory reported, reviewed and resubmitted in 2016-2017 (https://unfccc.int/sites/default/files/resource/docs/2017/irr/dnk.pdf).

[62] https://presse.ens.dk/news/basisfremskrivning-2018-nu-paa-engelsk-316511

[63] Under the Kyoto Protocol, the LULUCF category is dealt with separately under Articles 3.3 and 3.4.

[64] Denmark's CO_2 emissions - the effort in the period 1990-2001 and the associated costs, Report from the Danish EPA, No. 2, April 2005 (Main report http://www.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and Annex report: http://www.mst.dk/udgiv/publikationer/2005/87-7614-589-1/html).

[65] https://unfccc.int/sites/default/files/resource/8057126_Denmark-NC7-BR3-2-NC7-DNK-Denmarks-NC7-and-BR3_1January2018-12MB.pdf

followed by an ex-post evaluation. A major reason that only a few ex-post evaluations of individual measures have been carried out is that it is often difficult to clearly attribute an observed greenhouse gas reduction to a particular measure, since many areas (sectors/sources) are affected by several measures at the same time.

In the analysis of the importance of selected, implemented measures for greenhouse gas emissions as a result of efforts in 1990-2001, the effect and cost of a number of measures were estimated - both for the year 2001 and for the period 2008-2012. Thus, the latter case is a so-called without measures projection i.e. without the effects of measures implemented since 1990, which gives estimates of the size of mean annual greenhouse gas emissions in 2008-2012, if the measures until 2001 had not been implemented.

Please note that the statistical base for *the Effort Analysis* has included the emissions inventory submitted to the EU and the UN in 2003 (covering 1990-2001) and the "with measures" baseline projection (2008-2012), i.e. without additional measures, published in February 2003 together with the Climate Strategy of the government in 2003.

In December 2013 the Ministry of Climate, Energy and Building published a paper with another ex-post analysis in response to recommendations in a report published by the National Audit Office in October 2012. This paper contains an evaluation of the effects of certain climate change mitigation measures selected by the National Audit Office. A translation of this paper is contained in Denmark's 7th National Communication under the UNFCCC[66] (Annex B3).

In December 2015 estimates of the total effect of the group of policies and measures that promote the use of renewable energy (RE-PAMs) and of the total effect of the group of policies and measures that promote energy efficiency (EE-PAMs) were elaborated. In September 2019 these estimates were updated on the basis of the most recent energy statistics covering the period 1990-2017 and the August 2019 "with measures" projection covering the period until 2040. The methodologies are further described in Denmark's 7th National Communication under the UNFCCC[67] (Annex B4).

Separate estimate of the effect of the 2018 Energy Agreement

In this report the effects of most of the additional policies and measures *adopted* with the 2018 Energy Agreement is included in the "With Existing Measures" (WEM) greenhouse gas projection scenario.

In 2018, it was estimated that the *2018 Energy Agreement* alone will provide a 10-11 million tonnes reduction in Denmark's total greenhouse gas emissions by 2030. The majority of these reductions will be within sectors covered by the EU's Emissions Trading System (EU ETS) as approximately 0.15-0.25 million tonnes CO_2 is estimated to be the reduction in 2030 outside of the EU ETS (non-ETS). Accumulated over the non-ETS reduction commitment period 2021-2030 the energy agreement's initiatives are expected to reduce carbon emissions from the non-ETS sectors by approximately 1.1 to 1.5 million tonnes CO_2 in the period 2021-2030. The largest contributions come from new energy saving subsidies and the reduced electricity heating tax which makes it more attractive to switch to heat pumps. With

[66] https://unfccc.int/sites/default/files/resource/8057126_Denmark-NC7-BR3-2-NC7-DNK-Denmarks-NC7-and-BR3_1January2018-12MB.pdf

[67] https://unfccc.int/sites/default/files/resource/8057126_Denmark-NC7-BR3-2-NC7-DNK-Denmarks-NC7-and-BR3_1January2018-12MB.pdf

these and other initiatives, the agreement will help Denmark reach its 39% greenhouse gas emissions reduction target by 2030 in the non-ETS sectors.

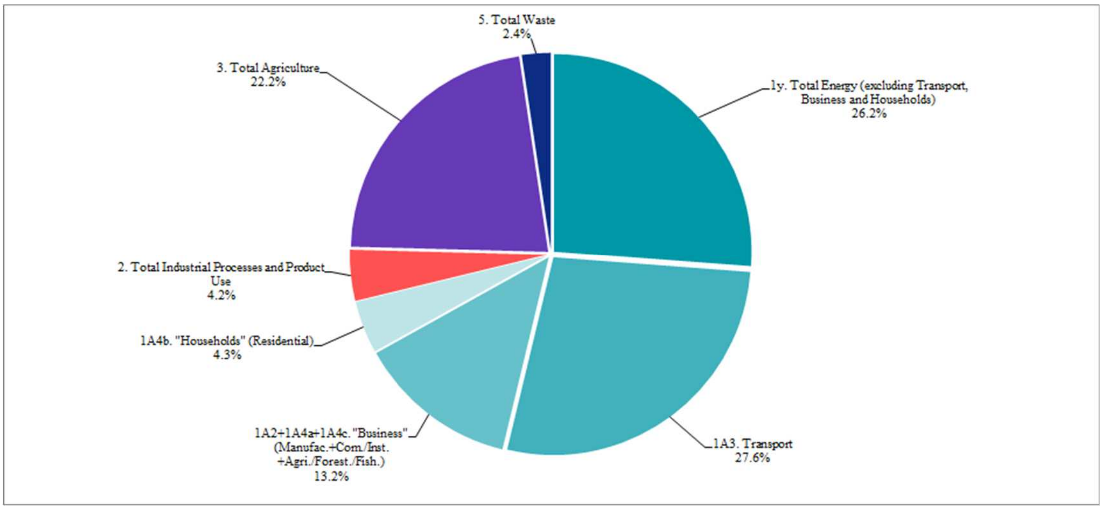
Table 4.2 Denmark's greenhouse gas emissions 1990-2017, the Base year under the second commitment period of the Kyoto Protocol and the main results of the August 2019 "with (existing) measures" (WEM) projection for 2020, 2025, 2030, 2035 and 2040 by sector and by gas (including indirect CO2), with and without LULUCF as reported under the UNFCCC

Source: Nielsen et al. (2019a), Nielsen et al. (2019b – to be published), Danish Energy Agency (2019) and Ministry of Climate, Energy and Utilities

GHG emissions (1990-2017) and projections (2018-2040)	1990 MtCO2e	1990 % share for/in sector	KP2 BY MtCO2e	KP2 BY % share for/in sector	2017 MtCO2e	2017 % share for/in sector	Change from 1990 (%)	Change from KP2 BY	2020 MtCO2e	2020 % share for/in sector	Change from 1990 (%)	Change from KP2 BY	2025 MtCO2e	2025 % share for/in sector	Change from 1990 (%)	2030 MtCO2e	2030 % share for/in sector	Change from 1990 (%)	2035 MtCO2e	2035 % share for/in sector	Change from 1990 (%)	2040 MtCO2e	2040 % share for/in sector	Change from 1990 (%)
Total (including LULUCF, with indirect CO_2)	75.2	107.0	70.8	100.0	50.9	106.2	-32.4	-28.2	46.9	105.7	-37.7	-33.8	43.7	105.8	-41.9	41.7	108.9	-44.6	40.0	108.3	-46.8	39.7	110.2	-47.2
CO_2 (with indirect CO_2)	59.4	84.5	54.8	77.4	37.8	79.0	-36.3	-31.0	34.5	77.7	-42.0	-37.1	31.5	76.1	-47.0	29.6	77.2	-50.2	28.0	75.7	-52.9	27.5	76.4	-53.6
Methane	7.8	11.1	7.9	11.1	7.1	14.8	-9.2	-10.0	6.7	15.2	-13.4	-14.3	6.8	16.4	-12.9	6.8	17.8	-12.4	6.8	18.3	-13.2	6.8	18.8	-13.3
Nitrous oxide	8.0	11.4	7.8	11.0	5.5	11.4	-31.5	-29.8	5.3	12.0	-33.6	-32.0	5.2	12.6	-35.0	5.1	13.3	-36.3	5.1	13.7	-36.4	5.2	14.4	-34.9
Industrial gases	0.0	0.1	0.3	0.5	0.5	1.0	1036.5	39.9	0.4	0.8	734.6	2.7	0.3	0.7	614.6	0.2	0.6	398.4	0.2	0.6	398.4	0.2	0.6	398.4
Total (without LULUCF, with indirect CO_2)	70.3	100.0	70.8	100.0	47.9	100.0	-31.9	-32.3	44.3	100.0	-36.9	-37.4	41.3	100.0	-41.2	38.3	100.0	-45.5	37.0	100.0	-47.4	36.0	100.0	-48.7
CO_2 (with indirect CO_2)	54.7	77.8	54.8	77.4	35.1	73.2	-35.9	-36.0	32.1	72.4	-41.3	-41.4	29.2	70.7	-46.5	26.4	68.8	-51.8	25.1	67.9	-54.1	24.1	66.8	-56.0
Methane	7.6	10.8	7.9	11.1	6.9	14.4	-9.4	-12.5	6.6	14.8	-13.4	-16.4	6.6	16.0	-13.0	6.6	17.3	-12.6	6.6	17.8	-13.5	6.6	18.2	-13.7
Nitrous oxide	8.0	11.3	7.8	11.0	5.5	11.4	-31.6	-30.1	5.3	12.0	-33.5	-32.0	5.2	12.6	-34.8	5.1	13.3	-36.2	5.1	13.7	-36.3	5.2	14.4	-34.8
Industrial gases	0.0	0.1	0.3	0.5	0.5	1.0	1036.5	39.9	0.4	0.8	734.6	2.7	0.3	0.7	614.6	0.2	0.6	398.4	0.2	0.6	398.4	0.2	0.6	398.4
1. Total Energy (with indirect CO_2)	53.5	76.1	53.6	75.7	34.1	71.2	-36.3	-36.4	30.9	69.8	-42.2	-42.3	28.0	67.6	-47.8	24.9	65.0	-53.5	23.6	63.9	-55.9	22.5	62.3	-58.0
CO_2 (with all indirect CO_2 here and no electricity trade after 2016)	52.8	98.6	52.9	98.6	33.3	97.7	-36.8	-37.0	30.2	97.8	-42.7	-42.8	27.3	97.6	-48.3	24.3	97.6	-54.0	23.0	97.6	-56.3	21.9	97.6	-58.4
Methane	0.4	0.7	0.4	0.7	0.4	1.1	-3.8	2.4	0.3	1.0	-21.9	-16.8	0.3	1.1	-23.0	0.3	1.0	-34.2	0.2	1.0	-41.6	0.2	0.9	-47.6
Nitrous oxide	0.4	0.7	0.4	0.7	0.4	1.2	11.9	11.0	0.4	1.3	7.9	7.0	0.4	1.4	6.2	0.3	1.4	-3.9	0.3	1.4	-6.9	0.3	1.4	-9.5
2. Total Industrial Processes and Product Use	2.3	3.3	2.6	3.7	2.0	4.2	-14.3	-24.0	2.0	4.5	-14.6	-24.3	2.1	5.0	-12.0	2.1	5.4	-11.6	2.1	5.6	-11.6	2.1	5.9	-8.7
CO_2	1.3	54.5	1.3	48.3	1.5	74.9	17.8	18.0	1.6	81.2	27.3	27.5	1.7	84.3	35.9	1.8	88.8	43.9	1.8	88.8	43.9	1.9	89.1	49.1
Methane	0.0	0.1	0.0	0.1	0.0	0.1	-6.0	-6.6	0.0	0.1	11.9	11.2	0.0	0.1	8.8	0.0	0.1	5.7	0.0	0.1	2.6	0.0	0.1	-0.5
Nitrous oxide	1.0	43.5	1.0	38.6	0.0	1.0	-98.1	-98.1	0.0	1.0	-98.1	-98.1	0.0	0.9	-98.1	0.0	0.9	-98.1	0.0	0.9	-98.1	0.0	0.9	-98.1
Industrial gases	0.0	1.8	0.3	13.0	0.5	24.0	1036.5	39.9	0.4	17.7	734.6	2.7	0.3	14.7	614.6	0.2	10.2	398.4	0.2	10.2	398.4	0.2	9.9	398.4
3. Total Agriculture	12.7	18.0	12.8	18.1	10.6	22.2	-16.0	-16.8	10.4	23.5	-17.7	-18.4	10.4	25.2	-17.8	10.5	27.4	-17.3	10.5	28.4	-17.1	10.8	29.9	-15.0
CO_2	0.6	4.9	0.6	4.8	0.2	2.1	-64.6	-64.6	0.2	2.1	-65.0	-65.0	0.2	2.0	-65.8	0.2	2.0	-66.6	0.2	2.0	-66.6	0.2	1.9	-66.6
Methane	5.6	44.1	5.8	45.6	5.5	52.1	-0.7	-4.8	5.5	52.4	-2.1	-6.1	5.6	53.4	-0.5	5.7	54.4	2.1	5.7	54.6	2.6	5.9	54.4	5.0
Nitrous oxide	6.5	51.0	6.3	49.6	4.9	45.8	-24.6	-23.1	4.7	45.5	-26.6	-25.2	4.6	44.6	-28.2	4.6	43.6	-29.4	4.6	43.5	-29.4	4.7	43.6	-27.3
4. Total Land-Use Categories (LULUCF)	4.9	7.0	0.0	0.0	3.0	6.2	-39.8	-	2.5	5.7	-48.6	-	2.4	5.8	-51.5	3.4	8.9	-31.2	3.1	8.3	-37.7	3.7	10.2	-25.5
CO2 (for KP2 BY only GHG emissions from deforestation)	4.7	95.5	0.0	100.0	2.8	92.6	-41.7	-	2.4	93.3	-49.8	-	2.2	92.5	-53.0	3.2	94.4	-32.0	2.9	93.6	-39.0	3.5	94.4	-26.4
Methane	0.2	3.9	0.0	0.0	0.2	6.5	-0.8	-	0.2	6.5	-14.4	-	0.2	7.3	-9.8	0.2	5.4	-5.7	0.2	6.2	-1.6	0.2	5.4	2.5
Nitrous oxide	0.0	0.6	0.0	0.0	0.0	1.0	3.7	-	0.0	0.2	-81.4	-	0.0	0.2	-78.7	0.0	0.2	-76.0	0.0	0.2	-73.3	0.0	0.2	-70.5
5. Total Waste	1.8	2.5	1.8	2.5	1.1	2.4	-35.8	-35.9	1.0	2.2	-44.8	-44.9	0.9	2.2	-48.0	0.9	2.2	-51.7	0.8	2.1	-55.6	0.7	1.8	-62.7
CO_2	0.0	1.2	0.0	1.0	0.0	1.4	-22.7	-10.5	0.0	1.8	-12.6	1.3	0.0	1.9	-12.6	0.0	2.1	-12.6	0.0	2.3	-12.6	0.0	2.7	-12.6
Methane (here including the estimated effects of biocovers)	1.6	92.0	1.7	94.8	1.0	85.1	-40.6	-42.5	1.0	104.5	-37.3	-39.3	0.8	83.2	-52.9	0.7	79.8	-58.0	0.6	78.0	-62.3	0.5	74.4	-69.9
Nitrous oxide	0.1	6.9	0.1	4.2	0.2	13.5	25.4	106.1	0.2	15.6	24.6	104.9	0.2	16.7	25.7	0.2	18.1	26.6	0.2	19.8	27.4	0.2	22.9	23.8
1x. Total Energy (excluding Transport)	42.8	60.8	42.9	60.6	20.9	43.6	-51.1	-51.2	17.6	39.6	-58.9	-59.0	14.6	35.4	-65.8	12.1	31.7	-71.6	11.6	31.4	-72.8	11.2	31.1	-73.8
CO_2 (with all indirect CO_2 here and no electricity trade after 2016)	42.2	98.7	42.3	98.7	20.3	97.0	-51.9	-52.1	17.0	96.9	-59.7	-59.8	14.1	96.4	-66.6	11.7	96.4	-72.3	11.2	96.6	-73.4	10.8	96.7	-74.4
Methane	0.3	0.7	0.3	0.7	0.4	1.7	17.4	17.8	0.3	1.7	-4.8	-4.5	0.3	2.0	-6.2	0.2	2.0	-20.3	0.2	1.9	-29.7	0.2	1.7	-37.1
Nitrous oxide	0.3	0.6	0.3	0.6	0.3	1.3	0.9	0.2	0.2	1.4	-5.9	-6.6	0.2	1.6	-10.4	0.2	1.6	-25.3	0.2	1.6	-29.3	0.2	1.6	-31.7
1A3 Transport	10.8	15.3	10.7	15.2	13.2	27.6	22.9	23.1	13.4	30.2	24.3	24.5	13.3	32.3	24.0	12.8	33.3	18.6	12.0	32.4	11.5	11.3	31.3	4.8
CO_2	10.6	98.3	10.6	98.5	13.1	98.9	23.5	23.5	13.2	98.9	25.0	25.0	13.2	98.8	24.6	12.6	98.7	19.1	11.8	98.7	11.9	11.1	98.6	5.1
Methane	0.1	0.7	0.1	0.5	0.0	0.1	-86.3	-80.9	0.0	0.1	-88.2	-83.6	0.0	0.1	-88.8	0.0	0.1	-88.2	0.0	0.1	-88.1	0.0	0.1	-88.5
Nitrous oxide	0.1	0.9	0.1	0.9	0.1	1.1	40.6	39.3	0.1	1.1	43.9	42.6	0.1	1.1	49.8	0.2	1.2	52.0	0.2	1.3	51.8	0.1	1.3	48.6
1y. Total Energy (excluding Transport, Business and Households)	28.1	39.9	28.2	39.8	12.5	26.2	-55.3	-55.5	9.9	22.2	-64.9	-65.0	7.5	18.1	-73.4	5.4	14.1	-80.8	5.3	14.3	-81.2	4.9	13.7	-82.5
CO_2 (with all indirect CO_2 here and no electricity trade after 2016)	27.8	99.0	27.9	99.0	12.2	97.3	-56.1	-56.2	9.6	97.2	-65.5	-65.6	7.2	96.2	-74.1	5.2	95.8	-81.4	5.1	95.9	-81.7	4.7	95.9	-83.0
Methane	0.1	0.5	0.1	0.5	0.2	1.6	43.2	43.2	0.2	1.6	9.8	9.8	0.2	2.2	18.0	0.1	2.6	-0.3	0.1	2.4	-8.0	0.1	2.4	-14.9
Nitrous oxide	0.1	0.5	0.1	0.5	0.1	1.1	-5.3	-5.0	0.1	1.3	-10.9	-10.7	0.1	1.6	-15.3	0.1	1.6	-36.6	0.1	1.6	-37.9	0.1	1.7	-40.8
1A2+1A4a+1A4c: "Business" (Manufac.+Com./Inst.+Agri./Forest./Fish.)	9.6	13.6	9.6	13.5	6.3	13.2	-34.0	-34.0	5.9	13.4	-37.8	-37.8	5.8	14.0	-39.4	5.6	14.8	-40.9	5.5	14.8	-42.7	5.5	15.3	-42.3
CO_2	9.4	98.6	9.4	98.5	6.2	98.0	-34.4	-34.4	5.8	98.2	-38.1	-38.0	5.7	98.1	-39.7	5.5	98.1	-41.2	5.4	98.1	-43.0	5.4	98.1	-42.6
Methane	0.0	0.5	0.0	0.5	0.1	0.9	21.7	15.3	0.0	0.8	2.4	-3.0	0.0	0.8	2.5	0.0	0.8	2.5	0.0	0.8	0.6	0.0	0.8	-1.1
Nitrous oxide	0.1	0.9	0.1	0.9	0.1	1.1	-21.0	-22.9	0.1	1.0	-30.8	-32.5	0.1	1.1	-30.7	0.1	1.1	-32.6	0.1	1.1	-34.5	0.1	1.0	-34.6
1A4b: "Households" (Residential)	5.1	7.3	5.2	7.3	2.1	4.3	-60.1	-60.2	1.8	4.0	-65.8	-65.9	1.3	3.3	-73.8	1.1	2.9	-78.7	0.9	2.3	-83.4	0.8	2.1	-85.3
CO_2	5.0	97.0	5.0	97.1	1.9	91.9	-62.2	-62.3	1.6	91.4	-67.8	-67.9	1.2	90.4	-75.6	1.0	90.4	-80.2	0.8	90.6	-84.5	0.7	91.2	-86.2
Methane	0.1	2.4	0.1	2.3	0.1	5.1	-13.8	-11.2	0.1	5.3	-24.3	-22.0	0.1	5.7	-37.2	0.1	5.4	-51.9	0.0	4.9	-65.9	0.0	3.9	-76.1
Nitrous oxide	0.0	0.6	0.0	0.6	0.1	2.9	89.4	88.8	0.1	3.3	85.8	85.2	0.1	3.9	68.1	0.0	4.2	45.4	0.0	4.6	23.2	0.0	4.9	16.6

Figure 4.8 Denmark's greenhouse gas emissions in 2017 by sector

Source: Nielsen et al. (2019) and the Danish Ministry of Climate, Energy and Utilities



4.3.1 Allowance regulation - Emission Trading Scheme

EU ETS 2005-2007

Directive 2003/87/EC on trading in CO_2 allowances (the EU ETS Directive) in 2005 introduced a greenhouse gas emissions allowance trading scheme in the EU. The objective of the allowance scheme is to reduce emissions of greenhouse gases so that the EU and its Member States can meet their reductions commitments under the Kyoto Protocol and the EU Burden-Sharing Agreement.

EU ETS 2008-2012

According to the EU ETS Directive, each Member State had to prepare a national allocation plan before the trading period 2008-12.

The European Commission approved the Danish National Allocation Plan (NAP2) in 2007. The NAP contained a detailed plan for the reduction efforts. In the NAP, the gap between the emission target and emission under business as usual amounted to 13 million tonnes CO_2 per year. Of this gap, 5.2 million tonnes CO_2 are covered by efforts in the emission trading sector, while the remaining 7.8 million tonnes CO_2 are covered by efforts in the non-emission trading sector using various instruments, including the use of CDM credits, sinks and additional domestic efforts. The NAP also ensures that Denmark honours the supplementarity principle.

Via the NAP, the allowance regulation in Denmark included individual emission limits 2008-2012 for CO_2 emissions from several sectors, which together produce approx. half of Denmark's total greenhouse gas emissions. Denmark allocated a total of 125 million CO_2 emission allowances during the five years of the scheme. Of these, 2.5 million have been allocated to new production units and major expansions. The rest have been allocated free of charge to those production units covered by the trading scheme in 2007.

In the following, only the principles and general figures for Denmark's implementation of the EU ETS Directive via NAP2 will be described.

From the 1 January 2008 the first Kyoto Commitment Period (CP1) commenced. In practice the EU ETS has not changed for the Danish operators under the EU ETS, even after the Community Independent Transaction Log and the registries under the

EU ETS connected to the International Transaction Log under the UN on 28 October 2008, as the registry was already ready to work in the international emissions trading system.

Relevant key figures in the NAP for Denmark for the period 2008 – 2012 are shown in Table 4.3.

Table 4.3: Key figures in the proposal for Denmark's national allocation plan 2008-12

Source: Denmark's National Allocation Plan 2008-12 (NAP2), 2007

	2003 emissions	Projected emissions 2008-12	Quota allocation 2008-12	Quota allocation 2005-07
	Million tonnes CO_2 equivalents per year			
Sectors subject to allowances, in total	36.6	29.7	24.5	33.5
- electricity & heat production	28.1	20.5	15.8	21.7
- other sectors subject to allowances, incl. offshore industries-	8.5	9.2	8.2	7.1
- auction			0	1.7
- new installations			0.5	1
Sectors not subject to allowances	*37.8*[1]	*38.1*		
Total	74.4	67.8		

[1] On the basis of the European Commission's broad definition of enterprises covered.

Denmark was committed to reducing its national greenhouse gas emissions by 21% in 2008-12, compared to 1990/1995 level. That meant that emissions had to be reduced to an average 54.8 million tonnes of CO_2 equivalents annually for the period.

In NAP2, the deficit between expected Danish emissions of CO_2 and the target Denmark was committed to achieving was expected to 13 million tonnes for the period 2008-12 if no further initiatives were implemented. The NAP documented how this deficit would be reduced to zero. As stated in NAP2, Denmark would meet its commitment through a combination of domestic and foreign environmental and energy measures by the government and by Danish enterprises with CO_2 emissions.

Denmark has had an active, environmentally oriented energy policy since the 1970s, and since 1990 this has been supplemented by an actual climate policy which, on an international scale, has entailed a major strain - economically and/or via administrative regulations - on most greenhouse gas emissions, especially from businesses and sectors not subject to allowances.

The period 2008 – 2012 was finalized in 2013 with the final surrendering of allowances and credits by companies participating under the EU ETS.

The final EU ETS accounting in Denmark for the period 2008-2012 shows that total verified CO_2 emissions under the EU ETS in Denmark were a little below the total amount of allocated allowances cf. Table 4.4. However, some companies have to some extent surrendered credits from JI and CDM projects and presumably instead sold or banked their surplus EU allowances.

Table 4.4: Verified CO_2 emissions under the EU ETS in Denmark, free allocations and surplus/deficit for the period 2008-2012

Source: Danish Energy Agency, May 2013

	Verified CO_2 emissions under the EU ETS in Denmark 2008-2012						Free allocation	Excess of quotas (negative number represents a deficit)
	2008	2009	2010	2011	2012	Annual Average 2008-12	Annual Average 2008-12	Annual Average 2008-12
	Million tonnes CO_2						Million tonnes EUAs	Million tonnes EUAs
Central power plants	17.6	17.8	17.2	13.8	10.9	15.46	13.4	-2.06
Industry and Service	5.3	4.3	4.2	4.3	4.3	4.48	5.8	1.32
Offshore	2.0	1.8	1.9	1.7	1.7	1.82	2.3	0.48
Other electricity and heat production	1.6	1.6	2.0	1.6	1.4	1.64	2.4	0.76
Total stationary[1]	**26.5**	**25.5**	**25.3**	**21.5**	**18.2**	**23.4**	**23.9**	**0.5**
Aviation[2]			(1.5)	(1.4)	1.3	1.3	1.1	- 0.2

[1] In 2012, a total of 375 stationary installations were covered. Of these were 16 central power and heat plants, 111 manufacturing industries, 241 decentralized electricity and district heating plants and 7 offshore companies.

[2] In 2012, total CO_2 emissions from the 26 aircraft operators covered by the EU ETS in Denmark exceeded the free allocation of allowances for 2012. It should be noted that aviation emissions for 2012 cannot be compared with previous years, as aircraft operators in 2012 have been able to make use of the EU Commission's "stop- the-clock " decision. This decision, which applies only for 2012, gives an operator the opportunity to deduct CO_2 emissions related to flights in and out of the EU. Most operators chose to make use of this opportunity.

EU ETS 2013-2020

The EU Climate and Energy Agreement from December 2008 extended the ETS system to 2013-2020 in order for the EU to reduce CO_2-emissions by 20% in 2020. At the same time allocation was centralised and reduced, while auctioning is being/have been used more extensively since 2013.

Free allocation for stationary installations is carried out on the basis of benchmarks. These benchmarks reward best practice in low-emission production and are an important signal of the EU's commitment to moving towards a low-carbon economy.

Although auctioning is the default method for allocating emission allowances to companies participating in the EU ETS, the manufacturing industry continues to receive a share of free allowances until 2020 due to carbon leakage. The heat production also continues to receive free allowances – however declining from 80% of the benchmark in 2013 to 30% of the benchmark in 2020 for those not being exposed to carbon leakage.

The allowances for the installations in the EU ETS have been calculated for 2013-2020 in accordance with the EU benchmarking decision 2011/278/EU. The Danish National Implementation Measures (NIM) list was approved by the European Commission in January 2014.

Waste incineration plants which are primarily used for district heating were included in the ETS in Denmark by 1st of January 2013, while about 30 installations exclusively using biomass were excluded of the ETS. The inclusion of waste incineration plants lead to an increase in the total amount of CO_2-emission from the ETS in Denmark in 2013 compared to 2012.

Aviation has been a part of ETS since 2012. Aircraft operators get free allowances based on their activity and the scope.

EU ETS 2021-2030

The legislative framework of the EU ETS for its next trading period 2021-2030 (phase 4) was revised in early 2018 to enable it to achieve the EU's 2030 emission reduction targets in line with the 2030 climate and energy policy framework and as part of the EU's contribution to the 2015 Paris Agreement.

The revision focuses on:

- Strengthening the EU ETS as an investment driver by increasing the pace of annual reductions in allowances to 2.2% as of 2021 and reinforcing the Market Stability Reserve (the mechanism established by the EU in 2015 to reduce the surplus of emission allowances in the carbon market and to improve the EU ETS's resilience to future shocks).
- Continuing the free allocation of allowances as a safeguard for the international competitiveness of industrial sectors at risk of carbon leakage, while ensuring that the rules for determining free allocation are focused and reflect technological progress.
- Helping industry and the power sector to meet the innovation and investment challenges of the low-carbon transition via several low-carbon funding mechanisms.

Denmark's national allowance registry

Denmark's national allowance registry – (DK ETR – Emission Trading Registry[68]) has been operating since 1 January 2005. The DK ETR is used to allocate allowances to production facilities subject to allowances and enables trade in allowances among the allowance holders found in the registry. Since the 1st of July 2012 the DK ETR has been a part of the EU ETS that host the emission trading registry for all of the member states in the EU. The DK ETR is constructed so it also fulfils all Kyoto requirements.

The DK ETR is also functioning as the national registry under the Kyoto Protocol. The establishment of a functioning DK ETR pursuant to the Kyoto Protocol is a prerequisite for the application of the Kyoto mechanisms.

4.3.2 The Kyoto Protocol mechanisms

For the period 2008-2012, the flexible Kyoto Protocol mechanisms have been important elements in supplementing domestic reduction measures aimed at fulfilling the international climate commitment under the Kyoto Protocol and the subsequent EU Burden Sharing Agreement.

For the period 2013-2020, the government will not use the flexible Kyoto Protocol mechanisms for the achievement of Denmark’s target under the EU Effort Sharing Decision, which is to be seen as Denmark’s contribution to the EU joint target under the 2nd commitment period of the Kyoto Protocol. For the achievement of the joint EU target for the EU Emissions Trading Scheme’s contribution to the EU joint overall target under the 2nd commitment period of the Kyoto Protocol, Danish entities under the EU ETS will be able to make use of the flexible Kyoto Protocol

[68] https://www.kvoteregister.dk

mechanisms subject to the conditions in the EU legislation. In the ETS, the use of international credits is capped (up to 50 % of the reduction required from EU ETS sectors by 2020). Quality standards also apply to the use of international credits in the EU ETS, including a ban on credits from LULUCF projects and certain industrial gas projects.

4.3.3 Taxes and duties

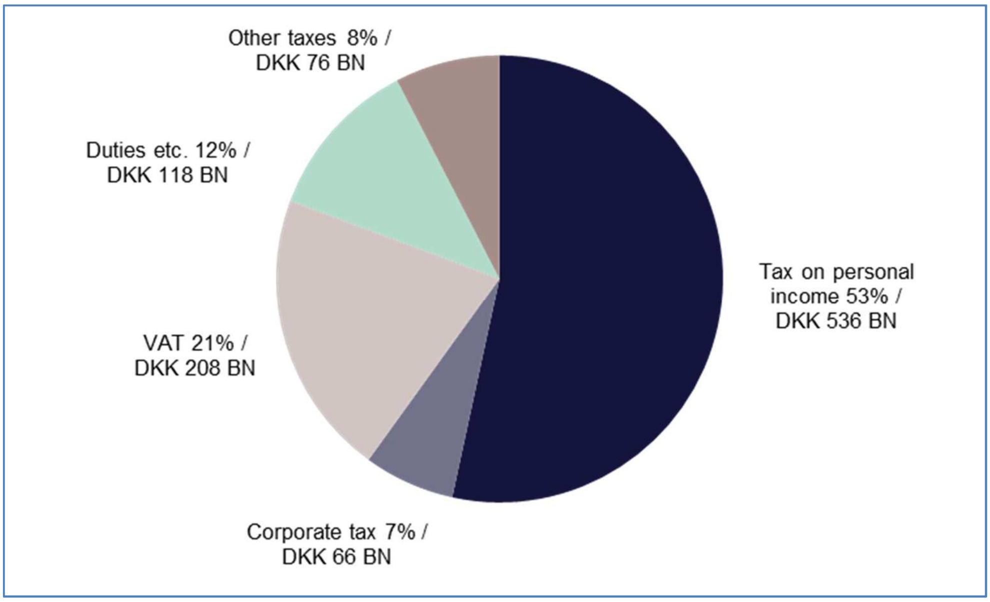
In Denmark, total taxes and duties made up a total of approx. 46% of GDP in 2017. The public sector provides childcare, education, unemployment benefits, health and disability benefits, old-age pensions, and many other services.

Personal income tax is the most important tax, constituting about half of total tax revenues. Other taxes are VAT, duties and corporation taxes. Danish VAT is relatively high, 25%, and there are no differentiated rates. There are a considerable number of additional consumption taxes and environmental taxes. The corporation tax rate is 22%.

Total revenue from all taxes and duties amounted to DKK 1,003 billion in 2017. The relative distribution is shown in Figure 4.9.

Figure 4.9 Relative distributions of taxes and duties 2017

Source: Ministry of Taxation, Statistics Denmark



Taxes that influence Denmark's greenhouse gas emissions

Retail prices on products that influence Danish greenhouse gas emissions are, in most cases, the decisive factor determining the degree to which they are consumed. Energy prices influence the composition and total size of energy consumption. Therefore extra taxes and duties put on products influence the consumption of these products and the size of greenhouse gas emissions associated with the use of the products.

Denmark has special taxes on motor vehicles, energy products, alcohol, tobacco, and a number of other products. During the past 25 years a number of new environmental taxes have been introduced. These taxes are imposed on consumer goods that cause pollution or are scarce (water, energy products such as oil, petrol, electricity, etc.) or on discharges of polluting substances (CO_2, HFCs, PVC, SF_6, SO_2, NO_x and sewage). Taxes are in accordance with EU legislation.

The introduction of CO_2 taxes and the increase in the rates of individual energy taxes since 1990 have had an effect on the consumption of a number of energy products and have therefore reduced the CO_2 emissions associated with consumption of these products.

4.3.3.1 CO_2, CH_4, and N_2O - taxes and duties relevant to these emissions

4.3.3.1.1 Energy

Denmark has had taxes on energy for many years. Since the first oil crisis in the early 1970s, the rates of the taxes have been aimed at reducing consumption and promoting the instigation of more energy-saving measures. Lower energy consumption will reduce emissions of CO_2, methane (CH_4), and nitrous oxide (N_2O) associated with combustion of fossil fuels.

Danish energy taxes are laid down in the four Danish tax acts on mineral-oil, gas, coal, and electricity, respectively (Mineralolieafgiftsloven, Gasafgiftsloven, Kulafgiftsloven, and Elafgiftsloven). Besides the energy taxes there is also a tax on CO_2, NO_x, sulphur and industrial gasses (see Table 4.5). As from 1 January 2016 the tax rates set in these tax acts follow a yearly regulation based on the consumer price index of two years prior except for the tax rates on industrial gasses.

Table 4.5 Energy taxes 2010-2018

Source: Ministry of Taxation

	Unit	2010	2011	2012	2013	2014	2015	2016	2017	2018
Coal	*DKK/toe*	2,399	2,445	2,487	2,533	3,006	2,282	2,299	2,315	2,324
Natural gas	*DKK/toe*	2,405	2,449	2,493	2,538	3,006	2,282	2,299	2,315	2,324
Oil products[1]	*DKK/toe*	2,400	2,443	2,487	2,532	3,009	2,282	2,299	2,315	2,314
Electricity: For heating	*DKK/kWh*	0.545	0.614	0.624	0.341	0.412	0.380	0.383	0.405	0.257[3]
Electricity: Other	*DKK/kWh*	0.659	0.730	0.742	0.755	0.833	0.878	0.885	0.910	0.914
Waste: Heating from waste	*DKK/toe*	1,930	2,035[2]	2,072	2,110	2,504	1,901	1,918	1,926	1,938
Other compostable biomass	*DKK/toe*	0	0	0	0	0	0	0	0	0

[1]Only oil used for other purposes than motor fuels
[2]From 1 January 2011 – 30 June 2011 the rate was 1955.2 DKK/toe, where toe is the energy unit "tonnes oil equivalents".
[3]From 1 January 2018 – 30 April 2018 the rate was 0.407 DKK/kWh.

A tax on NO_x (nitrogen oxides) was originally introduced as part of a 2008 energy agreement and came into effect on 1 January 2010 with a rate of 5 DKK per kg NOx. From 1 January 2012, a considerable increase in the taxation of NOx from 5 DKK per kg NOx to 25 DKK per kg NOx was implemented. However, the rate was reduced in 2016 to 5 DKK per kg NOx.

A tax on sulphur in fuels was introduced 1 January 1996 with a rate of 20 DKK per kg sulphur in fuels and a rate of 10 DKK for SO_2 emitted to the air. One of the side effects of this tax is assumed to be a reduction in CO_2 emissions.

In March 2012 a general agreement on Danish energy policy from 2012-2020 was made. The agreement seeks to ensure the transition from an energy supply based on fossil fuels to one based on renewable energy. Additional initiatives regarding taxes and duties have been adopted with the 2018 Energy Agreement and planned with the 2018 Climate and Air proposal. These initiatives are described later.

The Mineral-oil Tax Act entered into force on 1 January 1993. Before this, the tax on petrol was regulated via the Petrol Tax Act, which entered into force on 1 January 1983, and the Act on Taxation of Gas Oil and Diesel Oil, Heating Oil, Heating Tar, and Crude Oil was regulated via the Act on Taxation of certain Oil Products, which entered into force on 3 October 1977. Tax rates from recent years are shown in Table 4.6.

Table 4.6 Trends in taxes 2010-2018 under the mineral-oil tax act, stated in DKK/litre

Source: Ministry of Taxation

DKK per litre	2010	2011	01.01.12-30.06.12	01.07.12-31.12.12	2013	2014	2015	2016	2017	2018
Gas oil and diesel oil used as motor fuels	2.774	2.825	2.876	2.840	2.891	2.944	2.997	3.021	3.039	3.054
Light diesel oil	2.669	2.718	2.767	2.731	2.780	2.830	2.881	2.904	2.921	2.936
Diesel low in sulphur content	2.479	2.524	2.570	2.534	2.579	2.626	2.674	2.695	2.711	2.725
Diesel without sulphur	2.479	2.524	2.570	2.534	2.579	2.626	2.674	2.695	2.711	2.725
Fuel oil	2.330	2.372	2.415	2.415	2.835[1]	2.921	2.215	2.233	2.246	2.257
Auto gas	1.726	1.757	1.788	1.719	1.749	1.782	1.814	1.829	1.839	1.848

[1] In January 2013, the rate was 2.458, and from February to December the rate was 2.869.

From 1 June 1999 a tax differentiation between light diesel and diesel low in sulphur was introduced, to encourage the use of diesel low in sulphur, which is less polluting than light diesel. This was accomplished and a change took place soon after to the effect that almost all diesel sold was low in sulphur. The purpose of further differentiation from 1 January 2005 favouring sulphur-free diesel was likewise to encourage the use of this type of diesel in favour of diesel low in sulphur, and this has been successful.

In addition, tax differentiation has been introduced in order to achieve environmental goals other than direct reductions in greenhouse gas emissions. Thus tax differentiation has been introduced with a view to phasing out lead in petrol. The rate of tax to achieve this environmental goal is shown in Table 4.7.

TABLE 4.7 TRENDS IN TAXES ON DIFFERENT TYPES OF PETROL 2010-2018, DKK PER LITRE
Source: Ministry of Taxation

DKK per litre	2010	2011	2012	2013	2014	2015	2016	2017	2018
Petrol, with lead	4.567	4.649	4.733 / 4.700	4.785	4.871	4.959	4.999	5.028	5.053
Petrol, lead-free	3.881	3.951	4.022 / 3.989	4.062	4.134	4.209	4.243	4.268	4.289

[1] The term has been kept even though petrol companies in Denmark ceased using lead for octane improvement in 1994.

The gas tax on natural and town gas was introduced in its current form on 1 January 1996 with a rate for both natural and town gas at DKK 0.01/Nm^3. There has been taxation on gas, however, since 1 January 1979, when the tax on town gas and LPG was introduced. The tax on town gas was cancelled again in June 1983 and regulation of the tax on LPG was transferred to the Mineral-gas Tax Act when this Act entered into force. From 1 January 2015 a tax on biogas was introduced. The tax rates on gas from recent years are shown in Table 4.8.

Table 4.8 Taxes on gas 2010-2018, DKK per Nm^3

Source: Ministry of Taxation

DKK per Nm^3	2010	2011	2012	2013	2014	2015	2016	2017	2018
Natural gas	2.270	2.311	2.353	2.395	2.438	2.158	2.175	2.188	2.199
Town gas	2.270	2.311	2.353	2.395	2.438	2.158	2.175	2.188	2.199

The coal tax was introduced on 1 July 1982 and constituted DKK 127/tonne for hard coal and DKK 91/tonne for lignite and lignite briquettes on the day of entry into force. In the period 1 January 1997 - 31 December 2015 the tax increased from DKK 950/tonne to DKK 1526/tonne for hard coal and DKK 700/tonne to DKK 1036/tonne lignite. The rates have since 2008 developed as shown in Table 4.9. With effect from 1 January 1999, the so-called waste heat tax introduced (see Law no. 437 of 26 June 1998) as part of the Coal Tax Act. The waste heat tax was introduced in connection with increases in general taxes on fossil fuels to avoid giving too much incentive in favour of waste-based heat production, and to counteract the increased incentive for incineration of waste instead of recycling. From 1 January 2010 the tax was by burning waste converted from an amount of tax to a tax on energy and CO_2. Restructuring the waste incineration tax is no longer collected by Waste Tax Act, but is transferred to the Coal Tax and carbon dioxide tax law (see Law no. 461 of 12 June 2009 and the entry into force of Executive Order no. 1125 of 1 December 2009). Context of the proposal was especially that the then tax structure for waste fuels and fossil fuels taken together could result in waste streams are affected, so waste is not disposed of where it was most effective with regard to utilization of the waste energy. The purpose of the change was to make waste more cost-efficient, which means a welfare economic gain. The change improves the tax structure, because the waste now ordered virtually the same charges as fossil fuels. The restructuring charges will then be more neutral with respect to where the waste is burned. From 1 January 2010, energy from waste incineration imposed waste heat tax, surcharge and the CO_2 tax. CO_2 tax only if the waste is not biodegradable.

Table 4.9 Trends in coal taxes 2010-2018, DKK per tonne

Source: Ministry of Taxation

DKK per tonne	2010	2011	2012	2013	2014	2015	2016	2017	2018
Hard coal	1605	1634	1663	1693	2012	1526	1538	1547	1555
Lignite	1089	1109	1129	1149	1365	1036	1044	1051	1056

The electricity tax was introduced on 1 April 1977. With effect from 1 January 2013, the tax on electricity used for heating was reduced considerably, to take into account, that an increasing amount of renewable energy was being used in electricity production. It has been estimated that this will lead to an emission reduction outside the emissions trading scheme of 0.15 million tonnes CO_2 in 2015 and 0.29 million tonnes in 2018. Table 4.10 shows the development in electricity tax rates since 2010.

From 1 May 2018 until the end of 2019 the tax on electricity for heating is further reduced from DKK 0.407 per kWh by DKK 0.15 per kWh. In 2020 it is reduced by DKK 0.20 per kWh and from 2021 it is reduced by DKK 0.10 per kWh from 2021.

Further tax reductions on electricity are agreed with the 2018 Energy Agreement:

- The electrical heating tax will be reduced from 0.307 DKK/kWh to 0.155 DKK/kWh, effective 2021.

- The electricity tax will be reduced from 0.914 DKK/kWh to 0.774 DKK/kWh (phased in from 2019-2025).

- The electricity tax for certain liberal professions will be reduced from 0.914 DKK/kWh to 0.004 DKK/kWh in 2023. This implies that these liberal professions from 2023 will pay the same taxrate as other VAT-registered business.

Table 4.10 Trends in electricity taxes 2010-2018, DKK per kWh

Source: Ministry of Taxation

DKK per kWh	2010	2011	2012	2013	2014	2015	2016	2017	2018
Consumption of electricity, exceeding 4,000 kWh in all-year residences heated by electricity and electricity for space heating and comfort cooling in VAT registered business	0.545	0.614	0.624	0.341	0.412	0.380	0.383	0.405	0.257[1]
Other electricity	0.659	0.730	0.742	0.755	0.833	0.878	0.885	0.910	0.914

[1]From 1 January 2018 – 30 April 2018 the rate was 0.407 DKK/kWh.

The CO_2 tax on energy products was introduced on 1 March 1992 and was imposed on different types of energy products relative to their CO_2 emissions. A tax reduction was given to light and heavy industrial processes. From 1 January 2010 a structural change in the CO_2 tax was implemented as an adaption to the EU Emissions Trading Scheme. The tax rate was increased to DKK 150 /tonne of CO_2 indexed as mentioned below, cf. table 4.11. In total, this structural change in the CO_2 tax was estimated to lead to a reduction in the CO_2 emissions of 0.69 million tonnes.

Large waste incineration facilities are from 1 January 2013 included in the emissions trading scheme. This will lead to a reduction of CO_2 emissions outside the ETS of approximately 8.9 million tonnes.

Fossil energy products used for space heating are imposed the CO_2 tax regardless of the production is included in the ETS or not. Space heating included in the emission trading scheme is thus double taxed.

Table 4.11 CO_2 tax rates, 2000-2018, stated in DKK per tonne of CO_2

Source: Ministry of Taxation

DKK per tonne	2000-2004	2005-2009	2010[1]	2011	2012	2013	2014	2015	2016	2017	2018
Basic rate											
Heating in industry	100	90	155.4	158.2	161.1	164.0	166.9	170.0	171.4	172.4	173.2
Light industrial processes											
Basic rate	90	90	-	-	-	-	-	-	-	-	
With a voluntary agreement	68	68	-	-	-	-	-	-	-	-	
Resulting subsidy	22	22	-	-	-	-	-	-	-	-	
Heavy industrial processes											
Basic rate	25	25	-	-	-	-	-	-	-	-	
With a voluntary agreement	3	3	-	-	-	-	-	-	-	-	
Resulting subsidy	22	22	-	-	-	-	-	-	-	-	
Industrial processes covered by the Emission Trading Scheme											
Basic rate [2]	-	-	0	0	0	0	0	0	0	0	

[1] As of 1 January 2010 a structural change in the CO_2 tax was implemented. For the industries not regulated by the emissions trading scheme, a fixed lump sum transfer based on historical emissions was given, while the base rate was considerably increased to match the expected price of CO_2 quotas.

[2] Before 2010, the industrial processes covered by the ETS were taxed according to the table, depending on the type of process

Table 4.12 shows examples of the different types of CO_2 taxes converted into consumer units.

In addition to this, there are CO_2 taxes on heating tar, crude oil, coke, crude oil coke, lignite briquettes and lignite, LPG, and other gases.

As of 1 January 2008 the CO_2 taxes follow a yearly regulation of 1.8% in the period 2008-2015, similar to the energy taxes. From 2016 the tax is regulated with the consumer price index two years prior as the energy taxes.

Table 4.12 Examples of CO_2 taxes

Source: Ministry of Taxation

	Unit	2010	2011	2012	2013	2014	2015	2016	2017	2018
Gas oil and diesel oil	*DKK/litre*	0.413	0.420	0.428	0.435	0.443	0.451	0.455	0.457	0.460
Gas oil and diesel oil containing 4,8% bio fuel	*DKK/litre*	0.385	0.391	0.399	0.405	0.413	0.420	0.423	0.426	0.428
Fuel oil	*DKK/kg*	0.493	0.502	0.511	0.520	0.529	0.539	0.543	0.547	0.549
Lignite	*DKK/tonne*	225.8	225.9	225.10	225.11	301.3	306.8	309.8	311.1	312.6
Natural gas and town gas	*DKK/Nm³*	0.351	0.357	0.364	0.370	0.377	0.384	0.387	0.389	0.391
Petrol	*DKK/litre*	0.373	0.379	0.386	0.393	0.400	0.408	0.411	0.414	0.416
Petrol containing 4,8% bio fuel	*DKK/litre*	0.355	0.361	0.367	0.374	0.381	0.388	0.391	0.393	0.395

4.3.3.1.2 Transport

In the transport sector, the number of cars in Denmark and the use of motorised vehicles are influenced by the tax on cars and fuels. The latter has been described above.

The registration tax on motorised vehicles is calculated on basis of the value of the vehicle. It is furthermore integrated in the design of the registration tax that cars are granted deductions in the registration tax with reference to their specific energy efficiency and safety equipment. Cars with high energy efficiencies, such as electric vehicles, are granted large reductions in the registration tax. Passenger cars, light commercial vehicles and motorbikes are due to pay the registration tax.

The registration tax on electric vehicles is gradually introduced annually until 2023 when it is fully phased in. Furthermore a deduction dependant on battery capacity is given during the phase-in scheme. There is also a tax base deduction for electric and plug-in hybrid cars that amount to DKK 40,000 in 2019 and DKK 77,500 in 2020.In total, this means that electric cars with a value of up to DKK 400,000 (including VAT) currently on the Danish market will pay DKK 0 in registration tax in 2019 and 2020 and a low registration tax for more expensive electric vehicles. In addition, the part of the registration tax that will be phased in for plug-in hybrid cars, will be DKK 0 in 2019 and 2020 for most of the plug-in hybrid cars on the Danish market today.

Car owners have to pay half-yearly ownership taxes which are differentiated in accordance with the fuel efficiency of the cars, expressed in kilometres per litre. The energy consumption of electric cars is converted to a petrol fuel efficiency on the basis of the energy content of petrol. Examples of classes from 2018 for passenger cars are shown in Table 4.13.A and 4.13.B. From July the 1st 2018 the owner ship tax for cars registered in Denmark from October 3th 2017 is increased by 250 DKK half-yearly and there is introduced new classes in the ownership tax for the most energy efficient cars.

Hydrogen cars are not subject to registration tax nor ownership taxes before 2022. From 2022 there is a phase-in scheme of registration tax in 2022-2025 similar to the phase-in scheme for electric cars.

Table 4.13.a Examples from the Danish structure of tax incentives based on annual taxes on motor vehicles registrated in Denmark Before 3 october 2017 (2018), DKK/year

Source: Ministry of Taxation

Type of fuel	Fuel consumption (km/l)	Annual tax (DKK/year)
Petrol	> 19.9	660
	10.0 – 10.4	6,820
	< 4.5	22,860
Diesel	> 32.0	260
	28.1-32.0	1,200
	25-28.0	2,120
	22.5 - 24.9	2,980
	10.2 – 11.2	13,060
	< 5.1	33,440

Table 4.13.b Examples from the Danish structure of tax incentives based on annual taxes on motor vehicles registrated in Denmark from 3 october 2017 (From 1 July 2018), DKK/year

Source: Ministry of Taxation

Type of fuel	Fuel consumption (km/l)	Annual tax (DKK/year)
Petrol	> 49.9	660
	44.4 – 49.9	740
	33.3-36.3	860
	25.0-28.5	1,000
	22.2-24.9	1,080
	16.7-18.1	2,380
	< 4.5	23,360
Diesel	> 56.2	920
	50-56.2	1,000
	37.6-40.9	1,120
	28.1-32.0	2,200
	20.5-22.4	4,320
	10.2 – 11.2	13,560
	< 5.1	33,940

4.3.3.1.3 The household sector

For the household sector, the taxes levied on consumption of electricity and heat affect consumption figures, since these products become more expensive with the introduction of taxes.

4.3.3.2 HFCs, PFCs, and SF_6 - taxes and duties relevant to these emissions

Since 1 March 2001, imports of industrial gases HFCs, PFCs, and SF_6 (F-gases) in the industry/business sector have been subject to taxation. The tax is differentiated in accordance with the global warming potential of the substance with DKK 0.15 per kilogramme of CO_2 equivalents as the general principle and with DKK 600 per kilogramme as a general upper limit cf. the examples in Table 4.14.

As the taxes on industrial gases are based on the CO_2 tax, there was an increase in 2011, from DKK 0.10 per kilogramme of CO_2 equivalents to DKK 0.15, following the increased CO_2 tax rate shown in Table 4.11. The impact of this increase is expected to lead to a reduction in the emission of the industrial gasses of 0.02 million tonnes CO_2 equivalents.

Table 4.14 Examples of taxes on F-gases, 2018

Source: Ministry of Taxation

Substance	GWP	Tax in DKK per kg
HFC-134a	**1430**	215
R404a (a combination of 3 HFCs)	**3922**	588
SF_6	**22800**	600

4.3.3.3 Tax on methane emissions from natural gas fired power plants - equal in terms of CO_2 equivalents to the CO_2 tax.

As of 1 January 2011 a tax on methane emissions - equal in terms of CO_2 equivalents to the CO_2 tax - from natural gas fired power plants was introduced. This is expected to reduce methane emissions from gas engines through behavioural changes such as changing from motor operation to boiler operation and establishing mitigation measures. Consumption is also expected to fall as the price of heat will increase. These behavioural changes will result in falls in the emissions of unburned methane from power stations. In addition, CO_2 emissions will fall and consumption of natural gas will fall. In total, a decline of 0.06 million tonnes CO_2 equivalent emissions in 2 out of 5 years is expected, corresponding to an average annual reduction effect of approximately 0.02 million tonnes CO_2 equivalent per year in 2008-12.

Table 4.15 contains an overview of all existing taxes and duties relevant to greenhouse gas emissions in Denmark.

Table 4.15 Overview of Tax and Duty Measures

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO2 eq)**		Source of estimates
										2020	2030	
TD-1b: Mineral-oil Tax Act	Yes*	Energy, Transport	CO2, CH4, N2O	Demand management/reduction (Energy consumption)	Economic, Fiscal	Implemented	See text.	1993	Government: Ministry of Taxation	1200 and IE(G1 and G4)	1200 and IE(G1 and G4)	Estimates in 2017 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).
TD-2: Gas Tax Act	Yes*	Energy	CO2, CH4, N2O	Demand management/reduction (Energy consumption)	Economic, Fiscal	Implemented	See text.	1996	Government: Ministry of Taxation	IE (G1, G2 and G4)	IE (G1, G2 and G4)	
TD-3: Coal Tax Act	Yes*	Energy	CO2, CH4, N2O	Demand management/reduction (Energy consumption)	Economic, Fiscal	Implemented	See text.	1982	Government: Ministry of Taxation	IE (G1, G2 and G4)	IE (G1, G2 and G4)	
TD-4: Electricity Tax	Yes*	Energy	CO2, CH4, N2O	Demand management/reduction (Energy consumption)	Economic, Fiscal	Implemented	See text.	1977	Government: Ministry of Taxation	IE (G1, G2 and G4)	IE (G1, G2 and G4)	
TD-5: CO2 tax on energy products	Yes*	Energy	CO2	Demand management/reduction (Energy consumption)	Economic, Fiscal	Implemented	See text.	1992	Government: Ministry of Taxation	410 and IE (G1 and G4)	410 and IE (G1 and G4)	
TD-6: Green Owner Tax - a fuel-efficiency-dependent annual tax on motor vehicles	Yes*	Transport	CO2, CH4, N2O	Demand management/reduction (Energy consumption), Low carbon fuels/electric cars (Transport)	Economic, Fiscal	Implemented	See text.	1997	Government: Ministry of Taxation	IE (G1, G4 and G5)	IE (G1, G4 and G5)	
TD-7: Registration Tax - a fuel-efficiency-dependant registration tax on passenger cars and vans	Yes*	Transport	CO2, CH4, N2O	Demand management/reduction (Energy consumption), Low carbon fuels/electric cars (Transport)	Economic, Fiscal	Implemented	See text.	2000	Government: Ministry of Taxation	IE (G1 and G4)	IE (G1 and G4)	
TD-8: Tax on HFCs, PFCs and SF6 - equivalent to the CO2 tax	Yes*	Transport	HFCs, PFCs, SF6	Reduction of emissions of fluorinated gases (Industrial processes)	Economic, Fiscal	Implemented	See text.	2001	Government: Ministry of Taxation	IE (G1 and G6)	IE (G1 and G6)	
TD-9: Tax on methane from natural gas fired power plants - equivalent to the CO2 tax	Yes*	Energy	CH4, CO2	Reduction of losses (Energy supply), Control of fugitive emissions from energy production (Energy supply), Methane reduction ()	Economic, Fiscal	Implemented	See text.	2011	Government: Ministry of Taxation	30	30	Estimates in 2017 - based on The 2013 Analysis of the Effects of Selected Measures for the National Audit Office, Danish Energy Agency, December 2013 (http://www.ens.dk/sites/ens.dk/files/energistyrelsen/Nyheder/kyoto-samlenotat_9._december.pdf (an English translation is included in Denmark's 7th National Communication, Annex B3))
G2(former TD-1a): Energy taxes except on mineral oil	Yes*	Combined (TD-2, TD-3 and TD-4)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	1000	1000	Estimates in 2017 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).

* In principle included in the "with measures" projection scenario - not necessarily with separate annual estimates, but in most cases as a result of the assumption that the measure has contributed to the observed level of total Danish greenhouse gas emissions in the most recent historical inventory year used as the starting point for the projections.
** Estimated annual effects in 2020 and 2030 of measures implemented or adopted since 1990 - i.e. emission reductions and avoided emission increases since 1990.

4.3.4 The National Green Climate Fund

In connection with the PSO Agreement of 2016 a majority of political parties in the Danish parliament decided to allocate funds to a national green climate fund. The fund is targeted initiatives accross all sectors that promote the green transition in an appropriate manner, including in particular initiatives that can contribute to the to the achievement of Denmark's 2030 greenhouse gas emission reduction target in the non-ETS sector, etc. The total budget for the fund is DKK 375 million for the period 2017-2020 - with DKK 50 million in 2017, DKK 50 million in 2018, DKK 100 million in 2019 and DKK 175 million in 2020.

In June 2017, the 1st allocation of the budget was decided. From the budget for 2017, 2018 and partially 2019 a total of DKK 104-106 million has been allocated for the initiatives mentioned in Table 4.16. A short description of the initiatives is included below.

The estimated greenhouse gas emission reduction effect of these initiatives is in total up to 56,000 tonnes of CO_2 eq. annually in the period 2021-2030.

Table 4.16 Overview of the initiatives in the 1st allocation of funds in the National Green Climate Fund

DKK million	*2017*	*2018*	*2019*	*2020*
Annual budget	**50**	**50**	**100**	**175**
Measures in the district heating sector				
1.1 Establishment grants for electric heat pumps on non-ETS cogeneration plants	23.9	28.9	-	-
1.2 Mapping and advisory efforts for decentralized CHP plants	4.0	6.0	4.0	-
Other actions				
2. Recycling system for flammable refrigerants	2.5	-	-	-
3. Reduced retention time for slurry in stables	0.0	9.0	-	-
4. Climate-friendly road surface	0.6	3.1	-	-
5. Demonstration project - bio refinery plant	8.0	-	-	-
6. Measurement of nitrous oxide from wastewater	-	3.0	2.0	-
7. Heat pumps on subscription for the business sector	11.0	-	-	-
Total 1st allocation	**50.0**	**50.0**	**6.0**	**-**

1.1 Establishment grants for electric heat pumps on non-ETS cogeneration plants
For the purpose of promoting heat pumps, a temporary pool is set up for collective heat pumps at non-ETS cogeneration plants. The scheme includes heat pumps that utilize different heat sources, including surplus heat, heat from wastewater treatment plants, etc. The support will ensure a good framework for choosing heat pumps.

1.2 Mapping and advisory efforts for decentralized CHP plants
A targeted advisory scheme for decentralized CHP plants is introduced within and outside the ETS sector. The advice includes technical, administrative, financial and financial matters. The scheme shall include identification of concrete actions at the plants that can lower the heat price for consumers and greenhouse gas emissions from heat production. The technical efficiency improvements of the CHP plants are expected to lead to CO2 reductions in the sector.

2. Recycling system for flammable refrigerants
Funds are set aside for establishing a recycling system for climate-friendly but flammable refrigerants in cooperation with the refrigeration industry. In general, for fluorinated refrigerants, the more climate-friendly they are (low GWP), the greater flammability. With the establishment of a new recycling system, a significant barrier for the wider and accelerated use of climate friendly, but flammable, refrigerants is eliminated.

3. Reduced retention time for slurry in stables
Funds are allocated for a travel team that can support the 27 existing biogas joint facilities to conduct further investigations of barriers, development of solutions with more frequent collection of slurry from suppliers, as well as information / advice to suppliers regarding the importance of frequent collection in order to utilize the gas potential of the slurry. Biogas plants are generally expected to be of great interest in getting the slurry faster for degassing as it will provide a larger amount of gas with the same amount of slurry.

4. Climate-friendly road surface
A demonstration road with climate-friendly road surface / asphalt is set up with the aim of obtaining final clarity regarding laying techniques, durability and functional properties. In addition to delivering concrete reductions, the demonstration project will ensure that material selection and evaluation techniques have been tested and optimized in a real production environment.

5. Demonstration project - bio refinery plant
A pool will be allocated for targeted support for projects concerning establishment of a green bio refinery pilot plant. The establishment of a pilot plant for bio refining of green biomass can promote the use of agricultural crops with more positive climate and environmental impacts than, for example, grain crops. Bio refining of clover grass can produce a pulp for biogas, press cakes for cattle feed and protein concentrate for fodder products. The purpose of the pilot plant is to qualify, optimize and demonstrate the technology. The objectives are to reduce the technology costs, create a market segment and to map expected effects and side effects.

6. Measurement of nitrous oxide from wastewater
A prerequisite for reducing the emission of nitrous oxide from wastewater treatment plants is more accurate knowledge of the processes that lead to nitrous oxide formation. A pool is therefore established for tests on the measurement and regulation of nitrous oxide at the wastewater treatment plants. The purpose of the project is to 1) improve the accuracy of the national greenhouse gas emission inventories, 2) establish the basis for more accurate shadow price calculations for reduction measures in the area, 3) provide a basis for reducing nitrous oxide emissions from wastewater treatment plants that receive means for measuring and regulating nitrous oxide emissions as well as in other Danish wastewater treatment plants.

7. Heat pumps on subscription for the business sector
A pool is being established to support the purchase of a number of heat pumps by a number of energy service companies that they install with their customers. It is

expected that the scheme will lead to a large number of conversions from oil furnaces to heat pumps in the business sector during the next 4 years. It is also expected that the initiative could initiate a commercial market for fossil fuel conversion at companies.

In November 2017, the 2nd allocation of the budget was decided with the Agreement on Business and Entrepreneurship Agreement. From the budget for 2019 and 2020 a total of DKK 242,3 million has been allocated for lowering the electric heating tax cf. Table 4.17 (initiative no. 8). A short description of the initiative is included below.

Table 4.17 Overview of the initiative in the 2nd allocation of funds in the National Green Climate Fund

DKK million	*2017*	*2018*	*2019*	*2020*
Annual budget			**100,0**	**175,0**
1.2 Mapping and advisory efforts for decentralized CHP plants			4,0	
6. Measurement of nitrous oxide from wastewater			2,0	
8. Lower electric heating tax			67,3	175,0
Total 2nd allocation			**67,3**	**175,0**

Note: 2019 prices, including costs of administration

8. Lower electric heating tax

Reducing the electricity heating tax increases the incentive to use electric heat pumps, etc. in district heating production as well as in households and in business. It will also increase the incentive to use surplus heat. Reducing the electric heating charge will thus promote electrification in the heat supply and strengthen the green conversion. The parties to the Agreement on Business and Entrepreneurship agreed to reduce the electricity heating tax by an additional DKK 0.05 per kWh in 2019 and DKK 0.1 per kWh in 2020 funded by the funds allocated for the National Green Climate Fund.

In May 2019, the 3rd allocation of the budget was decided. Following the agreement on allocation of funds from June 2017 and the allocation of funds in connection with the Agreement on Business and Entrepreneurship Agreement in November 2017, there was DKK 26.7 million left to be allocated in 2019. As agreed in May 2019, a total of DKK 26.7 million has been allocated for the initiatives mentioned in Table 4.18. A short description of each initiative is included below.

Table 4.18 Overview of the initiatives in the 3rd allocation of funds in the National Green Climate Fund

DKK million	*2017*	*2018*	*2019*	*2020*
Annual budget			**26.7**	-
9. GHG accounting and awareness building at farm-level			7.7	-
10. Climate-friendly feed production			2.0	-
11. Promotion of green biorefining			14.0	-
12. Promoting climate-friendly construction			3.0	-
Total 2nd allocation			**26.7**	**-**

Note: 2019 prices, including costs of administration

9. Greenhouse gas accounting and awareness building at farm-level

There is a need to strengthen the individual farmer's knowledge of the climatic consequences of their production. Furthermore, provide them with some management tools to be able to plan their agricultural operation more climate-friendly. Therefore, an initiative is initiated to develop a concept for greenhouse gas accounting at the farm-level as well as an advisory concept in relation to climate-friendly production.

10. Climate-friendly feed production
Danish agriculture largely imports feed from abroad. Production and transport of these results in emissions of greenhouse gas. Increased production of grass protein in Denmark can help reduce greenhouse gas emissions and at the same time have a positive climate effect in Denmark, if cultivation of grass replaces the production of maize and grain. Therefore, an experiment is initiated on climate-friendly feed production, which will help to develop a Danish production of climate-friendly feed.

11. Promotion of green biorefining
Continued development of biorefining can help increase the demand for grass, which is a more environment- and climate-friendly crop than an annual grain crop. In order to make grass an attractive and competitive crop, the subsidy framework is extended to a scheme regarding promotion of green biorefining from the January 2018 Targeted Regulation Agreement to support commercial prototype plants.

12. Promotion of green building
Upscaling of the best solutions in green building - including wood construction - must ensure a lower climate impact from the construction. Therefore, there is a need to initiate analysis work and knowledge sharing to ensure that all construction partners can put the latest knowledge, research and innovation into practice. An initiative to promote green building must be initiated, which through a series of analyzes, etc. can gather knowledge and support learning about construction with low climate impact. The work may play a role in any subsequent work on developing a national strategy for green building.

4.3.5 Energy (Fuel Combustion, including Transport, and Fugitive Emissions from Fuels)

Greenhouse gas emissions from energy (as defined by the 2006 IPCC Guidelines for greenhouse gas inventories – i.e. from energy consumption and – in the case of Denmark – from flaring) made up 71% of Denmark's total greenhouse gas emissions in 2017 (without LULUCF), of which CO_2 was the primary emission. 97.7% of the emissions from the energy sector are CO_2. 1.1% is methane (CH_4), and the remaining 1.2% is nitrous oxide (N_2O).

4.3.5.1 CO_2

Energy production and energy-consuming activities in the transport sector and industry are main contributors to the total emissions of CO_2 due to use of large quantities of coal, oil and natural gas. The energy sector is, therefore, centrally placed in efforts to reduce emissions of CO_2.

Many initiatives have been taken over the years to reduce the emissions, and work is still going on to find the best and most cost-effective measures with the objective to fulfil Denmark's international climate obligations.

Danish experience shows that through persistent and active energy policy focus on enhanced energy efficiency and conversion to cleaner and renewable energy sources, it is possible to sustain high economic growth and at the same time reduce fossil fuel dependency and protect the environment.

The energy sector is fully liberalised. Today, electricity production from Danish power plants is controlled by market forces. Danish electricity generation is traded freely across national borders on the Nordic and the north-German electricity markets. Thus there is a significant extent of integration in the Northern European electricity market. This entails, for example, that increased use of renewable energy in the Danish electricity system or enhanced efforts to save electricity do not automatically mean that generation at coal-fired power plants is reduced correspondingly during the first commitment period of the Kyoto Protocol 2008-2012.

The introduction of the CO_2 allowance regulations through the EU emissions trading scheme (EU ETS) has been pivotal for Denmark’s possibilities to comply with the climate commitments. The EU ETS constitutes a central instrument in ensuring that the Danish energy sector is enabled to provide the reductions required if Denmark is to comply with its climate obligations. At the same time, the EU ETS permits significant improvements to the cost effectiveness of Denmark's climate effort.

The government’s long-term objective is to become a nation with an energy supply solely based on renewable energy sources and thus independent of fossil fuels.

The objective of the Danish energy policy today is security of supply, environmental concerns, energy savings and well-functioning energy markets within frameworks that secure cost effectiveness. Several initiatives often meet more than one of the purposes mentioned at the same time. Efforts concerning climate change should thus be seen in a broader context than CO_2 alone, not least when it comes to the purpose and calculation of effects.

Denmark gave priority to renewable energy sources and energy efficiency early on. Most of the public support schemes and regulations have prioritised energy efficiency and renewable energy. In this respect the development in Denmark has been quite different from other IEA countries, which have invested in new energy supply – notably nuclear energy.

Danish public support programmes have instigated competition amongst private companies. Most public support for energy research and development in Denmark has been open for competing applicants. Similarly, all procurement of energy technologies induced by public schemes has followed EU rules requiring open tenders or has left it to competitive markets in general.

A large number of policies and measures have been implemented over the years to meet the various energy-policy objectives cf. Table 4.16.

4.3.5.1.1 The allowance regulation relevant to the energy sector

A key instrument for reaching the goals for emission reductions is the EU Emission Trading Scheme (EU ETS), which is a CO_2 allowance scheme for energy production and energy-intensive industries as described in section 4.3.1. The EU Member States have devised this trading scheme for greenhouse gas emissions in order to fulfil the international climate commitments set out in the Kyoto Protocol, in particular with the aim of reducing CO_2 emissions from energy production and energy-intensive industries.

The allowances scheme entered into force on 1 January 2005. The 2005-2007 period was used as a testing phase. The EU ETS Directive has been revised a number of times.

The allowance allocation for 2008-2012 was determined on the basis of the national allocation plan from July 2006, submitted the European Commission. The EU ETS 2008-2012 has been an important measure in Denmark's fulfilment of its climate obligations under the first commitment period of the Kyoto Protocol. The scheme aligns well with government policy for the energy area on liberalisation of the energy markets and management of environment efforts by the market.

The installations subject to the allowance regulations account for a little less than half of Danish emissions of greenhouse gases. Almost all major Danish installations with considerable emissions are covered by the ETS. Most of these are generators of power and heat, the rest are industrial enterprises plus a few production units within the offshore sector.

Both the statutory and the administrative basis for the scheme have been established. The necessary legal basis was adopted by the Danish Folketing in June 2004 and the 2008-2012 national allocation plan was approved by the European Commission on 31 August 2007.

According to the national allocation plan for the period 2008-2012 an average annual allowance of 24.5 million tonnes CO_2 has been allocated. According to the allocation plan this should correspond to a drop in annual emissions of about 5 million tonnes per year in 2008-2012, or a reduction of about 17% compared with emissions expected in the national allocation plan for the period. This level was set by balancing environmental considerations against competitiveness and jobs:

- Electricity and heat producers were allocated about 15.8 million EAUs. The allowance for electricity generation is allocated as ”per kWh”, while for heat production allowances are allocated according to emissions in the base years 1998-2004.

- The other 133 installations (industry and offshore) have been allocated allowances corresponding to emissions in the base years 1998-2004. A total of 8.2 million tonnes CO_2 per year have been allocated to industry and offshore.

- A special reserve of 0.5 million tonnes CO_2 per year has been allocated with free allowances for new installations and significant extensions to existing units.

Allowances not allocated by the end of the commitment period or returned due to closures have been auctioned. The period 2008 – 2012 was finalized in 2013 with the final surrendering of allowances and credits by companies participating in the EU ETS as shown in section 4.3.1.

The new EU Climate and Energy Agreement from December 2008 extended the ETS system to 2013-2020 in order for the EU to reduce CO_2 emissions by 20% in 2020. At the same time allocation was centralised and auctioning is to be used more extensively from 2013. The allowances have been calculated for this period in accordance with the EU benchmarking decision 2011/278/EU.

The legislative framework of the EU ETS for its next trading period 2021-2030 (phase 4) was revised in early 2018 to enable it to achieve the EU's 2030 emission reduction targets in line with the 2030 climate and energy policy framework and as part of the EU's contribution to the 2015 Paris Agreement. Phase 4 of the EU ETS is still under implementation.

4.3.5.1.2 Energy and CO_2 taxes

Taxes have also been used for many years as an instrument to reduce CO_2 emissions from the energy sector, since fuels used for heat production are subject to energy and CO_2 taxes. The main objective is general GHG reductions and the promotion of the use of fuels with lower CO_2 emissions, mainly biomass. Energy and CO_2 taxes are described in detail in section 4.3.3.

4.3.5.1.3 Combined heat and power

The main elements of the Danish strategy to promote renewable energy and the efficient use of energy resources since the end of the 1970s have been increased use of CHP and expanding of district heating areas. Effective heat supply planning has ensured the highest share of district heating and CHP in the Western Hemisphere. This has secured early markets for district heating technologies and a possibility for the use of many renewable energy sources like straw, municipal waste, wood waste and geothermal energy. About half of Denmark's domestic electricity consumption is produced on CHP plants, and the potential for further use of CHP is limited. Wind energy delivered about 43 % of domestic electricity supply in 2017 and is expected to deliver around 53% of domestic electricity supply by 2020. For this reason the CHP production is expected to be reduced in the future, though CHP and the valuable services CHP plants provide - also in terms of back up capacity - is expected to remain an integral part of the overall system. CHP has been promoted partly by the tax system, partly by electricity production subsidies for biomass and biogas, partly by feed-in tariffs (replaced later by a “base subsidy”).

One of the initiatives in the 2018 Energy Agreement is the modernisation of the heating sector and mitigating the impacts of eliminating the “base subsidy”.

The regulations governing our heat production require modernisation. The energy agreement proposes a change of direction, granting greater flexibility and promoting new green solutions and technologies.

Regulatory constraints on the heat production of district heating plants will be eliminated, giving them the freedom to invest in transitions to greener energy, e.g. heat pumps, biomass and geothermal systems, thus enabling the transition towards a renewable energy system. The regulatory relief for individual district heating plants will depend on the size of their district heating areas. The last constraints are expected to be lifted by 2030 at the latest.

The 2018 Energy Agreement gives consumers a greater freedom of heating choice. The power to obligate consumers to be connected to the collective heating system will be abolished. This will allow for investment in other individual heating solutions, e.g. heat pumps for single homes.

No new consumer obligations will be permitted as from January 2019, while the consequences of repealing existing consumer obligations will be analysed before the parties to the agreement make a decision on such repeals.

The modernisation will ensure that the district heating sector remains viable without public subsidies once the so-called “base subsidy” is phased out. In the short term, the elimination of this base subsidy may cause higher heating bills for some consumers. Therefore, the energy agreement allocates 540m DKK in the period 2018-2023 for targeted efforts to help heating plants and consumers, and to help manage stranded costs.

The 2018 Energy Agreement will improve the legal and regulatory framework for the heating sector, supporting more voluntary investment in green solutions. This will facilitate the breakthrough of new technologies – heat pumps, geothermal solutions, solar PV, etc – in heating plants and in consumers’ homes.

4.3.5.1.4 Renewable energy

The increasing use of renewable energy sources is reducing emissions of CO_2 from fossil fuels. The long term goal for the Danish government is to be a climate neutral society by 2050. The initiatives in the 2012 Energy Agreement cover the energy policy areas for the period until 2020. With the 2018 Energy Agreement additional initiatives for the period after 2020 was adopted.

The expected headline results for 2020 are the following: more than 40% renewable energy in final energy consumption; approximately 50% of electricity consumption to be supplied by wind power; gross energy consumption will continue to drop up to 2020, but then rise slightly towards 2030; and greenhouse gas emissions will be reduced by 37% compared to 1990.

The expansion of energy from offshore wind turbines after 2020 will help ensure that nearly 55% of the nation’s energy needs are met with renewable energy by 2030.

Renewable energy sources are promoted with economic measures, including use of energy and CO_2 taxes on fossil fuels and through the Public Service Obligation Schemes (PSO), which have been a supplement to the price of electricity paid by all consumers until 2017. The Danish PSO levy will be phased out during a period of 5 years (2017-2022), and the financing of support to renewables will gradually shift to the State Budget.

As a first step a political agreement was reached in September 2017 on technology neutral tenders in 2018 and 2019 allowing photovoltaic panels and wind turbines to compete to deliver the most green power to consumers. The total budget for the tenders in 2018 and 2019 is approx. DKK 0.5 billion. In the 2018 a total of 160 MW onshore wind projects and 100 MW solar PV projects won in the tender round with an weighed average price premium of 23 DKK per MWh for a 20 year period.

In addition to the tender scheme, it was also agreed to allocate DKK 150 million for new test wind turbines to be established both inside and outside the two national test centres for large wind turbines in 2018 and 2019.

In accordance with the 2018 Energy Agreement renewable energy on market conditions will be pursued. This includes a continuation of the technology neutral tenders in 2020-2024 with a total budget of DKK 4.2 billion. The costs of establishing offshore wind turbines have decreased significantly in recent years. To support the continuation of this trend, the energy agreement will facilitate the creation of a better framework for realising Denmark’s offshore wind potential without state subsidies. However, subsidies may remain necessary for the installation of cables that transport green electricity from offshore wind farms to consumers’ outlets.

The 2018 Energy Agreement also establishes a reserve of 400m DKK in 2025 and 500m annually from 2026 to support further efforts to advance the use of RE.

The parties further agreed to allocate funding of 250m DKK annually in 2026-2030 for climate-related efforts. The parties also noted that the gradual expiration of subsidies funded by the PSO tax will free up finances that will be utilised to fund the initiatives in the 2018 Energy Agreement.

Wind power

The 2012 Energy Agreement includes a target of applying another 1900 MW of new capacity from onshore and offshore wind by the end of 2021. Most of the new capacity will come from offshore wind power. In this respect the Danish Energy Agency was responsible for tendering 1350 MW new offshore capacity: The Horns Rev 3 tender of 400 MW in the North Sea, which was inaugurated on 22 August 2019[69], the Kriegers Flak tender of 600 MW in the Baltic Sea with expected commissioning in the period 2019-21 and the so-called near shore tender of 350 MW – Vesterhav Nord and Syd - with expected commissioning in 2023. Also following from the 2012 Energy Agreement the Nissum Bredning test project (28MW) was inaugurated on 12 May 2018[70]. As a result, wind energy is expected to cover 50 % of Danish electricity consumption in 2020.

The 2018 Energy Agreement includes the establishment of three new offshore wind farms 2018-2030 that will supply at least 2,400 MW of green electricity to the energy system[71] – more than the total combined electricity consumption of all Danish households. A variety of factors will be considered before choosing the location of the offshore wind farms, including cost, the surrounding environment, and seabed conditions. A cost-effective expansion of wind energy is essential. Therefore, a sound procurement process will allow for maximum competition to achieve the lowest possible price. In recognition of the significant aesthetic impact that offshore wind turbines can have on the coastal landscape, the energy agreement expands the power of municipalities to reject offshore wind turbines from 8 km to 15 km off the shore.

Biomass

In 2017, biomass accounted for approximately 54% of renewable-energy production, mostly in the form of straw, wood pellets, wood chip and biodegradable waste for incineration. Approximately 82% of the biomass was imported, mainly in the form of wood pellets (54 PJ), biofuels (10.4 PJ), wood chips (5.5 PJ), fire wood (2.6 PJ) and biodegradable waste for incineration (2.2 PJ).

The energy production from biomass has more than doubled since 1990 - primarily due to the policy agreement from 1993 (the Biomass Agreement: requires power plants to use 1.4 million tonnes of straw and wood, equivalent to almost 20 PJ per year) and the policy agreement from February 2008 on the increased use of straw and chips at the large co-generation plants (up to 700,000 tonnes in 2011). At the same time, the consumption of biomass continues to rise as a source of energy for the

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[69] https://kefm.dk/aktuelt/nyheder/2019/aug/danmarks-stoerste-havmoellepark-viser-vejen-mod-groen-fremtid/ and https://group.vattenfall.com/press-and-media/news--press-releases/pressreleases/2019/vattenfall-inaugurates-scandinavias-largest-offshore-wind-farm

[70] https://www.tvmidtvest.dk/artikel/her-er-de-vilde-med-vindenergi-moeller-rejst-uden-protester

[71] This was reported as Planned Measure no. E1 in the draft NECP as it was not included in the WEM-projection scenario. The measure is now included in the August 2019 WEM-projection scenario and therefore reported here as adopted.

supply of heat in district-heating plants and in smaller installations for households, enterprises and institutions.

Although it was demonstrated in Denmark in the mid-1990s that biogas plants can be established with reliable operation and with an acceptable economy biogas still only accounted for 6.5% of renewable-energy production in 2017.

Liquid biofuels, such as animal and vegetable oils, biodiesel and bioethanol, is used only on a small scale. Liquid biofuels from bio-waste by the so-called second generation technologies are now at a low level.

4.3.5.1.5 Fuel conversion from coal to natural gas

Substitution of coal and oil by natural gas reduces emissions of CO_2. The first Danish natural gas was landed from the Danish sector of the North Sea in 1984, and since then consumption of natural gas has increased to 193 PJ in 2001. Since then, consumption has decreased to 117 PJ in 2017 due mainly to high gas prices. In 2017, natural gas covered 16% of gross energy consumption. In the power sector, natural gas was introduced in 1985 and peaked with 25% around 2000. In 2017, this had decreased to 7.6%, mainly due to the relation between power prices and gas prices. The use of natural gas is expected to decrease further as a result of introducing more renewable energy and extensive energy-saving policies.

In accordance with the 2018 Energy Agreement, the government will formulate a gas strategy that will provide the necessary basis for a market-based and commercially-utilized gas system. The strategy will, inter alia, explore the potential of biogas and other green gases, thus contributing to a climate-neutral Denmark by 2050 at the latest.

4.3.5.1.6 Research and development

Danish support for new energy technologies has been comprehensive and relatively stable. A long list of direct and indirect support schemes and policies have, in combination, created a domestic market which has given Danish companies a boost. This boost has enabled many companies to become international market leaders. Danish companies continue to enjoy commercial success within the energy-related marketplace.

R&D activities include energy savings, more efficient energy conversion, renewable energy technologies and efforts within System Integration and Smart Energy.

Research and development activities in the field of energy are not motivated solely by climate issues, but are relevant to climate issues, since they contribute to determining the overall framework for the CO_2 intensity of energy production and consumption in the future.

There is a broad political commitment to support R&D activities through public funding and the Danish Government has in its manifesto by November 2016 stated that Denmark is committed to an ambitious green transition for the national energy supply. This calls for comprehensive R&D efforts for the development of improved and new sustainable energy technologies.

Denmark is one of the partners in the public-private initiative Mission Innovation comprising 22 countries and the European Commission. The aim of Mission Innovation, that was founded in relation to the COP21 in Paris 2015, is to strengthen the multilateral R&D efforts within clean energy technologies to promote a continuous cost effective green transition of the energy systems.

Thus Denmark as one of the partners has chosen to strengthen the dedicated public investments in clean energy research, development and demonstration focusing on reduction of technology costs and CO_2 emissions and with an emphasis on innovative projects that can be replicated and scaled up with the involvement of private investors. Denmark will seek to double these efforts departing from a baseline of the average funding to the Danish Energy Technology Development and Demonstration Programme (EUDP) of the years 2015-2016 and until 2020 where DKK 580 million will be allocated.

The EUDP programme was established in 2008 and since then the programme has supported more than 600 projects with a total of DDK 3 billion. On average, 45-50% of the activities under the Programme are financed by the EUDP and hence the private investments in the supported projects are of the same size as the public support leading to approximately to DKK 6 billion in total investments. The Danish Parliament has dedicated DKK 400 million for EUDP for the fiscal year 2018.

A minor programme is administrated on behalf of the power distribution companies by the Danish power association Dansk Energi. The objective is to support research and development within energy-efficient use of electricity through development of energy-efficient products and processes in buildings, industry etc. The annual funds for this programme are DKK 25 million.

Activities relating to strategic research and innovation in general are since 2014 administrated by Danish Innovation Fond. The Fund covers all sorts of research and innovation projects and is not limited to energy matters. However, for 2017 and 2018 DKK at least 100 million /year will be earmarked for R&D within new and clean energy technologies.

In 2018, the energy and climate research was strengthened with the 2018 Energy Agreement.

The parties to the 2018 Energy Agreement intend to phase in additional state funding for energy and climate research, going from 580m DKK in 2020 to a target of 1 billion DKK annually from 2024. These funds will be earmarked for research, development and demonstration of new technology.

Intensifying energy and climate research as we move towards 2030 will ensure continued efforts to develop the technologies that will help Denmark's energy system transition to cleaner and greener solutions. Research and development in new energy and climate technology solutions will also generate new opportunities for growth, jobs and Danish technology exports.

The research funding will support Denmark's commitment to the international collaboration Mission Innovation, in which a number of countries have pledged to increase energy research funding by 2020. With an ambitious funding target of 1 billion DKK from 2024 onwards, Denmark further cements its long-term commitment to research, development and demonstration in the field of energy and climate. Through Danish initiatives such as the Energy Technology Development and Demonstration Program (EUDP) and Innovation Fund Denmark, Denmark is contributing to the global cooperation to develop the energy and climate technologies of tomorrow.

The EUDP funding will support the development and demonstration of Danish energy technology solutions, with a view to subsequent commercialisation. These solutions may range from new floating foundations for offshore wind turbines, to large scale demonstration projects such as Nordhavns Lab, which intelligently integrates various energy technology solutions.

Strategic and applied energy research is among the many activities supported by Innovation Fund Denmark. This funding is awarded directly to talented researchers, entrepreneurs and companies, as well as to others with strong ideas about energy technology solutions for the benefit of society.

4.3.5.1.7 Energy savings

Reducing energy consumption by increasing energy efficiency and promoting energy saving is a very important element for Danish energy policy.

Among the grid and distribution companies (electricity, natural gas, oil and heating), the electricity companies have been working with energy savings since the early 1990s and the natural gas and district heating companies have been working with energy savings since 2000.

Since 2006, several political agreements have been reached to significantly strengthen the energy savings efforts in Denmark.

The obligations have been implemented as voluntary agreements between the Minister of Energy, Utilities and Climate and grid and distribution companies. Energy companies' costs are financed by a levy on their tariffs.

In the policy agreement from 2012, the obligation for the grid and distribution companies in the electricity, natural gas, district heating and oil sectors was increased by 75% in 2013 and 2014 (to 10.7 PJ) and by 100% in 2015 (to 12.2 PJ). In December 2016, the Minister of Energy, Utilities and Climate entered a new agreement on energy savings with the grid and distribution companies for the period 2016-2020. The obligation was decreased from 12.2 PJ to 10.1 PJ in 2016 to 2020. The agreement ensures Denmark's continued implementation of Article 7 of the EU Energy Efficiency Directive.

Targeted work to improve energy efficiency specifically in the public sector has been going on for many years, and considerable savings have been achieved. In 2014 a new circular on energy efficiency in state institutions was reviewed in line with the requirements in Articles 5 and 6 of the EU Energy Efficiency Directive.

The ministries obligated under the existing Ministerial Order are bound by an energy savings target, but are at liberty to pursue the instruments which are most cost effective in their particular circumstances, including deep renovations; behavioural measures etc.

Data on energy consumption in the public sector have been collected for some years as means of rendering the sector's energy consumption visible.

Table 4.16 Measures in the energy sector (See also specific measures in Table 4.17 (Business), 4.18 (Household s) and 4.19 (Transport)).

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO2 eq)**		Source of estimates
										2020	2030	
EN-1: EU-CO2-emission trading scheme for electricity and district heat production and certain industrial processes (incl. Business) and aviation from 2012	Yes*	Energy, Industry/Industrial processes, Cross-cutting	CO2	Switch to less carbon-intensive fuels (Energy supply), Increase in renewable energy (Energy supply), Efficiency improvement in the energy and transformation sector (Energy supply), Control of fugitive emissions from energy production (Energy supply)	Regulatory, Economic	Implemented	See text.	2005	Government: Danish Energy Agency and entities uner the EU ETS	IE (G1, G3 and G4)	IE (G1, G3 and G4)	
EN-2: Biomass Agreement (Agreement on the use of biomass in electricity production)	Yes*	Energy	CO2	Increase in renewable energy (Energy supply)	Economic, Voluntary Agreement	Implemented	See text.	1993	Government: The electricity producers	1100 and IE (G1 and G3)	1100 and IE (G1 and G3)	Estimates in 2017 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).
EN-3: Price supplement and subsidies for renewable energy production	Yes*	Energy	CO2	Increase in renewable energy (Energy supply)	Economic	Implemented	See text.	2008	Government: Danish Energy Agency and entities responsible for energy production	IE (G1 and G3)	IE (G1 and G3)	
EN-4: Tenders for offshore wind turbines	Yes*	Energy	CO2	Increase in renewable energy (Energy supply)	Regulatory	Implemented	See text.	2013	Government: Danish Energy Agency and entities responsible for energy production	IE (G1 and G3)	IE (G1 and G3)	
EN-5(expired): Scrapping scheme for old wind turbines	Yes*	Energy	CO2	Increase in renewable energy (Energy supply)	Economic	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish	See text.	2008	Government: Danish Energy Agency	IE (G1 and G3)	IE (G1 and G3)	
EN-6: Energy development and demonstration	Yes*	Energy	CO2, CH4, N2O	Research and development (), Research and development (), Research and development ()	Information	Implemented	See text.	2008	Government: EUDP Secretariat c/o Danish Energy Agency	IE (G1)	IE (G1)	
G4: All EE mitigation actions (Energy Efficiency) since 1990	Yes*	Combined (TD-b1, -2, -3, -4, -5, -6, -7; EN-1; BU-1, -2, -6, -7, -9, -10; TR-1a, -1b, -2, -3, -4, -5, -6, -7, -10, -11, -12; HO-1, -2, -3, -4, -5, -6)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	17583	13231	Estimated in September 2019 based on the energy projection from August 2019. The methodology is described in Denmark's 7th National Comminication, Annex B4.

* In principle included in the "with measures" projection scenario - not necessarily with separate annual estimates, but in most cases as a result of the assumption that the measure has contributed to the observed level of total Danish greenhouse gas emissions in the most recent historical inventory year used as the starting point for the projections.
** Estimated annual effects in 2020 and 2030 of measures implemented or adopted since 1990 - i.e. emission reductions and avoided emission increases since 1990.

4.3.5.1.8 *Specific measures in the business sector (Fuel combustion in Manufacturing Industries and Construction, Commercial/Institutional and Agriculture, Forestry and Fisheries)*

Energy use in the business sector covers energy use in Manufacturing Industries and Construction, Commercial/Institutional and Agriculture, Forestry and Fisheries (cf. the 2006 IPCC Guidelines for greenhouse gas inventories). In 2017, energy use in the business sector was responsible for 13.2% of Denmark's total greenhouse gas emissions.

In 2017, the greenhouse gas emissions from energy use in the business sector decreased by approximately 34% from 9.6 million tonnes CO_2 equivalents in 1990 to 6.3 million tonnes CO_2 equivalents in 2017, primarily due to improvements in energy efficiency and energy savings.

According to the August 2019 projection, the expected emissions from the business sector's energy use are an average of 6.3 million tonnes CO_2 equivalents in 2017 decreasing to 5.6 million tonnes CO_2 equivalents in 2030.

The on-going initiatives to reduce emissions from the business sector include promotion of energy savings and energy-efficiency improvements as well as conversion of energy production to cleaner fuels. Certain energy-intensive businesses are also subject to allowances regulation as a consequence of the EU Emission Trading Scheme.

Analyses have shown that there is a big potential for profitable energy-efficiency improvements within the business sector, so improving energy efficiency is a vital area of action.

The measures implemented in the business sector are shown in Table 4.17.

Industry is responsible for most of the sectors' emissions of CO_2. The emissions come mainly from energy-consuming activities in industry. Cement and brick production also contributes especially high levels of CO_2, due to the raw materials used.

The main instrument to reduce CO_2 emissions in energy-intensive industry is the EU's emission allowance scheme, covering about 120 industry installations.

Business and industry have introduced major energy efficiencies over the past 25 years. This is mainly due to a green tax package for the business sector, which was firstly introduced in 1995. The package contained a combination of taxes and discounts for energy intensive enterprises. The package led to a higher CO_2 tax and the introduction of a space-heating tax for businesses. In order to get the tax discount, the eligible energy intensive enterprises have to sign an agreement on energy efficiency with the Danish Energy Agency. With the political agreement on economic growth from 2013, the CO_2 tax on electricity in production process in the industry was abolished and the voluntary agreement scheme ended. Electricity production is thus included in the ETS. With a political agreement on economy growth from July 2014 it was decided to revive the voluntary agreement scheme. The new scheme entered into force in September 2015. The current scheme subsidizes electricity-intensive enterprises payment of electricity tax (the PSO tax until 2020 – cf. the phase-out of the PSO mentioned in Chapter 4.3.4.1.4).

Today business not included in the ETS are imposed the CO_2-tax on their fossil fuels for process and all business are imposed the CO_2-tax on their fossil fuels for space heating regardless of the business is included in the ETS. Business pay an energy tax of DKK 4,5 per GJ on their fossil fuels used for process and an energy tax of DKK 55,5 per GJ on their fossil fuels for space heating (2018 tax rates). Some business, e.g. mineralogical and metallurgical processes, are exempt of the energy tax on their process and agriculture pay a lower rate than DKK 4,5 per GJ. VAT registered business pay in general a tax on electricity of DKK 0.004 per kWh except on their electricity for space heating where they pay a higher rate.

As an element in the implementation of the 2012 energy policy agreement, a DKK 3.75 billion (€500m) fund was established to subsidise industries to convert to renewable energy. As of August 2013, businesses have been able to get investment subsidy from this fund to convert from fossil fuel (i.e. coal, oil, gas) to renewable energy sources (i.e. biomass, solar, wind) or district heating in their production process. The subsidy also includes investments in energy-efficiency measures. The estimated effect of this “Renewables for industry” initiative is a reduction of 1 million tonnes of CO_2 per year from 2020 and onwards. As a result of a political agreement of November 2016, the scheme expired at the end of the 2016.

Large enterprises in Denmark are by law required to have a mandatory energy audit every fourth year. The law is no. 345 of 8th of april 2014 “Lov om ændring af lov om fremme af besparelser i energiforbruget, lov om varmeforsyning, lov om kommunal fjernkølig og forskellige andre love”. The law transposes the energy efficiency directive article 8. Denmark has defined large enterprise in accordance with the EU definitions saying that enterprises that do not fall under the category of micro, small and medium-sized enterprises, in accordance with the Commission’s recommendation 2003/361/EC of 6 May 2003 concerning the definition of micro, small and medium-sized. Enterprises with ISO 50,001 or ISO 14,001 are exempt. The deadline for the first energy audits was the 5th of December 2015 and afterwards every fourth year. The scope of the energy audit is buildings, processes and transport. There is no requirement of implementing the energy saving proposals from the energy audits.

As part of a political agreement on economic growth from June 2014 a DKK 40 million (5.4 mio. EURO) fund was established to run a centre for energy savings in enterprises. The money was given for the period 2014-2017. The aim of the centre is to identify and exploit the energy efficiency potential already existing within primarily small and medium sized companies. The large companies are covered by the voulantary agrement scheme and the mandatory energy audit.

With a view to promote targeted energy savings, the 2018 Energy Agreement allows the current energy efficiency obligation scheme to expire by the end of 2020, and replaces it with a new subsidy scheme for energy efficiency improvements in businesses.

The 2018 Energy Agreement introduces a new scheme with subsidies for energy efficiency improvements in businesses from 2021-2024. These funds will be limited to 300m DKK and there will be an individual subsidy cap. The scheme for businesses targets energy consumed in the delivery of services and manufacture of products – also known as “process energy”.

Denmark’s municipalities and regions own a total building mass of more than 36 million square metres. The energy efficient operation and renovation of these buildings holds great potential for reducing energy consumption. Therefore, the energy agreement allocates 100m DKK annually in the period 2021-2024 for loans to finance energy renovations in buildings owned or operated by municipalities and regions.

The energy agreement allocates 19m DKK in 2018, 33m DKK in 2019, 34m DKK in 2020, and 44m DKK annually from 2021-2024 for information activities relating to energy savings. This funding is also earmarked for the utilisation of data to promote energy efficiency.

Table 4.17 Measures in the business sector

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO2 eq)**		Source of estimates
										2020	2030	
BU-1: Agreements on energy efficiency with business	Yes*	Energy	CO2	Efficiency improvement in industrial end-use sectors (Energy consumption)	Voluntary Agreement, Economic	Implemented	See text.	1993	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	
BU-2: Savings activities by elec. grid, gas, oil and district heating companies (consump. of final energy excl. Transp.)	Yes*	Energy	CO2	Demand management/reduction (Energy consumption)	Information	Implemented	See text.	2006	Government: Danish Energy Agency	60 and IE (G1 and G4)	60 and IE (G1 and G4)	Estimates in 2017 - based on The 2013 Analysis of the Effects of Selected Measures for the National Audit Office, Danish Energy Agency, December 2013 (http://www.ens.dk/sites/ens.dk/files/energistyrelsen/Nyheder/kyoto-samlenotat_9._december.pdf (an English translation is included in Denmark's 7th National Communication, Annex B3))
BU-6: Circular on energy-efficiency in state institutions	Yes*	Energy	CO2	Efficiency improvement in services/ tertiary sector (Energy consumption)	Regulatory	Implemented	See text.	2005	Government: The Danish Energy Agency is responsible for the circular. The individual ministries and state institutions are responsible for the implementation of the circular.	IE (G1 and G4)	IE (G1 and G4)	
BU-7(expired): Campaigns and promotion of efficient appliances (including elec. heating, conversion and efficient appliances in households)	Yes*	Energy	CO2	Efficiency improvement of appliances (Energy consumption)	Information	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish	See text.	1997	Government: The Minister for Climate and Energy / The Danish Energy Authority	IE (G1 and G4)	IE (G1 and G4)	
BU-8(expired): Renewables for the industry	Yes*	Energy	CO2	Increase in renewable energy (Energy supply)	Economic	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish	See text.	2013	Government: Danish Energy Agency, other state authorities, enterprises	1000	IE (G1)	The estimate for 2020 shown here is a former separate estimate for this measure. Although this measure has expired it is still included in the list as some effect of the implementation carried out before expiration remain. But this has not been quantified separately. The separate estimate shown here is not included in the calculation of the total effect of all measures.
BU-9: Mandatory Energy Audit for large Enterprises	Yes*	Energy	CO2	Efficiency improvement in industrial end-use sectors (Energy consumption)	Regulatory	Implemented	See text.	2014	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	
BU-10: The center for energy savings in enterprises	Yes*	Energy	CO2	Efficiency improvement in industrial end-use sectors (Energy consumption)	Information	Implemented	See text.	2014	Government: Danish Eneergy Agency	IE (G1 and G4)	IE (G1 and G4)	
G4: All EE mitigation actions (Energy Efficiency) since 1990	Yes*	Combined (TD-b1, -2, -3, -4, -5, -6, -7; EN-1; BU-1, -2, -6, -7, -9, -10; TR-1a, -1b, -2, -3, -4, -5, -6, -7, -10, -11, -12; HO-1, -2, -3, -4, -5, -6)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	**17583**	**13231**	Estimated in September 2019 based on the energy projection from August 2019. The methodology is described in Denmark's 7th National Comminication, Annex B4.

* In principle included in the "with measures" projection scenario - not necessarily with separate annual estimates, but in most cases as a result of the assumption that the measure has contributed to the observed level of total Danish greenhouse gas emissions in the most recent historical inventory year used as the starting point for the projections.
** Estimated annual effects in 2020 and 2030 of measures implemented or adopted since 1990 - i.e. emission reductions and avoided emission increases since 1990.

4.3.5.1.9 Specific measures in the Transport sector

In 2017, the transport sector was responsible for 27.6% of Denmark's total greenhouse gas emissions. The emissions from the transport sector are primarily CO_2 with a share of 98.9% of the transport sector's total greenhouse gas emissions. Nitrous oxide makes up approximately 1.1% and methane about 0.1%.

In 2017, the transport sector's final energy consumption - primarily oil products - made up 27.6% of total final energy consumption in Denmark (without military and fuel sold for international aviation). The consumption of energy for transport has increased by 21.5 % since 1990. The most recent baseline scenario from August 2019 predicts an increase in the sector's greenhouse gas emissions peaking with a 24.7 % increase from 1990 to 2023 followed by a 6% point decrease until 2030.

Table 4.18 shows the existing policies and measures within the transport sector. A number of important steps have been taken by the European Union. Most important of all is probably the EU's requirements on average CO_2 emissions for passenger cars and vans, i.e. the mechanism imposing fines on manufacturers if they fail to comply with the CO_2 targets.

CO_2 measures at EU level and Danish measures aimed at reducing the transport sector's CO_2 emissions are described under the measures sections below.

The national environmentally motivated measures for the transport sector, which have also influenced CO_2 emissions, are usually characterised by aiming at limiting environmental impacts in general. The registration tax and the annual tax (the green owner tax) which is dependent on the energy efficiency of the vehicle as well as fuel taxes are assessed to have had considerable effects on CO_2 emissions.

Transport in itself has a number of side-effects in addition to contributing to the greenhouse effect through higher CO_2 emissions, for example air pollution causing poor air quality or acidification, noise, accidents and congestion. It is thus important to note that the various initiatives implemented in the transport area typically address many of these aspects as well - and thus cannot only be considered in relation to CO_2 emissions.

From 2012 all petrol and diesel for transport sold in Denmark must contain an average of 5.75% of biofuels, which must live up to the EU sustainability criteria. According to the Energy Agreement of March 2012 a 10 percent target is foreseen by 2020. However this will depend on the political agreement expected to be reached in 2018-2019.

Cars with high energy efficiencies, such as electric vehicles, are granted large reductions in the registration tax. Electric vehicles and plug-in hybrid vehicles are furthermore granted deductions in the registration tax until 2021. Hydrogen vehicles are exempted from the registration tax until the end of 2020.

Additional taxinitiatives regarding low and zero emission vehicles is planned with the 2018 Climate and Air proposal. These initiatives are described in chapter 4.3.5.1.12.

When it comes to transport infrastructure, a historically high level of national-level investments have been approved since 2009, and the clear majority of these investments have gone to rail projects (as opposed to road projects). Many of these projects are currently under construction. Including only major projects – and only projects carried out solely or partly by the national level – the value of the current rail projects under construction is around 129 billion DKK (compared to around 38 billion DKK for current road projects). In 2013, the former government decided to allocate the future proceeds from a change in the oil industry taxation to a fund for the improvement of the rail infrastructure in Denmark. The upgrade is expected to reduce travel times and CO_2 emissions substantially. Given the current, lower oil-prices and therefore the reduction in income from taxation, the former government carried out a review of the planned investments. This has resulted in a lower level of investment from the fund (included in the above mentioned investment totals) where the electrification of the main lines and the regional lines on Zealand and certain speed upgrade has been given priority so far. Certain further investments from this fund can be expected in the coming years, but further rail investments must take into account the current amount of large and interfering projects, which limits the feasibility of further rail investments in the shorter term.

The tunnel under the Fehmarn Belt including adjacent landworks will reduce CO_2 emissions by potentially 200,000 tonnes per year. This is mainly due to the following effects:

1. Rail freight trains will reduce the travel distance by 160 km

2. Rail transport for passengers and freight will be strengthened

3. The current ferry service between Rødby and Puttgarden is expected to cease operation.

The 2018 Energy Agreement allocates an additional 500m DKK for green transport solutions over the period 2020-2024.

In accordance with the former government's 2018 Climate and Air proposal a commission for the transition to green cars has been established with a view to analyze measures for the promotion of green cars on a large scale in Denmark. The commission will also look into how to remove barriers, expand and restructure the infrastructure for the new car types and economically prepare society for a large scale expansion of green cars. The green conversion of the transport sector, with the current tax system, will mean lost revenues for the state. In the state budget today there is a solid source of income from registration taxes, annual owner taxes, fuel and other car related taxes of approx. DKK 50 billion annually, which amounts to approx. 5 pct. of the state's total revenue. Regardless of whether we push technology development or not, the proceeds from current fuel taxes will decrease as the cars become more and more energy efficient. The commission will therefore also be tasked with making proposals that can provide alternative revenues.

Furthermore there will be no registration tax in 2019 and 2020 on green cars priced below 400,000 DKK. Further information on this is included in Chapter 4.3.3.1.2.

In accordance with the former government's 2018 Climate and Air proposal municipalities now have greater powers to grant parking discounts for low-emission cars and allow low- and zero-emission cars to run in bus lanes. Cheaper parking in towns and allowances for driving in bus lanes can make low and zero emission cars – and thereby the choice of green transportation in the city – more attractive.

Also following from the former government's 2018 Climate and Air proposal it is now easier for passengers to choose a green taxi rather than a conventional taxi at stations and other similar traffic hubs by reserving space for the green taxis at the front of the queue. The green change of the taxi business is supported through the initiative to establish more and faster chargers, where special attention is paid to the taxi business's needs when placing the chargers. Furthermore, up to 300 out of 750 taxi drivers with zero emission vehicles applying for new taxi licenses in 2019 and 2020 are now guaranteed a taxi license.

The oldest diesel cars contribute disproportionately to air pollution in the cities and at the same time have a higher CO_2 emission than newer diesel cars. Funds for a temporarily raise of the scrap premium for older diesel cars in 2019, in total DKK 100 million, has been allocated and spent in the period from 1 February to 1 July 2019. With this initiative owners of old diesel cars from before 2006 could receive a scrap premium of DKK 5,000.

Table 4.18 Measures in the transport sector

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO2 eq)**		Source of estimates
										2020	2030	
TR-1a: EU demands on vehicle manufactures to deliver fuel efficient cars and vans	Yes*	Transport	CO2	Efficiency improvements of vehicles (Transport)	Regulatory	Implemented	See text.	2000	Other: European Commission	600 and IE (G1, G4 and G5)	600 and IE (G1, G4 and G5)	Estimates in 2017 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).
TR-1b(expired): Information campaign on fuel consumption of new cars	Yes*	Transport	CO2	Demand management/reduction (Transport), Improved behaviour (Transport)	Information	Implemented (and Expired - but included as it is expected to have influenced the level of	See text.	2000	Government: Denmark`s Road Safety and Transport Agency	IE (G1, G4 and G5)	IE (G1, G4 and G5)	
TR-2(expired): Energy-correct driving technique	Yes*	Transport	CO2	Improved behaviour (Transport)	Information	Implemented (and Expired - but included as it is expected to have	See text.	2000	Government: Ministry of Justice	IE (G1, G4 and G5)	IE (G1, G4 and G5)	
TR-3(expired): Initiative on enforcing speed limits	Yes*	Transport	CO2	Improved behaviour (Transport)	Information, Economic	Implemented (and Expired - but included as it is expected to have	See text.	2014	Government: Ministry of Justice	IE (G1, G4 and G5)	IE (G1, G4 and G5)	
TR-4(expired): Establishment of intermodal installations	Yes*	Transport	CO2	Modal shift to public transport or non-motorized transport (Transport), Improved behaviour (Transport)	Economic	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish	See text.	2014	Government: Ministry of Transport and Energy, municipalities, Danish State Railways (DSB)	IE (G1 and G4)	IE (G1 and G4)	
TR-5(expired): Promotion of environmentally friendly goods transport	Yes*	Transport	CO2	Modal shift to public transport or non-motorized transport (Transport), Demand management/reduction (Transport), Improved behaviour (Transport)	Economic, Information	Implemented (and Expired - but included as it is expected to have	See text.	2014	Government: Danish Environmental Protection Agency, Haulage contractors	IE (G1 and G4)	IE (G1 and G4)	
TR-6(expired): Reduced travel times for public transport	Yes*	Transport	CO2	Modal shift to public transport or non-motorized transport (Transport), Demand management/reduction (Transport)	Regulatory	Implemented (and Expired - but included as it is expected to have influenced the level of	See text.	2014	Government: Ministry of Transport and Energy and Danish State Railways (DSB)	IE (G1 and G4)	IE (G1 and G4)	
TR-7: Spatial planning	Yes*	Transport	CO2	Low carbon fuels/electric cars (Transport), Demand management/reduction (Transport), Improved transport infrastructure (Transport)	Regulatory	Implemented	See text.	2000	Local: Municipalities	IE (G1 and G4)	IE (G1 and G4)	
TR-8: EU requirements regarding biofuels	Yes*	Transport	CO2	Low carbon fuels/electric cars (Transport)	Regulatory	Implemented	See text.	2012	Government: Danish Energy Agency	290 and IE (G1 and G3)	290 and IE (G1 and G3)	Estimates in 2017 - based on The 2013 Analysis of the Effects of Selected Measures for the National Audit Office, Danish Energy Agency, December 2013 (http://www.ens.dk/sites/ens.dk/files/energistyrelsen/Nyheder/kyoto-samlenotat_9._december.pdf (an English translation is included in Denmark's 7th National Communication, Annex B3))
TR-9(expired): Transport infrastructure projects in the fields of electric vehicles, gas and hydrogen	Yes*	Transport	CO2	Low carbon fuels/electric cars (Transport), Improved transport infrastructure (Transport)	Economic	Implemented (and Expired - but included as it is expected to have influenced the level of	See text.	2014	Government: Ministry of Transport	IE (G1)	IE (G1)	
TR-10: Electrification of parts of the rail infrastructure	Yes*	Transport	CO2	Improved transport infrastructure (Transport)	Economic	Adopted	See text.	2014	Government: Ministry of Transport	IE (G1)	IE (G1)	
TR-11(expired): Investments in a new metro line and bicycle transport facilities.	Yes*	Transport	CO2	Improved transport infrastructure (Transport)	Economic	Implemented (and Expired - but included as it is expected to have	See text.	2014	Government: Ministry of Transport, Local:Municipality of Copenhagen	IE (G1)	IE (G1)	
TR-12: Investment in a tunnel under the Femern Belt	Yes*	Transport	CO2	Improved transport infrastructure (Transport)	Economic	Adopted	See text.	2028	Government: Ministry of Transport	-300	200	Estimates for the construction phase (emissions of 300 kt CO2eq/year) and operation phase (reduktion of 198.5 kt CO2eq/year) in the 2013 EIA for the project, Chapter 19 (https://www.trm.dk/da/publikationer/2013/vvm-for-femern-baelt).
G5(new): Energy effciency in transport by passenger cars	Yes*	Combined (TD-6, TR-1a, TR-1b, TR2 and TR-3)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	550	550	Estimates in 2017 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).

* In principle included in the "with measures" projection scenario - not necessarily with separate annual estimates, but in most cases as a result of the assumption that the measure has contributed to the observed level of total Danish greenhouse gas emissions in the most recent historical inventory year used as the starting point for the projections.

** Estimated annual effects in 2020 and 2030 of measures implemented or adopted since 1990 - i.e. emission reductions and avoided emission increases since 1990.

4.3.5.1.10 *Specific measures in the residential sector*

In 2017, the residential/household sector contributed to Denmark’s total national greenhouse gas emissions with 2.1 million tonnes of CO_2 equivalents, corresponding to a share of 4.3%. The residential sector in the greenhouse gas inventory only includes CO_2 emissions from burning of oil and natural gas since emissions from production of electricity and district heating used by households are attributed to the plants where the electricity and heat is produced.

Approximately 92% of greenhouse gas emissions from the residential sector in 2017 consisted of CO_2. There are also small emissions of methane and even smaller emissions of nitrous oxide.

In this section measures addressing all types of energy consumption in the household sector are described, although some of the energy savings will result in emission reductions in the energy production sector.

In 2017, consumption of energy by households, including electricity and district heating, was responsible for around 30% of the total final energy consumption in Denmark.

The major part of energy consumption in households is used for space heating - 83% in 2017. District heating constituted 44% of household energy consumption for heating in 2017. When district heating is produced at CHP plants or with renewable energy, there are big CO_2 savings overall from the use of district heating instead of individual heating based on, for example, oil-fired boilers.

Oil consumption for heating fell from 22% of household energy consumption in 2000 to 6% in 2017. In 2030, oil is expected to amount to less than 2% of final energy consumption for heating, assuming that recent decades’ phase-out of oil consumption for heating continues.

Up to 2003, households changed to gas in particular, but from 2004 onwards the change is more to wood pellets in particular. Up to 2030, wood pellet consumption is expected to fall by 3.5% annually, whereas consumption of oil and gas is expected to fall. The falling consumption of wood pellets and fossil fuels will be offset by an increasing contribution from heat pumps.

Despite a rising number of electrical appliances, the associated electricity consumption has remained constant over the past 15 years. This is because electrical appliances have become more efficient, partly as a consequence of the EU Ecodesign Directive and the Energy Labelling Directive.

The reduction of taxes in accordance with the Energy Agreement from June 2018 is expected to trigger a rise in electricity consumption. Meanwhile, other energy agreement initiatives will ensure that renewable energy output in Denmark matches the country’s total electricity consumption by 2030.

Households' disposal of waste also contributes to emissions of methane from landfill sites.

The action being taken on households' waste and transport consumption is described in the sections on waste and transport. This section therefore concentrates on the possibilities of reducing the CO_2 emissions through savings in electricity and heating in households and the possibilities for conversion to more environment-friendly forms of heating. The possibilities for reduction in the public energy supply system are described in the section on the energy sector.

In 2017, the final energy consumption in the household sector was 162.5 PJ for space heating and hot water (climate-corrected) and 31.4 PJ of electricity for appliances, etc. Consumption for heating has been quite constant for a number of years, in spite of an increase in the number of households and in the area heated. The consumption of electricity for appliances, etc. is still increasing. The increase in the consumption of electricity has, however, not been nearly as great as the increase in the number of appliances, since these have become steadily more energy efficient.

With a view to reducing energy consumption and environmental impacts from the household sector, a wide range of initiatives have been launched, as described in Table 4.19 in order to promote:

- Electricity savings,
- Savings in energy consumption in space heating, and
- Fuel conversion (from the use of oil to district heating and the use of renewable energy).

Several concrete measures and incentives already implemented are described below.

Energy taxes
All energy consumption for space heating as well as other energy consumption in households and the public sector, as well as non-VAT-registered businesses is subject to energy taxes. Throughout the 1990s CO_2 and energy taxes have steadily increased, but since 2002 they have been almost stable. The CO_2 tax was increased in 2010 by more than 50 pct. The increases have mainly affected households, helping to reduce their energy consumption.

As expanding infrastructure powered by renewable energy will be a key component in Denmark's successful green transition, the 2018 Energy Agreement included initiatives with a view to reducing taxes on electricity and restructure the rules on surplus heat utilisation. Increased electrification is essential to harnessing the full potential of green energy, and will enable the integration of fluctuating outputs of wind and solar energy into our energy system. Green electricity can be converted into heat and channelled through district heating systems or into large-scale heat storage facilities – ensuring a flexible energy system and optimum utilisation of green electricity.

Electrification of the energy system is thereby a cornerstone of the green transition.

Despite a steadily growing supply of green electricity, the taxes on electricity for households in Denmark remain very high. High taxes on electricity constrain the use of electricity by Danes, causing significant socioeconomic losses. To address this problem, the energy agreement calls for reductions in the electrical heating tax and electricity tax. The reduction of taxes is expected to trigger a rise in electricity consumption. Meanwhile, other energy agreement initiatives will ensure that renewable energy output in Denmark matches the country's total electricity consumption by 2030. Electrical heat pumps are furthermore expected to replace heating based on fossil fuels and biomass.

Agreed tax reductions:

- The electrical heating tax will be reduced from 0.307 DKK/kWh to 0.155 DKK/kWh, effective 2021.

- The electricity tax will be reduced from 0.914 DKK/kWh to 0.774 DKK/kWh (phased in from 2019-2025).

- The electricity tax for certain liberal professions will be reduced from 0.914 DKK/kWh to 0.004 DKK/kWh in 2023.

Beginning in 2020, 100 million DKK will be earmarked annually for revising regulations that govern surplus heat and promoting its utilisation. A working group will be tasked with exploring electricity tariffs and related issues, including the conditions for certain groups of electricity customers and whether tariffs can be billed in a different and better way. The possibility of a dynamic electricity tax will also be explored. The tax reductions will equate to lower electricity bills, thus improving the productivity of businesses and the welfare of individual households.

CO_2 taxes
Some of the energy consumption in households is subject to CO_2 taxes. The CO_2 tax is further described in section 4.3.3.

Minimum energy requirements for buildings
Denmark has a long experience with energy efficiency and energy savings in buildings. From 1990 to 2017 energy consumption for heating has been reduced by 16.1% per m^2. The goal is to reduce energy consumption in new buildings by 75% by 2020 relative to 2006.

All new buildings must, according to the Danish building code, be constructed as nearly zero-energy buildings (NZEB).

The benefits of reducing energy consumption are tangible: less fossil fuel is consumed and the environment has improved substantially. Strict and progressively tightened building regulations since 1977 have ensured a stable demand for energy-efficient building technologies.

Energy labelling of buildings when built, sold or rented
Energy labelling of buildings must be implemented after finishing the construction of a building and on the sale or rental of the building - primarily heating consumption. This applies in principle for all buildings, irrespective of size, apart from production facilities, factories etc. The energy performance is expressed by a numeric indicator of primary energy in kWh/m2 per year based on the primary energy factor.

Regular energy labelling of large buildings and public buildings
The Energy Performing Certificate (EPC) consist of an energy label and an energy plan. For publicly owned buildings over 250 m^2 the EPC must be prepared regularly every ten years. Furthermore all large buildings over 600 m^2 which are frequently visited by the public must display the EPC in a prominent place clearly visible to the public.

Minimum energy requirements and energy labelling of appliances
The Danish Energy Agency has a national energy labelling scheme for façade windows. Approximately 90 % of suppliers adhere to the scheme. Danish authorities play an active role both in negotiation of compulsory EC requirements and in securing awareness of and compliance with these, including through information on the Agency's website. But in general, the effect of EC product regulation is accounted for elsewhere.

Subsidy scheme related to buildings

The subsidy scheme related to buildings allocates DKK 200 million for each year in the period 2021-2024. The scheme will be implemented as a competitive subsidy scheme aimed at achieving energy savings in buildings. Financial aid will be given to owners of buildings who have renovated their buildings in accordance with a specific list of energy savings belonging to the subsidy scheme.

Information initiative towards private households
The 2018 energy agreement allocates funding for information activities relating to energy savings. The main target is to promote energy-efficient solutions and energy renovation of buildings. The measures of the initiative will be information campaigns, web-based information for private households etc., primarily via social media and the website SparEnergi.dk. The initiative also includes utilisation of data to promote energy efficiency.

Knowledge Centre for Energy Savings in Buildings
The Knowledge Centre for Energy Savings in Buildings is a service for craftsmen and educational institutions concerning energy efficiency improvements. The centre has worked with industry organisation within the area of mediating knowledge to its members, and provides courses to support the general further education of craftsmen. Furthermore, educational efforts are carried out by the labour market training centres.

Heat pumps as an energy service
In this initiative, which has been deployed since 2016, energy companies install, finance, run and maintain heat pumps installed in smaller residential and commercial buildings. Customers have no up-front investment cost but pay for the supplied heat much as they would for district heating. This has increased the number of heat pump installations, and heat pumps in the scheme tend to operate more efficiently, because they are run by professionals rather than building owners.

The initiative is targeting mainly areas without supply of natural gas or district heating.

The 2018 Energy Agreement focuses on the remaining oil-fired boilers and barriers to promote the use of heat pumps. There are currently app. 80000 oil-fired boilers heating Danish homes. To reduce this number, annual funding of 20m DKK from 2021-2024 will be allocated for a support scheme to promote the replacement of oil-fired boilers with heat pumps.

Furthermore it was decided that no new consumer obligations will be permitted as from January 2019, while the consequences of repealing existing consumer obligations will be analysed before the parties to the agreement make a decision on such repeals.

"Better Houses"
"BetterHouses" is a scheme (voluntary and market-driven system) from the Danish Energy Agency focusing on energy renovation of buildings. The aim is to make it easier for owners of buildings, mostly homeowners, to energy renovate by creating a "one stop shop" for energy renovation, where the owner only has to contact one certified building contractor and to get an overall counselling on energy renovation of the entire building. Skilled workmen are educated under the BetterHouses program to be advisors on energy renovation. The Danish Energy agency approves the BetterHouses firms and professionals like architects, engineers, craftsmen, energy consultants and building designers can take training courses to become BetterHouses advisors. The training is carried out at academies of higher education. A Better Houses advisor can manage the process and can follow the project all the way from plan to completed renovation.

Strategy for energy renovation of buildings
In May 2014 a strategy for energy renovation of buildings was adopted. The strategy contains initiatives which will promote the renovation of the Danish building stocks and insures that energy efficiency measures are implemented on the buildings.

In accordance with the revised energy performance of buildings directive, Denmark will establish a long-term renovation strategy in 2020 to support the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy efficient and decarbonised building stock by 2050, facilitating the cost-effective transformation of existing buildings into nearly zero-energy buildings.

Table 4.19 Measures in the household (residential) sector

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)**		Source of estimates
										2020	2030	
HO-1: Energy labelling of small and large buildings (incl. public sector and business)	Yes*	Energy	CO_2, CH_4, N_2O	Efficiency improvements of buildings (Energy consumption)	Regulatory, Information	Implemented	See text.	1997	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	
HO-2: Energy labelling of electric appliances	Yes*	Energy	CO_2	Efficiency improvement of appliances (Energy consumption)	Information	Implemented	See text.	1992	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	
HO-3: Substitution of individual oil-based furnaces	Yes*	Energy	CO_2	Switch to less carbon-intensive fuels (Energy supply), Efficiency improvements of buildings (Energy consumption)	Economic, Information	Implemented	See text.	2010	Government: Danish Energy Agency	20 and IE (G1 and G4)	20 and IE (G1 and G4)	Estimates in 2017 - based on The 2013 Analysis of the Effects of Selected Measures for the National Audit Office, Danish Energy Agency, December 2013 (http://www.ens.dk/sites/ens.dk/files/energistyrelsen/Nyheder/kyoto-samlenotat_9._december.pdf (an English translation is included in Denmark's 7th National Communication, Annex B3))
HO-4: Better Houses	Yes*	Energy	CO_2	Efficiency improvements of buildings (Energy consumption)	Information	Implemented	See text.	2014	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	
HO-5: Strategy for Energy renovation of buildings	Yes*	Energy	CO_2	Efficiency improvements of buildings (Energy consumption)	Information, Education, Research	Implemented	See text.	2014	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	
HO-6 (new): Heat pumps as an energy service	Yes*	Energy	CO_2	Efficiency improvements of buildings (Energy consumption), Increase in renewable energy (Energy supply)	Economic	Implemented	See text.	2016	Government: Danish Energy Agency	IE (G1 and G4)	IE (G1 and G4)	
G4: All EE mitigation actions (Energy Efficiency) since 1990	Yes*	Combined (TD-b1, -2, -3, -4, -5, -6, -7; EN-1; BU-1, -2, -6, -7, -9, -10; TR-1a, -1b, -2, -3, -4, -5, -6, -7, -10, -11, -12; HO-1, -2, -3, -4, -5, -6)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	**17583**	**13231**	Estimated in September 2019 based on the energy projection from August 2019. The methodology is described in Denmark's 7th National Comminication, Annex B4.

* In principle included in the "with measures" projection scenario - not necessarily with separate annual estimates, but in most cases as a result of the assumption that the measure has contributed to the observed level of total Danish greenhouse gas emissions in the most recent historical inventory year used as the starting point for the projections.

** Estimated annual effects in 2020 and 2030 of measures implemented or adopted since 1990 - i.e. emission reductions and avoided emission increases since 1990.

4.3.5.2 CH_4 (methane)

Total emissions of methane from the energy sector account for about 1.1% of the sector's greenhouse gas emissions, corresponding to about 0.5 million tonnes CO_2 equivalents. Many small sources contribute to this overall relatively minor source of greenhouse gas emissions. The biggest single contribution comes from gas-fired CHP plants, which emit unburnt natural gas. With a view to minimising the emissions, a 1998 Statutory Order, in force from 2006 to 2013, has limited emissions of nitrogen oxides, unburnt carbon hydrides, including methane, and carbon monoxide etc.. However, the limit value for unburned hydro carbons was removed in a revision of the Statutory Order entering into force on 7 January 2013.

As of 1 January 2011 a tax on methane emissions - equal in terms of CO_2 equivalents to the CO_2 tax - from natural gas fired power plants was introduced (see chapter 4.3.3.3.).

4.3.5.3 N_2O (nitrous oxide)

Nitrous oxide accounts for 0.8%, or 0.4 million tonnes CO_2 equivalents, of the energy sector's total greenhouse gas emissions. Within energy, emissions of nitrous oxide from transport have increased since the introduction of new cars with catalytic converters in 1990. However, as the population of cars from before 1990 is almost zero today, no further increase in specific nitrous oxide emissions from cars with catalytic converters is expected.

4.3.6 Industrial Processes and Product Use (IPPU)

The greenhouse gas emissions from industrial processes and product use made up 4% of Denmark's total greenhouse gas emissions in 2017 (without LULUCF), of which CO_2 was the primary emission. 75% of the sector's emissions are CO_2, primarily from cement production, and 24% are emissions of the industrial gases HFCs, PFCs, and SF_6.

4.3.6.1 CO_2 - Cement production

Cement production results in large emissions of CO_2. The production process itself is very energy-intensive, and a large quantity of CO_2 is emitted in connection with the production process.

Cement production in Denmark is concentrated in a single company. About half of the emissions come from the company's energy consumption and the other half from chalk, which is one of the raw materials used in the process. A lot has been done within the cement industry. For example, in the last 20 years the Danish cement producer has significantly reduced its CO_2 emissions per tonne cement produced.

Since 2005, all CO_2 emissions from cement production in Denmark are subject to the EU ETS.

4.3.6.2 N_2O - Production of nitric acid

The emission of nitrous oxide (N_2O) from the production of nitric acid in connection with the production of fertilizer in Denmark has only been included in Danish emissions inventories in recent years, even though production from the single plant in Denmark, with associated emissions, has taken place for many years, including 1990, Denmark's basis year for emissions of nitrous oxide.

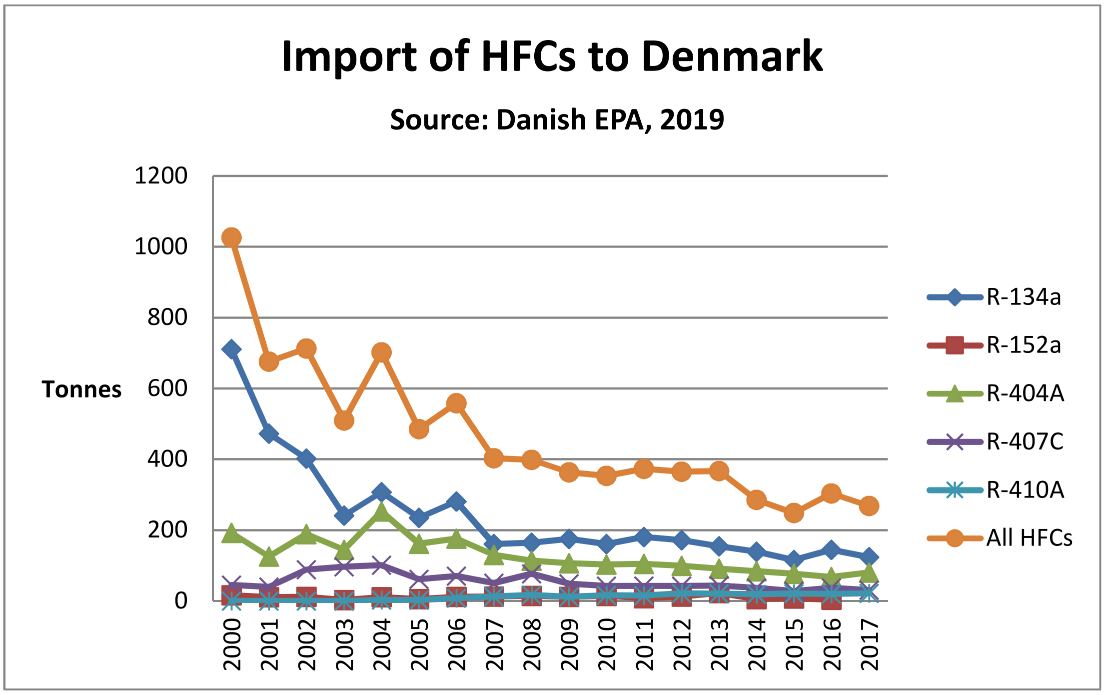
In summer 2004, however, the owner decided to stop production of fertilizer and so production of nitric acid in Denmark. Emissions of nitrous oxide from production of nitric acid in 2003 corresponded to 0.9 million tonnes CO_2 equivalents. In 2004 emissions were about one-half of this, and from 2005 they ceased entirely cf. market conditions for production of fertilizer in Europe.

4.3.6.3 HFCs, PFCs and SF_6 - Consumption of these substances

Emissions of the so-called industrial gases HFCs, PFCs, and SF_6 are in accordance with the emission inventories included in the industrial sector. This is also the case for emissions from other sectors during use and scrapping of equipment containing HFCs, PFCs and SF_6. These gases are used for several purposes including as refrigerants and blowing agents, etc. (HFCs) and insulator gas in high voltage switchgear (SF_6). Since there is no production of these gases in Denmark, all emissions are related to the import of the substances. The developments in imports of chemical mixtures containing HFCs in recent years are shown in Figure 4.10.

Figure 4.10 Import of HFCs to Denmark 2000-2017 in Tonnes HFCs

Source: Danish Environmental Protection Agency



The Danish regulation of emissions of the industrial greenhouse gases (HFCs, PFCs, and SF_6) is 2-phased, since there is a consumer tax on the use of the substances and also a statutory order on the phasing out use of the gases in new facilities and products. Both measures are further described below.

According to model-based calculations, the combined effect of taxation and regulation of F-gases compared to a business as usual scenario starting in 2000 is an approximately 1.4 million tonnes of CO_2 equivalents reduction in annual F-gas emissions in 2020. The accumulated emission savings over the period from 2000 to 2020 is estimated at approximately 11.2 million tonnes of CO_2 equivalents.

4.3.6.3.1 Taxes on HFCs, PFCs and SF_6

Taxes corresponding to their GWP have been imposed on each of the greenhouse gases from March 2001 in combination with the Danish CO_2 tax of DKK 0.15 per kg CO_2 as described in section 4.3.3. This means that HFC-134a is subject to a tax of DKK 215/kg, as it has a GWP of 1,430. There is a ceiling of DKK 600/kg so although SF_6 has a GWP of 23,900, the tax is only DKK 600/kg and not DKK 3,585/kg.

The tax is imposed on the substances on importation because none of them is produced in Denmark. The tax is payable whether the substances are imported as pure substances or as part of imported products. If the content in the products is not known, the tax is based on a fixed tariff.

The tax is payable on a wide range of products, including:

- Refrigerating and freezing plants
- Air-conditioning plants
- PUR foam for cooling plants, district heating pipes, insulated gates and doors, panels for refrigeration and freezer rooms, extruded polystyrene for insulation (XPS foam), jointing foam
- Spray canisters
- Insulation gas

The tax is also payable on services on existing and new installations/products.

4.3.6.3.2 Regulation of HFCs, PFCs and SF_6

On 15 July 2002, a statutory order on the regulation of certain industrial greenhouse gases came into force.

This Statutory Order includes a general ban on the use of industrial greenhouse gases in a great number of new facilities and products from 1 January 2006, including household cooling and freezing appliances, PUR foam, etc. However, some products and applications are exempted from the ban. This applies, for example, to servicing existing plants, mobile cooling plants, including mobile air conditioning plants, the use of HFCs in cooling and air conditioning plants with fillings between 0.150 and10 kg HFC, SF_6 in high voltage plants, etc. The Statutory order was revised in May 2017 in order to reflect the development of new low GWP, fluorinated refrigerants such as HFOs. The only change is that the revised order does not cover HFCs with a GWP below 5. All other provisions remains unchanged. The Statutory Order was revised again in November 2018 allowing the use of HFCs in certain hermetically sealed heat pumps in amounts up to 50 kg. The purpose of the revision was to remove barriers for the use of medium size heat pumps in the energy system.

To ensure the best possible implementation of the phase-out dates for the refrigeration sector, a total of DKK 12 million was reserved for the period 2005-2007 for development of alternatives and for subsidies for implementation of the alternatives developed in the previous years. A knowledge centre for HFC-free cooling has been established. This centre disseminates knowledge and offers technical assistance.

As from 2015 to 2017 DKK 1,5 million is reserved for promoting cooling equipment relying on natural refrigerants and retrofitting existing equipment to use refrigerants with lower GWP.

To ensure regeneration and environmentally friendly destruction of newly developed flammable fluorinated refrigerants DKK 2.5 million is granted from 2017 to 2019 to upgrade the existing return system (see Chapter 4.3.4).

In 2019 an information campaign costing 300.000 DKK aiming at preventing illegal imports of HFC is expected to be launched.

An overview of the above measures regarding industrial processes is given in table 4.20.

Table 4.20 Measures in the Industrial Processes sector

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO2 eq)**		Source of estimates
										2020	2030	
IP-1: Regulation of use of HFCs, PFCs and SF6 (phasing out most of the uses)	Yes*	Industry/Industrial processes	HFCs, PFCs, SF6	Reduction of emissions of fluorinated gases (Industrial processes)	Regulatory	Implemented	See text.	2006	Government: Danish Environmental Protection Agency	IE (G1 and G6)	IE (G1 and G6)	
G6(new): F-gas taxes and regulation	Yes*	Combined (TD-8 and IP-1)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	**800**	**800**	Estimates in 2017 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).

* In principle included in the "with measures" projection scenario - not necessarily with separate annual estimates, but in most cases as a result of the assumption that the measure has contributed to the observed level of total Danish greenhouse gas emissions in the most recent historical inventory year used as the starting point for the projections.

** Estimated annual effects in 2020 and 2030 of measures implemented or adopted since 1990 - i.e. emission reductions and avoided emission increases since 1990.

4.3.7 Agriculture

The primary occupational sectors agriculture, forestry and fisheries are generally considered as one single economic sector in Denmark, although the importance of the individual sectors differs greatly with respect to Denmark's emissions and uptake of greenhouse gases. Agricultural farms have emissions of primarily methane and nitrous oxide as described in this section. Liming, urea application and other carbon-containing fertilizers are minor sources of CO_2 emissions. The CO_2 emissions by sources and removals by sinks in relation to Denmark's agricultural soils and forests are included under the LULUCF sector described in Section 4.3.7. CO_2 emissions from energy use in agriculture are included under energy (section 4.3.4).

In 2016, emissions of greenhouse gases from agriculture (i.e. excluding CO_2 from cropland and grassland under the LULUCF sector) were responsible for 20.9% of Denmark's total greenhouse gas emissions (total excluding LULUCF, but with indirect CO_2). Total greenhouse gas emissions from agriculture consisted, in 2016, of 52.8% from methane, 45.1% from nitrous oxide and 2.1% CO_2 emissions primarily from liming. Agriculture is the overall most important sector regarding emissions of N_2O and CH_4. In the same year, the contribution of N_2O and CH_4 from agriculture to the national total emission of these gases was 89.0% and 79.2%, respectively. N_2O emissions from agriculture decreased by 26.5% and the CH_4 emissions from agriculture decreased by 0.4% from 1990 to 2016 (*Nielsen et al., (2018a)*).

Table 4.21 shows measures for greenhouse gas emission reductions within agriculture.

Policies and measures relevant for the agricultural sector which have affected or will affect the sector's greenhouse gas emissions are:

- Ban on burning of straw on fields
- Action Plans for the Aquatic Environment I and II and Action Plan for Sustainable Agriculture
- Action Plan for the Aquatic Environment III
- Ammonia Action Plan
- Action Plan for Joint Biogas Plants and subsequent follow-up programmes, including the New Energy Policy Agreement
- Environmental Approval Act for Livestock Holdings
- Agreement on Green Growth 2009
- Agreement on Green Growth 2.0
- Subsidy for conversion of arable land on organic soils to nature
- Political Agreement on a Food and Agricultural Package and the political Agreement on Targeted Regulation and subsequent agreements [such as the national budget for 2020, which includes allocation of additional funding for afforestation and environment- and climate-technologies]
- Agreement on Nature (the Nature Package)
- Advisory task force on barriers for reducing the hydraulic retention time of manure before being delivered to biogas plants (PSO Agreement of 17 November 2016)
- National Green Climate Fund – Initiatives in agriculture 2017

- GHG accounting and awareness building at farm-level. Climate-friendly feed production for pigs. Promotion of green bio-refining. (Agreement of 2nd May 2019)
- Multifunctional Land Reparcelling Fund (Agreement of 19th September 2019).

Stronger research efforts in agriculture affecting all greenhouse gases

New solutions and new technology are needed for the production of even more climate-friendly food in the future. At the same time, there is a need to know more about how greenhouse gas emission reductions can be obtained in the best way with the technology we already have available today.

Funded by the National Green Climate Fund other research work in agriculture was initiated in 2019 as mentioned in chapter 4.3.4:

- Climate accounts and information on individual farm-level
- Climate-friendly feed production
- Promotion of green bio refining
- Promotion of green building

Further information is included in chapter 4.3.4.

In 2019, DKK 90 million was allocated for climate change mitigation research in agriculture in the period 2019-2021 and a research programme has been launched consisting of 10 projects. An additional 30 million DKK has been allocated to this initiative in 2022.

Furthermore, 40 million DKK has been allocated to climate research in agriculture in 2020 as part of the Danish Green Development and Demonstration Programme (GUDP).

4.3.7.1 CH_4 (methane)

Methane emissions mainly steam from the agricultural sector, contributing, in 2016, with 79% of total Danish CH_4 emissions, corresponding to 5.6 million tonnes CO_2 equivalents (*Nielsen et al., (2018a)*). Agricultural systems have two main sources of methane. Methane is formed through enteric fermentation of feed during digestion in livestock (farm animals) and from conversion of carbon in the manure.

Danish agriculture's biggest contribution to the methane emissions comes from dairy cows.

In the digestion process, methane is a by-product of the fermentation of feed in the rumen, primarily from grass and roughage fodder such as grass, grass silage and maize silage. In addition, methane is formed by microorganisms during conversion of carbon in the manure under anaerobic conditions, increasing with increasing temperatures and pH. These conditions especially occur in manure stores and housing systems with slurry (liquid manure) or deep litter. Methane from manure management in Denmark is primarily linked to pig production.

The emission of methane from agriculture has remained more or less stable in the period from 2006 to 2017. At present, the number of dairy cows in Denmark is projected to increase slightly in combination with an increased milk production per dairy cow, which again could cause the feed intake and thus the methane emissions from enteric rumen fermentation to rise. At the same time, the CH_4 emissions from manure are expected to slightly decrease due to an increasing share of the manure expected to be treated in biogas plants or acidified in the livestock housing system (the stable). The effect on methane emissions from acidification needs further documentation.

4.3.7.1.1 Biogas

Biogas from digestion of manure and organic wastes carries a number of potential advantages when used to substitute fossil energy: reductions in emissions of greenhouse gases, better utilization of manure as fertiliser, recycling and use of organic wastes for energy and fertiliser purposes etc. However, there are also environmental challenges for example increased ammonia emission and odour from the biogas plants.

As part of the Danish Rural Development Programme 2007-2013, financial support has been provided to investments in biogas plants in 2010 and in 2012. In 2012 support was awarded to both new and existing biogas plants to the amount of DKK 262 million.

In order to stimulate expansion of the biogas sector the subsidy on the sales price of electricity production based on biogas was adjusted by the Energy Policy Agreement of 22 March 2012. The Agreement resulted in an amendment to the Promotion of Renewable Energy Act of 27 December 2008.

The Energy Policy Agreement continued funding biogas for combined heat and power (CHP) and introduced subsidy equality so that biogas sold to the natural gas grid would receive the same subsidy as biogas used at CHP plants. In addition the agreement also introduced a new subsidy when biogas is used in industrial processes, as a fuel for transport or for the production of heat.

As part of the PSO Agreement of 17 November 2016, it was decided to establish and fund an advisory task force with the aim of investigating and removing barriers for reducing the hydraulic retention time of manure before being delivered to biogas plants, and thus reduce methane emissions while increasing biogas production at the same time. The taskforce commenced their work in late 2018.

Consequently the latest projection from the Danish Energy Agency expects an increase in biogas production from 3.9 PJ in 2007 to 22,0 PJ in 2020 and 28 PJ in 2030 mainly based on agricultural sources.

The biogas production is expected to result in a reduction of the annual emissions of methane and CO_2 by approximately 0.9 million tonnes of CO_2 equivalents by 2020 including the reduced CO_2 emissions from substitution of fossil fuels, primarily natural gas. Reductions in the emission of nitrous oxide is not included in this figure as they are not well documented in the case of storage of degassed slurry. The expected effect was re-estimated in September 2016 by DCE[72].

As mentioned in chapter 4.3.4, the 1st allocation of the budget under the National Green Climate Fund in June 2017 included an earmarking of 9,0 million DKK for developing solutions in existing biogas plants and associated suppliers of feedstock with a view to reduce the retention time of manure in the housing system prior to the treatment in the biogas plant. This is expected to increase the production of biogas per unit input of manure while at the same time reducing emissions of methane from the housing system. The expected effect of this initiative is not included in the GHG emission projection from March 2017.

As part of the 2018 energy agreement, it was decided to no longer permit new applicants to the existing subsidy schemes for the use of biogas from January 1st 2020.

[72] "Biogasproduktions konsekvenser for drivhusgasudledning i landbruget" Rapport nr. 197 DCE, 2016.

In 2019 a targeted effort to reduce methane emissions from Danish biogas plants was initiated. The total reduction effect of this initiative over the period 2021-2030 is estimated at approximately 1.1 million tonnes CO2 equivalents (accumulated annual reductions).

4.3.7.2 N_2O (nitrous oxide)

Agriculture is the largest source of nitrous oxide emissions in Denmark. Of the total Danish N_2O emissions of 5.3 million tonnes CO_2 equivalents in 2016, 89% or 4.8 million tonnes of CO_2 equivalents came from agriculture (*Nielsen et al., (2018a)*). The process of emission of N_2O occurs in some types of manure storage facilities and during conversion of mineral and organic bound nitrogen (e.g. in manure and applied wastewater sludge) in the soil. Some of the leached nitrogen is also converted into nitrous oxide. Nitrogen entering the soil with applied fertiliser and manure, and through plant residue, is the main sources of nitrous gas emissions.

Likewise, ammonia (NH_3) volatilisation contributes to the greenhouse effect because some of the ammonia nitrate ends up as nitrous oxide in the atmosphere. Ammonia volatilisation into the atmosphere stems almost exclusively from agriculture, through conversion processes from manure, fertiliser, sludge, crop residue and treatment of straw with ammonia. In particular, the emissions occur during handling of manure in animal housing, during storage and transport of manure, and from grazing animals[73] (*Nielsen et al., (2018a)*).

The main reason for the drop in the overall emissions of N_2O from the agricultural sector of 25% from 1990 to 2017 is enforced legislation (see below) to reduce nitrogen leaching by improving the utilisation of nitrogen binding in manure, as well as measures to reduce the application of mineral fertilizers to soils. The legislation has resulted in a considerable reduction in the use of mineral fertilisers. It has also helped, that the market driven effort to improve the feeding efficiency (and thereby also the farmers economy) have reduced the nitrogen excreted per unit livestock produced. The basis for the N_2O is then reduced (*Nielsen et al., (2017a)*). Implementation of the Action Plans for the Aquatic Environment II and III contribute the most to this reduction[74,75]. Further projected decrease in N_2O emissions towards 2020 is mainly attributed to areas being taken out of agricultural production for urban development and infrastructure etc., and to anticipated increased shares of organic agriculture (DCE, December 2014).

In 2016, the Political Agreement on a Food and Agricultural Package from 2015) allowed Danish farmers to use more nitrogen in the fields through a lifting of the reduced fertilizer standards for nitrogen. The potential slight increase in future N_2O emissions resulting from this policy change is sought mitigated by correspondingly implementing measures for ensuring optimization of N-binding and carbon sequestration in agricultural soils (e.g. catch crops).

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[73] Mikkelsen et al., 2005: Mikkelsen, M.H., Gyldenkærne, S., Poulsen, H.D., Olesen, J.E. & Sommer, S.G. (2005). Opgørelse og beregningsmetode for landbrugets emissioner af ammoniak og drivhusgasser 1985-2002. Arbejdsrapport fra DMU Nr. 204 (in Danish).

[74] Olesen et al., 2004: Olesen, J.E., Petersen, S.O., Gyldenkærne, S., Mikkelsen, M.H., Jacobsen, B.H., Vesterdal, L., Jørgensen, A.M.K., Christensen, B.T., Abildtrup, J., Heidmann, T. & Rubæk, G. (2004). Jordbrug og klimaændringer - samspil til vandmiljøplaner. DJF rapport Markbrug nr. 109. (in Danish).

[75] Olesen, 2005: Olesen, J.E. (2005). Muligheder for reduktion af drivhusgasemissioner i jordbruget. I: Olesen, J.E. (red). Drivhusgasser fra jordbruget - reduktionsmuligheder. DJF rapport Markbrug nr. 113, s. 12-32. (in Danish).

4.3.7.2.1 *Action Plans for the Aquatic Environment I and II and Action Plan for Sustainable Agriculture*

One of the main purposes of the Action Plans for the Aquatic Environment and the Action Plan for Sustainable Agriculture was to reduce agriculture's nutrient losses to the aquatic environment.

The action plans was implemented as regulation of farmers' behaviour. The Action Plan for the Aquatic Environment I was initiated in 1987, and the Action Plan for Sustainable Agriculture in 1991. In particular, these action plans included requirements concerning closed periods for applying slurry, ensuring a better utilisation of manure as well as minimum slurry storage capacity, mandatory incorporation of manure into the soil shortly after application, and winter green fields. The Action Plan for the Aquatic Environment II from 1998 contained a number of additional measures, including re-establishment of wetlands, afforestation, agreements on environment friendly agricultural measures, establishment of organic farming on an additional 170,000 ha, improved utilization of fodder, reduced animal density, use of catch crops, reduced fertilisation norms, and increased efficiency in use of nitrogen in manure. The aim of the political plans, which has now been reached, was to reduce nitrogen leaching by 100,000 tonnes N/year up to the year 2003[76]. The benchmark for the evaluation of the agricultural nitrogen leaching, as part of the final evaluation of the Action Plan for the Aquatic Environment II in December 2003, was 311,000 tonnes N per year. The evaluation showed that measures already implemented in addition to the measures agreed upon and financed by Action Plan II would result in a reduction of the total nitrogen leaching from agriculture (root zone and stable and storage facilities) of around 149,000 tonnes N per year. This corresponds to a reduction of around 48% of 311,000 tonnes N. After taking into account the calculation uncertainties, the nitrogen discharge reduction goal of 49% was achieved.

Specifically, these action plans have reduced the emissions of nitrous oxide. There have presumably also been small effects on methane emissions from manure stores, particularly as a consequence of increased use of anaerobic fermentation of manure in biogas plants and the reduced use of deep litter. The increased use of catch crops and larger overall areas with organic farming would also be expected to an increased storage of carbon in the soil.

Most of the changes in nitrous oxide emissions from agriculture through the period since 1990 can be attributed to these action plans. However, it has been calculated that even without the action plans there would have been a reduction in emissions, although to a much lesser extent, due to an overall optimization and improvement of farming techniques and management practices. The effect of these action plans on emissions of nitrous oxide has been calculated at about 2.2 million tonnes CO_2 equivalents/year[19]. There are no estimates of the effect of the Action Plans I and II for the Aquatic Environment and the Action Plan for Sustainable Agriculture on carbon storage in the soil.

4.3.7.2.2 *The Ammonia efforts*

Ammonia emitted from agriculture will stimulate emissions of nitrous oxide when it is deposited in other ecosystems. Reducing ammonia emissions will therefore also result

[76]Grant et al., 2000: Grant, R., Blicher-Mathiesen, G., Jørgensen, V., Kyllingsbæk, A., Poulsen, H.D., Børsting, C., Jørgensen, J.O., Schou, J.S., Kristensen, E.S., Waagepetersen, J. & Mikkelsen, H.E. (2000). Vandmiljøplan II - midtvejsevaluering. Miljø- og Energiministeriet, Danmarks Miljøundersøgelser, Silkeborg, Denmark. 65 pp (in Danish).

in a reduction of nitrous oxide emissions from that step in the production system. However, as the reduced ammonia emissions increase the nitrogen content in the manure, more nitrogen will, depending on the regulation, be applied to agricultural soils, increasing ammonia as well as nitrous oxide emissions during application. Together with the Action Plans for the Aquatic Environment I, II and III, the Ammonia Action Plan, which was adopted in 2001 carried a projected reduction of ammonia emissions by an estimated 15-20,000 tonnes of nitrogen annually. Hence, ammonia evaporation from agriculture should be reduced from 90,000 tonnes of nitrogen in the mid-1990s to approximately 60,000 tonnes of nitrogen in 2004.

The measures covered by the Ammonia Action Plan are:

1) Optimisation of manure handling in stables for cattle, pigs, poultry and fur animals.
2) Rules on covering storage facilities for solid manure and slurry tanks.
3) Ban on overall surface spreading and reduction of the time from field application of manure to incorporation in soil.
4) Ban on ammonia treatment of straw.

Following from an ex-ante analysis in 2001, these measures were estimated to have lowered the level of annual emissions of nitrous oxide corresponding to 34,000 tonnes of CO_2 equivalents from 2010. A shorter period of exposure for spread manure was estimated to have the greatest effect with an estimated reduction of 13,000 tonnes of CO_2 equivalents in annual emissions[22].

According to the latest emission inventory[77] a 22 per cent decrease in emissions of ammonia from agriculture from 2001 to 2016 can be seen – corresponding to a reduction of 75,000 tonnes CO_2 equivalents in annual N_2O emissions. From 1990 there was a 43 percent decrease in 2016 - corresponding to a reduction of 200,000 tonnes CO_2 equivalents in annual N_2O emissions. The level of approximately 60,000 tonnes of nitrogen in emissions of ammonia from agriculture projected to be reached in 2004 was reached in 2011.

In 2019, further measures to reduce emissions of ammonia from agriculture was implemented. However, the effect on greenhouse gas emissions is estimated to be neutral.

4.3.7.2.3 Action Plan for the Aquatic Environment III and the agreements of Green Growth

With the political agreement on the Action Plan for the Aquatic Environment III (APAE III) of 2 April 2004, a number of measures were implemented to follow up on the results attained via the previous plans. This third action plan contains targets with respect to nitrogen, phosphorus, sensitive natural areas, and slurry odour. It is a 10-year agreement, and was, in 2008 and 2011, evaluated with respect to the Water Framework Directive and the Habitats Directive. Special emphasis in the APAE III was on the use of catch crops, stricter requirements for use of manure as well as afforestation and agro-environmental measures. In addition, the agreement includes research initiatives aimed at slurry odours and reduction of emissions of nutrients, e.g. research into technology to

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[77] http://cdr.eionet.europa.eu/dk/eu/nec_revised/inventories/envwovdkw/

manage slurry, ammonia etc. The effect of the action plan for the period 2008-2012 was projected at 0.2 million tonnes CO_2 equivalents/year[78].

In 2008 the APAE III was evaluated on results, adequacy of tools and economic aspects to ensure that activities and expected results were achieved. The main conclusions for a number of measures were that implementation and effects have not been as anticipated. At the midterm evaluation of the APAE III, covering the years 2004-2007, no reductions in the production of animal manure were recorded, nor any decrease in the use of mineral fertilizers. Furthermore, no significant reductions in nitrogen leaching were proved for the investigated period (Waage Petersen et al., 2008).Thus, no change in the key parameters that provided reduction in the emissions of greenhouse gasses in the earlier action plans for the aquatic environment have happened so far, and it may therefore be difficult to reach the initial target.

In 2009, the Danish government launched the Green Growth Agreement (GGA) – as a plan for ensuring better conditions for nature and the environment while allowing agriculture to develop as a business. The GGA is a long-term plan for Danish nature, environment and agriculture with the purpose of ensuring that a high level of environmental, nature and climate protection goes hand in hand with modern and competitive agriculture and food industries.

The GGA was augmented in 2010 by the Green Growth Agreement 2.0, containing a series of initiatives to improve agriculture and food sector growth conditions and thus help to secure employment on farms, in the food industry and downstream industries. Furthermore, the GGA 2.0 supported the ongoing development of bioenergy with the aim of contributing to support Denmark's target of 30 per cent renewable energy by 2020 and fulfilment of Denmark's climate goals.

The GGA contains targets with respect to discharges of nitrogen and phosphorus to the aquatic environment, protection of nature and biodiversity, development of renewable energy in the agricultural sector including biogas plant, reduction of harmful pesticides, development of the organic sector and strengthened initiatives within research and development within the agricultural and food sectors.

The GGA also dealt with the problems previously encountered in achieving the expected goals through the APAE III. The measures in the GGA likewise pursued the achievements of the objectives of the Nitrates Directive on reducing discharges of nitrogen and phosphorus, as the target in APAE III were included in the GGA target. Different from the former APAE's were also the switch from a target on N leaching from the root zone to a target on N discharge to the aquatic environment. As the GGA worked to implement the EU Water Framework Directive, some measures were targeted sub-catchment while some measures were general rules.

The initiatives incorporated in the GGA were projected to reduce the agricultural sector's overall emissions of greenhouse gases by about 800,000 tonnes of CO_2 equivalents annually. Of this, about 400,000 tonnes reduction were expected to be derived from a green, market-based re-structuring of nitrogen regulation.

The latest estimate of achieved effects of the GGA, as well as of structural developments in agriculture etc., used in the October 2014 WEM greenhouse gas emission reduction projection amounts to 0.5 Mt of CO_2 eq. annually by 2021 (DCE,

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[78] Olesen et al., 2001: Olesen, J.E., Andersen, J.M., Jacobsen, B.H., Hvelplund, T., Jørgensen, U., Schou, J.S., Graversen, J., Dalgaard, T. & Fenhann, J. (2001). Kvantificering af tre tiltag til reduktion af landbrugets udledning af drivhusgasser. DJF-rapport Markbrug 48. (http://web.agrsci.dk/djfpublikation/djfpdf/djfm48.pdf , in Danish).

December 2014). A joint evaluation of the GGA's and the APAE's March 2014 showed an overall reduction effect of approx. 0.19 Mt CO_2 eq. annually for the period of 2007-2011, and approx. 0.337 Mt CO_2 eq. annually for 2012-2015. The reduction of specific emissions for 2007-2011 equals annually an estimated 4 Kt CO_2 eq. from CH_4, 67 Kt CO_2 eq. from N_2O, 107 Kt CO_2 eq. from carbon storage, and 11 Kt CO_2 eq. stemming from reductions in fuel use. Likewise, for the period of 2012-2015 the reductions equals an estimated 179 Kt CO_2 eq. from N_2O, 129 Kt CO_2 eq. from carbon storage, and 41 Kt CO_2 eq. stemming from reductions in fuel use, while emissions stemming from CH_4 rose with 12 Kt CO_2 eq.[79] (DCA 2014).

4.3.7.2.4 Environmental Approval Act for Livestock Holdings

The Environmental Approval Act for Livestock Holdings was implemented on 1 January 2007, providing national minimum requirements for environmental protection (odour, ammonia, nitrate, phosphorous, landscape, etc.) when livestock holdings are established, expanded or changed. The purpose of the Act was also to ensure the use of best available techniques (BAT).

The measures covered by the Environmental Approval Act for Livestock Holdings in 2007 were:

- 300 m buffer zones around ammonia-sensitive areas where no extension of livestock farms can take place if such an extension would lead to increased ammonia deposition in natural areas vulnerable to ammonia.
- Demand for a general reduction of ammonia emissions relative to a production facility with the lowest ammonia emission norm: 2007: 15%, 2008: 20%, 2009: 25%.
- Demands for injection of animal slurry on black soil and grass within buffer zones (1 km from vulnerable natural areas and, from 2011, in the whole country).
- Demand for fixed cover on most new containers for solid manure and slurry tanks (if they are within a distance of 300 meter to neighbours or vulnerable natural areas).
- Environmental standards and limits for nitrate-leaching to surface waters and groundwater depending on vulnerability, e.g. denitrification capacity and standards for phosphorous surplus depending on soil type and drainage.
- Environmental standards and limits for maximum deposition of ammonia on vulnerable nature and maximum odour impact on neighbours and cities.

The effect of these measures on greenhouse gas emissions has not yet been quantified.

The Environmental Approval Act for Livestock Holdings was changed in 2011, and the environmental standards for ammonia were heightened trough several measures. The general reduction goal was increased to a reduction of 30%, the specific ammonia reduction requirements were introduced with a maximum for total deposition to certain ammonia sensitive areas. This replaced the 300 meter buffer zones. In general this led to an overall tightening of the ammonia reduction with local exceptions.

[79] DCA (2014): Shelde, K. & J. E. Olesen. Klimaeffekt af kvælstofvirkemidler i dansk landbrug i perioden 2007-2015. Report on evaluation of GHG effects ordered from the Danish Ministry of Agriculture and Fishery (in Danish).

4.3.7.2.5 *Political Agreement on a Food and Agricultural Package and the political Agreement on Targeted Regulation and subsequent agreements*

In 2015 the Green Growth Agreement was replaced by the Political Agreement on a Food and Agricultural Package (FAP) which ensures better production conditions for farming, while at the same time handling a number of the key environmental challenges.

The agreement includes a diverse package of measures designed to make a shift in the way environmental regulation in the agricultural sector is carried out, from a general regulation to a targeted approach. The fertilization standards for the agricultural sector was lifted to the level of economic optimum and a new targeted regulation based on specific environmental goals for the aquatic environment and ground water resources is introduced from 2019.

The re-establishment of wetlands, rewetting of organic soils and afforestation (conversion of arable land) remain important measures to reduce the loss of nitrogen to the aquatic environment. As a part of the Political Agreement on a Food and Agricultural Package a comprehensive support scheme for catch crops was also introduced. The agreement also included changes to the regulation on the use of catch crops in Danish agriculture: a requirement of catch-crops as compensation for livestock-related nitrogen leaching and additional catch-crops as part of a targeted regulation. The aforementioned regulatory schemes on catch crops were implemented in addition to the already existing two other schemes, covering mandatory catch crops and catch crops as part of the EU requirement of environmental focus area.

Demands on growing catch crops (primarily grass) in the autumn to reduce the nitrate leaching do also sequester CO_2. Based on plans for future agricultural regulations the area is expected to increase significantly towards 2021. In 2018 an additional agreement on Targeted Regulation was agreed upon. In addition to catch crops measures such as energy crops, reduced fertilizer/manure application, fallow land etc. was introduced as a part of the scheme. Money was also allocated to develop technologies from biorefining from grass with the aim of commercializing green bio refining and thus increase the demand for grass and other crops with lower climate- and environmental footprint.

Most recently, a political agreement (November 2019) has been reached on frontloading the positive climate and nutrient effects of targeted regulation from 2021 to 2020. From 2019 to 2020 there will be a substantial increase in agricultural land with catch crops (potentially 550,000 hectares out of a appx 2,6 mill. hectares of arable farmland). As a part of targeted regulation, the farmer can choose a number of alternative measures to catch crops to mitigate nutrient leaching. From 2020, all alternative measures have a positive climate effects.

As a part of the Political Agreement on a Food and Agricultural Package money was also allocated for afforestation, environmental and climate technologies and conversion of arable land on organic soils to nature under the Danish Rural Development Programme funded by the European Agricultural Fund for Rural Development (EAFRD). As a part of the agreement on the national budget of 2020, an additional 35 mio. DKK have been allocated for afforestation purposes and 170 mio. DKK for investments at farm-level, including environmental and climate technologies.

4.3.7.2.6 *Subsidy for conversion of arable land on organic soils to nature*

Cultivated organic soils emits large amounts of CO_2. In Demark approximately 66,000 hectares of organic soils (>12% organic carbon) are under agricultural practice.

In 2014 the Danish Government adopted a subsidy scheme for conversion of arable land on organic soils to natural habitats under the framework of the common agricultural policy (CAP). This scheme is now a part of the Agreement on the Food and Agricultural Packet.

The objective of the scheme is to reduce agricultural emissions of greenhouse gases from organic soils through less intensive agricultural operations. The initiative also offers opportunities for synergies in relation to reduced discharges of nitrogen into watercourses, lakes and fiords as well as for increased biodiversity. From 2015 to 2017 the plan has been to provide economic subsides to convert approximately 2,500 hectares of organic lowland areas into rewetted natural habitats and reduce emissions of greenhouse gases. The CO_2 effect has been estimated at a reduction of at least 33.000 tonnes of CO_2-eq. annually in the period 2014-2017. The effect is likely to be greater due to prioritization of projects with the lowest emission reduction costs (DKK per kg CO_2), depending on soil types[80]. The areas under the subsidy scheme are registered with a ban on cultivation, fertilisation and pesticide application. As a part of the Agreement on the Food and Agricultural Packet the scheme has been extended to 2020. The scheme is co-financed by the Danish rural development by the European Agricultural Fund for Rural Development (EAFRD).

In September 2019 an Agreement was made on establishing a Multifunctional Land Re-parcelling Fund 2019-2021. The objective is to facilitate re-parcelling of land and thereby obtain synergies between agricultural production and biodiversity, climate, environment, recreation and rural development.

4.3.7.2.7 Political Agreement on Nature

A Political Agreement on Nature (the Nature Package) was installed in May 2016 with the main aim of supporting an increased protection of biodiversity. The agreement states initiatives within the following areas: Biodiversity in forests, continued initiatives for nature (initiatives derived from the former plan Danish Nature Policy), nature and biodiversity, urban nature and outdoors recreation, open land management and the farmer's role as resource manager of nature areas, modern nature conservation, and simplification of legislation.

As a result of the nature package 10.200 acres of forest is designated as untouched forest and another 3.600 acres is designated as forest in which management primarily is based on biodiversity considerations in state-owned areas. Also government grant scheme has been established to increase areas of untouched forest in private owned forests.

The climate effect of this Agreement has not been established.

4.3.7.2.8 Bio-refining

Bio-refining can produce a range of products such as inputs to biogas production, protein and fodder and other higher value products for use in e.g. the chemical and pharmacological industry. As mentioned in chapter 4.3.4, the 1st allocation of the budget under the National Green Climate Fund in June 2017 included an earmarking of 8 million DKK as support in 2017 for pilot-scale bio-refinery projects based on non-food biomass. Commercialization of the bio-refining sector can facilitate demand for crops such as grasses with higher associated environmental and climate benefits than for

[80] DCE (2014): Jensen, P.N. (red). Fastsættelse af baseline 2021. Effektvurdering af planlagte virkemidler og ændrede betingelser for landbrugsproduktion i forhold til kvælstofudvaskning fra rodzonen for perioden 2013-2021. DCE technical report no. 43.

conventional crops like corn or cereals. In addition, bio-refining is considered to be essential in realizing the bio-economy potential within Danish agriculture and other connected sectors.

In 2019, additional funds have been allocated through the National Green Climate Fund for promotion of green bio refining (see chapter 4.3.4).

4.3.7.2.9 Promotion of precision agriculture.

Preparation of pilot project on precision farming to investigate to what extend high-tech solutions such as sensors and GPS data can optimize cultivation with regard to nitrogen leacing was initiated in 2019. There are potentially positive climate mitigation effects from precision farming. However, more knowledge beyond the existing initiative is needed in order to quantify the effect. The potential outcome will be integrated in future work on climate.

Table 4.21 Measures in agriculture, forestry and fisheries (See also Table 4.25 (LULUCF))

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)**		Source of estimates
										2020	2030	
AG-1(expired): Action Plan for the Aquatic Environment I+II and Action Plan for Sustainable Agriculture	Yes*	Agriculture	N_2O	Reduction of fertilizer/manure use on cropland (Agriculture)	Regulatory	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish	See text.	1987	Government: State, Local: Municipalities	**1900**	**1900**	Estimates in 2017 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).
AG-2(expired): Action Plan for the Aquatic Environment III	Yes*	Agriculture	N_2O	Reduction of fertilizer/manure use on cropland (Agriculture)	Economic, Regulatory	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish	See text.	2004	Government: State, Local: Municipalities	IE (G1)	IE (G1)	
AG-4a/4b/4c/4d/4e: Reduced emissions of ammonia	Yes*	Agriculture	N_2O	Reduction of fertilizer/manure use on cropland (Agriculture), Improved animal waste management systems (Agriculture)	Regulatory	Implemented	See text.	2001	Government: State, Local: Municipalities	IE (G1)	IE (G1)	
AG-4f: Environmental Approval Act for Livestock Holdings	Yes*	Agriculture	N_2O, CH_4	Reduction of fertilizer/manure use on cropland (Agriculture), Improved livestock management (Agriculture), Improved animal waste management systems (Agriculture)	Regulatory	Implemented	See text.	2007	Government:State, Local:Municipalities	IE (G1)	IE (G1)	
AG-6: Biogas plants	Yes*	Agriculture, Energy	CO_2, CH_4	Improved animal waste management systems (Agriculture), Increase in renewable energy (Energy supply), Switch to less carbon-intensive fuels (Energy supply)	Economic	Implemented	See text.	1987	Government: State	**240**	**207**	2020: "Biogasproduktions konsekvenser for drivhusgasudledning i landbruget" Rapport nr. 197 DCE, 2016 (http://dce.au.dk/udgivelser/vr/nr-151-200/abstracts/nr-197-biogasproduktions-konsekvenser-for-drivhusgasudledning-i-landbruget/); 2030: Preliminary estimate (to be published, in Danish).
AG-9(expired): Agreement on Green Growth	Yes*	Agriculture, Energy	N_2O, CO_2, CH_4	Reduction of fertilizer/manure use on cropland (Agriculture), Increase in renewable energy (Energy supply), Switch to less carbon-intensive fuels (Energy supply)	Economic, Regulatory	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish	See text.	2009	Government: State	500	0	The estimate for 2020 shown here is a former separate estimate for this measure. As this measure has been replaced by measure no. AG-12, only the effect estimated under AG-12 is included in the calculation of the total effect of all measures.
AG-11(new+expired): Agreement on Green Growth 2.0	Yes*	Agriculture, Energy	CO_2, CH_4, N_2O	Increase in renewable energy (Energy supply), Reduction of pesticides use (), Reduction of tax on productive farmland (), Conversion to organic farming ()	Economic, Regulatory	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish	See text.	2010	Government: Ministry of Environment and Food	0	0	Notat nr. 2, Vedrørende effekter af forskellige tiltag i forbindelse med Grøn Vækst, Aarhus Universitet (http://pure.au.dk/portal/files/38211855/010511_DJF_DMU_notat_2_inkl_Baselinegruppens_kommentarer_og_sp_rgsm_l.pdf , in Danish)
AG-12(new): Political Agreement on a Food and Agricultural Package	Yes*	Agriculture	N_2O, CO_2	Improve the ability of the food and agricultural industry to increase primary production and exports, as well as to contribute to creating growth and jobs, in due interaction with protection of nature and the environment. ()	Economic, Regulatory	Implemented	See text.	2016	Government: Ministry of Environment and Food	**-122**	**-122**	Answer to question no. 391 (ord. part) asked by the parliament's Committee for Environment and Food on 15 Januar 2016 (http://www.ft.dk/samling/20151/almdel/mof/spm/391/svar/1299227/1598927/index.htm , in Danish)
AG-13(new): Agreement on Nature (the Nature Package)	Yes*	Agriculture, Forestry/LULUCF	CO_2, CH_4, N_2O	Protection of biodiversity through increased involvement of farmers in land use planning, simplification of related legislation etc. (), Protection of biodiversity through increased involvement of farmers in land use planning, simplification of related legislation etc. ()	Regulatory	Implemented	See text.	2016	Government: Ministry of Environment and Food	IE (G1)	IE (G1)	

* In principle included in the "with measures" projection scenario - not necessarily with separate annual estimates, but in most cases as a result of the assumption that the measure has contributed to the observed level of total Danish greenhouse gas emissions in the most recent historical inventory year used as the starting point for the projections.

** Estimated annual effects in 2020 and 2030 of measures implemented or adopted since 1990 - i.e. emission reductions and avoided emission increases since 1990.

4.3.8 *LULUCF (Land-Use, Land-Use Change and Forestry)*

4.3.8.1 CO_2 – emissions and removals in LULUCF under the Climate Convention

The emission of GHGs from the LULUCF sector (Land Use, Land Use Change and Forestry) includes primarily the emission of CO_2 from land use and small amounts of N_2O from disturbance of soils not included in the agricultural sector.

The LULUCF sector is subdivided into six major categories:

- Forest
- Cropland
- Grassland
- Wetlands
- Settlements
- Other Land

Forests and forestry are important due to CO_2 sequestration and emissions as a consequence of trees growing, respiring and decomposing. Danish forests contain a considerable store of CO_2 absorbed from the atmosphere. When new forests are established, new CO_2 stores are created. Afforestation is therefore a useful climate policy instrument.

The total sector has been estimated to be a net source of 0-8 % of the total Danish emission incl. LULUCF (average 2013-2017). The average emission in 2013-2017 has been estimated to 2313 kt CO_2 equivalents with an emission of 2971 kt CO_2 equivalents in 2017.

Emissions/removals from the sector fluctuate based on specific conditions in the given year. In general, the forest sector has been a net sink, while Cropland and Grassland have been net sources. The latter due to a large area with drained organic soils. Emissions from drained organic agricultural soils accounts for approximately for 6-7 % of the total Danish emission incl. LULUCF in the latter years (this estimate is under revision).

In years where the total sector accounts to approximately zero, the forest and/or the agricultural mineral soils are net sinks. Forest has shown to be a large sink until 2014 and turned into a small net source in 2015 and 2016. In 2017, Forest was a small sink. Since 2013, Forest has been estimated to be an accumulated net sink of 5397 kt CO_2 equivalents. In 2017, Cropland has been estimated to be a net source of 4.7 % of the total Danish emission incl. LULUCF. This is mainly due to a large area with cultivated organic soils. Grassland is a net source contributing to 1.5 % of the total Danish emission. This is also due to a large area with drained organic soils (the estimated size of this area is under revision). Emissions from Cropland have shown a continuous decrease since 1990 with 47 % and the emission from Grassland has decreased with 22 %. However, large variations occur between years.

<u>*Forest policies*</u>

The political measure to increase carbon sequestration is the objective from the National Forest Programme (2002): "Forest landscapes should cover 20-25% of Denmark after one tree generation (80-100 years)" – and the scope and potential for natural habitats and processes should be strengthened in this effort. This measure relates to Article 3.3 of the Kyoto Protocol. Various measures have been taken towards achieving this goal as shown in Table 4.25. For instance, a government grant scheme has been established as an incentive for afforestation on private agricultural land. Also, the state itself is establishing new forests, and some private individuals are establishing forests on agricultural land without a government grant. Through rural planning and differentiated incentives, afforestation is particularly encouraged in certain priority areas in order to pursue multiple forest functions and values, implementing the water framework directive and including recreation and ground water protection.

In October 2018 the Danish Ministry for Environment and Food launched a new National Forest Programme. It sets out a long term vision and two long term goals related to expansion of forest cover and biodiversity conservation, 13 strategic orientation lines as well as a number of concrete actions for a multifunctional and sustainable development of Danish forests.

The vision is “A forest area in growth with healthy and robust forests which accommodate diversity and which provide for good opportunities for sustainable timber production, which create jobs, take care of biodiversity and preserve natural treasures, mitigate climate change, protect groundwater and offer great outdoor experiences - in new and old forests and for the benefit of both present and future generations”.

The long term goal for forest cover reads: “Before the end of the 21st century, forested landscapes cover 20-25 pct. of Denmark's total area”. Thus, the goal relates to “forest landscapes”, which constitutes all forests and some surrounding areas as well. However, a precise definition of forest landscapes has not been developed. The Danish forest area is currently 14.5 pct. of the land cover.

Many strategic orientation lines relates to climate and energy, most notably those below.

Under the header “More forest and less global warming”:

- Increase the Danish forest area and increase the public utility of the new forests.
- Increase the uptake and stocks of carbon in forests and wood products through sustainable management.

Under the header Sustainable production:

- A favourable and clear framework for sustainable production of timber and other goods.
- Increase the demand and supply of documentable sustainable timber.
- Uniform, robust and operational criteria for "sustainable timber".
- Continue the conversion and development of close to nature forestry.

Forest carbon estimations

In the estimation of carbon pools and emissions from existing forests, afforestation and deforestation in 1990 to 2015, the information collected in relation to different forest census and inventories is combined with the satellite-based land use/land cover map for the base year 1990, 2005 and 2011. Hereby, consistent estimates of emissions from existing forests are obtained utilising as much information from the data sources as possible and providing best possible time series. To estimate the forest area satellite-based land use/land cover maps have been used for 1990, 2005 and 2011. From 2012 and onwards actual vector data are used.

Estimates of woody biomass carbon pools are obtained by applying species specific biomass functions developed for the most important tree species in Denmark (Skovsgaard et al. 2011; Skovsgaard and Nord-Larsen, 2012, Nord-Larsen and Nielsen 2015) to individual tree measurements in the National Forest Inventory plots. For tree species where no biomass function is available, stem volumen for conifers and the total above-ground volumen for deciduous trees are calculated using species specific volume or form factor functions. Subsequently, total stem or above ground biomass is calculated by multiplying the volumes with species specific basic densities for the wood. The estimated biomass is converted into total above-ground and below-ground biomass by multiplying with expansion factors calculated from expansion factor functions for beech and Norway spruce as representatives of deciduous and coniferous species (Skovsgaard et al. 2011; Skovsgaard and Nord-Larsen, 2012). The quantity of carbon is calculated by multiplying by the conversion factor of 0.5 tonnes C/tonne dry matter.

Estimation of deadwood carbon pools follows the calculations stated above except that a conversion factor is applied according to the degree of decomposition of the wood.

Estimation of carbon pools in the forest floor (litter) is based on measurements of the depth of the litter layer on the National Forest Inventory plots. As peat lands are reported specifically, a maximum depth of 15 cm is used in the calculations. Forest-floor carbon for individual species is estimated by multiplication of the forest floor depth by the plot area, a species-specific density (Vesterdal & Raulund-Rasmussen, 1998) and the ground cover fraction of the individual species. Calculation of ground cover fraction is based on the proportion of basal area of the individual species and total forest-floor carbon is estimated by summation of forest-floor carbon of the different species.

For estimation of carbon pools in the mineral soil, average carbon content for different soil types (loamy, sandy and organic) were applied to the individual National Forest Inventory plots according to their soil types determined from Danish soil mapping. The average soil carbon contents used in this analysis were obtain in a forest soil inventory in which it was documented that forest mineral soil is not an overlooked source of CO_2 emissions. In a study, analysis of time series data did not reveal any changes in forest mineral-soil carbon pools observed in 1990 and 2007-2009.

A more detailed record of the calculations of carbon pools are provided by Nord-Larsen and Johannsen (2016)[81].

Table 4.22 shows the total area reported under Forest Land (FL) under the Convention. The area with FL has increased since 1990 due to an intensive afforestation programme. In the beginning of the 1990's, approximately 3000 ha were afforested every year. In recent years, approximately 1900 ha are afforested per year. The estimated emission from organic matter varies between years. Mineral soils are a small sink due to the afforestation. The CO_2 emission from organic soils is slightly reduced over time due to rewetting of the organic soils in the forests.

[81] Nord-Larsen, T., & Johannsen, V. K. (2016). Danish National Forest Inventory: Design and calculations. Department of Geosciences and Natural Resource Management, University of Copenhagen. (IGN Report). http://static-curis.ku.dk/portal/files/164970017/Danish_National_Forest_Inventory.pdf

Table 4.22 Area and annual emissions 1990 to 2017 from forest land.

Source: Denmark's National Inventory Report 2019 and University of Copenhagen - Department of Geosciences and Natural Resource Management

Area and emissions	1990	2000	2010	2013	2014	2015	2016	2017
Area								
Forest Land Area (1000 ha)	548.7	590.8	627.7	637.3	637.3	637.5	637.5	638.6
Emissions								
Living and dead biomass, kt C	-185.9	-185.4	-481.	-843.2	-840.3	-616.9	-29.8	216.5
Litter, kt C	-17.9	-17.8	-544.9	159.3	-218.8	614.0	174.4	-372.5
Dead wood, kt C	-4.8	-4.8	-43.8	-23.0	-69.7	1.6	0.0	81.9
Mineral soils, kt C	-0.6	-7.1	-12.6	-12.4	-11.9	-11.6	-11.2	-10.7
Organic soils, kt C	52.6	50.2	45.7	47.0	47.1	47.3	47.4	47.5
Total, kt C	-156.6	-165.0	-1037.1	-672.2	-1093.6	44.3	230.8	-37.4
CH4, kt CH4	0.2	0.7	1.1	1.2	1.2	1.2	1.2	1.2
N2O, kt N2O	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total, kt CO2 eqv.	-542.5	-562.5	-3750.9	-2412.1	-3957.1	215.4	899.5	-83.8

Information on the accounting of emissions and removals related to forest activities according to the Kyoto Protocol accounting rules is included in chapter 4.3.8.2.

Carbon sequestration in afforestation is stored in the total living biomass (incl. roots) of the trees. Forests raised on agricultural land accumulate far more biomass than the previous agricultural land-use. The forest biomass contains about 50% carbon, which is absorbed as CO_2 through photosynthesis. Probably, additional carbon is stored in the organic matter in the soil following afforestation of cropland due to a larger supply of dead organic matter and the absence of soil preparation. Denmark reported on sequestration in litter (forest floors) developing after conversion from agriculture to forestry while mineral soil C stocks are reported as unchanged based on field measurements. Previous studies did not indicate any consistent change in mineral soil C stocks (*Vesterdal et al., 2002, 2007*).

The effect of afforestation on other greenhouse gases, such as nitrous oxide and methane has recently been studied in Denmark (*Christiansen and Gundersen, 2011*). The acidification of nitrogen-rich former agricultural land may stimulate the formation of nitrous oxide, and blocking of drains after afforestation and the resulting water stagnation could increase methane emissions. The recent projects have shown that methane uptake in soils is in fact increased following afforestation of well-drained soils, although only in oak stands, while methane uptake was unchanged in Norway spruce (*Christiansen and Gundersen, 2011*). In more wet afforested areas, methane may be emitted when drainage pipes stop working (*Christiansen et al., 2012*). Nitrous oxide emissions increased with time since afforestation in both oak and spruce stands (*Christiansen and Gundersen, 2011*). Increased methane and nitrous oxide emissions could to some degree counteract the positive effect of afforestation on CO_2 sequestration. However, since information is still scarce on changes in the methane and nitrous oxide emissions, analyses of the consequences of afforestation are only carried out for CO_2.

The continued growth of new forests will provide for carbon sequestration on a long-term basis. Owing to the legal protection of forest land use, the sequestration in subsidised afforested land is expected to be permanent. If the objective of increasing the forest area is to be achieved, however, an enhanced rate of planting will be needed. Afforestation offers many other benefits in addition to CO_2 sequestration. Conversion of farmlands into forest reduces the loss of nitrogen to the aquatic environment. Besides playing a major role in protecting the aquatic environment from nitrogen afforestation provides valuable groundwater protection and protection of habitats for fauna and flora. Forest is also a highly valued type of nature in terms of cultural values and landscape amenity and has great value for outdoor recreation. In addition to carbon sequestration, afforestation thus contributes to a wide range of values.

4.3.8.2 CO_2 – emissions, removals and credits from Activities under Articles 3.3 and 3.4 of the Kyoto Protocol

In 2007, a research and monitoring programme for the monitoring and reporting activities under Articles 3.3 and 3.4 was decided with a total budget of DKK 72 million. The results from this programme have been included in the annual reporting of greenhouse gas inventories under the UNFCCC and the Kyoto Protocol since April 2010 and the final results are approved under the Kyoto Protocol with the publication of the inventory review report on 4 February 2015.

A new research and monitoring programme has been launched to cover the 2nd commitment period 2013-2020.

The results from these programmes are further described in the following sections.

In 2019, an analysis to improve the monitoring and accounting of carbon dioxide uptake and storage in soils and forests was initiated. The estimation of carbon sequestration in soils and forests is extremely complex. Therefore an analysis to improve the estimation methodologies to better target increases in CO_2 sequestration has been initiated.

4.3.8.2.1 Article 3.3

In accordance with Article 3.3 of the Kyoto Protocol, emissions and removals from afforestation, reforestation and deforestation (ARD) activities have been included in the accounting of Removal Units (RMUs) in the 1st commitment period 2008-2012 under the Protocol. The total accounted quantity in the 1st commitment from ARD was a net loss of 255.9 Gg. Mainly due to a low growth rate in the afforested areas and a high deforestation rate (Submission to UNFCCC in April 2014 and UNFCCC inventory review report of 4 February 2015).

In total for the first 5 years of the 2nd commitment period afforestation, reforestation, and deforestation (ARD) activities has been estimated to a net sink of approximately 949 Gg CO_2-equivalent or in average 190 Gg CO_2-equivalent per year.

No reforestation was recorded in in the 1st commitment period or the first 5 years of the 2nd commitment period.

4.3.8.2.2 Article 3.4

In accordance with Article 3.4 of the Kyoto Protocol, emissions and removals from forest management (FM), cropland management (CM) and grazing land management (GM) activities have been elected to be included in the accounting of RMUs in the 1st and 2nd commitment period under the Protocol.

Forest management

According to the final estimates for the 1st commitment period (2008-2012) (*Nielsen et al., 2014* and the *Inventory Review Report* published on 4 February 2015), average CO_2 removals from Forest Management amounted to 4050 Gg. The included carbon pools were above-ground and below-ground biomass, dead wood and soil. This estimate was much higher than the specified maximum of credits as removal units for Denmark at 183 Gg CO_2 (50Gg C) annually in 2008-2012.

In 2017 the preliminary removal for forest management for the years 2013 to 2017 has been estimated to 4638 Gg CO_2-eq or equivalent to 928 Gg CO_2-eq in average per year (Nielsen *et al., 2019*). This combined with a Forest Management Reference Level (FMRL) of 407 Gg as inscribed in the appendix of the annex to decision 2/CMP.7 and a preliminary technical correction of -82.6 Gg (Nielsen *et al., 2019*) gives a preliminary net accounting of 6270 Gg CO_2-eq or equivalent to 1254 Gg CO_2-eq in average per year from Forest Management in 2013-2017.

Emissions from forest management may originate from an increased harvesting caused by an uneven age distribution such as observed for beech in Denmark. However, the observed emissions origins from a lower sequestration in living biomass than usually observed and an unexplained loss of carbon in the forest litter pool.

Harvested wood products (HWP)

Carbon emissions from harvested wood products (HWP) have been reported since 2013. Denmark has chosen to report under Approach B, the production approach, which refers to equations 12.1, 12.3 and 12.A.6 of volume 4 of the 2006 IPCC Guidelines and the 2013 Supplementary GPG.

According to a questionnaire on the production of the Danish wood industry, the production of sawnwood in 2017 was about 686.000 m^3, while the production of woodbased panels was about 428.000 m^3, which both are an increase compared to 2016. The questionnaire covered an estimated 90 % of the revenue generated in the sawnwood sector and 100 % of the sector revenue for wood-based panels (there were only two relevant companies). A cross validation of the roundwood consumption showed an average deviation of 8 % for 2011-2013 between the Questionnaire and the figures reported by Statistics Denmark based on harvest and trade statistics. As of 2017, the HWP pool originating from domestic harvest and domestic consumption consisted of about 5 million tonnes carbon (67 % from sawnwood and 33 % from wood-based panels – the paper pool was insignificant). This is equivalent to 13 % of the carbon stock in live forest biomass. If imported wood were also included, the pool increases to about 29 million tonnes carbon equivalent to 75 % of the carbon stock in live forest biomass. The total inflow of carbon to the HWP pool in 2017 is reported to about 164.000 tonnes carbon - 64.000 tonnes from sawnwood and 100.000 tonnes from woodbased panels. The outflow from the pool is reported to about 115.000 tonnes carbon in 2017 - 66.000 tonnes from sawnwood and 49.000 tonnes carbon from wood-based panels. Thus, there has been a net carbon sequestration in HWP of about 44.000 tonnes carbon in 2017. See Table 4.23.

The estimate of the size of the total HWP stock is quite uncertain, as the empirical basis for the FOD model and the attached half-lives is weak. Conducting direct inventories of the carbon stock may be a method to reduce uncertainty. In the Danish case, estimates based on the FOD model for the total HWP pool, including imported

wood and converted to finished wood products actually came quite close, when measured per capita, to estimates from Finland originating from a direct inventory. Regarding estimates for pool changes, uncertainty on half-life may be of less importance, as longer retention time in the pool may be traded off against higher emissions levels from the historic pool. This depends on the characteristics of the pool, i.e. the size of the pool vs. the recent inflow. Uncertainty on activity data relates to both uncertainty on measurements, e.g. caused by reporting errors, and statistical uncertainty, caused by variation in the sampled population.
Judging from the coverage and the validation results, surveying the production of semi-finished wood products in Denmark by questionnaire has been successful. It will be repeated in the following years as part of the future reporting of HWP.

Table 4.23. HWP in use from domestic harvest (CRF table 4.Gs1).

Source: Denmark's National Inventory Report 2019

HWP produced and consumed domestically (ΔC HWPdom IU DH)	HWP in use from domestic harvest				Net emissions/ removals from HWP in use
	Gains	Losses	Half-life	Annual Change in stock (ΔC HWP IU DH)	
	(t C)		(yr)	(kt C)	(kt CO_2)
Total	**190140.0**	**-145822.6**		**44.3**	**-162.4**
1. Solid wood	190140.0	-145735.3		44.4	-162.7
Sawn wood	74927.3	-77765.3	35.00	-2.8	-10.4
Wood panels	115212.7	-67970.0	25.00	47.2	-173.1
2. Paper and paperboard	NO	-87.4	2.00	-0.1	0.3

Cropland management and Grazing land management:

In 2006, the government at that time decided to include removals of CO_2 by soils (Article 3.4 of the Kyoto Protocol) in the calculation of Denmark's climate accounts under the Kyoto Protocol.

From 1990 to the 1st commitment period 2008-2012 Cropland management and Grazing land management has shown a net reduction in greenhouse gas emissions of 7697 Gg CO_2-equivalents or in average 1539 Gg CO_2-equivalents per year.

From 1990 to the first five years of the 2nd commitment period, i.e. 2013-2017, Cropland management and Grazing land management has shown a net reduction in emissions of 10119 Gg CO_2-eq. or in average of 2024 Gg CO_2-equivalents per year.

Contributions to the Kyoto Protocol under Article 3.4 concern changes to vegetation and soil carbon stocks. Under the Kyoto Protocol, the flows of carbon to and from biomass and soils are stated according to a net-net principle by which the change in net emissions is calculated as the rate of change for the carbon stock in the 1st and 2nd commitment period less the rate of change for the carbon stock in the reference year (1990). As elected land cannot leave an elected activity, emissions from areas, which have been converted from Cropland and Grassland to Wetlands and Settlements in the commitment periods, are included in the accounting. For agriculture, the following potential sources of CO_2 emissions and CO_2 sequestration have been included:

1. Net change in the content of carbon in mineral soils in connection with changed land use and cultivation.
2. Net change in the soil's carbon stock in connection with drainage and cultivation of organic soils or re-establishment of wetlands.
3. Change in the carbon content of wood biomass in wind breaks and fruit farms.

The agricultural mineral soils has shown to be a steady increasing sink. This is primarily due to increased yields, better management, ban on straw burning, statutory requirements for catch crops, etc.

One of the measures with an effect on return of carbon to the soil has been the ban on burning of straw residues on fields as shown in Table 4.25.

The ban has resulted in greater return of carbon to the soil, and therefore increased carbon storage in the soil, as well as increased use of straw as a fuel. Both uses will result in a net reduction in CO_2 emissions. Not burning straw prevents the methane and nitrous oxide emissions associated with the burning. On the other hand, there are some emissions of nitrous oxide in connection with the return of nitrogen to the soil when the straw is mulched.

The measure works by regulating behaviour, and the ban was introduced from 1990. The measure was implemented in the form of a statutory order under the Environmental Protection Act. Ban on field burning is a part of cross compliance under EUs Common Agricultural Policy.

Demands on growing catch crops (primarily grass) in the autumn to reduce the nitrate leaching do also sequester CO_2. The area today is approximately 440.000 hectares or approximately 16 % of the agricultural area.

The agricultural yields are projected to increase in the future due to a shift in the fertilizer regulation from 2015. Higher yields will result in a higher amount of crop residues returned to soil and secondary increase the soil carbon stock.

Another measure which will increase sequestration in woody biomass is the planting of windbreaks also mentioned in Table 4.25. The objective of planting windbreaks has primarily been to reduce wind erosion and ensure greater biodiversity. Planting of windbreaks has been supported under conditions described in the Statutory Order on Subsidies for Planting Windbreaks and Biotope-improving Measures (Statutory Order no. 1101 of 12/12/2002). Support has been granted under the EU Rural Districts Programme. For the period 2017-2019 windbreaks will be established under the political agreement of May 2016 called “Naturpakken” and will focus primarily on ensuring greater biodiversity. Since the end of the 1960s about 1,000 km of tree-lined windbreaks have been planted with government subsidies. It is also estimated that about 30% more has been planted without subsidies. Estimates indicate that planting of windbreaks leads to CO_2 sequestration in woody biomass of about 130,000 tonnes CO_2/year[82].

[82] Gyldenkærne et al, 2005: Gyldenkærne, S., Münier, B., Olesen, J.E., Olesen, S.E., Petersen, B.M. & Christensen, B.T. (2005). Opgørelse af CO_2-emissioner fra arealanvendelse og ændringer i arealanvendelse. Arbejdsrapport fra DMU (under preparation,, in Danish).

Total from activities under Articles 3.3 and 3.4

The total amount of net RMU credits from activities under Articles 3.3 and 3.4 is estimated at 8.6 million RMUs (or tonnes of CO_2-equivalents) for the whole period 2008-2012 or as the average per year 1.7 million RMUs.

The total preliminary amounts of net RMU credits under Articles 3.3 and 3.4 has been estimated to 17.3 million RMUs (or tonnes CO_2-equivalents) in the first five years of 2nd commitment period or in average 3.5 million RMUs per year.

Further information on the accounting of emissions and removals related to activities under Articles 3.3 and 3.4 under the Kyoto Protocol is included in Table 4.24.

Table 4.24. INFORMATION ON ACCOUNTING FOR ACTIVITIES UNDER ARTICLES 3.3 AND 3.4 OF THE KYOTO PROTOCOL

Source: Denmark's National Inventory Report 2019

GREENHOUSE GAS SOURCE AND SINK ACTIVITIES	Base Year(2)	NET EMISSIONS/REMOVALS									Accounting parameters	Accounting quantity (4)
		2013	2014	2015	2016	2017	2018	2019	2020	Total(3)		
	(kt CO2 eq)											
A. Article 3.3 activities												
A.1. Afforestation/reforestation		8,56	-341,86	-620,66	27,58	-600,50				-1526,89		-1526,89
Excluded emissions from natural disturbances(5)		NA	NA	NA	NA	NA				NA		NA
Excluded subsequent removals from land subject to natural disturbances(6)												
A.2. Deforestation		38,51	116,33	252,32	147,38	23,67				578,20		578,20
B. Article 3.4 activities												
B.1. Forest management										-4637,98		-6269,90
Net emissions/removals		-2546,39	-3774,33	667,52	677,72	337,49				-4637,98		
Excluded emissions from natural disturbances(5)		NA	NA	NA	NA	NA				NA		NA
Excluded subsequent removals from land subject to natural disturbances(6)												
Any debits from newly established forest (CEF-ne)(7),(8)		NA	NA	NA	NA	NA				NA		NA
Forest management reference level (FMRL)(9)											409,00	
Technical corrections to FMRL(10)											-82,62	
Forest management cap(11)											19822,07	-6269,90
B.2. Cropland management (if elected)	4470,10	2043,95	3152,12	2608,81	2854,47	2429,18				13088,53		-9261,95
B.3. Grazing land management (if elected)	1000,51	844,01	954,02	783,29	789,24	775,17				4145,74		-856,83
B.4. Revegetation (if elected)	NA	NA	NA	NA	NA	NA				NA		NA
B.5. Wetland drainage and rewetting (if elected)	NA	NA	NA	NA	NA	NA				NA		NA

Table 4.25 Measures in the Land-use, Land-use change and Forestry sector (LULUCF)

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO2 eq)**		Source of estimates
										2020	2030	
LU-1: Ban on burning straw on fields	Yes*	Forestry/LULUCF	CO2	Conservation of carbon in agricultural soils and reduction of air pollution. ()	Economic	Implemented	See text.	1989	Government: State, Local: Municipalities	IE (G7)	IE (G7)	
LU-2: Planting of windbreaks	Yes*	Forestry/LULUCF	CO2	Enhancing carbon sequestration through planting of windbreaks ()	Economic	Implemented	See text.	1960	Government: Ministry of Environment and Food	IE (G7)	IE (G7)	
LU-3: Subsidies scheme for private afforestation on agricultural land (increase the forest area in Denmark)	Yes*	Forestry/LULUCF	CO2	Afforestation and reforestation (LULUCF), Strengthening protection against natural disturbances (LULUCF)	Economic	Implemented	See text.	1991	Government: Danish Environmental Protection Agency	IE (G7)	IE (G7)	
LU-4: Public afforestation (state and municipalities)	Yes*	Forestry/LULUCF	CO2	Afforestation and reforestation (LULUCF), Strengthening protection against natural disturbances (LULUCF)	Regulatory, Voluntary Agreement	Implemented	See text.	1989	Government: Danish Environmental Protection Agency, Local: Municipalities	IE (G7)	IE (G7)	
LU-5: Subsidy for conversion of arable land on organic soils to nature	Yes*	Forestry/LULUCF, Agriculture	CO2, N2O	Reduction of fertilizer/manure use on cropland (Agriculture), Prevention of drainage or rewetting of wetlands (LULUCF)	Economic	Implemented	See text.	2015	Government: Ministry of Environment and Food	IE (G7)	IE (G7)	
G7(new): LULUCF activities	No	Combined (LU-1, -2, -3, -4 and -5)	Combined	Combined	Combined	Combined	Combined	Combined	Combined	1740	1740	Estimates by DCE, 2017 (http://dce2.au.dk/pub/SR244.pdf).

* In principle included in the "with measures" projection scenario - not necessarily with separate annual estimates, but in most cases as a result of the assumption that the measure has contributed to the observed level of total Danish greenhouse gas emissions in the most recent historical inventory year used as the starting point for the projections.
** Estimated annual effects in 2020 and 2030 of measures implemented or adopted since 1990 - i.e. emission reductions and avoided emission increases since 1990.

4.3.9 Waste

The direct contribution of the waste sector to greenhouse gas emissions consists primarily of methane from the decomposition of organic waste that takes place at landfill sites. Greenhouse gas emissions from wastewater treatment included both methane (85%) and nitrous oxide (14%) in 2017. Out of the total greenhouse gas emissions from the waste sector of 1.1 million tonnes CO_2 equivalents in 2017 – corresponding to 2.4% of total Danish greenhouse gas emissions – the proportion from landfills was 57%, from compost production 20%, from wastewater treatment 15%, from biogas plants 6% and 2% from other minor sources such as accidental fires.

Please note that all incineration of waste in Denmark is associated with energy utilisation, which is why the emission of CO_2 from the incineration of plastic waste is included under the energy sector.

4.3.9.1 CH_4 (methane)

In previous years, efforts within the waste sector have been based on the Action Plan for Waste and Recycling 1993-97, which included targets on waste treatment up to the year 2000. The plan did not relate directly to the waste sector's contribution to methane emissions (CH_4), but included a number of initiatives that are of relevance to waste products containing industrial gases (HFCs and SF_6), besides an objective concerning stopping landfilling combustible waste.

Nor did the subsequent waste plan, Waste 21, which covers the period 1998-2004, relate directly to the waste sector's possibilities for contributing to solution of the problem of greenhouse gas emissions. The plan aimed at stabilising the total quantities of waste in 2004, and increasing recycling and reducing the environmental burden from the environmentally harmful substances in waste, including the industrial gases. With respect to waste incineration, the objective was to adjust incineration capacity to what was absolutely necessary to ensure best possible energy utilisation, maximum CO_2 displacement and regional self-sufficiency. The plan thus contributed indirectly to reduction of greenhouse gas emissions.

The objective in Waste 21 was for 64% of all waste to be recycled, 24% to be incinerated and not more than 12% to be landfilled.

That objective was already reached in the year 2000, and according to the Danish Environmental Protection Agency's Waste Statistics 2000 (ISAG) total waste in that year amounted to about 12.8 million tonnes.

Waste Strategy 2005-08 was issued in September 2003. The Waste Strategy aimed at decoupling growth in waste amounts from economic growth. The Strategy also aimed at preventing the loss of resources in waste and environmental impacts from waste, as well as better quality waste treatment and an efficient waste sector. Finally, the strategy aimed at reducing waste amounts sent to landfill to 9% in 2008 and increasing recycling to 65% of all waste.

The most important initiatives regarding greenhouse gases in the Strategy were improvement of landfills and increased collection of plastic packaging for recycling.

The first part of the Waste Strategy 2009-12 was issued in March 2009 and the second part was issued in June 2010. The recycling target for all waste was still 65%, and the target for overall waste amount sent to landfills was reduced to 6%.

The current waste strategy (*Denmark without Waste I + II*) reflects a general change of focus in Denmark to considering waste as a resource. The Danish waste strategy includes 1) a Resource Strategy and a Resource Plan for waste management which focuses on increasing recycling and 2) a Waste Prevention Strategy.

The Resource Strategy and the Resource Plan for waste management 2013-18 (*Denmark without Waste I*) includes a goal of 50% recycling of seven fractions (organic, paper, cardboard, glass, plastic, wood and metal) of household waste in 2022. The strategy focuses also on organic waste from households and the service sector, recovery of metals etc. in waste electrical and electronic waste (WEEE) and shredder waste, construction and demolition waste and phosphorous in sewage sludge.

It is estimated that the initiatives in the strategy will lead to a decrease in the amount of incinerated waste (820.000 tonne less in 2022).

The Waste Prevention Strategy (*Denmark Without Waste II*) 2015-20 includes a number of initiatives with a special focus on food waste, textiles, electronic equipment, packaging and construction.

Both the Resource Strategy for Waste Management and the Waste Prevention Strategy have the purpose of keeping materials and products in circulation thus reducing primary production of materials and products, which is often energy demanding. The two strategies thus lead to indirect greenhouse gas savings, which are not directly quantifiable.

The latest figures for waste in Denmark are in the Danish EPA Waste Statistics 2017. Total waste (primary waste, excluding soil) in 2017 was 11.7 million tonnes of which 68% was recycled, 29% incinerated, and 3% landfilled.

The waste sector's contribution to the direct reduction of greenhouse gas emissions consists mainly in:

- banning the landfilling of organic waste,
- utilising gas from closed as well as existing landfills,
- optimising the oxidation of methane gas in landfill covers (biocovers),
- recovery of shredder waste from landfills.

On the top of this there are measures that indirectly reduce greenhouse gas emissions:

- increasing recycling of plastic-, paper-, cardboard-metal-, WEEE-, wood-, and glass-waste, that will substitute primary production of materials
- using waste (except for plastics) as an energy source in dedicated incineration plants
- digestion of organic waste to produce biogas.

An overview of the detailed measures implemented in the pursuance of these objectives is given in Table 4.26. The emission of methane from Danish landfills is calculated to have been 71,000 tonnes gross in 1990, decreasing to approximately 33,800 tonnes in 2013, corresponding to a 52 per cent reduction.

As a consequence of the municipal obligation to assign combustible waste to incineration, from 1 January 1997, methane emissions from the Danish landfills will continue to decrease in the years ahead.

According to the Danish Energy Authority's inventory Biogas, Production, Forecast and Target Figures, there were 25 gas plants at Danish landfills in 2002. These installations produced 10,000 tonnes of methane annually, compared to approx. 1,700 tonnes in 1993. In 2004, methane recovery from landfills amounted to 7,700 tonnes methane[83]. The same study shows that, through optimising existing gas plants, a further 1,800 tonnes methane per year could be recovered over the next five years. Furthermore, the establishment of new gas-collection equipment at five landfills could contribute with additional 1,300 tonnes methane per year over the next five years.

However, optimisation of existing plant and establishment of new gas plants will probably require subsidies. The previous subsidy scheme to promote gas collection at landfills was discontinued at the end of 2001.

Only a few landfill gas plants are expected to be established in the future. The maximum quantity of methane recovered peaked in 1998 at about 13,200 tonnes. The quantity of methane recovered will continue to fall gradually over many years.

The total quantity of waste incinerated rose from 2,216,000 tonnes in 1994 to 3,335,000 tonnes in 2017, i.e. an approximately 50% increase. This is a slight decrease compared to 2006 where 3,489,000 tonne of waste was incinerated. The energy produced from the non-fossil part of waste used as fuel in the incineration plants is included as part of the renewable energy production in the Danish energy statistics. The international greenhouse gas inventories include greenhouse gases from incineration of the content of oil-based products, such as plastics in waste.

In accordance with the targets in the waste strategies, waste incineration plants are designed so as to optimise energy utilisation.

Besides the direct effect of waste management on greenhouse gas emissions, the emissions are also affected indirectly through recycling of paper, cardboard, plastic, metals, etc. which means less energy consumption and thus less CO_2 emissions during production of raw materials and new products.

The implementation of national waste plans and fulfilment of targets has necessitated the implementation of a wide range of measures.

In 1996 the Statutory Order on Waste was amended to introduce a municipal obligation to assign combustible waste to incineration (corresponding to a stop for disposal of combustible waste at landfills). As a result of this, large quantities of combustible waste that used to be disposed of at landfills are now either recycled or used as fuel in Danish incineration plants.

Besides the traditional regulation via legislation, statutory orders, and circulars, the waste sector is regulated by means of a range of policies and measures, including taxes and charges, grant schemes and agreements.

A tax on landfilling and incineration of waste was introduced in Denmark in 1987. Since 1993 the tax has been differentiated to reflect the political priorities of the different forms of treatment. It thus costs most to landfill waste, less to incinerate the waste and nothing in tax to recycle waste. The waste tax has been increased several times and today (November 2018) the waste tax is DKK 475 per tonne waste disposed of at landfills. With effect from 1 January 1999, the so-called waste heat tax introduced as part of the Coal Tax Act (see chapter 4.3.3.1.1). The waste heat tax was introduced in connection with increases in general taxes on fossil fuels to avoid giving too much incentive in favour of waste-based heat production, and to counteract the increased incentive for incineration of waste instead of recycling. From 1 January 2010, energy

[83] Willumsen, 2004

from waste incineration imposed waste heat tax,. The taxes thus provides an incentive to recycle as much of the waste produced as possible and to use non-recyclable, combustible waste as fuel in energy production instead of disposal of the waste at landfills.

Weight-and-volume-based taxes (e.g. on various packaging and carrier bags) encourage a reduction in packaging consumption and thus the quantities of waste. The weight-based tax is based on an index that reflects the environmental burden of the materials used.

Under the Danish EPA's "Programme for Cleaner Products etc.", grants were made for projects that reduced the environmental burden in connection with development, production, sale and use of products or in connection with the management of the waste generated during the product's entire lifecycle. Furthermore, support could be granted to waste projects aiming at reducing the problems in connection with disposal of waste. A total of approximately DKK 100 million for the part of the programme related to waste was allocated for the 5-year period 1999 to 2003.

In 2005 the Programme for Cleaner Products etc. was replaced by the Danish government's "Enterprise Scheme" which refunds CO_2 taxes to business. The waste part of this programme was aimed exclusively at enterprises. A total of DKK 33 million for the five-year period 2004 to 2008 was earmarked for the waste part of the scheme. The subsidies were to be used to reduce the environmental impact of waste.

In 2005, the Danish EPA also supported initiation of a development project aiming at documenting the oxidation of methane in landfill biocovers. By applying covers mainly consisting of compost, optimal oxidation in covers can be ensured and methane emissions from landfills can be reduced. If the reduction can be documented it can be credited to the CO_2 accounts. This bio-cover project was carried out by the Technical University of Denmark with funding from the EU LIFE Programme. The bio-cover project has established a viable methodology for documentation of the reduction of greenhouse gas emissions gained by installation of a bio-cover system on a landfill. The methodology consists of a logical order of tasks using well documented measuring technologies. The demonstration project also proved that several obstacles may occur in relation to the biocovers on landfills which can prevent an efficient greenhouse gas reduction, and the project has obtained an understanding of which precautions should be taken.

The most important obstacles are:
a) Ability to control point gas releases,
b) Ability to distribute the landfill gas to active parts of the bio-cover system, and
c) Ability to obtain a spatially even gas distribution to active parts of the bio-cover.

Due to the obstacles the goal of reaching a 90% reduction of the methane emission was not reached; the obtained reduction was in the 20-30% range.

To address the obstacles and to improve the method, another biocover-project was initiated in 2007 as part of the Enterprise Scheme. The project was performed on another landfill, and was taking the identified difficulties into account. A reduction of the methane emission of 79-93 % was reported in the project.

Based on the promising results of the latest large scale biocover-project combined with a low shadow price, approximately 180 mio. DKK has been allocated to a Subsidy programme for biocovers at landfill sites. The subsidy programme is expected to run from 2016 – 2019, and the estimated reduction in methane-emission in the year 2021 is 300,000 t CO_2-equivalents. The actual methane-emission reduction will be assessed when the subsidy programme is finalized.

In 2007 subsidies from the enterprise scheme were given for establishing methane recovery and test pumping at 11 landfill sites. The results were reported in 2011 and showed a reduction of the emission of methane over a five year period equalling 84,435 tonnes of CO_2 equivalents.

The goal in the EU Packaging Directive of increasing the collection of plastic packaging waste for recycling to 22.5% was met in 2008 through an amendment to the Statutory Order on Waste requiring municipalities to improve the possibilities of people and enterprises to separate and deliver plastic packaging waste for recycling. This meant an increase in recycling of about 12,000 tonnes in 2012 compared to 2008.

Furthermore, producer responsibility obligations have been introduced concerning waste electrical and electronic equipment (WEEE) and batteries due to new EU Directives resulting in higher collection and recycling rates of these used products. The aim is to increase recycling of metals significantly, resulting in energy savings compared to extraction and refining of virgin materials.

On the basis of the EU Landfill Directive, demands on the establishment and operation of landfills in Denmark have been tightened with Statutory Orders No. 650 of 29 June 2001, No. 252 of 31 March 2009, No. 719 of 24 June 2011 and No. 1049 of 28th of August 2013 on landfills. According to the Statutory Orders on landfills, methane in landfills for mixed waste must be monitored. From landfills where significant amounts of biodegradable waste are disposed of, methane gas must be managed in an environmentally-sound way.

An amendment to the Statutory Order on Waste in 2000 means that municipalities should assign non-recyclable waste PVC and impregnated wood to landfill. The objective was to avoid adding PVC and impregnated wood to incineration with the consequential pollution of flue gas and slag. According to the current Statutory Order on Waste (2018), the municipalities shall ensure that recyclable and non-recyclable PVC is collected. Recyclable PVC should be recycled whereas non-recyclable PVC should be assigned to landfill. Impregnated wood should be collected and landfilled, unless the municipality classify the waste wood as suitable for material recovery or incineration. Today, most impregnated wood is classified as suitable for incineration and exported to incineration with energy recovery in Germany.

It is not possible to make a quantitative estimate of the effects of the various measures for the waste area. The objectives in the national waste plans are related to waste amounts and their treatment. The developments are monitored through the annual waste statistics. However, changes in the treatment of waste cannot immediately be converted into changes in emissions of greenhouse gases.

Table 4.26 Measures in the waste sector

Name of mitigation action	Included in with measures GHG projection scenario	Sector(s) affected	GHG(s) affected	Objective and/or activity affected	Type of instrument	Status of implementation	Brief description	Start year of imple-mentation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO2 eq)**		Source of estimates
										2020	2030	
WA-1: A ban of landfill of combustible waste.	Yes*	Waste management/waste	CH_4	Reduced landfilling (Waste), Waste incineration with energy use (Waste), Enhanced recycling (Waste)	Regulatory	Implemented	See text.	1997	Local: Municipalities	333	333	Estimates in 2017 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).
WA-2: The waste tax	Yes*	Waste management/waste	CH_4	Reduced landfilling (Waste)	Economic, Fiscal	Implemented	See text.	1987	Government: Ministry of Taxation	IE (G1)	IE (G1)	
WA-3: Weight-and-volume-based packaging taxes	Yes*	Waste management/waste	CO_2, CH_4	Demand management / reduction (Waste)	Economic, Fiscal	Implemented	See text.	2014	Government: Ministry of Taxation	IE (G1)	IE (G1)	
WA-4: Subsidy programme – Enterprise Scheme (special scheme for businesses)	Yes*	Waste management/waste	CH_4	Demand management / reduction (Waste)	Economic	Implemented	See text.	2004	Government: Ministry for the Environment	IE (G1)	IE (G1)	
WA-5: Increased recycling of waste plastic packaging	Yes*	Waste management/waste	CO_2	Enhanced recycling (Waste)	Regulatory	Implemented	See text.	1994	Government: Danish Environmental Protection Agency	IE (G1)	IE (G1)	
WA-6: Implementation of the EU landfill directive	Yes*	Waste management/waste	CH_4	Improved landfill management (Waste)	Regulatory	Implemented	See text.	1999	Government: Danish Environmental Protection Agency, Local: Municipalities	IE (G1)	IE (G1)	
WA-7(expired): Support for (construction of facilities for) gas recovery at landfill sites	Yes*	Waste management/waste	CO_2, CH_4	Enhanced CH_4 collection and use (Waste)	Economic	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish	See text.	1984	Government: Danish Energy Authority	205	205	Estimates in 2017 - based on The 2005 Effort Analysis (http://www2.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf and http://www2.mst.dk/Udgiv/publikationer/2005/87-7614-589-1/pdf/87-7614-590-5.pdf (summary in English included in Denmark's 7th National Communication, Annex B2)).
WA-8(expired): Subsidy programme for cleaner products	Yes*	Waste management/waste	CH_4	Demand management / reduction (Waste)	Economic	Implemented (and Expired - but included as it is expected to have influenced the level of total Danish	See text.	1999	Government: Ministry for the Environment	IE (G1)	IE (G1)	
WA-9: Subsidy programme for biocovers on landfills	Yes*	Waste management/waste	CH_4	Improved landfill management (Waste)	Economic	Implemented	See text.	2017	Government: Danish Environmetal Protection Agency	300	179	Estimates by the Danish Energy Agency, March 2017 - based on "Virkemiddelkatalog, Tværministeriel arbejdsgruppe, August 2013, Klima-, Energi- og Bygningsministeriet" (https://ens.dk/sites/ens.dk/files/Analyser/virkemiddelkatalog_-_potentialer_og_omkostninger_for_klimatiltag.pdf)
G1(changed): Group of all policies and measures except in the LULUCF sector	Yes*	Combined (TD-b1, -2, -3, -4, -5, -6, -7, -8, -9; EN-1, -2, -3, -4, -5, -6; BU-1, -2, -6, -7, -8, -9, -10; TR-1a, -1b, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12; HO-1, -2, -3, -4, -5, -6; IP-1; AG-1, -2, -4a-f, -6, -9, -11, -12, -13; WA-1, -2, -3, -	Combined	Combined	Combined	Combined	Combined	Combined	Combined	50671	75288	Calculated as the sum of the effects estimated for G3, G4, TD-9, TR-12, G6, AG-1, AG-6, AG-12, WA-1, WA-7 and WA9.

* In principle included in the "with measures" projection scenario - not necessarily with separate annual estimates, but in most cases as a result of the assumption that the measure has contributed to the observed level of total Danish greenhouse gas emissions in the most recent historical inventory year used as the starting point for the projections.
** Estimated annual effects in 2020 and 2030 of measures implemented or adopted since 1990 - i.e. emission reductions and avoided emission increases since 1990.

Annex 2

Denmark's With Existing Measures (WEM or "frozen policy") scenario, published August 2019 in Danish and October 2019 in English by the Danish Energy Agency.

1 Denmark’s Energy and Climate Outlook 2019

Denmark’s Energy and Climate Outlook (DECO19) is a technical assessment of how Denmark’s energy consumption and production, as well as Denmark’s greenhouse gas emissions, will evolve over the period up to 2030 based on the assumption of a frozen-policy scenario.

A frozen-policy scenario describes a scenario with existing measures, i.e. a scenario in which no new policies are introduced.

DECO19 is therefore the Danish Energy Agency's best guess at what the future will be if *no* new measures are decided in the climate and energy area other than those adopted by the Danish Parliament by the end of May 2019.

The methodology behind the projections in DECO19 is well-defined and is based primarily on technological costs and on rational options and financial viability requirements of players in given markets (Danish Energy Agency, 2019a). At the same time, existing projects are also included if there is an approved application or funding commitment, for example for the conversion of a power plant from coal to biomass.

The assumed 'policy freeze' pertains to the climate and energy area only and does not imply that development in general will come to a halt. For example, economic growth and demographic trends are not part of the freeze.

DECO19 helps to examine the extent to which Denmark's climate and energy targets andcommitments will be met within the framework of current regulation.

DECO19 can thus be used as a technical reference when planning new measures in the climate and energy area, and when assessing the impact of such measures.

1.1 What are Denmark's targets and commitments in the climate and energy area?

The climate and energy area is characterised by local, as well as by national and international targets and commitments. Most recently, the Social Democratic Party, the Danish Social-Liberal Party, the Socialist People's Party and the Red-Green Alliance formulated a target to reduce Denmark's greenhouse gas emissions by 70% in 2030 compared with 1990 (A *et al.*, 2019). The more specific framework for this target has not yet been established and, therefore, no shortfall figure has been calculated for this target.

This year’s Climate and Energy Outlook focuses on the target framework set out in EU legislation. This is because the results in DECO19 will be included in Denmark's National Energy and Climate Plan (NECP) to be submitted to the EU at the end of 2019 (European Commission, 2019a).

In 2009 the EU Climate and Energy Package was adopted and in December 2018 the Winter Energy Package was adopted. The Climate and Energy Package obligates Denmark to achieve, as a minimum, a total renewables share of 30% by 2020; a renewables share of 10% in transport by 2020; and a 20% CO2 reduction in non-ETS greenhouse gas emissions in 2020 relative to 2005.

The Winter Energy Package stipulates that, by 2030, the EU as whole must have reduced its greenhouse gas emissions by at least 40% relative to 1990; that the renewables share must be at least 32%; and that EU energy efficiency must have been improved by at least

32.5%[84] (European Commission, 2018a). For greenhouse gas emissions within the ETS system, it has been decided that the EU must reduce emissions by at least 43% by 2030. For greenhouse gas emissions outside the ETS system (non-ETS), Denmark is under a national obligation to reduce emissions by 39% by 2030, following a fixed reduction trajectory.

Under the Winter Energy Package, Denmark is required to report on its obligations in Denmark's National Energy and Climate Plan (NECP) to the EU. DECO19 and the upcoming NECP will form the basis for the European Commission's statement of whether Member States are making sufficient contributions to meeting overall EU targets for 2030.

1.2 WHAT IS NEW IN DECO19?

Denmark's Energy and Climate Outlook changes from year to year. This is due to the introduction of new regulation that impacts the climate and energy area. However, updates to the detailed technical-economic assumptions behind the outlook are also an important factor and include updates to developments in fuel prices and the carbon price, new statistics on the composition of electricity and heat production, the total number of vehicles on the road, and agricultural production. Appendix 1 lists the general updates made in DECO19.

For example, last year, in DECO18, the Danish Energy Agency increased the expectations regarding future electricity consumption by large data centres. These expectations have been maintained in DECO19 and reflect an overall expectation for this sector that is not tied to decisions by individual players on individual projects, for example Apple's decision in June 2019 not to establish a data centre in Aabenraa in Southern Denmark (Aabenraa Municipality,2019). As in DECO18, the projection of electricity consumption by large data centres is still assessed to be associated with considerable uncertainty (COWI A/S on behalf of the Danish Energy Agency, 2018).

The most substantial changes in DECO19 compared with DECO18 are attributable to the effect of the Energy Agreement of 29 June 2018. Among other things, this agreement ensures financing of three offshore wind farms, relaxation of electricity taxes, new technology-neutral tenders, removal of the cogeneration requirement in small-scale district heating areas, new energy saving efforts, etc. (Ministry of Energy, Utilities and Climate, 2018). Other effects are attributable to new EU regulations imposing stricter emissions standards for passenger cars and vans (European Commission, 2019b) and heavy-duty vehicles (European Parliament, 2019).

DECO19 therefore reflects the expectation that both national and international regulations are to have a significant impact on developments in the climate and energy area.

However, there are also other factors influencing the area. DECO19 adjusts the expectation for the effect of a relatively new market product, the so-called PPAs (Power Purchase Agreements), which introduce new sources of financing to the electricity market. A PPA is a direct agreement between an investor/producer and a major consumer on trade in a specific production of electricity. For example, a PPA may help provide major consumers with a guarantee of origin with respect to purchases of renewable energy to cover their electricity consumption. Based on its knowledge of a number of

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[84] 1 The energy efficiency target has been established in relation to the EU projection from 2007 and includes a obligation to achieve energy savings corresponding to 0.8% of final annual energy consumption (European Commission, 2018b).

specific projects that are far into the implementation phase, the Danish Energy Agency can observe that businesses can increasingly see the value of social responsibility and they set voluntary renewable energy targets. Facebook's target of being 100% reliant on renewable energy in 2020 is an example of this (Facebook, 2019).

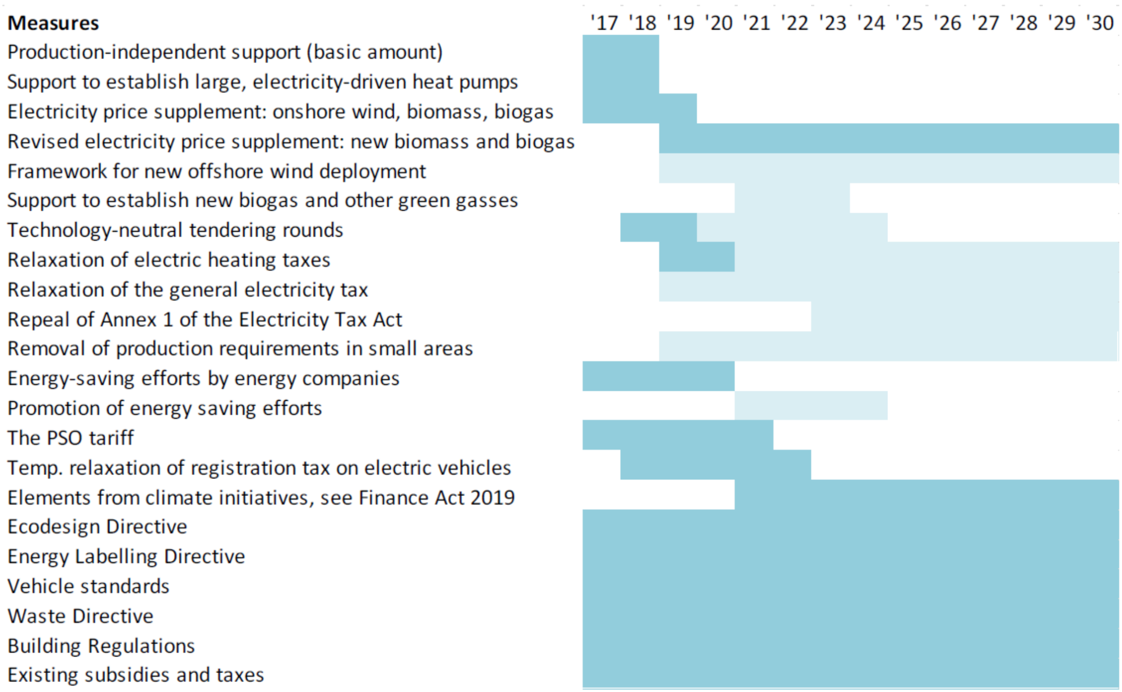
Studies and observations of the PPA market in combination with the technology-neutral tenders form the basis for DECO19's expectations regarding renewables deployment in the absence of new measures. This is particularly important in relation to expectations for new commercial solar PV (ground-mounted solar farms) and onshore wind. There is considerable uncertainty associated with projecting the deployment of commercial solar PV installations and the rate at which older onshore wind turbines are decommissioned.

1.3 WHICH REGULATION IS OF PARTICULAR SIGNIFICANCE FOR DECO19?

Figure 1 illustrates the time range of impacts from regulations in the climate and energy area of specific significance for the projection.

Elements of the Energy Agreement of 29 June 2018 (Ministry of Energy, Utilities and Climate, 2018) are broken down by individual focus areas in the figure. Even though, in principle, the 2018 Energy Agreement is only in force for the period up to and including 2024, the time scope extends until 2030 for certain elements of the Agreement. For example, this applies to the framework conditions for new offshore wind deployment. The measures are described in Appendix 3.

Figure 1: The time scope for Danish regulation of special significance for the frozen-policy scenario in DECO19. Areas shadedin light blue reflect measures that are part of the 2018 Energy Agreement. See Appendix 3.



1.4 HOW HAS THE ENERGY AND CLIMATE OUTLOOK BEEN PREPARED AND CALCULATED?

Denmark's Energy and Climate Outlook has been prepared by the Danish Energy Agency, assisted by an inter-ministerial monitoring group comprising the Ministry of Climate, Energy and Utilities, the Ministry of Finance, the Ministry of Taxation, the Ministry of Transport and Housing, the Danish Transport, Construction and Housing Authority, the Ministry of Environment and Food, the Danish Agricultural Agency, the Danish Environmental Protection Agency, the Danish Ministry of Industry, Business and Financial Affairs and the Danish Nature Agency.

In order to qualify the methodological and technical-economic basis for the model analyses in DECO19, the Danish Energy Agency has moreover consulted several experts and institutions.

The results presented in DECO19 are based on the integrated model platform for projections and impact analyses in the energy and climate area developed by the Danish Energy Agency since 1984. Figure 2 shows the overall elements in the model platform, with inputs on the left and outputs on the right. The figure and the model platform are described in more detail in Appendix 4.

The model platform is being regularly improved. For example, DECO19 uses a newly developed investment model for small-scale district heating areas. This model provides an improved approach to making projections about new investments as well as about decommissioning of existing facilities in the district heating sector.

On the basis of the Danish Energy Agency’s system analyses, the Danish Centre for Environment and Energy (DCE) at Aarhus University models emissions of greenhouse gases for fuel consumption and non-energy-related activities (Aarhus University, 2019). Non-energy-related activities include agriculture as well as waste management, wastewater treatment and industrial processes.

1.5 MANAGING SENSITIVITIES AND UNCERTAINTIES

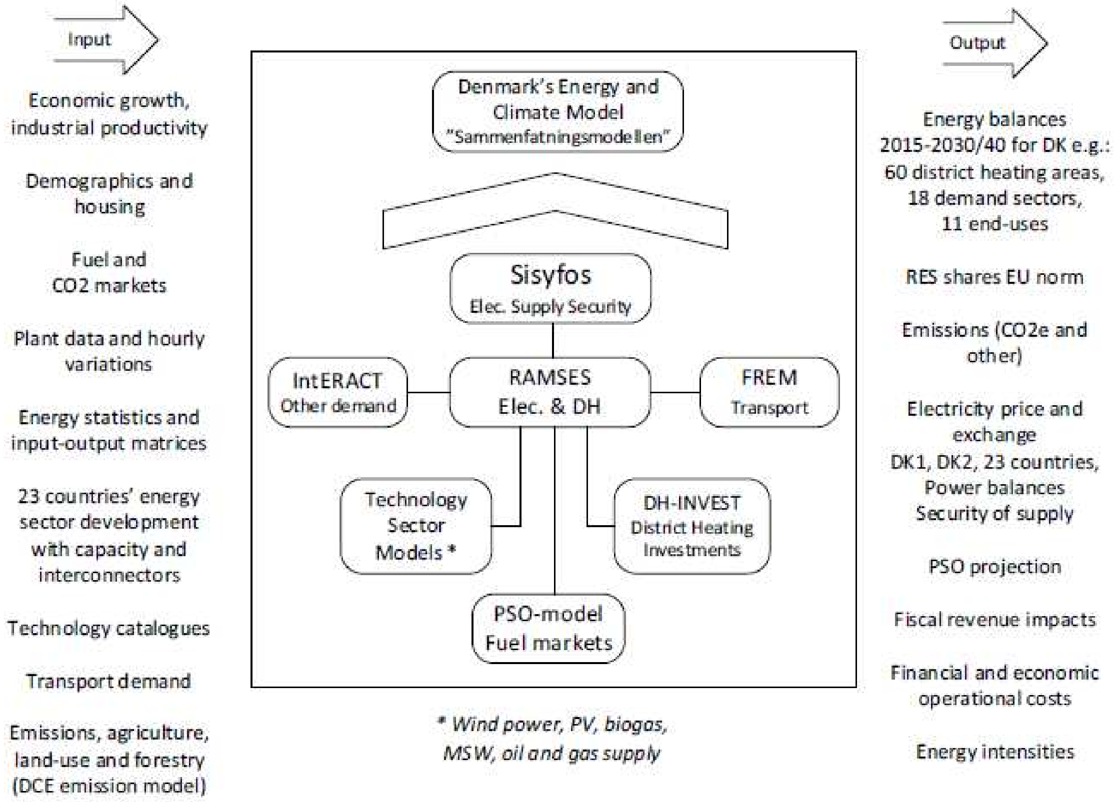
DECO19 presents a baseline scenario up to 2030 using a central set of assumptions which the Danish Energy Agency assesses to be the most probable in the absence of any new measures and on the basis of current knowledge.

It is important to consider that these assumptions and uncertainties affect the key results in this outlook report.

Several particularly sensitive assumptions have been identified, for example assumptions regarding the electricity consumption of data centres, changes in the carbon price, elements of renewables deployment and the deployment of electrified vehicles. As a result of this, partial sensitivity analyses have been completed, which means that a sensitivity analysis has been performed for each sensitivity parameter 'all else being equal'. The resulting partial sensitivity effects cannot readily be aggregated, i.e. the effects cannot be added together. The probability of variation in the individual sensitivities has not been assessed, nor has an overall risk analysis been performed.

The results of the partial sensitivity analyses are summarised in Chapter 8.

Figure 2: The Danish Energy Agency's integrated model platform for energy and climate projections. See the Danish Energy Agency website for descriptions and documentation of the sub models (Danish Energy Agency, 2019h). Elements in the model platform are described in more detail in Appendix 4.



1.6 BACKGROUND APPENDICES AND DATA CAN BE DOWNLOADED

The detailed central assumptions behind projections, such as assumptions concerning deployment of onshore wind, solar PV and biogas, accompany this report as a number of background appendices (Danish Energy Agency, 2019a).

Tables behind the results are included as a spreadsheet (Danish Energy Agency, 2019b). Results values for 2018 and 2019 have been omitted from the tables for reasons described in Appendix 5.

The background appendices and results figures and tables can be downloaded from https://ens.dk/outlook (Danish Energy Agency, 2019e).

2 The overall picture

• In 2030, Denmark's greenhouse gas emissions are expected to be reduced by 46% compared with the UN base year 1990 in the absence of new measures.

• The EU obligation for the non-ETS sector (non-ETS) will be met and exceeded for 2013-2020. For 2021-2030, an accumulated shortfall of 28 million tonnes CO2-eq. is expected.

• Emissions from LULUCF (land use and forestry) are expected to have fallen from 5 million tonnes CO2-eq. in 1990 to just over 3 million tonnes CO2-eq. in 2030. For the period 2021-2030 there is a preliminary basis for including an overall LULUCF contribution of 14.6 million tonnes CO2-eq. in Denmark's reduction efforts in non-ETS. The LULUCF statement is subject to considerable uncertainty.

• The total share of renewables (RES) is expected to be 54% in 2030. In 2020, the renewables share is expected to be 41%, whereby Denmark will have met, and exceeded, its EU obligation of 30%.

• The renewables share of electricity consumption (RES-E) is expected to exceed 100% from 2028 and reach 109% in 2030. This is due in particular to deployment of offshore wind, onshore wind and solar PV.

• The percentage of renewable energy in transport (RES-T) is expected to reach 19% in 2030, which is contingent on increased use of electricity to run railways and passenger cars and vans, as well as a high percentage of renewable energy in electricity consumption (RES-E). RES-T is expected to be 9% in 2020, which means that with no new measures Denmark will not meet its EU obligation of 10% renewables in transport.

• Consumption of coal is expected to be reduced by 90% in 2030 compared with 2017.

• Final energy consumption will increase by 0.4% annually, particularly due to increasing energy consumption in the service sector due to new electricity consumption by large data centres. Gross energy consumption will remain around 2017-levels.

• Electricity consumption (excluding grid losses) is expected to increase by 3% annually, which is due in particular to increasing consumption by large data centres and in heating, whereas increases in electricity consumption for transport will have only a minor effect on total electricity consumption.

• The macro-economic energy intensity measured as gross energy consumption is expected to fall by 1.2% annually, i.e. gross energy consumption is expected to increase by less than the economy.

• Uncertainties and assumptions subject to sensitivity affect the key results. For example, there is uncertainty associated with the projection of electricity consumption by large data centres, the carbon price, the number of dairy cattle, the level of coal-fired electricity production capacity, and the type of vehicles in the sale of new vehicles.

2.1 Total greenhouse gas emissions expected to be reduced by 46% in 2030

Since 1990, which is the UN base year for calculating climate efforts, total annual greenhouse gas emissions have fallen from 70.8 million tonnes to 50.6 million tonnes in 2017, corresponding to a reduction of 29%. Up to 2030, emissions are expected to drop to 38 million tonnes, corresponding to a reduction of 46% compared with the UN base year.

The projections show that total greenhouse gas emissions will be reduced by 46% in 2030 relative to the 1990 UN base year.

2.2 Achievement of non-ETS reduction targets 2021-2030 will fall short by 28 million tonnes CO2-eq.

Under the EU 2030 Climate and Energy Framework, Denmark is committed to reducing emissions from non-ETS sectors by 39% by 2030 relative to the 2005 level (European Commission, 2014, 2017b). The non-ETS sectors include transport, agriculture, households, waste, other industries, and a number of small-scale CHP plants.

Emissions in all years throughout the period 2021-2030 are expected to exceed the annual subtargets. The accumulated shortfall has been calculated at 28 million tonnes CO2-eq. in 2030.

The projections show that, in the absence of new measures, Denmark will not meet its obligation to reduce greenhouse gas emissions in the non-ETS sectors for the period 2021-2030. In all the years, emissions are expected to exceed the annual targets and the accumulated shortfall for the entire period is expected to be 28 million tonnes CO2-eq. in the absence of new measures.

2.3 Total share of renewables (RES) expected to rise to 54% in 2030

Figure 3 shows the total share of renewables (RES) as well as renewables shares for transport (RES-T), electricity consumption (RES-E), heating and cooling (RES-H&C), and district heating (RES-DH), respectively, calculated on the basis of the method described in the EU Renewable Energy Directive (EU, 2009; Eurostat 2018).

The total renewables share (RES) and the renewables share for transport (RES-T) are subject to binding national EU targets in 2020. The EU Renewable Energy Directive also sets out a 2030 target for 27% renewables for EU countries together, but this target has not been implemented as national obligations. Instead, EU Member States are obligated to account for their contributions to reaching the common EU target in their National Energy and Climate Plans.

The projections show that the renewables share (RES) is expected to be 41% in 2020, whereby Denmark will have met, and exceeded, its EU obligation for a 30% renewables share by 2020.

The renewables share for transport (RES-T) will reach 9% in 2020, whereby there will be a shortfall of 1 percentage point compared with the RE Directive obligation of 10% in 2020.

The overall renewables energy share (RES) will increase up to 2030, when it will reach 54%. The trend depends on the deployment of offshore wind, onshore wind and solar PV and on the conversion of CHP plants to biomass, while energy-efficiency improvements in transport, industry and services and households will contribute to a lesser extent[85].

The rate of renewables deployment in electricity supply is expected to exceed the rate of increase in electricity consumption, and Denmark's production of electricity from renewables is expected to exceed Denmark's electricity consumption from 2028. The

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[85] The renewables share is calculated in relation to final energy consumption (denominator). Therefore, energy-efficiency improvements entail a higher renewables share, all else being equal.

renewables share of electricity consumption (RES-E) is expected to increase to 109% in 2030. This trend is particularly contingent upon the offshore wind farms included in the 2018 Energy Agreement being commissioned by 2030. There are also updated expectations regarding deployment of commercial solar PV (groundmounted solar farms) and expectations regarding replacement of older onshore wind turbines with fewer, more efficient turbines.

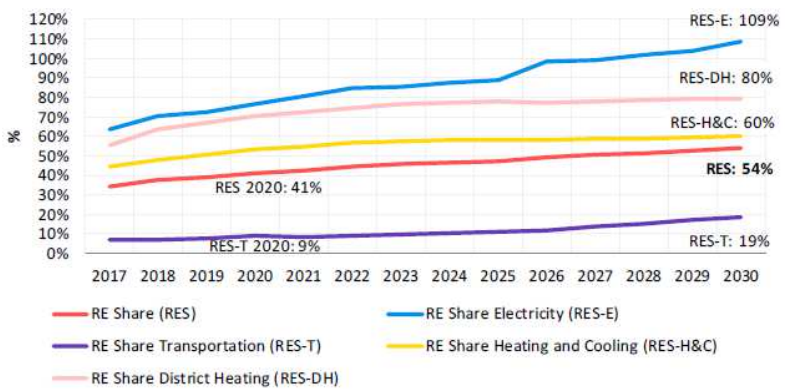
The projection of onshore wind and solar PV deployment depends on the development in electricity prices (Chapter 6.5); maintenance of the level for tender prices achieved in the 2018 technologyneutral tendering round (Danish Energy Agency, 2019f); voluntary renewable energy targets from large consumers and the market for PPA/guarantees of origin (K2 Management for the Danish Energy Agency, 2019). This includes knowledge obtained by the Danish Energy Agency from municipalities and businesses about specific projects that are a long way into the preparation phase.

A high percentage of renewable energy in electricity consumption (RES-E) affects calculation of the renewables share in transport (RES-T) because the Renewable Energy Directive uses a multiplication factor of four for the renewables share of electric road transport and a multiplication factor of 1.5 for the renewables share of electric rail transport (see the glossary). With this background, RES-T increases to 19% in 2030, which is contingent on the number of electrified passenger cars and vans increasing to around 9% of the total number in 2030, and an increased use of electricity in rail transport. Greater use of bio-natural gas in transport will only contribute to a very limited extent. The blending ratio of biofuels in petrol and diesel is expected to be maintained at the current level in the absence of new measures.

Fuel consumption for domestic air traffic is included in the calculation of the renewables share. The aviation sector has announced ambitious plans for biofuel blending, but as these announcements are neither binding nor reflect a profitable development pathway for companies in the absence of new measures, the plans have not been included in a renewables contribution from this sector.

The projections show that the total share of renewables (RES) is expected to reach 54% in 2030 in the absence of new measures. The renewables share of electricity consumption (RES-E) is expected to exceed 100% from 2028. A high RES-E affects the renewables share for transport (RES-T), which will reach 19% in 2030. The total share of renewables in 2020 meets and exceeds the Renewable Energy Directive, while the renewables share for transport in 2020 will be 1 percentage point short of meeting the EU obligation.

Figure 3: Renewables shares 2017-2030 [%]. The renewables shares is calculated as defined in the RE Directive (Eurostat, 2018).



2.4 Gross energy consumption maintained, coal consumption reduced significantly

Figure 4 shows that, since 1990, gross energy consumption has been relatively constant, with falling consumption of coal and increasing consumption of renewable energy. Gross energy consumption peaked in 2007 at 873 PJ and has since followed a downward trend.

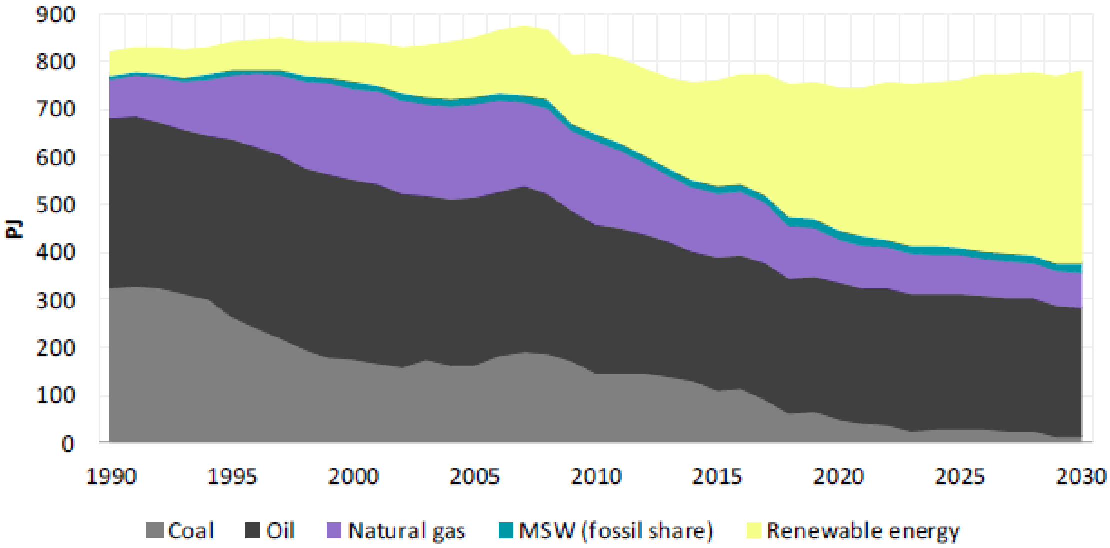
Gross energy consumption is expected to drop up to 2020 by 1.2% annually, after which gross energy consumption will rise slightly to 778 PJ in 2030, corresponding to the consumption in 2017.

Coal consumption will fall considerably up to 2030 by 14% annually, due in particular to the expected stop in the use of coal in large-scale CHP production.

In 2030, only the power station Fynsværket and the cement industry will consume large amounts of coal. However, some plants will retain the option for coal operation, although actual use is assumed to be limited.

The projections show that gross energy consumption will fall up to 2020, then rise slightly so that the 2030 consumption will be similar to the 2017 level. Consumption of coal is decreasing especially sharply, and by 2030 consumption will be more or less limited to the Fynsværket power station and in the cement industry.

Figure 4: Gross energy consumption by type of energy 1990-2030 [PJ]. The calculation for 1990-2017 has been adjusted for outdoor temperature/degree days relative to normal years (climate-adjusted) and electricity trade with other countries (electricity-trade adjusted, see Appendix 2).



2.5 Final energy consumption is growing, in particular for the service sector

Figure 5 shows that final energy consumption will increase to 671 PJ in 2030, corresponding to an annual increase of 0.4%.

Only energy consumption by households is expected to fall (by 0.5% annually), while for the other sectors energy consumption is expected to rise steadily. The largest increase will be in energy consumption in the service sector, which will increase by 2.8% annually, particularly due to expected new electricity consumption by large data centres

(COWI A/S for the Danish Energy Agency, 2018). There is still considerable uncertainty associated with projecting electricity consumption by large data centres.

The service sector's share of final energy consumption will increase to 18% in 2030, which is almost the same as manufacturing industries at 20% in 2030.

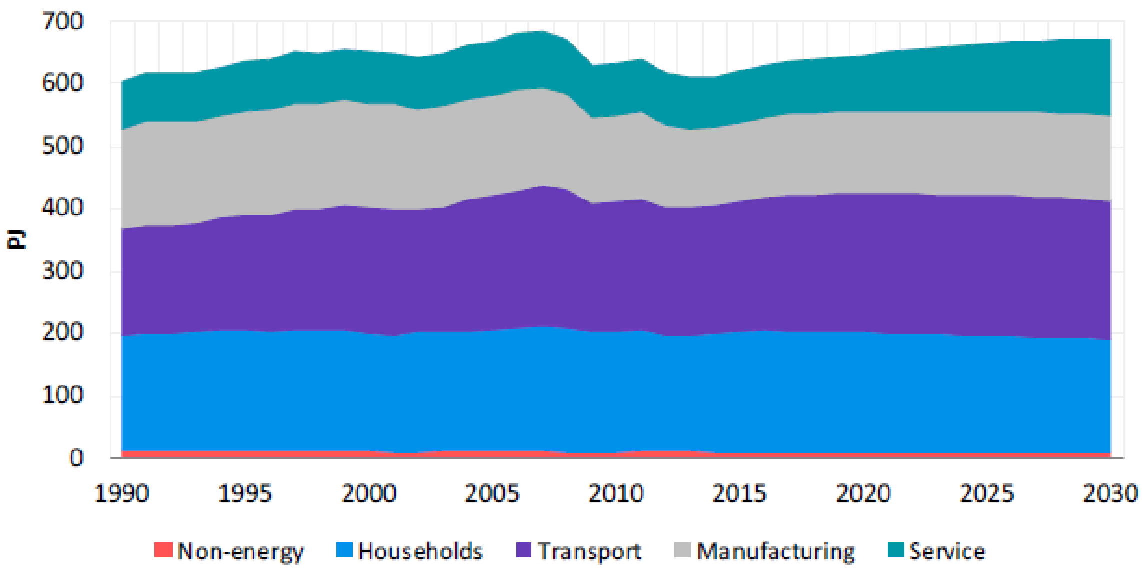
Energy consumption by manufacturing industries will increase by 0.4% annually as a result of economic growth in combination with the effect of energy efficiency measures.

Energy efficiency in industry and services is reflected in energy intensity, which expresses energy consumption in relation to the production value of industry and services. Total energy intensity in industry and services will fall by around 1% annually up to 2024, but the annual rate of reduction will halve from 2025 in the absence of new measures (Chapter 4.6).

Energy consumption by the transport sector will increase by 0.2% annually, primarily due to increasing transport volume.

The projections show that final energy consumption is expected to increase by 0.4% annually, particularly due to increasing electricity consumption by large data centres, which is included in energy consumption by the service sector.

Figure 5: Final energy consumption by consumption sector 1990-2030 [PJ].



2.6 Electricity consumption increases due to data centres and electrification of heating and transport

Electricity consumption and its composition will change up to 2030, depending, in particular, on the expected electricity consumption of large data centres and electrification within heating and transport.

Figure 6 illustrates that electricity consumption (excl. grid losses) will increase by 3% annually up to 2030.

COWI A/S has assessed the deployment of data centres on behalf of the Danish Energy Agency (COWI A/S for the Danish Energy Agency, 2018). On the basis of this assessment, expectations are maintained that electricity consumption by large data centres will increase to 25.3 PJ (7 TWh) in 2030.

Electricity consumption for space and domestic water heating will increase by more than 7.7% annually to 27 PJ (7.5 TWh) in 2030, which reflects expectations for more widespread use of heat pumps in households, district heating and in industry and services.

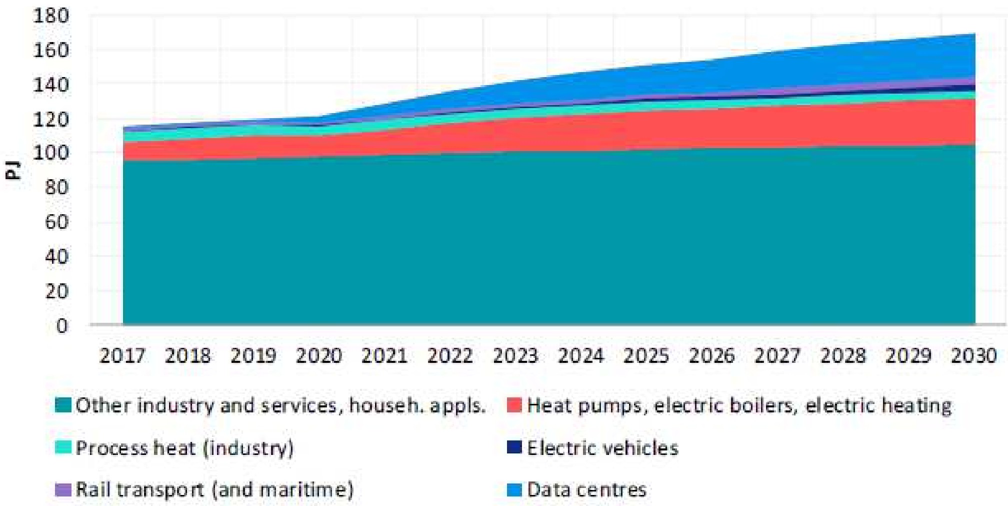
Electricity consumption for transport will increase to 7.5 PJ (2 TWh) in 2030 based on expectations for railway electrification and an increasing number of electrified vehicles in road transport[86].

A total of 1,545 electric vehicles and 3,128 plug-in hybrid vehicles were sold in 2018, which together corresponds to 2.1% of the total sale of passenger cars, which was 218,565 (De Danske Bilimportører, 2019). There are also a number of electrified vans, buses and trucks. In the absence of new measures, sales of electric and plug-in hybrid vehicles are expected to increase to 22% of total annual sales of passenger cars and vans in 2030. With this backdrop, electrified vehicles are expected to account for almost 9% of the total number of passenger cars and vans on the road in 2030.

Figure 6 shows electricity consumption by use in 2030. It can be seen from the figure that data centres are expected to account for 15%, electricity consumption for heating 13%, and electricity consumption for road and rail transport is expected to account for 4%.

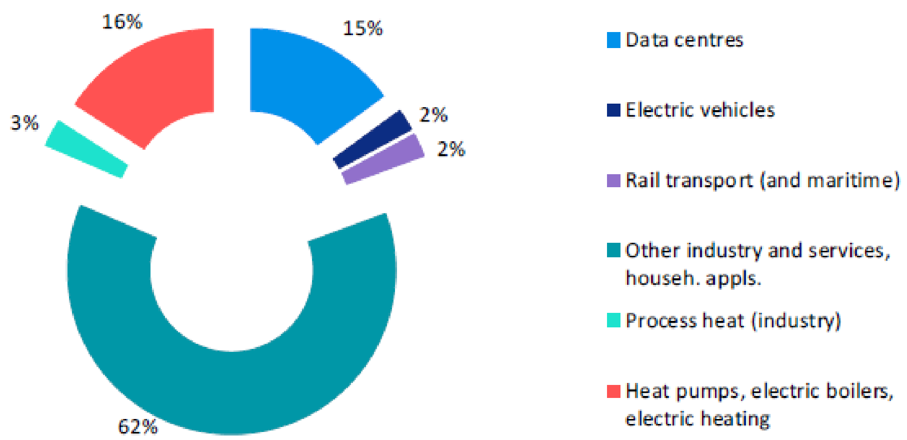
The projections show that electricity consumption is expected to increase by 3% annually, due in particular to increasing consumption by large data centres and for heating, whereas increases in electricity consumption by transport will have only a minor effect on total electricity consumption.

Figure 6: Electricity consumption (excluding grid losses) by use 2017-2030 [PJ].



[86] Electrified vehicles comprise electric vehicles (BEV, EV) and plug-in hybrid vehicles (PHEV), while hybrid vehicles (HEV) are categorised in relation to their primary fuel (usually petrol).

Figure 7: Electricity consumption (excluding grid losses) by use in 2030 [%].



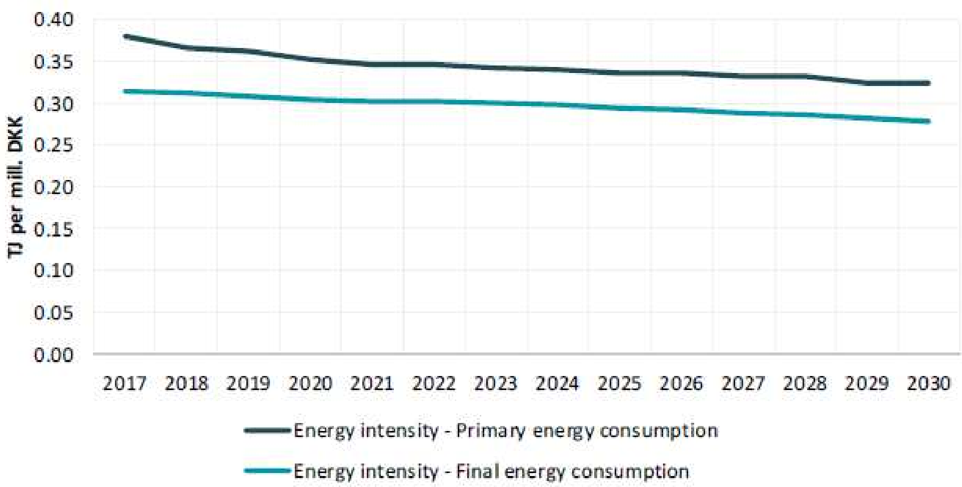
2.7 Macro-economic energy intensity is falling

Macro-economic energy intensity compares changes in energy consumption with changes in GDP. At a general level, energy intensity can help reflect developments in economic energy efficiency, although it does not serve to describe developments in technical energy efficiency[87].

Figure 8 shows that energy intensity measured as gross energy consumption in relation to GDP is expected to fall from 0.38 TJ per DKK million to 0.32 TJ per DKK million in 2030, corresponding to an annual drop in energy intensity of 1.2%. Furthermore, the figure shows that energy intensity measured as final energy consumption is expected to fall by 0.9% annually.

The projections show that macro-economic energy intensity is falling (rising energy efficiency). Energy intensity measured as gross energy consumption compared with GDP is expected to fall by 1.2% annually.

Figure 8: Macro-economic energy intensity measured in relation to gross energy consumption and final energy consumption 2017-2030 [TJ per DKK mill.].



[87] Energy intensity does not take account of energy consumption in international maritime transport and aviation, although these are included in GDP.

2.8 Sensitivities and methodological considerations

The projections are based on a number of central assumptions with associated uncertainties. Changes in these assumptions may have significance for the key results of the projections.

Possible consequences of selected sensitivities for the key results of the projections are described in Chapter 8.

3 Energy consumption in households

3.1 Main points

• 83% of household energy consumption is used for space heating, the rest for electricappliances. Household energy consumption for heating is expected to fall by 0.6% per year, despite an expected increase in floor area of 0.5% per year over the period. This is particularly due to continued energy efficiency improvements in buildings and an expected shift to more efficient heating technologies, primarily heat pumps.

• Consumption of district heating is slightly declining but constitutes 44% of household energy consumption for heating in the whole period.

• In 2030, oil consumption for heating is expected to amount to less than 2% of final energy consumption for heating, which reflects that recent decades' phase-out of oil consumption for heating is expected to continue.

• Gas consumption continues to constitute a significant, but slightly falling, percentage of energy consumption for heating. Gas consumption is expected to drop by 1.6% per year and is expected to amount to 14% of energy consumption for heating in 2030.

• Recent years' increase in the consumption of wood pellets for heating is expected to have peaked, and consumption is expected to fall to 6% of energy consumption for heating in 2030.

• The contribution to space heating from heat pumps will increase by 7.4% annually. Heat pumps for heating purposes replace declining consumption of wood pellets, oil and gas, and will amount to 16% of energy consumption for heating in 2030.

• Electricity consumption for appliances is expected to increase by 0.3% annually from 2017 to 2030, while the number of electrical appliances will increase by 2.3% annually. This difference is especially due to electrical appliances becoming increasingly more efficient as a result of the EU Ecodesign Directive.

3.2 The overall picture

Final energy consumption by households was 30% of the total final energy consumption in 2017, and this is expected to fall to 27% in 2030. The share of energy consumption used for heating will be around 83% throughout the period. Other energy consumption by households is used for electrical appliances.

Figure 9 shows that consumption of district heating is slightly declining and constitutes 44% of household energy consumption for heating in the whole period.

Oil consumption for heating fell from 22% of household energy consumption in 2000 to 6% in 2017. In 2030, oil is expected to amount to less than 2% of final energy consumption for heating, assuming that recent decades' phase-out of oil consumption for heating continues.

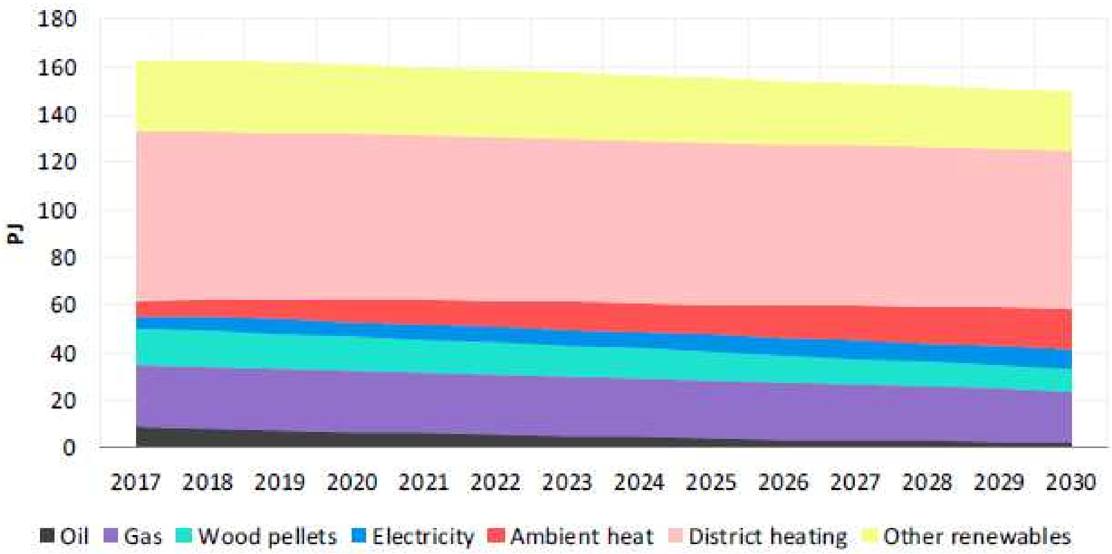
Up to 2003, households changed to gas in particular, but from 2004 onwards the change is more to wood pellets in particular. Figure 9 shows that the distribution of energy consumption by energy product is still changing. Up to 2030, wood pellet consumption is expected to fall by 3.5% annually,whereas consumption of oil and gas will fall annually by 9.3% and 1.6%, respectively. The fallingconsumption of wood pellets and fossil fuels will be offset by an increasing contribution from heatumps, which will increase by 7.4% annually.

Other consumption of renewables will comprise fuel wood in particular and is expected to fall by 1.5% annually up to 2030.

Despite a rising number of electrical appliances, the associated electricity consumption has remained constant over the past 15 years. This is because electrical appliances have become more efficient, partly as a consequence of the EU Ecodesign Directive and the Energy Labelling Directive. In the projections, the number of appliances is expected to increase by 2.3% annually, while electricity consumption for these is expected to increase by 0.3% annually up to 2030.

The projections show that heat pumps will increasingly replace consumption of fossil fuels and wood pellets for heating, and that households will buy more electrical appliances but that these appliances will be more efficient.

Figure 9: Final energy consumption by households for heating 2017-2030 [PJ]. Gas comprises mains gas, i.e. natural gas, gasworks gas and bio-natural gas. Other renewable energy includes firewood in particular, but also solar heating and straw.



3.3 Energy consumption for heating will fall despite an increase in heated floor area

Final energy consumption by households for heating is expected to fall to 150 PJ in 2030, corresponding to an annual 0.6% decrease. The total heated floor area is also expected to increase by 0.5% per year in the period.

Net space heating demand is expected to fall from 140 PJ in 2017 to 135 PJ in 2030. This fall is due to higher standards of insulation in new buildings, re-insulation of existing buildings and demolition of older buildings. This development is linked to tighter building regulations and energy saving efforts by energy companies up to 2020, as well as the expected effects of the new funding scheme for energy savings in buildings from 2021 to 2024.

The projections show that energy consumption for heating will fall, despite an increase in heated floor area. This primarily depends on tighter building regulations and energy saving efforts by energy companies up to 2020 and the expected effects of the new energy savings pool up to 2024.

3.4 HEAT PUMPS MORE PROMINENT IN HOUSEHOLD HEATING

Up to 2030, heat pumps are expected to increasingly displace other heating technologies. This depends in particular on relaxations of the tax on electric heating in the 2017 Agreement on Business and Entrepreneurial Initiatives and in the Energy Agreement 2018 (Ministry of Energy, Utilities and Climate, 2018).

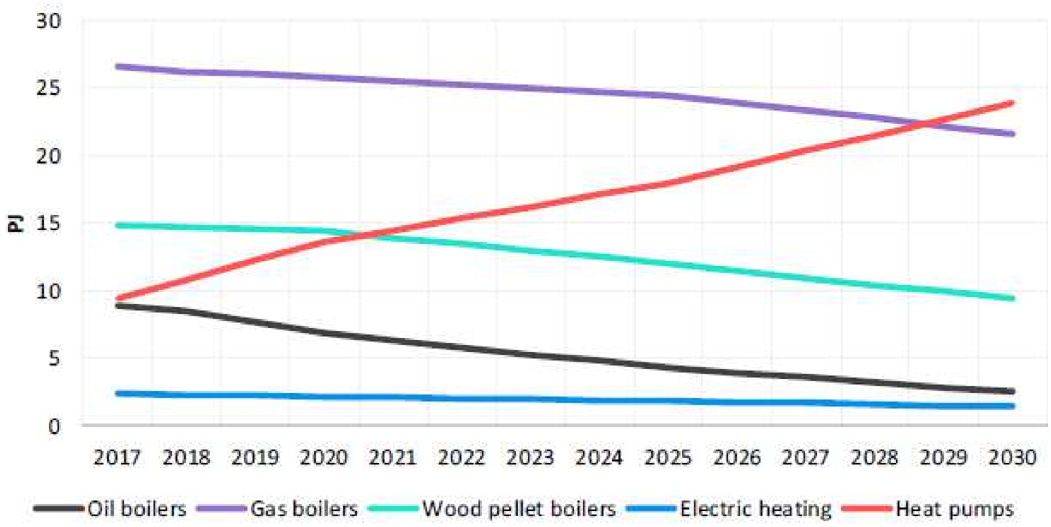
Figure 10 shows that consumption of oil, gas and wood pellets for heating is expected to fall up to 2030. After several years' increase, consumption of wood pellets is expected to fall by 3.5% annually, and will be at 9 PJ in 2030, corresponding to the 2006 level.

Heat pumps are expected to replace in particular consumption of oil and wood pellets for heating. The contribution from heat pumps will increase by 7.4% annually and exceed consumption of wood pellets from 2021. Electricity consumption for electric radiators is expected to fall to 1.5 PJ in 2030.

Gas is expected to continue to account for an important share of heating at 14% in 2030.

The projections show that heat pumps will replace declining consumption of fossil fuels and wood pellets. While consumption of oil will be almost phased out in 2030, gas will continue to account for a significant part of heating.

Figure 10: Final energy consumption by households analysed by selected heating technologies 2017-2030 [PJ]. Energy consumption by heat pumps includes ambient heat and electricity consumption. Gas comprises natural gas, gas works gas and bio-natural gas. District heating and fuel wood have been excluded.

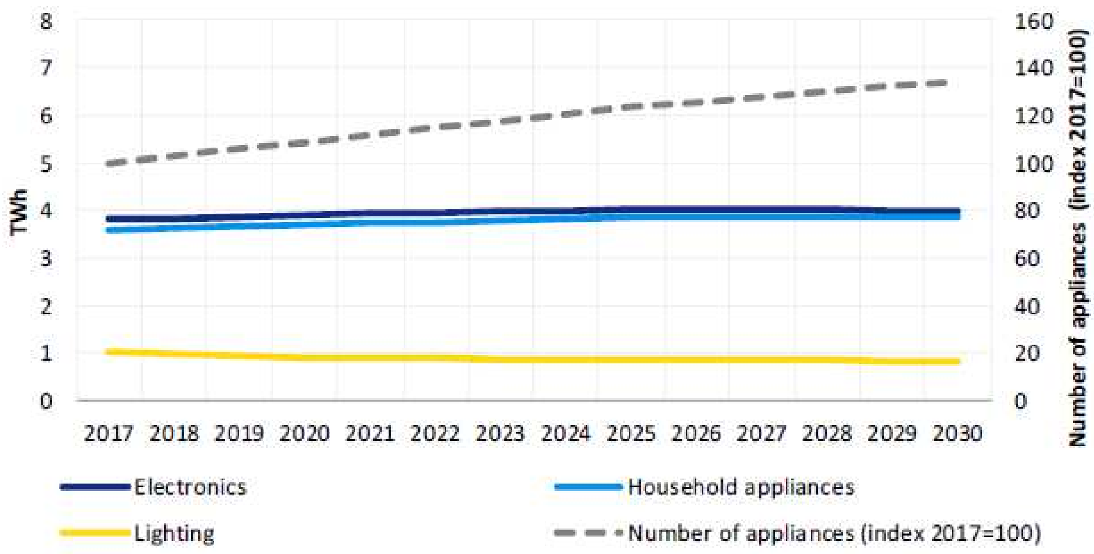


3.5 MORE, BUT ALSO MORE EFFICIENT ELECTRICAL APPLIANCES

Due to growing private consumption, people will buy more electrical appliances. Figure 11 illustrates that the number of electrical appliances is expected to increase by 2.3% annually. At the same time, the efficiency of appliances will improve due to the impact of the Ecodesign Directive (European Commission, 2009) and more efficient appliances are preferred by consumers following the Energy Labelling Directive (European Commission, 2017a). The projections are also conditional on an expectation that more products will be covered by these regulations. With this background, electricity consumption for appliances is expected to remain almost stable at around 31 PJ (8.7 TWh).

The projections show that there will be slightly increasing electricity consumption for more, but also more efficient, electrical appliances. Efficiency improvements of electrical appliances depend on EU standards for ecodesign and energy labelling of products.

Figure 11: Number of electrical appliances [Index] and developments in electricity consumption by use: electronic equipment, electrical appliances and lighting 2017-2030 [TWh].



3.6 SENSITIVITIES AND METHODOLOGICAL CONSIDERATIONS

Expectations regarding households' choice of heating technology are sensitive to fuel prices as well as consumer prices of electricity and district heating. Moreover, assumptions about technology costs for individual heating technologies have a significant impact. The Danish Energy Agency's basis for its expectations is described in the Danish Energy Agency Technology Catalogue for individual heating systems (Danish Energy Agency, 2019i).

Possible consequences of selected sensitivities for the key results of the projections are described in Chapter 8.

4 Energy consumption in industry and services

4.1 Main points

• Final energy consumption by industry and services will increase by 1.4% annually up to 2030. The increase primarily depends on increasing electricity consumption by large data centres and the end of the energy savings pools in 2024.

• More than 3/4 of fossil fuel consumption by industry and services will be used for mediumand high-temperature process heat in 2030. About 1/3 of oil consumption will be for internal transport purposes such as tractors, fishing boats and construction machines.

• Renewable energy consumption by industry and services will increase by 5.5% per year to amount to 13% of final energy consumption by industry and services in 2030.

• Consumption of electricity by industry and services will increase by about 3% annually, of which electricity consumption by large data centres will account for 80%.

• Use of heat pumps by industry and services will increase for both space heating and process heat. Consumption of electricity and ambient heat for heat pumps will increase from 2% of final energy consumption by industry and services in 2017 to around 5% in 2030.

• Energy intensity for industry and services (without data centres) will fall up to 2030, but the rate of reduction will halve from 2025 when the energy savings pools end in 2024.

Photo 1: Industry in Esbjerg. Process-related emissions from industry are expected to constitute a growing percentage of total emissions from industry and services (Text box 2, page 64).

4.2 The overall picture

In 2017, final energy consumption by industry and services was 34% of the total final energy consumption, and this is expected to rise to 38% in 2030. Figure 13 illustrates that changes can be divided into two periods. From 2017 to 2020 energy consumption by industry and services will increase by 0.9% annually, while from 2021 to 2030 it is expected to increase by 1.5% annually, corresponding to 1.4% per year on average from 2017-2030.

The increase in energy consumption by industry and services depends on increasing electricity demand for large data centres. There is significant uncertainty linked to the projections of electricity consumption by data centres (COWI A/S for the Danish Energy Agency, 2018). Energy consumption without data centres will increase by 0.6% annually.

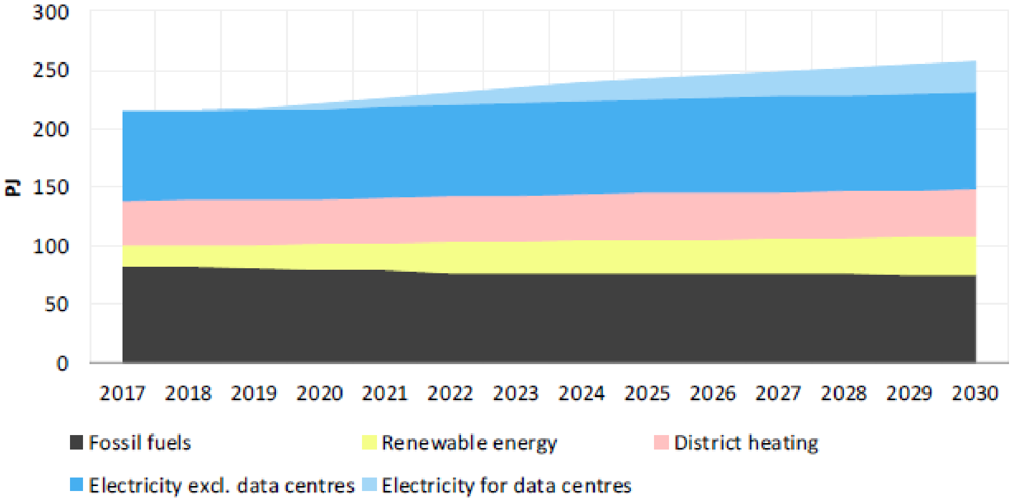
Total electricity consumption by industry and services will increase from 76 PJ in 2017 to 108 PJ in 2030, corresponding to an annual increase rate of 2.8%. 80% of this increase depends on increasing electricity demand for large data centres.

From 2017 to 2030, final consumption of fossil fuels by industry and services will fall from 83 PJ to 75 PJ, which means that the fossil fuels share of final energy consumption by industry and services will fall from 39% to 29%. About 3/4 of the consumption of fossil fuels by industry and services is used for medium- and high-temperature process heat. Consumption of renewable energy will increase from 8% of total final energy consumption by industry and services in 2017 to 13% in 2030, corresponding to an increase rate of 5.5% annually. This trend is due in particular to an increase in consumption of renewable energy gas and heat pumps.

The energy efficiency of industry and services is expected to continue to increase up to 2030, but the rate of increase will halve from 2025 because the energy savings pools only apply until 2024.

The projections show that energy consumption by industry and services will increase by 1.4% annually up to 2030 due to increasing electricity consumption by data centres and declining energy-efficiency improvements after 2024. The percentage of fossil fuels in final energy consumption by industry and services will fall to 29% in 2030.

Figure 12: Final energy consumption by industry and services by type of energy 2017-2030 [PJ].



4.3 FOSSIL FUEL CONSUMPTION WILL DROP SLIGHTLY UP TO 2030

Figure 13 shows that final fossil fuel consumption by industry and services will fall by 1.2% annually up to 2024, and then fall by 0.3% annually. Consumption of coal, coke, petroleum coke and fossil waste is expected to rise, however, to about 1% per year, due to expected economic growth.

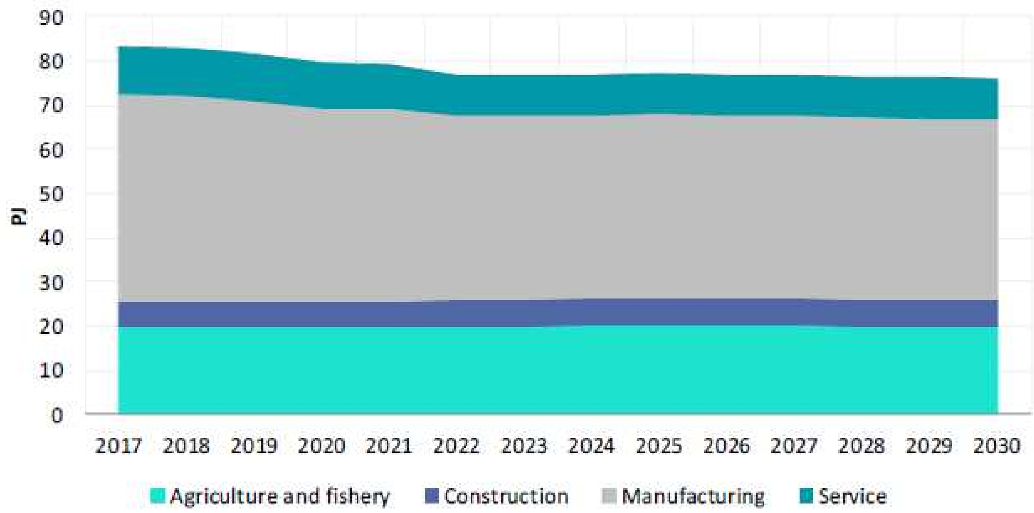
Consumption of fossil fuels in the service sector will fall from 11 PJ in 2017 to 9 PJ in 2024, corresponding to about 3% annually. From 2025, service sector fossil fuel consumption will level off.

Fossil fuel consumption by manufacturing industries will fall by 2% annually up to 2024, and then level off.

Consumption of fossil fuels in building and construction as well as agriculture, forestry and fishing is expected to remain unchanged in 2030 in relation to 2017.

The projections show that consumption of fossil fuels by industry and services will fall up to 2024 and then level off. With regards to the service sector, natural gas consumption for space heating in particular will drop up to 2024.

Figure 13: Final consumption of fossil fuels by industry and services by sector 2017-2030 [PJ].



4.4 FOSSIL FUELS PRIMARILY FOR MEDIUM AND HIGH-TEMPERATURE PROCESS HEAT

Figure 14 shows that consumption of fossil fuels by industry and services in 2030 will be for internal transport, process heat and space heating. Internal transport includes commercial transport by vehicles and machinery such as construction machines, tractors, combine harvesters, fishing boats and trucks. Energy consumption for other commercial transport, such as vans, is included in energy consumption by the transport sector (Chapter 5).

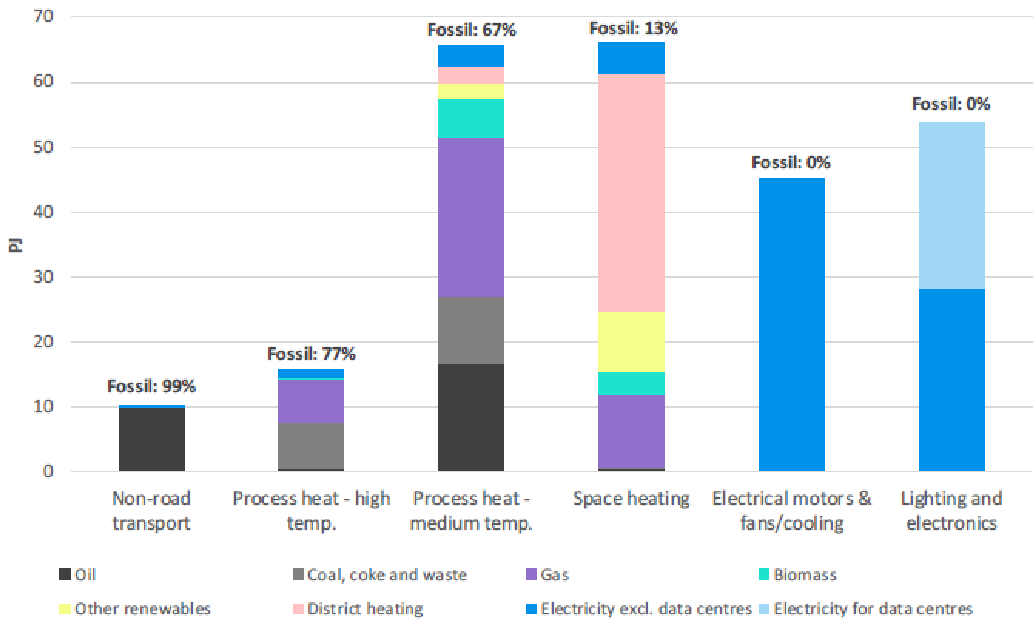
In 2030, more than 50% of consumption of fossil fuels by industry and services is expected to be used for medium-temperature process heat (less than 150 °C), while about 25% will be used for high-temperature process heat (more than 150 °C).

Around 2/3 of energy consumption for high-temperature process heat is direct firing, especially with coal, coke, petroleum coke and gas, used for example in the production of cement and tiles.

Fossil fuels are expected to account for 67% of energy consumption for medium-temperature process heat, 77% of energy consumption for high-temperature process heat (more than 150 °C) and 13% of energy consumption for space heating.

The projections show that, in 2030, more than 50% of consumption of fossil fuels by industry and services is expected to be used for medium-temperature process heat (less than 150 °C), while about 25% will be used for high-temperature process heat (more than 150 °C).

Figure 14: Industry and services' consumption of different types of energy by use in 2030 [PJ] and share of fossil fuels [%].Coal includes coal, coke, petroleum coke and fossil waste. Gas comprises mains gas that includes both natural gas and bionatural gas. The fossil share does not include fossil fuels used for electricity and district heating production.



4.5 USE OF HEAT PUMPS WILL INCREASE FOR BOTH SPACE HEATING AND PROCESS HEAT.

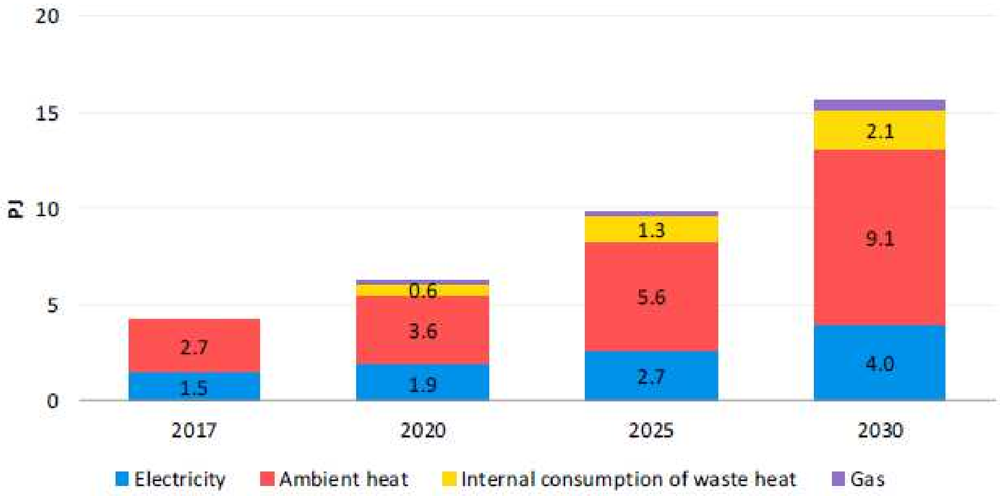
Use of heat pumps for space heating will increase, and use of heat pumps for industrial processes will also increase. By utilising internal waste heat from processes, heat pumps can provide higher temperatures with high efficiency, and this encourages increasing use for process purposes.

Figure 15 shows that electricity consumption by industry and services for heat pumps is expected to increase from 1.5 PJ in 2017 to 4 PJ in 2030, corresponding to a 7.6% annual increase.

Consumption of electricity and ambient heat for heat pumps is expected to increase from 2% of final energy consumption by industry and services in 2017 to 5% in 2030.

The projections show that industry and services is expected to invest in heat pumps used for both space heating and process heat. Consumption of electricity and ambient heat for heat pumps will account for 5% of final energy consumption by industry and services in 2030.

Figure 15: Industry and services energy consumption for heat pumps [PJ].



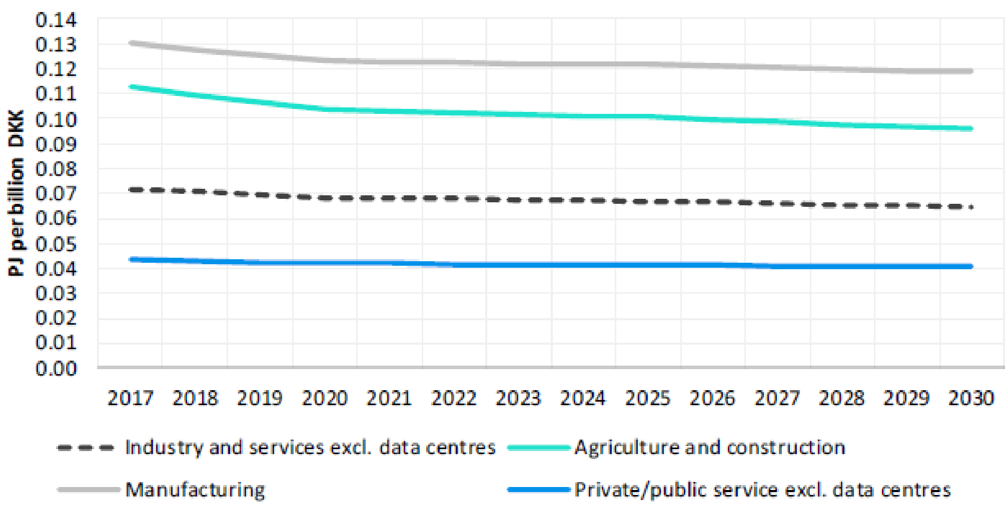
4.6 Energy intensity reduced further, but to a lesser extent from 2025

Energy efficiency in industry and services is reflected in energy intensity, which expresses energy consumption in relation to the production value. Falling energy intensity thus indicates increasing economic energy efficiency. The calculation of energy intensity is without data centres, as so far there is no statistical basis for assessing the production value of data centres[88].

Figure 16 shows that energy intensity will fall up to 2030. Total energy intensity for industry and services will fall by around 1% annually up to 2024. From 2025 the drop in energy intensity will halve to 0.5% annually.

The projections show that energy intensity in industry and services will fall up to 2030, but the annual rate of reduction will halve from 2025 in the absence of new measures.

Figure 16: Energy intensity in industry and services by industry 2017-2030 [PJ/DKK bn.].



[88] Sea transport, the utilities sector and energy production industries such as refineries have also been excluded. Production values and energy consumption from these are not included in this statement of energy intensities.

4.7 Sensitivities and methodological considerations

The projection of energy consumption by industry and services is sensitive to economic growth, and this is included as an overall exogenous assumption.

The projections are also sensitive to assumptions about by the demand for electricity from data centres, as well as to assumptions about the effect of the energy saving pool up to 2024. Technology choices and fuel use primarily depend on assumptions regarding technology costs, fuel prices and the carbon price.

Possible consequences of significant sensitivities for key results are described in Chapter 8.

5 Energy consumption in transportation

5.1 Main points

• Final energy consumption by the transport sector will increase by 0.2% annually up to 2030.

• The share of fossil fuels in energy consumption by the transport sector will fall from 95% in 2017 to 92% in 2030.

• The renewables share in the transport sector (RES-T) will increase to 19% in 2030 based on the calculation method in the Renewable Energy Directive.

• Sales of electrified vehicles are expected to increase steadily and will account for 22% of total sales of new vehicles and 9% of the total number of passenger cars and vans on the road in 2030. The share of electrified vehicles in sales of new vehicles up to 2030 is subject to significant uncertainty.

• Electricity consumption by the transport sector will increase by about 13% annually up to 2030. Electricity consumption by road transport will correspond to electricity consumption by rail transport in 2030.

5.2 The overall picture

Final energy consumption by the transport sector was 218 PJ in 2017, corresponding to 34% of total final energy consumption. Up to 2030, final energy consumption by the transport sector is expected to increase by 0.2% annually and reach 223 PJ, which will correspond to 33% of total final energy consumption.

Up to the financial crisis in 2008, energy consumption by the transport sector was increasing steadily. The financial crisis and EU requirements for energy efficiency of vehicles resulted in a fall in energy consumption from 2008 to 2013, after which energy consumption rose again, primarily within aviation and road transport. For road transport, this was due in particular to increased road traffic volume and an associated increase in the number of vehicles, particularly small petrol cars and mid-range diesel cars.

Energy consumption by road transport is expected to increase by 0.1% annually up to 2030. The increase in energy consumption is less than the increase in road traffic volume. This is due to improvements in vehicle's energy efficiency as a result of technological developments, including electrified vehicles as well as EU requirements for manufacturers of passenger cars, vans and trucks.

Figure 17 shows that road transport will account for 74% of energy consumption by the transport sector in 2030, of which passenger cars and vans will account for 47 percentage points. Energy consumption by the aviation sector is expected to increase by 0.6% annually, and will account for 20% of energy consumption by the transport sector in

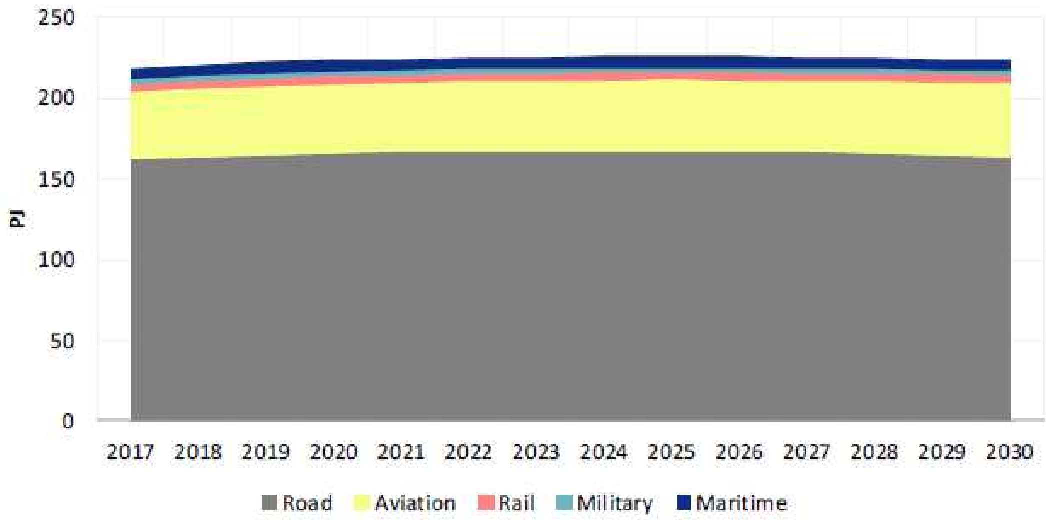
2030. This increase is due to a 35% increase in air traffic, whereas energy efficiency will improve by 26%.

The share of fossil fuels in energy consumption by the transport sector will fall from 95% in 2017 to 92% in 2030. The renewables share in the transport sector (RES-T) will, however, increase to 19% in 2030 based on the calculation method in the Renewable Energy Directive which reflects the value of a reduced conversion loss from using electricity based on renewable energy for transport (see glossary).

The renewables share increase is due in particular to an increased consumption of electricity produced from renewable energy sources (Chapter 6.3). In 2030, the renewable share of electricity consumption by the transport sector will correspond to the consumption of first generation biofuels.

The projections show that road transport will account for three-quarters of energy consumption by the transport sector. Electricity consumption by the transport sector will increase by 13% annually. The share of fossil fuels in energy consumption by the transport sector will fall to 92% in 2030. The renewables share in the transport sector (RES-T) will increase to 19% in 2030.

Figure 17: Final energy consumption by the transport sector by use 2017-2030 [PJ].



5.3 Electricity consumption by the transport sector is increasing

Figure 18 shows that electricity consumption by the transport sector will increase to 7.5 PJ in 2030, corresponding to an annual increase of 13%.

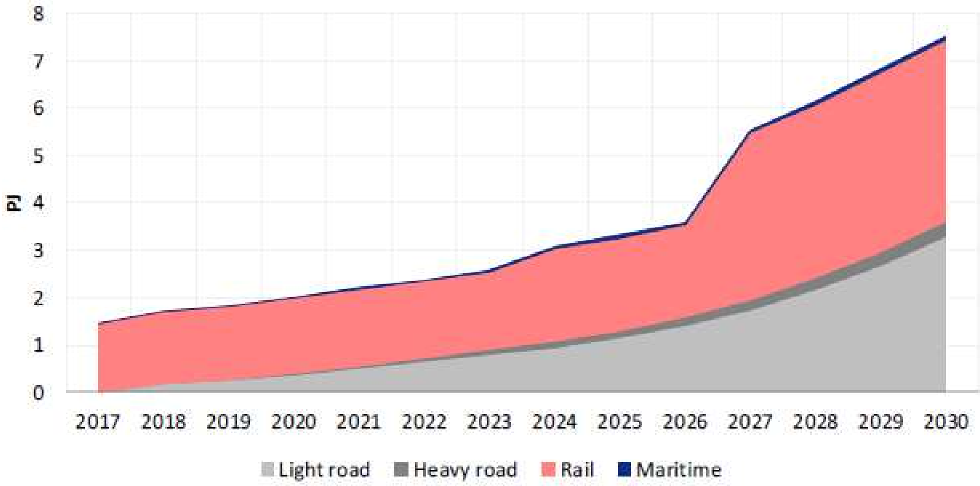
In 2030, light road transport (passenger cars and vans) and rail transport will account for 44% and 51% of electricity consumption by the transport sector, respectively.

A major increase in electricity consumption by rail transport in 2027 is based on expectations for a launch of new rolling stock and that the electrification of the link between Fredericia and Aalborg will be finished in 2026.

In addition, there will be less electricity consumption in heavy-duty transport (less consumption by trucks and buses, primarily intercity buses) and limited electricity consumption in maritime transport.

The projections show that electricity consumption by the transport sector will increase by 13%annually. In 2030, electricity consumption by road transport is expected to correspond to electricity consumption by rail transport.

Figure 18: Electricity consumption by the transport sector by area of use 2017-2030 [PJ].



5.4 MORE ELECTRIFIED VEHICLES SOLD, MAKING THE SHARE OF TOTAL FLEET 9% IN 2030

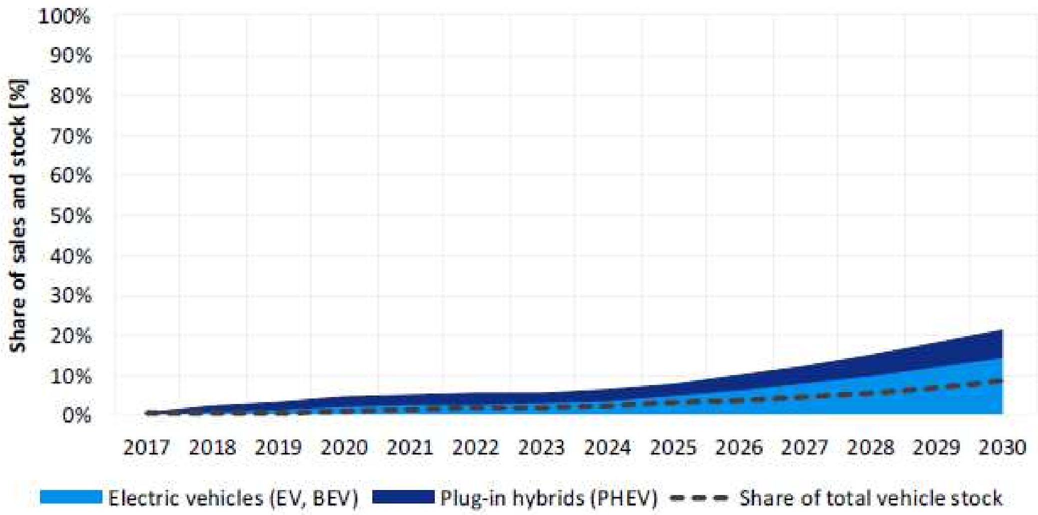
Figure 19 reflects the expectation that electrified passenger cars and vans will constitute an increasing share of sales of new vehicles up to 2030. This is based on expectations of technological developments and falling technology costs. On this basis, electrified vehicles are expected to account for 22% of total sales of new vehicles in 2030, in the absence of new measures. Sales of hydrogen vehicles are expected to be very limited.

The number of electrified passenger cars and vans will increase to around 300,000 in 2030, and electrified passenger cars and vans will make up almost 9% of the total fleet in 2030.

Electrified vehicles are expanding into the global car market. However, this technology is still under development. This entails a significant uncertainty about sales and the total number of electrified vehicles up to 2030.

The projections show that electric vehicles and plug-in hybrid vehicles, in the absence of new measures, are expected to account for 22% of sales and almost 9% of the total number of passenger cars and vans on the road in 2030. This corresponds to approximately 300,000 electrified passenger cars and vans in 2030.

Figure 19: Electrified vehicles' share of sales of new vehicles and share of total number of passenger cars and vans on the road 2017-2030 [%].



5.5 92% OF ENERGY CONSUMPTION BY TRANSPORT WILL BE FOSSIL IN 2030

Measured in relation to final energy consumption, the share of fossil fuels in the transport sector will fall from 95% in 2017 to 92% in 2030. This is due to a combination of electrification of the rail and road transport sectors as well as improved energy efficiency for conventional vehicles. Fossil fuel consumption by road transport is expected to amount to 73% of total fossil fuel consumption by the transport sector in the absence of any new measures.

Figure 20 shows that the renewables share increasingly consists of electricity produced fromrenewable energy sources. In 2030, the renewables share of electricity consumption by the transport sector will correspond to the consumption of first generation biofuels, whereas consumption of second generation biofuels will constitute a smaller share.

Certain multiplication factors reflecting the value of a reduced conversion loss when using electricity must be used to calculate the renewables share in the transport sector according to the method in the Renewable Energy Directive (RES-T) (see glossary for definition of RES-T). RES-T is expected to be 9% in 2020 and will increase to 19% in 2030.

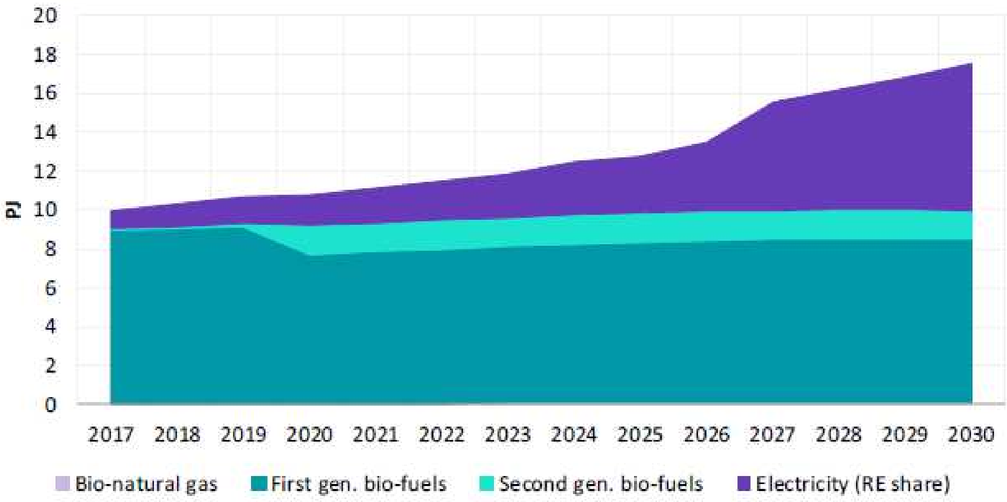
Consumption of biofuels, except for bio-natural gas, is expected to increase to 9.8 PJ in 2030, corresponding to 4% of energy consumption by the transport sector. Blending of biofuels with petrol and diesel fuel for road transport will not increase after 2020 in the absence of any new measures.

Consumption of gas which includes a growing share of bio-natural gas will increase, but bio-natural gas is expected to constitute a very limited share of renewable energy consumption in transport.

Fuel consumption for aviation is expected to be 100% based on fossil fuels throughout the period in the absence of new measures.

The projections show that the share of renewable energy in the transport sector is increasing, although renewable energy will continue to constitute a minor share of energy consumption by the transport sector. Renewable energy consumption by the transport sector will increasingly be influenced by the renewables share of electricity consumption which, in 2030, will correspond to consumption of first generation biofuels. Fuel consumption for aviation is expected to be 100% based on fossil fuels throughout the period. The renewables share in the transport sector (REST) calculated on the basis of the method in the Renewable Energy Directive is expected to amount to 9% in 2020 and will increase to 19% in 2030.

Figure 20: Renewable energy consumption by the transport sector 2017-2030 [PJ].



5.6 SENSITIVITIES AND METHODOLOGICAL CONSIDERATIONS

The projections are based on the expectation of a continued increase in demand for road transport. Moreover, the projection includes an expectation that technological developments will lead to cheaper batteries and thereby cheaper electric vehicles and plug-in hybrid vehicles. The project also assumes that the relaxation of vehicle registration tax for electric vehicles will be phased out in 2023.

The projection also includes the effect of new EU requirements for emissions from newly registered vehicles that is expected to lead to increased energy efficiency of conventional vehicles. So far, there has been no decision on the effect of driverless cars and car-share schemes, for example.

Road transport projections are particularly sensitive to assumptions about road transport volume, the efficiency of vehicles as well as to assumptions about future sales of petrol and diesel vehicles and electrified vehicles. In addition, there is methodological uncertainty associated with the calculation of the difference between standard figures for fuel consumption by new vehicles and actual energy consumption when travelling on the road.

The projection does not include effects of any use of biofuel in aviation fuel.

Sensitivity analyses have been made on the phase-in rate for electrified vehicles and for biofuel blending in the aviation sector. Possible consequences of these sensitivities for overall key results are described in Chapter 1.

6 Production of electricity, district heating and renewable energy gas

6.1 Main points

• Developments in electricity and district heating supply up to 2030 will be characterised by an almost full conversion to renewable energy. This depends on an expected phase out of large-scale coal-fired and small-scale gas-fired CHP as well as continued deployment of offshore wind, onshore wind and solar PV.

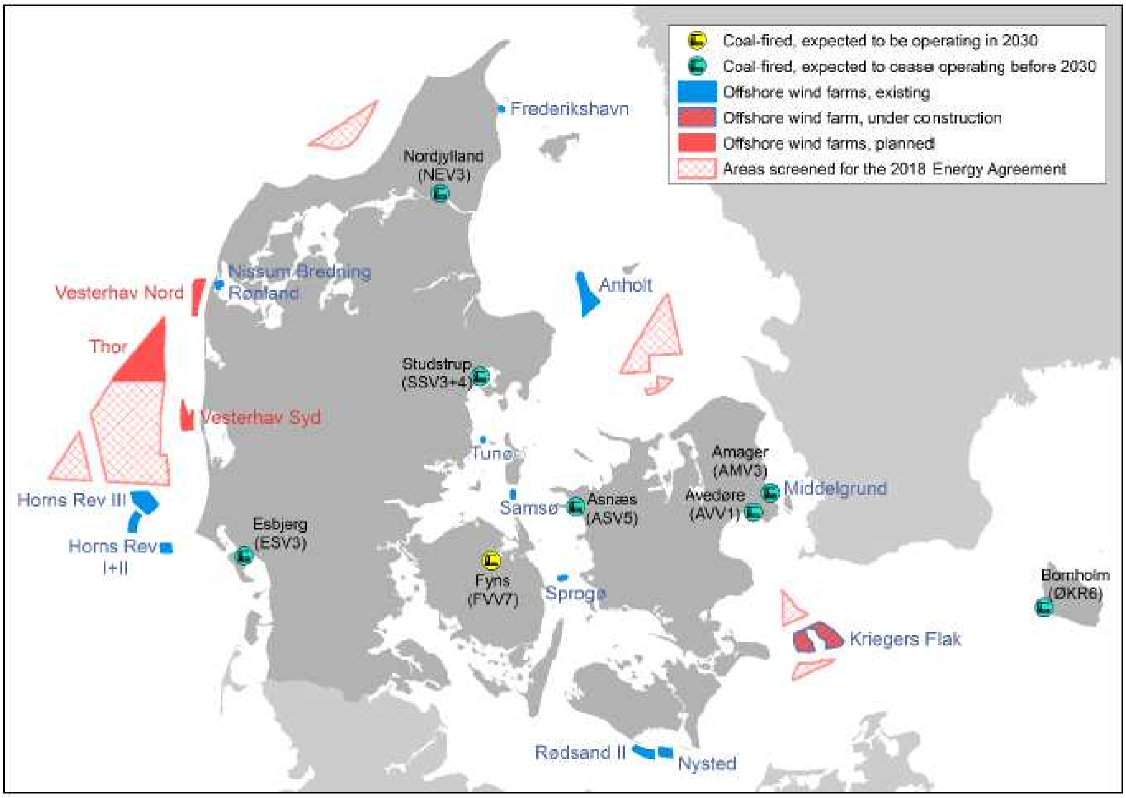
• The renewables share of electricity consumption (RES-E) will exceed 100% from 2028 and is expected to reach 109% in 2030. The increase in RES-E is contingent on expectations of deployment of wind power and solar PV in particular.

• The renewables share of district heating (RES-DH) will increase in particular up to 2023 and is expected to reach 80% in 2030. Heat production from large heat pumps and electric boilers will increase from 1% of the district heating consumption in 2017 to 11% in 2030.

• Coal consumption for production of electricity and district heating will drop from 85 PJ in 2017 to 7 PJ in 2030. This is contingent on expectations regarding discontinuation of operation or conversion to solid biofuels at specific coal-fired CHP plants. In the absence of any new measures, Fynsværket is the only coal-fired plant expected to be operational in 2030. Natural gas consumption for production of electricity and district heating will drop from 38 PJ in 2017 to 8 PJ in 2030. This is contingent on declining gas-based CHP capacity and increased biogas blending in the grid.

• Production of renewable energy gas in the form of bio-natural gas, which is biogas upgraded through blending with natural gas in the grid, and decreasing consumption of gas from the grid mean that the share of bio-natural gas produced will increase in 2030 to 25% of total domestic consumption of gas.

Figure 21: Location of coal-fired electricity production plants and offshore wind turbines.



6.2 THE OVERALL PICTURE

Figure 22 illustrates that developments in electricity and district heating supply up to 2030 will be characterised by almost full conversion to renewable energy. This depends on an expected phase out of large-scale coal-fired and small-scale gas-fired CHP as well as continued deployment of offshore wind, onshore wind and solar PV. Consumption of coal, natural gas and oil for production of electricity and district heating is expected to be reduced by 86% in 2030 compared with 2017.

The renewables share in electricity consumption (RES-E) will increase steadily from 64% in 2017 to more than 100% in 2028 and will reach 109% in 2030. A renewables share of more than 100% means that domestic production of renewable energy exceeds domestic consumption.

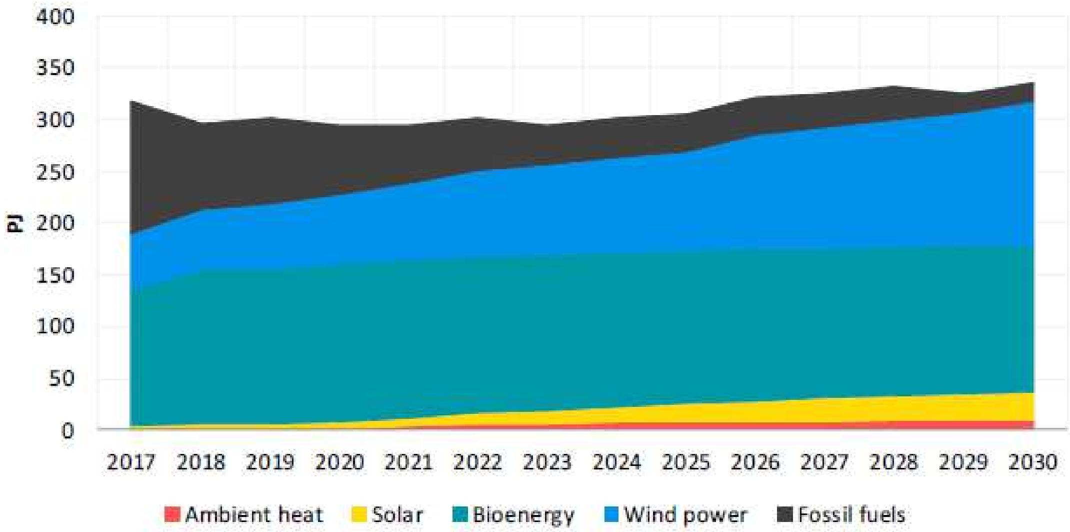
The renewables share in district heating consumption (RES-DH) will increase from 55% in 2017 to 76% in 2023 and will then slowly increase up to 80% in 2030. District heating supply will be characterised by conversion from coal and gas to biomass and heat pumps. RES-DH will not reach a higher level, particularly due to the consumption of waste for incineration in district heating production and the fossil (non-biodegradable) component in this. The fossil share of waste for incineration will cover around 10% of district heating consumption in 2030 in the absence of any new measures.

The increasing electricity production from wind power means that, in normal years, Denmark will be an ever larger net exporter of electricity from 2026 onwards. In the absence of any new measures, in 2030 net exports of electricity will constitute 12% of domestic electricity production, corresponding to 14% of electricity consumption (including grid losses)[89].

Increased production of renewable energy gas in the form of bio-natural gas, which is biogas upgraded through blending with natural gas in the grid, and decreasing consumption of mains gas also mean that the share of bio-natural gas production will increase from 5% in 2017 to 25% in 2030 in relation to the domestic consumption of gas.

The projections show that developments in electricity and district heating supply up to 2030 will be characterised by an almost full conversion to renewable energy. This depends on an expected phase out of large-scale coal-fired and small-scale gas-fired CHP as well as continued deployment of offshore wind, onshore wind and solar PV, whereas the consumption of bioenergy will increase to a lesser extent. The renewables share in electricity consumption (RES-E) will reach 109% in 2030, the renewables share in district heating consumption (RESDH) will reach 80% in 2030, while the share of bio-natural gas production will increase to 25% in 2030 compared with the domestic consumption of gas.

Figure 22: Consumption of energy by the electricity and district heating sector, by type of energy 2017-2030 [PJ].



6.3 The renewables share in electricity consumption (RES-E) will exceed 100% in 2028

Figure 23 shows that the renewables share in electricity consumption (RES-E) will increase steadily and is expected to exceed 100% from 2028 and reach 109% in 2030. This development is contingent on new offshore wind, updated expectations regarding the deployment of commercial solar PV (ground-mounted solar farms) and the expected replacement of older onshore wind turbines with fewer, more efficient turbines.

In the following, grid-connected capacity is stated as per 1 January of the year concerned.

Total installed capacity of offshore wind will increase from 1,300 MW in 2017 to 4,900 MW in 2030. This depends on the deployment of three new offshore wind farms of a total of 2,700 MW. From pre-feasibility studies, the average farm size for new offshore wind farms has been adjusted upwards from 800 MW, as decided in the Energy Agreement

[89] Calculations are based on normal years, and fluctuations can be expected in individual statistical years.

2018 to 900 MW. In addition, deployment of 390 MW offshore wind is expected, possibly nearshore.

Total installed capacity of onshore wind will increase from 4,200 MW in 2017 to 5,300 MW in 2024, after which it will decrease to 4,800 MW in 2030. However, electricity production from onshore wind is expected to increase over the entire period, as new turbines are more efficient than older turbines. From 2019 to 2021, the capacity of onshore wind is expected to increase by 500 MW. Of this, three projects will be financed by the 2018 technology-neutral tendering round, whereas other projects are expected to be realised through future technology-neutral tendering rounds or financed on market terms through a PPA. From 2022, deployment of onshore wind is expected to be around 225 MW annually up to 2030. In addition, deployment of 135 MW capacity of test turbines is expected.[90] The number of onshore wind turbines is expected to be reduced from 4,200 in 2017 to around 1,500 turbines in 2030.

Total solar PV capacity will increase from 900 MW in 2017 to 4,900 MW in 2030. This depends on an expected deployment of 3,750 MW of commercial ground-mounted solar farms. The expectation of ground-mounted solar farms is based on an updated assessment of data from municipalities, project developers and grid companies.

From feasibility assessments for households and other industries, capacity is expected to increase by a further 365 MW of building-integrated (including roof-top solar) installations up to 2030.

Background appendices to DECO19 (Danish Energy Agency, 2019a) describe in more detail the projections of deployment of onshore wind and solar PV. The basis for the projections is primarily expectations of developments in electricity prices (Chapter 6.5), falling technology costs (Danish Energy Agency, 2019i) and levels of prices achieved in the 2018 technology-neutral tendering round (Danish Energy Agency, 2019f), as well increasing interest from businesses to meet voluntary renewable energy targets through guarantees of origin in combination with funding opportunities in the form of technology-neutral tendering rounds and/or PPAs (Textbox 1). There seems to be considerable uncertainty associated with assumptions regarding market-based financing for onshore wind and solar PV after the end of technology-neutral tendering rounds as well as assumptions regarding the decommissioning of older wind turbines.

Textbox 1: ”Power Purchase Agreement” (PPA) can contribute to financing renewable energy deployment.

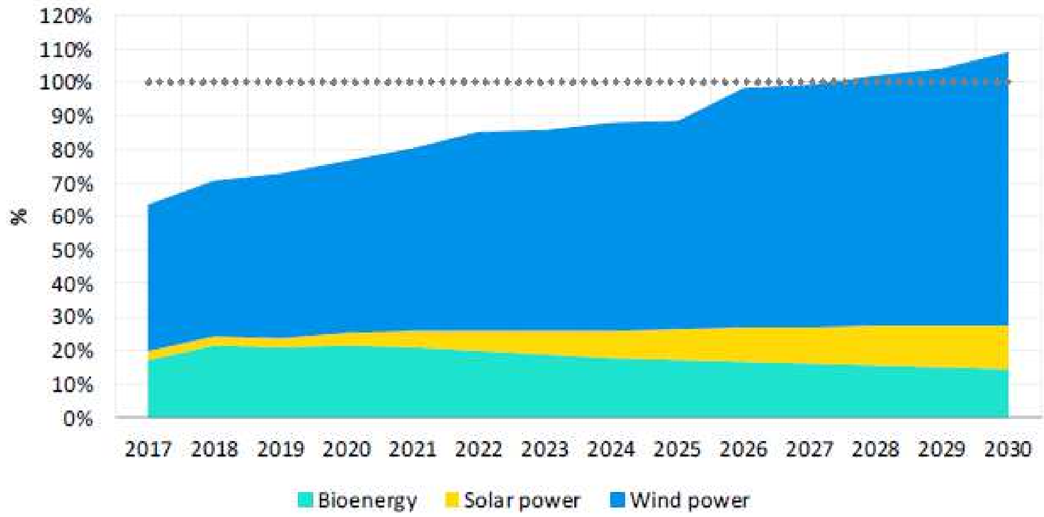
A PPA (Power Purchase Agreement) is a direct agreement between the investor/producer and consumer on trade in a specific production of electricity. For example, a PPA may help ensure a major consumer aguarantee of origin for purchases of renewable energy to cover its electricity consumption. A PPA may contribute to financing new capacity on market terms. Businesses seem to increasingly appreciate the value of voluntary renewable energy targets. Facebook's target of being 100% reliant on renewableenergy in 2020 is an example of this (Facebook, 2019).

On behalf of the Danish Energy Agency, K2 Management A/S has analysed the potential for commercial PPA agreements in Denmark (K2 Management on behalf of the Danish Energy Agency, 2019). The analysis presents several scenarios for promoting PPAs. In the central scenario (”realistic growth” scenario), the analysis suggests that PPAs could form the basis for 29% of total electricity consumption by industry and services in 2040. Such an expectation is associated with considerable uncertainty.

[90] 7 It is possible to achieve a price supplement for electricity production on test turbines at and outside the Høvsøre and Østerild national test centres. Although the primary purpose of test turbines is testing and development andnot electricity production, nevertheless the test turbines will contribute to the electricity supply to some degree.

The projections show that the renewables share in electricity consumption (RES-E) will increase steadily and is expected to exceed 100% from 2028 and reach 109% in 2030. This depends on the deployment of offshore wind, onshore wind and commercial solar PV. Expectations regarding the deployment of onshore wind and commercial solar PV are particularly sensitive to developments in technology costs and the importance of major consumers' voluntary renewable energy targets and financing terms, including bilateral electricity trade agreements (PPAs).

Figure 23: Renewables share in electricity consumption (RES-E) by wind power, solar PV, bioenergy and hydropower 2017-2030 [%]. Hydropower is very small and has been included in solar PV.



6.4 Increasing electricity production from renewable energy will be exported from 2026

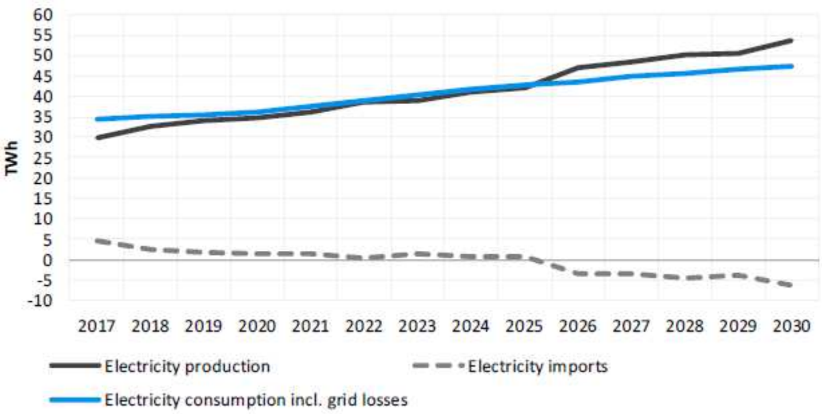
Figure 24 shows that electricity consumption, including grid losses, is expected to increase from 34 TWh in 2017 to 50 TWh in 2030, corresponding to an annual increase of 3%.

The increasing electricity consumption is followed by a relatively larger increase in domestic electricity consumption, which will increase from 30 TWh in 2017 to 54 TWh in 2030, corresponding to an annual increase of 4.7%. This increase depends on the deployment of wind power and solar PV, and on Denmark's potential to sell electricity on high-price markets in the Netherlands (via Cobra Cable), the United Kingdom (via Viking Link) and Germany (via the East Coast and West Coast Links).

Denmark is expected to be an increasingly larger net exporter of electricity from 2026. In theabsence of any new measures, in 2030 net exports of electricity are expected to constitute 12% of electricity production, corresponding to 14% of electricity consumption (including grid losses).

The projections show that increasing electricity production from wind power and solar PV isexpected to result in systematically increasing net exports of electricity in the absence of any new measures. Net exports are expected to amount to 14% of electricity consumption, including grid losses, in 2030 in the absence of any new measures.

Figure 24: Electricity consumption, including transmission and distribution losses, electricity production and electricity imports 2017-2030 (TWh).



6.5 More renewable energy abroad, more interconnectors and stable electricity prices

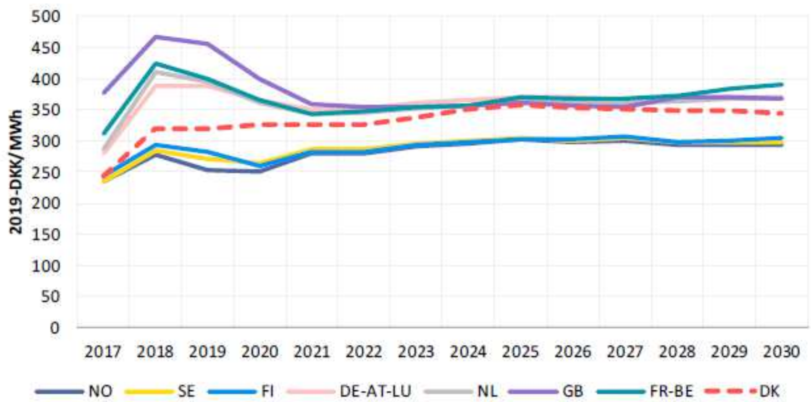
The composition of the electricity production capacity in Europe up to 2030 is marked by expectations of more renewable energy and more interconnectors as described in the background appendices to DECO19 (Danish Energy Agency, 2019a). The consequence of this development is expected to be a reduced difference in electricity prices and greater price stability between connected market areas.

Figure 25 shows that, on this basis, up to 2021, Denmark's price zone converges toward just below a continental north-west European price range, while the other Nordic countries are expected to group together at a lower price range.

Prices for all the years are model results. The Danish Energy Agency uses statistical prices for 2017-2018 and forward prices for 2019-2020. The resulting projection of electricity prices, including technology-weighted electricity prices and hourly electricity prices are stated in the background appendices to DECO19 (Danish Energy Agency, 2019a).

> The projections show that Denmark's electricity price zone converges toward just below a continental north-west European price range, while the other Nordic countries are expected to group together at a lower price range.

Figure 25: Electricity spot market prices for Denmark and selected price-setting markets 2017-2030 [2019 DKK/MWh]. Prices for all the years are model results. The Danish Energy Agency uses statistical prices and forward prices for 2017-2020. NO: Norway, SE: Sweden, FI: Finland, DE-AT-LU: Germany, Austria, Luxembourg, NL: The Netherlands, GB: Great Britain, FR-BE: Belgium, DK: Denmark.

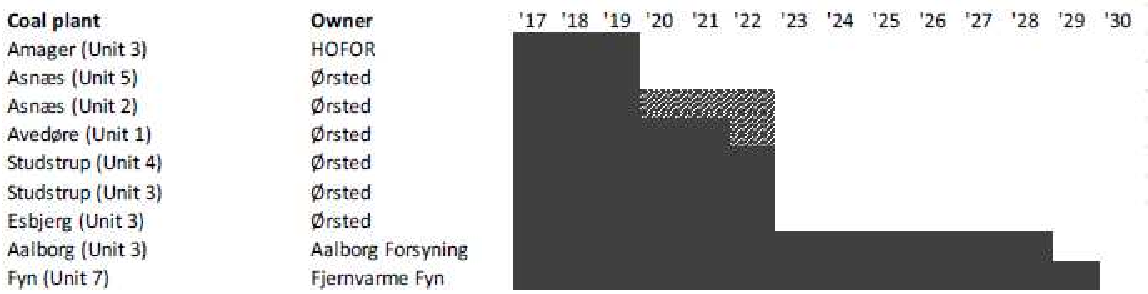


6.6 CONSUMPTION OF COAL AND GAS WILL BE REDUCED BY 85% UP TO 2030

Figure 28 shows that the consumption of fossil fuels for electricity and district heating production will be reduced to 17 PJ in 2030, corresponding to a reduction of 85% compared with 2017. Coal consumption will be reduced to 7 PJ, corresponding to a reduction of 92%.

The reduction in coal consumption is linked to an expected date for decommissioning specific coalfired power plant units. Figure 21 (page 46) illustrates the geographic location of coal plants, whereas Figure 26 illustrates the expected availability of coal plants during the projection period.

Figure 26: Availability of coal plants in the projection 2017-2030. Light grey shows that operation of the relevant plant is expected to be limited in the relevant period.



Ørsted A/S, which owns Asnæsværket, Studstrupværket, Esbjergværket and Avedøreværket, has announced that they will stop using coal from 2023. Projections reflect that coal operation at these plants can no longer be expected to be profitable due to increasing costs from 2023. Among other things, this is due to expectations of increasing carbon prices.

Aalborg Forsyning A/S, which owns Nordjyllandsværket, has announced that they will stop using coal from 2029. The projections reflect that transitioning to district heating supply based on other fuels is expected to be financially viable for society as well as for businesses from 2029.

Fjernvarme Fyn A/S, which owns Fynsværket, has not presented their final decision as to whether they will stop using coal. Projections reflect that operation of Fynsværket up to 2030 will still be financially profitable due to Fynsværket's production of process heat for horticultural industry.

Figure 27 shows that small-scale district heating plants in small and medium-sized urban areas are expected to replace gas-fired CHP with electric boilers and heat pumps, for example. Small plants' capacity for electricity consumption in 2030 is likely to correspond to their capacity for electricity consumption for heating. Moreover, development of medium-sized plants is characterised by declining gas-based electricity capacity and increasing capacity to meet electricity demand for heating. Projections of increases in small-scale CHP capacity are based on detailed profitability assessments of investment opportunities on current market terms in the individual district heating areas (Danish Energy Agency, 2019a). Figure 28 shows that the consumption of natural gas is expected to be reduced to 8 PJ in 2030, corresponding to a reduction of 80% compared with 2017.

The projections show that consumption of coal by the electricity and district heating supply sector will be reduced by 92%, whereas natural gas consumption will be reduced by 80% up to 2030.

Figure 27: Small-scale electricity production capacity (>0) and electricity consumption capacity for heat production (<0) in small and medium-sized urban areas 2017-2030 [MW electricity].

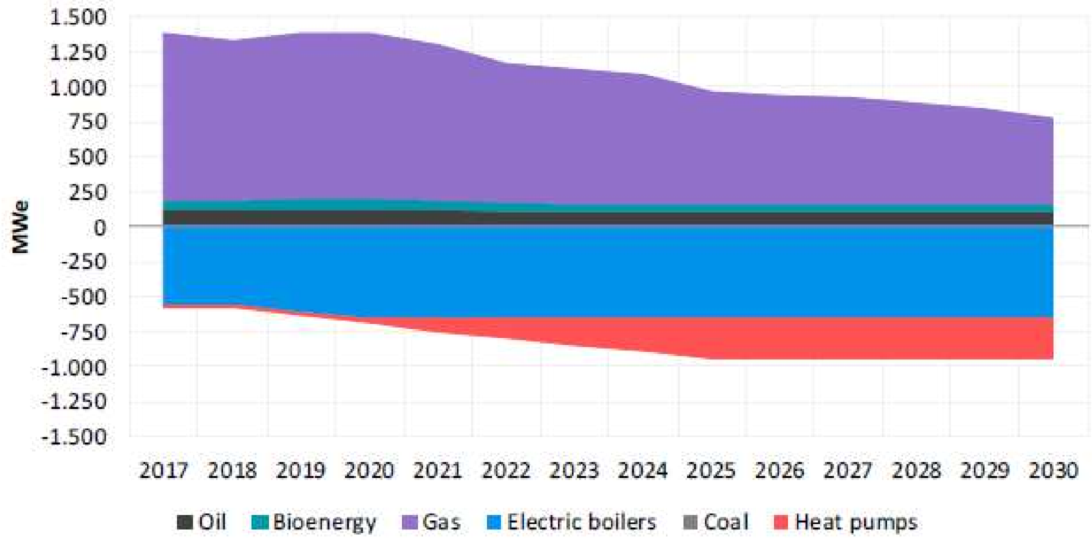
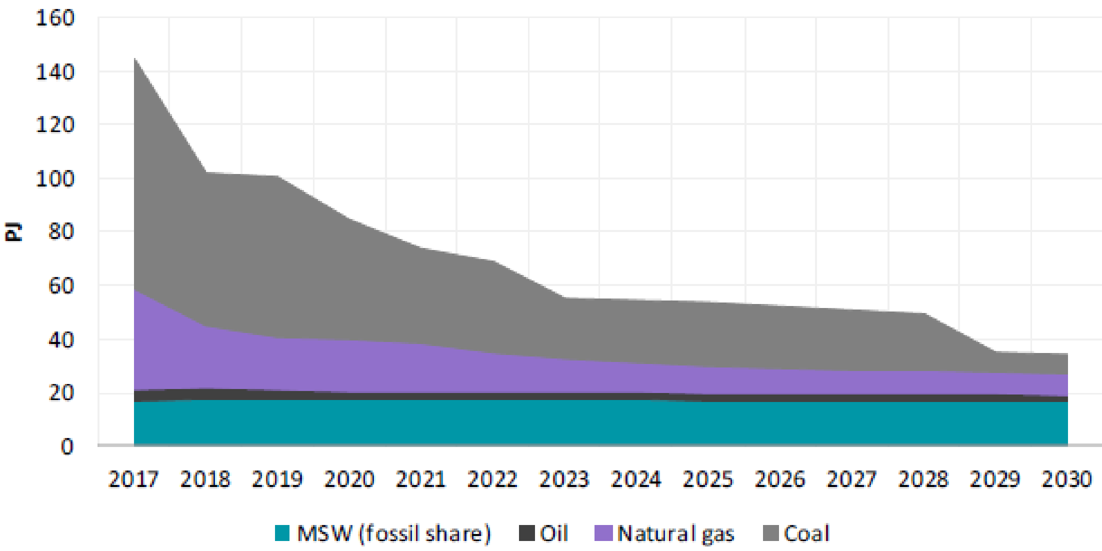


Figure 28: Consumption of fossil fuels in the electricity and district heating sector 2017-2030 [PJ].



6.7 The CHP share of electricity and heat production is falling steadily

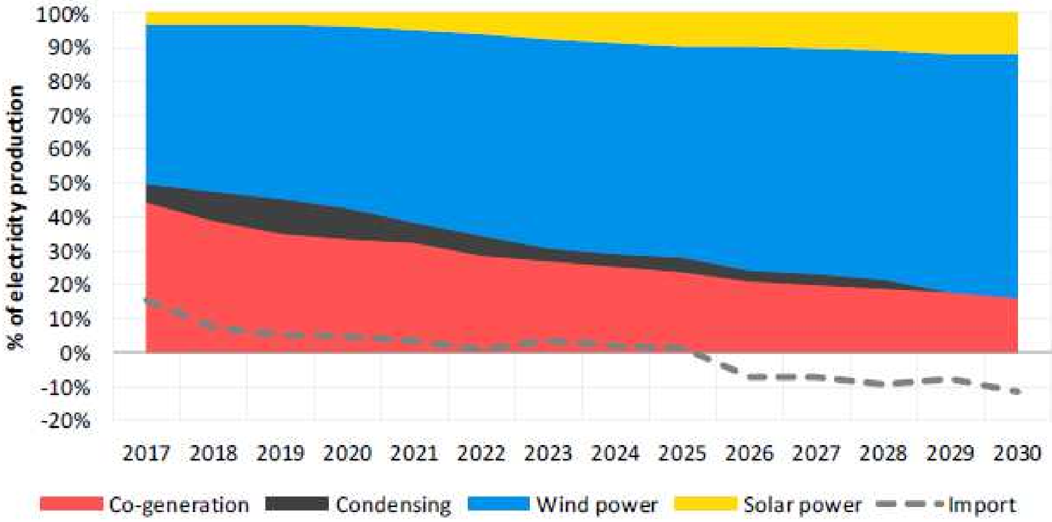
Figure 29 shows that the CHP share of electricity production, i.e. where heat is produced via electricity production, will fall steadily from 44% in 2017 to 17% in 2030.

The share of electricity production without production of heat (condensing operation) will be reduced as a result of decommissioning coal-fired power plant units and discontinuation of condensing operation at Fynsværket.

In 2030, net exports of electricity will constitute 12% of domestic electricity production in the absence of any new measures.

The projections show that the CHP share of electricity and heat production is falling. Very limited condensing operation is expected at CHP plants in 2030. This is contingent on decommissioning coal-fired power plant units and discontinuation of condensing operation at Fynsværket.

Figure 29: Domestic electricity production by type of production, and share of electricity imports in total electricity production [%].



6.8 The renewables share in district heating (RES-DH) will increase and then level off

Figure 30 shows that consumption of biomass will see an annual increase of almost 10% up to 2020, replacing consumption of coal and natural gas. This development reflects the effect of a transition to biomass at several CHP plants that has already been decided and is ongoing. Consumption of coal will therefore decrease by almost 30% annually up to 2020, after which it will decrease to a smaller extent by around 10% annually. Natural gas consumption will decrease steadily by around 10% annually throughout the period.

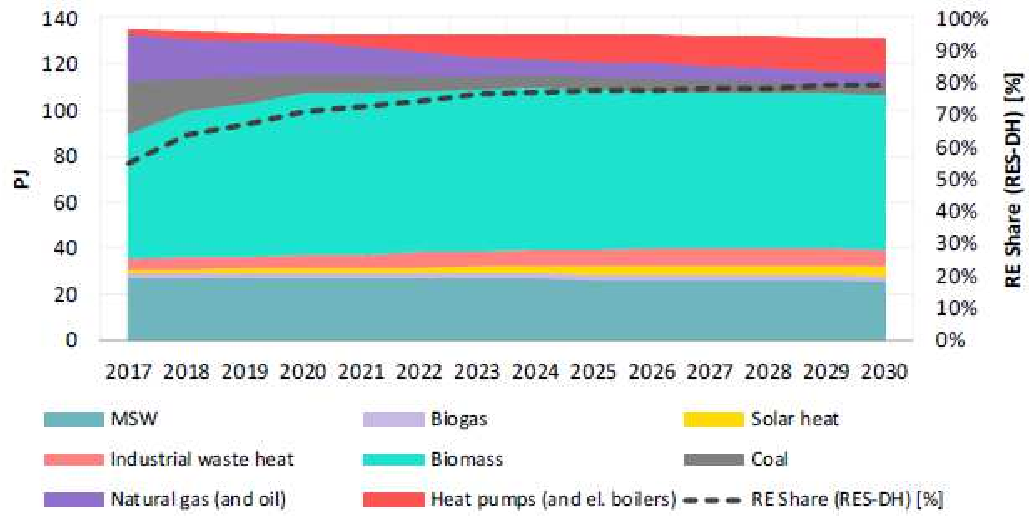
District heating production from heat pumps and electricity boilers will increase by 15% annually. Among other things, this is conditional on a reduction in the tax on electric heating and on phasing out the PSO tariff. Heat pumps and electric boilers are expected to account for around 10% of total district heating production in 2030.

Consumption of solar thermal energy will increase by around 10% annually, and consumption of industrial surplus heat will increase by 3% annually, while consumption of biogas and waste will be constant. Non-biodegradable waste is included in fossil fuels, and will account for around 10% of district heating production in 2030.

On this basis, the renewables share in district heating (RES-DH) is expected to increase from 55% in 2017 to 76% in 2023, and then increase slightly to almost 80% in 2030. RES-DH will not reach a higher level, particularly due to the consumption of waste in district heating production and the fossil (non-biodegradable) share of this.

The projections show that the renewables share in district heating (RES-DH) will increase to 76% up to 2023, and then increase slightly to almost 80% in 2030. Heat pumps and electric boilers are expected to account for 10% of total district heating production in 2030, while solar thermal heating is expected to account for 3%. The fossil share of waste for incineration will amount to 10% of district heating production in 2030.

Figure 30: District heating production by type of energy and renewables share in district heating 2017-2030 [PJ]. Heat pumpscover production from ambient heat and surplus heat. Surplus heat is without use of heat pumps.



6.9 Bio-natural gas will account for 25% of total consumption of mains gas in 2030.

Production of biogas to be upgraded by blending in the grid (bio-natural gas) is expected to increase up to 2023[91].

Production and consumption of biogas directly for electricity and heat production as well as for industrial processes are expected to be maintained at the current level.

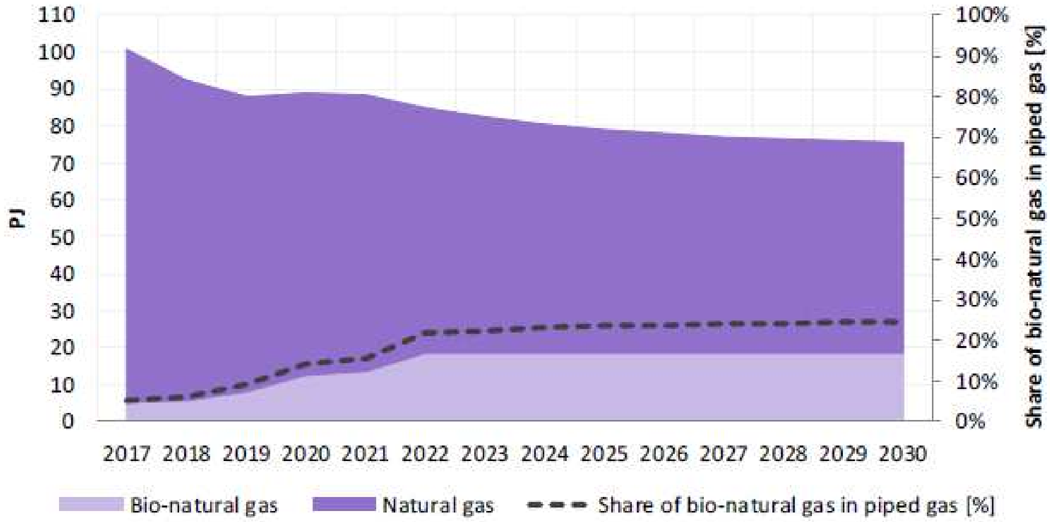
Figure 31 shows that the production of bio-natural gas is expected quadruple to 18.5 PJ in 2023, after which production will level off. However, falling gas consumption will mean that the share of bio-natural gas relative to total consumption will continue to increase up to 2030. The share of bionatural gas in relation to total consumption is expected to increase to 25% in 2030.

Background appendices to DECO19 (Danish Energy Agency, 2019a) describe in more detail the projections of biogas production broken down by use.

The projections show that increased production of bio-natural gas and decreasing consumption of gas from the grid mean that the share of bio-natural gas produced will increase to 25% in 2030 compared with the domestic consumption of gas.

[91] Bio-natural gas is biogas that has been upgraded to meet the supply requirements for gas in the grid.

Figure 31: Consumption of mains gas broken down by natural gas and bio-natural gas 2017-2030 [PJ], and the share of bionatural gas in mains gas [%]. The calculation is based on bio-natural gas produced in relation to the domestic consumption of mains gas.



6.10 Sensitivities and methodological considerations

Projections of electricity and district heating supply as well as production of renewable energy gases are particularly sensitive to the following assumptions:

- Developments in electricity consumption, in particular uncertainty about electricity consumption by large data centres
- Developments in fuel prices and carbon prices.
- Domestic deployment of onshore wind, in particular the rate with which older wind turbines will be decommissioned and the availability of locations for new turbines
- Domestic deployment of commercial solar PV (ground-mounted solar farms)

Possible consequences of significant sensitivities for key results are described in Chapter 8.

Photo 2: Denmark is expected to be an ever larger net exporter of electricity from the mid-2020s.

7 Emissions of greenhouse gases

7.1 Main points

• Since 1990, annual greenhouse gas emissions have fallen from 70.8 million tonnes to 50.8 million tonnes CO2-eq. in 2017, corresponding to a reduction of 29%. By 2030, emissions are expected to drop to 38 million tonnes, corresponding to a reduction of 46%[92].

• Non-ETS emissions are expected to be reduced by 20% in 2020 compared with 2005. Emissions are expected to meet the annual sub-targets in all years. Accumulated overachievement will amount to 15 million tonnes CO2-eq.

• Non-ETS emissions are expected to be reduced by 25% in 2030 compared with 2005. Emissions are not expected to meet the annual reduction targets in any year. The accumulated shortfall is expected to be 28 million tonnes CO2-eq. in 2030[92].

• Emissions from LULUCF (land use and forestry) are expected to have fallen from 5 million tonnes CO2-eq. in 1990 to just over 3 million tonnes CO2-eq. in 2030. For the period 2021-2030 there is a preliminary basis for including an overall LULUCF contribution of 14.6 million tonnes CO2-eq. in Denmark's reduction efforts in non-ETS. The LULUCF statement is subject to considerable uncertainty.

7.2 The overall picture

Since 1990, which is the UN base year for calculating climate efforts, total annual greenhouse gas emission have fallen from 70.8 to 50.6 million tonnes CO2-eq. in 2017, corresponding to a reduction of 29%[93]. Up to 2030, emissions are expected to drop to 38 million tonnes, corresponding to a reduction of 46% compared with the UN base year[92,94].

Figure 32 illustrates that the most significant change will be within emissions related to the production of electricity and district heating, where observed emissions from 1990 to 2017 have dropped by almost 21 million tonnes CO2-eq, corresponding to a reduction of 63%. This trend is expected to continue up to 2030, when emissions will have been reduced to 3 million tonnes CO2-eq, corresponding to a reduction of 92% compared with 1990.

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[92] In the absence of new measures and excluding emissions from land use and forestry (LULUCF).

[93] Statistical years have been adjusted for electricity trade and outdoor temperatures, which are described in background appendices to DECO19 (Danish Energy Agency, 2019a) .

[94] The global warming potentials (GWP) laid down in the Kyoto Protocol were used to calculate CO2-eq. for methane and nitrous oxide, for example (UNFCCC, 2014). Reporting to the UN under the Paris Agreement will begin in 2023, from when adjusted global warming potentials will be used (UNFCCC, 2019). For Denmark, this is expected to increase emission levels by between 0.03 and 0.3 million tonnes CO2-eq. annually from 1990 to 2017 and around 0.2 million tonnes CO2-eq. annually in the subsequent period. It has not yet been decided how to consider this change in the statement for the EU and in the reduction burden sharing.

Emissions from other energy-related consumption, which includes individual heating of houses as well as heating and process energy consumption by industry and services, dropped by 34% from1990 to 2017. Emissions will continue to drop up to 2030, when emissions are expected to have dropped by 48% compared with 1990.

Emissions from the transport sector increased by 16% from 1990 to 2017, but are expected to fall up to 2030, when emissions are expected to have increased by 11% compared with 1990. In 1990, the transport sector accounted for 17% of total emissions. The declining energy-related emissions mean that the transport sector is expected to account for 34% of total emissions in 2030. This will make the transport sector account for the largest share of total emissions.

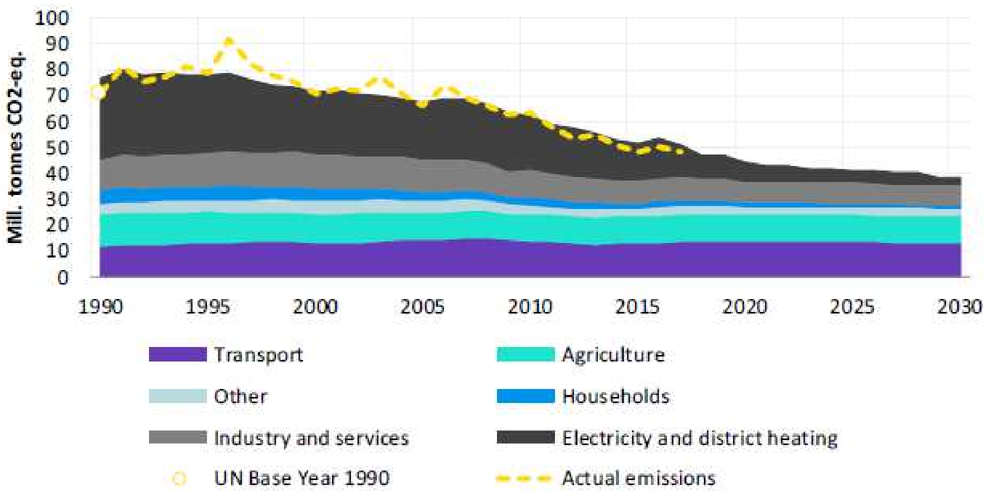
Emissions from agriculture have dropped by 16% from 1990 to 2017, and will drop slightly up to 2030, when emissions are expected to have dropped by 17% compared with 1990.

Other emissions, including process-related emissions from industrial gases, the chemicals industry, cement production and emissions from waste management and wastewater management, are expected to amount to 8% of total emissions in 2030. Emissions declined by 24% from 1990 to 2017, and will continue to decline slightly up to 2030, when emissions are expected to have dropped by 29% compared with 1990. Emissions from cement production are expected to increase due to economic growth, whereas emissions from other sources in this category are expected to decrease. Text box 2 presents a separate calculation of energy- and process-related CO2 emissions from industry and services.

In addition to energy and process-related emissions, emissions from land use and forests (LULUCF) are expected to be a source of net emissions of just over 3 million tonnes CO2-eq. in 2030. This is a drop from 5 million tonnes CO2-eq. in 1990. For the period 2021-2030, there is a preliminary basis for including an overall LULUCF contribution of 14.6 million tonnes CO2-eq. in Denmark's reduction efforts outside the ETS sector. The LULUCF statement is subject to considerable uncertainty.

The projections show that total greenhouse gas emissions will be reduced by 46% in 2030 relative to the 1990 UN base year in the absence of any new measures[92].

Figure 32: Emissions of greenhouse gases by sector from 1990-2030 and in the 1990 UN base year [mill. tonnes CO2-eq.]. The statistical calculation of the area chart for 1990-2017 has been adjusted for electricity trade with other countries (electricitytradeadjusted (Appendix 2)). Reduction targets are based on observed (actual) emissions relative to the UN base year and excluding LULUCF. LULUCF emissions are calculated separately and are not included here.



7.3 Achievement of non-ETS reduction targets 2013-2020

Non-ETS emissions stem primarily from transport, agriculture, households, some industries and waste, and a number of small-scale CHP plants.

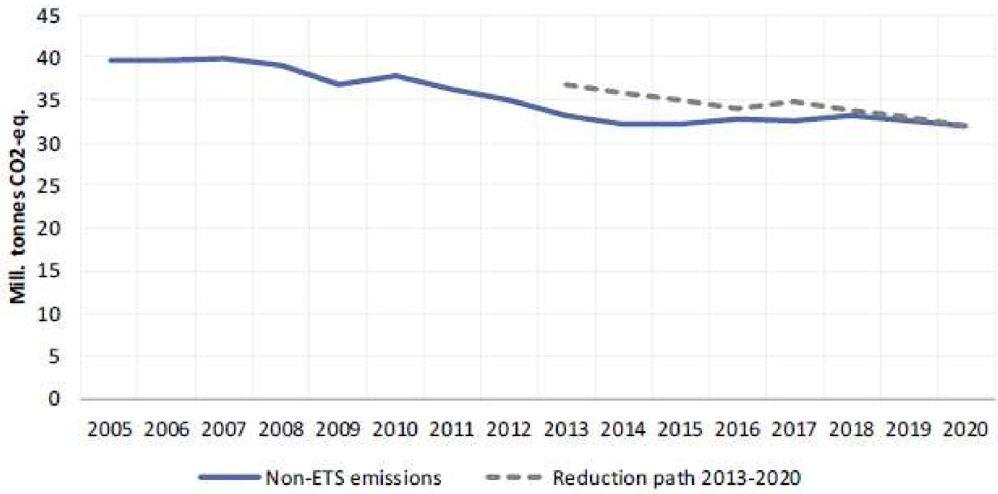
Under the 2009 EU Climate and Energy Package, Denmark is committed to reducing emissions from non-ETS sectors by 20% by 2020 relative to the 2005 level. This includes reaching gradually tighter annual sub targets. Overachievement in one year can be transferred to subsequent years up to 2020. In 2017, the permitted annual emissions for the years 2017-2020 were adjusted upwards.

Figure 33 shows that, in 2020, emissions are expected to be 32 million tonnes CO2-eq., corresponding to a reduction of exactly 20% compared to 2005. Denmark is expected to overachieve in all years in the commitment period. Total accumulated overachievement is expected to amount to 15 million tonnes CO2-eq. for the period.

The overachievement for the period cannot be carried forward to the next commitment period, 2021-2030.

The projections show that non-ETS emissions are expected to be reduced by 20% in 2020 compared with 2005. Emissions are expected to meet the annual sub-targets in all years. Accumulated overachievement will amount to 15 million tonnes CO2-eq. The overachievement cannot be carried forward to the next commitment period, 2021-2030.

Figure 33: Non-ETS emissions 2005-2020 and reduction commitment 2013-2020 [mill. tonnes CO2-eq.]



7.4 Achievement of non-ETS reduction targets 2021-2030 will fall short by 28 million tonnes CO2-eq.

Under the EU 2030 climate and energy framework, Denmark is committed to reducing emissions from non-ETS sectors by 39% by 2030 relative to the 2005 level, including meeting gradually tighter annual sub targets (European Commission, 2014, 2017b). Up to 2020, minor adjustments to the overall reduction targets may potentially occur.

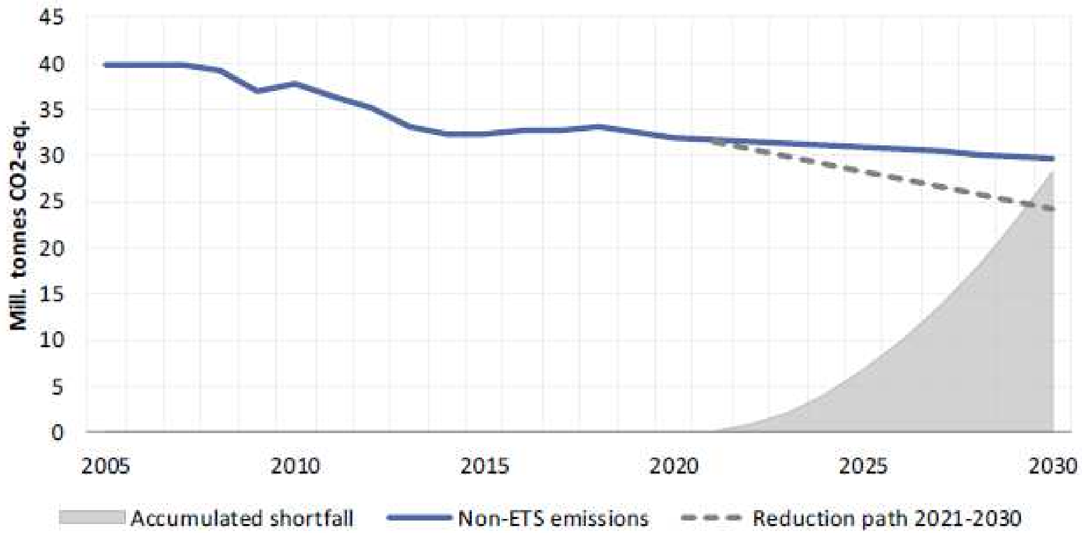
Figure 34 shows that, in 2030, emissions are expected to be 30 million tonnes CO2-eq., corresponding to a reduction of 25% compared to 2005, resulting in a shortfall of 14 percentage points relative to the commitment.

The figure also shows that, in all years throughout the period 2021-2030, emissions are *unlikely* to meet the annual sub targets. The accumulated shortfall is expected to be 28 million tonnes CO2-eq. in 2030.

The accumulated shortfall is sensitive to even small adjustments in annual emissions. Annual emissions are particularly sensitive to livestock numbers and to the composition of the vehicle fleet, including the number of electrified vehicles. The sensitivity analyses in Chapter 1 indicate that the shortfall could vary by plus/minus 6-8 million tonnes CO2-eq, corresponding to around 2% of total non-ETS emissions in the period.

The projections show that non-ETS emissions are expected to be reduced by 25% in 2030 relative to 2005. This means that the target of a 39% reduction by 2030 will be a further 14 percentage points short. Emissions are expected to exceed the annual sub-targets in all the years. The accumulated shortfall is expected to be 28 million tonnes CO2-eq. in 2030.

Figure 34: Non-ETS emissions 2005-2030, reduction commitment and accumulated shortfall 2021-2030 [mill. tonnes CO2-eq.].



7.5 Land use and forests (LULUCF) are a source of falling net emissions

Plants absorb CO2 from the atmosphere as part of their photosynthesis, and forests and farmland thus hold considerable stores of carbon. However, the stored CO2 may be released again into the air, for example in connection with burning trees or draining farmland. This cycle is referred to as LULUCF (Land Use, Land Use Change and Forestry) and is calculated separately.

Figure 35 shows that LULUCF net emissions are expected to fall from 5 million tonnes CO2-eq. in 1990 to just over 3 million tonnes CO2-eq. in 2030. Furthermore, the figure shows considerable fluctuations in emissions from year to year, and, in some years, LULUCF is the source of net sinks of carbon. Calculations and projections of LULUCF are associated with considerable uncertainty.

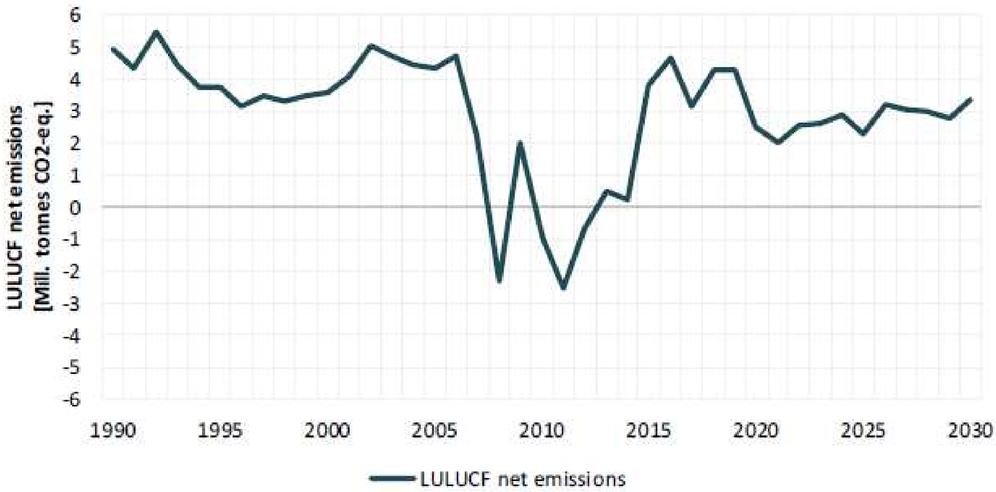
Under the EU 2030 climate and energy policy framework, Denmark can include a LULUCF contribution in its reduction efforts outside the ETS sector (non-ETS) of up to 14.6 million tonnes CO2-eq. for the period 2021-2030 (European Commission, 2018b), provided that Denmark's carbon balance is improved by at least the same amount. The calculation of improvements in the carbon balance follows the LULUCF Regulation and is based on changes in LULUCF emissions relative to various reference levels (European Commission, 2018a).

The projections show, albeit with considerable uncertainty, that the improvement in Denmark's carbon balance in soils and forests preliminarily can be calculated at over

DKK 14.6 million tonnes CO2-eq. The calculation is based on a calculation for agriculture and forestry up to 2017 and on a projection for agriculture (DCE, 2019). Furthermore, the calculation is based on a preliminary projection for forestry from the proposed Danish National Forests Accounting Plan 2021-2030, which is pending approval (Johannsen *et al.*, 2019).

The projections show, albeit with considerable uncertainty, that emissions from land use and forestry (LULUCF) are expected to have fallen from 5 million tonnes CO2-eq. in 1990 to just over 3 million tonnes CO2-eq. in 2030. The projections also show a preliminary basis for including an overall LULUCF contribution of 14.6 million tonnes CO2-eq. in Denmark's reduction efforts outside the ETS sector for the period 2021-2030. After completion of calculations, the statement of the area of organic lowlands was adjusted upwards. This may be of significance for the calculated LULUCF emissions/sinks. Thus, a specific assessment is required.

Figure 35: LULUCF emissions and sinks 1990-2030 [mill. tonnes CO2-eq.]



7.6 EMISSIONS FROM MANUFACTURING INDUSTRY AND SERVICES

Text box 2 presents a separate statement of CO2 emissions by manufacturing industry and services in 2030 broken down by use. Among other things, the statement shows that processrelated CO2 emissions will make up an increasing share of total emissions in industry and services.

Text box 2: CO2 emissions in manufacturing industry and services in 2030.

In 2030, total CO2 emissions from manufacturing industry and services are expected to be around 7.2 million tonnes. Around 20% of these emissions will come from burning coal, coke, petroleum coke and fossil waste; around 30% will come from burning oil products; and around 25% will come from burning natural gas. Other emissions, corresponding to around 25% of the total emissions, comprise of process emissions such as emissions from limestone in connection with the production of cement.

Figure 36 shows total CO2 emissions by industry and services by energy service and fuel.

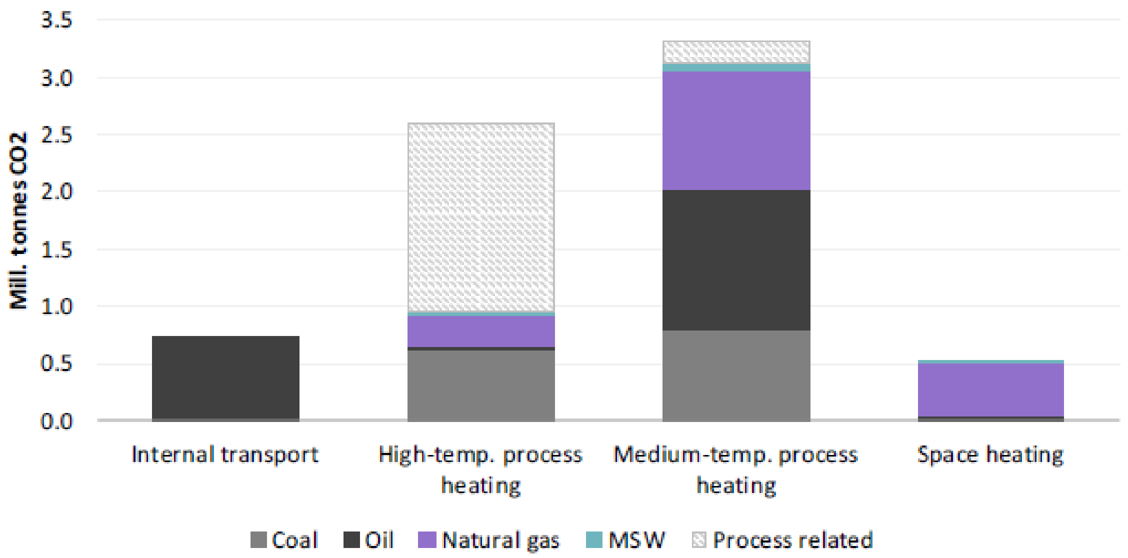
• Around 45% stem from energy-related consumption and from processes in connection with the production of medium-temperature heat such as drying/dehydration, heating and evaporation. Process-related emissions account for around 5% of this figure.

• Around 35% stem from energy-related consumption and from processes in connection with the production of high-temperature heat such as in the production of tiles and cement. Processrelated emissions account for around 65% of this figure. Energy-related emissions stem primarily from burning coal, petroleum coke and coke.

• Around 10% come from energy-related consumption in combustion engines in internal transport, such as tractors and construction machines. All of these emissions stem from oil products.

• The remainder (around 7%) stem from energy-related consumption in the production of space heating. Burning natural gas in boilers accounts for around 90% of this figure.

Figure 36: CO2 emissions from industry and services in 2030 by energy service and type of fuel [mill. tonnes CO2].



7.7 Sensitivities and methodological considerations

Projections of greenhouse gas emissions are particularly sensitive to the efficiency of vehicles, the carbon price, technological developments, transport volume and changes in agricultural production.

Possible consequences of significant sensitivities for key results are further described in Chapter 8.

8 Sensitivity analyses

8.1 Main points

• Partial sensitivity analyses have been completed for selected central assumptions: electricity consumption by data centres, the carbon price, renewables deployment, sales of electrified vehicles, energy-efficiency improvements in industry and services, number of dairy cows, biofuels in aviation and coal-fired electricity production capacity.

• The partial sensitivity analyses show that uncertainty regarding central assumptions can have a significant impact on key results in the projections. For example, the analyses show that no onshore wind and solar PV deployment after 2024 could reduce the total share of renewables (RES) in 2030 from 54% to 50.5%.

8.2 Selection of sensitivities

Table 1 includes a number of sensitivities and parameter variations for use in partial sensitivity analyses. ‘Partial’ in this context means that a sensitivity analysis was performed for each parameter variation 'all else being equal’, and the resulting effects can therefore not be readily aggregated.

The probability of variation in the individual sensitivities has not been assessed, nor has an overall risk analysis been performed.

Table 1: Selected sensitivities and parameter variations.

	Sensitivity	DECO19 baseline	Parameter variation 2030
A	Electricity consumption by data centres	'Linear growth'	The ‘Denmark deselected’ scenario, in which the electricity consumption of data centres is reduced by 80% in 2030 (COWI A/S for the Danish Energy Agency, 2018)
B	Carbon price	MoF baseline	Carbon price +/- 50%
C	Renewables deployment	DEA baseline	More renewables: + 450 MW offshore wind Less renewables: No onshore wind and solar PV deployment after 2024
D	Electrified vehicles	DEA baseline	More electrified vehicles: + 100% share of sales of new vehicles Fewer electrified vehicles: - 50% share of sales of new vehicles
E	Energy efficiency improvement in industry and services	DEA baseline	A smaller or greater effect of the energy saving pool for industry and services from 2021 to 2024
F	Dairy cattle	DEA baseline	+/- 15% in the number of dairy cows
G	Biofuels in aviation	DEA baseline	+ 10% biofuel blending in the aviation sector in 2030.
H	Coal-fired electricity production capacity	DEA baseline	More coal: A carbon price of DKK 50/tonne in combination with continued operation at Nordjyllandsværket (NEV3) as well as the possibility for coal-fired operation at Studstrupværket (SSV3) and Avedøreværket (AVV1) whenever viable. Less coal: End of operation at Fynsværket before 2030 when the heat capacity will be replaced by heat pumps and biomass boilers.

8.3 Result of partial sensitivity analyses

Figure 37 and Figure 38 compare the significance of the partial sensitivities for two key results, the renewables share (RES) and greenhouse gas emissions, respectively. Numerical values and other key results are in Appendix 6.

The two figures show the significance of the partial sensitivities for DECO19's central result for 2030.

Note the following about the partial sensitivities

A. Significantly lower electricity consumption by data centres in the 'Denmark deselected' scenario (COWI A/S for the Danish Energy Agency, 2018) can increase the renewable energy share by 1.6 percentage points. Emissions will not be affected, as electricity exports will increase proportionately to the lower electricity consumption.
B. A higher carbon price can increase the renewable energy share by 0.5 percentage points and the electricity price by 100 DKK/MWh.
C. No onshore wind and solar PV deployment after 2024 can reduce the renewables share by 3.5 percentage points and the electricity price by 10 DKK/MWh.
D. More electrified vehicles can reduce fossil gross energy consumption by 9 PJ and increase electricity consumption by 3.2 PJ (0.9TWh), which can reduce emissions by 0.6 million tonnes CO2-eq.
E. A greater effect of the energy saving pool for industry and services in the period 2021-2024 can reduce the fossil gross energy consumption by 1.5 PJ, which can reduce emissions by 0.1 million tonnes CO2-eq.
F. The number of dairy cows can affect emissions by +/- 0.5 million tonnes CO2-eq. if there is a change in the stock of +/- 15%.
G. Blending of 10% biofuels in the aviation sector can increase the renewables share by 0.6 percentage points and reduce fossil gross energy consumption by 4.6 PJ. The change in emissions has not been calculated here, as the emissions from international air travel are not included in the national totals of the UN/EU greenhouse gas inventories.
H. More coal-fired electricity production capacity in combination with a lower carbon price can increase the fossil gross energy consumption by 22.6 PJ, which can increase emissions by 2.2 million tonnes CO2-eq. Less coal-fired electricity production capacity can reduce fossil gross energy consumption by 4.9 PJ and reduce emissions by 0.5 million tonnes CO2-eq.

The projections' partial sensitivity analyses show that central assumptions have a significant impact on key results in the projections. For example, the analyses show that no onshore wind and solar PV deployment after 2024 could reduce the total share of renewables (RES) in 2030 from 54% to 50.5% (3.5 percentage points). More coal-fired electricity production capacity in combination with a lower carbon price can increase emissions by 2.2 million tonnes CO2-eq.

Figure 37: Difference between baseline and partial sensitivities in the total share of renewables (RES). Red bars show reduced renewables shares; green bars show increased renewables shares.

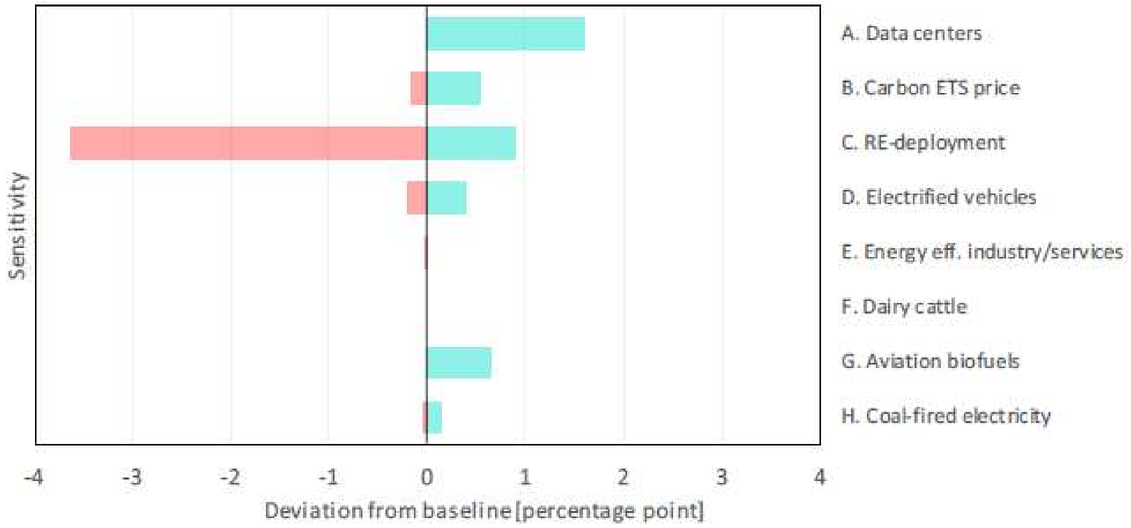
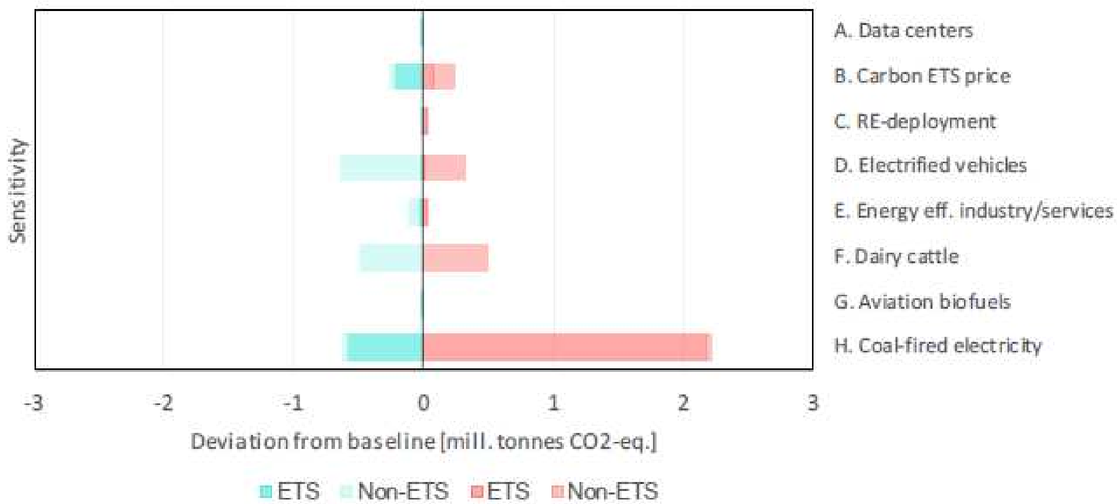


Figure 38: Difference between baseline and partial sensitivities in emissions broken down by ETS and non-ETS [mill. Tonnes CO2-eq.]. Green bars show reduced emissions; red bars show increased emissions.



Appendix 1. Why does the report change from year to year?

For several reasons the report on Denmark's Energy and Climate Outlook changes from year to year:

• New regulation – for example the Energy Agreement of 29 June 2018, which includes financing for 3 offshore wind farms, relaxation of electricity taxes, removal of the cogeneration requirement in small-scale district heating areas as well as new energy saving efforts (Ministry of Energy, Utilities and Climate, 2018); new EU regulation in the transport area laying down emissions standards for passenger cars and vans (European Commission, 2019b); as well as the required implementation of new regulation of emissions standards for heavy-duty vehicles (European Parliament, 2019).

• Updated expectations for overall economic growth (Ministry of Economic Affairs and the Interior, 2019).

• Updated expectations for developments in fuel prices and the carbon price (Danish Energy Agency, 2019e; IEA, 2018).

• Updated expectations regarding specific projects and advances in energy technology in general, for example with regard to the number of full-load hours of wind power and solar PV in a normal year (Danish Energy Agency, 2019i).

• New market trends. For example updated expectations for the number of so-called PPA and guarantees of origin, which in turn are the basis for expectations in the projections for the deployment of commercial solar installations (ground-mounted solar farms) and onshore wind, in particular[95].

• Updated expectations for the energy mix in electricity supply in the other 23 European countries included in the electricity market model of the analysis platform (ENTSO-E, 2018a, 2018b).

• Updates to statistics, which, for example, may result in altered expectations regarding the composition of household energy consumption for heating. For example, DECO19 is based on the most recent final energy statistics, Energy Statistics 2017 and Energy Production Statistics 2017 (Danish Energy Agency, 2019g, 2019c).

• Improvements to the model platform. For example, DECO19 uses a newly developed investment model for small-scale district heating areas. This model provides a stronger methodological approach to making projections about new investments as well as about decommissioning of existing facilities in the district heating sector.

[95] A Power Purchase Agreement (PPA) is a direct agreement between the investor/producer and consumer on trade in a specific production of electricity. For example, a PPA may help ensure a major consumer a guarantee of origin for purchases of renewable energy to cover its electricity consumption. A PPA may contribute to financing new capacity on market terms.

Appendix 2. Why are some statistical figures adjusted for electricity trade with other countries?

The results in DECO19 align with statistical principles and standards. Among other things, this means that the statistical statements (values for 2017 and earlier) of gross energy consumption and total greenhouse gas emissions are adjusted for annual net exchanges of electricity with other countries.

This adjustment is made to ensure that the statistical statements of gross energy consumption and greenhouse gas emissions reflect the actual interrelated system impacts of developments in Denmark's energy consumption. Without this adjustment for trade in electricity, Denmark could reduce its gross energy consumption and CO2 emissions by simply importing electricity produced from coal south of the border.

In periods with net imports, the adjustment for trade in electricity approximately reflects Denmark's gross energy consumption and CO2 emissions if Denmark had produced its own electricity corresponding to its net imports of electricity in the current electricity supply system.

In periods with net exports of electricity, the adjustment for trade in electricity approximately reflects reduced gross energy consumption and CO2 emissions in the countries receiving the exported electricity.

With this adjustment, the calculations provide a representative energy and emissions impact of annual net exchanges of electricity with other countries. This impact figure is then included in the relevant result for the year. The method is based on the assumption that marginal electricity production in an interlinked European energy system can be represented by the average composition of thermal electricity production plants in Denmark year by year. In this context, thermal electricity production plants cover electricity production from coal, natural gas, oil and solid biomass (wood pellets and wood chips). In the Energy Statistics report, adjustment for trade in electricity is performed on the basis of a historical 5-year average.

The Danish Energy Agency's method for statistical computation of the adjustment of a netexchange of electricity with other countries is assessed and updated periodically, most recently in 2016 (Danish Energy Agency, 2016).

The statements of gross energy consumption and CO2 emissions for statistical years have moreover been adjusted for fluctuations in temperature (climate-adjusted) relative to a statistically determined normal year.

Normal years have been used for projection years (2018 and onward), and projected results in DECO19 have not been adjusted for foreign trade in electricity. The reason that the projected results in DECO19 have not been adjusted for foreign trade in electricity is that Denmark is expected to become a systematic exporter of electricity over the projection period, and that Denmark's domestic electricity supply is expected to be converted to non-thermal production technologies, which means that any future method of adjusting for trade in electricity will probably have to be updated to reflect this. Projected results for total gross energy consumption and total greenhouse gas emissions for the period 2018-2030 have therefore been stated as observed (actual) consumption and emissions in normal years.

Appendix 3. Policy measures with implications for DECO19

The following describes elements of policy measures with particular implications for DECO19, see Figure 1 in Chapter 1.3.

In principle, the Energy Agreement of 29 June 2018 (Ministry of Energy, Utilities and Climate, 2018) covers the period up to and including 2024. However, since the last of the three offshore wind farms under the agreement is not expected to be commissioned until 2030, the agreement can be interpreted to affect the entire projection period. In addition to three new offshore wind farms, the Energy Agreement ensures funding for new biogas production; continued relaxation of electricity taxes; new technology-neutral tendering procedures for solar PV, onshore wind and nearshore offshore wind; as well as new energy saving efforts in place of the energy saving scheme (energy saving efforts of energy companies), which runs until the end of 2020 (Danish Energy Agency, 2019d). The new energy saving scheme includes subsidy pools for energy saving efforts by industry and services as well as by households. Furthermore, the scheme includes a campaign to raise awareness about how households can save energy. DECO19 moreover includes the effect of abolishing Annex 1 of the Danish Electricity Tax Act as part of the Energy Agreement, which will allow more business and industry sectors to seek refunds for electricity taxes. Finally, removal of the cogeneration requirement and the fuel obligation in small-scale district heating areas under the Energy Agreement, as well as the Danish Energy Agency's possibility to grant exemption from the cogeneration requirement in large-scale district heating areas, are also included. Removal of the cogeneration requirement, including removal of the possibility to be exempted from this requirement, has implications for the expected scope of the conversion of facilities from coal-based and natural-gas-based CHP generation to production based on other energy supply technologies such as heat pumps and biomass boilers.

The Energy Agreement earmarks a financial reserve for even more renewable energy from 2025 - the so-called RE reserve. The effect of this element has not been included in DECO19 because any realisation of the RE reserve must be based on a period assessment of developments *without* realisation of the RE reserve. Furthermore, the Energy Agreement's pool for the deployment of green transport has yet to be realised as concrete measures and has therefore also not been included.

The Energy Agreement's relaxation of electricity taxes prolongs and expands current relaxations agreed in connection with the Agreement on Business and Entrepreneurial Initiatives of 12 November 2017 (Ministry of Industry, Business and Financial Affairs, 2017). In the energy area, this agreement is valid up to and including 2020.

The PSO tariff, which is paid for over the electricity bill, is being phased out and will be discontinued from year end 2021 (Danish Energy Agency, 2018b).

An agreement on a temporary relaxation of the registration tax on electrified vehicles (Danish Ministry of Taxation, 2018) has been included as having an effect on sales of vehicles up to 2022.

Earlier subsidy schemes for new offshore wind, new biomass-based CHP and new biogas production will lapse during 2019 and will be replaced by the technology-neutral tendering scheme. Existing facilities established under earlier subsidy schemes will continue under existing terms and conditions. However, the 2018 amendment to the Promotion of Renewable Energy Act and to the Electricity Supply Act stipulates a revised price supplement for biomass-based electricity generation based on facility-specific depreciation in accordance with EU state aid rules.

Furthermore, production-independent support for small-scale CHP production (the so-called basic amount) and support for establishment of large electricity-driven heat pumps ended at year end 2018 (Danish Energy Agency, 2018a).

The technology-neutral tendering procedure conducted in the period 2018-2019 has been included with the effects achieved from this initiative. Upcoming technology-neutral tendering procedures have been included as an element in the Energy Agreement and have been distributed across technologies as appropriate.

Agreements funded by the Danish Finance Act 2019 (Ministry of Finance, 2018) have been included as having an effect on some of the emissions from agriculture; on emissions of certain greenhouse gases from cooling systems; as well as on reduced leakages from biogas plants from 2021.

EU product standards such as the Ecodesign Directive and the Energy Labelling Directive, and standards for transport vehicles, have been included as having an effect throughout the projection period with the restrictions and expansions already decided by the EU.

In principle, the EU Waste Framework Directive will have effect throughout the entire projection period. However, there is currently no basis for any new expectations with regard to the composition of waste or the calorific value, including the renewable energy share of waste for incineration, just as the existing incineration capacity is assumed to stay the same.

The Danish building regulations will continue, in which transitioning to building class 2020 will be optional, and the regulations will be current throughout the projection period.

Other existing taxes and subsidies will continue to apply throughout the projection period.

Appendix 4. DECO19’s model platform

The following describes elements in DECO19’s model platform, see Figure 2.

Figure 2 shows the overall elements in the model platform, with inputs on the left and outputs on the right.

Inputs include: projection of emissions based on, amongst other things, DECO19’s energy balance and on emissions from agriculture, for example, in collaboration with the Danish Centre for Environment and Energy (DCE) at Aarhus University; projections by the Danish Ministry of Finance and the Ministry of Economic Affairs and the Interior of economic and demographic developments, business productivity and CO2 emission allowances; the International Energy Agency's (IEA's) projection of world market prices of fossil fuels adapted to a Danish level; detailed plant data on Denmark’s energy plants, based, among other things, on the Danish Energy Agency's energy production statistics and master data register; Statistics Denmark's input-output matrices for exchanges etween sectors; the Danish Energy Agency's technology catalogues; and the projection of the electricity demand, energy production capacity and interconnectors of 23 European countries, based on data from the European Network of Transmission System Operators, ENTSO-E.

Output includes (year-by-year and hour-by-hour up to 2030) energy consumption by sector, by use and by technology; energy balances for supply facilities and for district heating areas; greenhouse gas emissions; key indicators such as shares of renewables in accordance with the requirements of the Renewable Energy Directive (Eurostat, 2018); electricity exchange and the electricity price for each of the 15 European electricity market areas included in the electricity market model; security of electricity supply; fiscal revenues; socioeconomic and corporate financial performance; as well as developments in the energy intensities of businesses.

The model platform integrates the following sub models:

• The summary model "Denmark's Energy and Climate Model", which integrates the sector models mentioned below and results from the DCE's emissions model such as to provide an overall projection result at system level. Furthermore, the summary model forms the basis for the comparative analyses of projection scenarios vis-a-vis impact assessments at system level.

• RAMSES, which models electricity and district heating supply. RAMSES is a technicaleconomic model for operations optimisation, which is based on a detailed description of all energy-producing facilities and district heating areas in Denmark’s energy system as well as on an aggregated description of the electricity production plants in the European electricity markets included in the model, including interconnectors between these markets. RAMSES simulates operations in the interlinked European energy system on an hourly basis. RAMSES does not automatically take account of new investments. RAMSES includes Denmark as well as 23 countries broken down by 15 European electricity market areas. Trends in new production capacity are defined partly exogenously based on specific knowledge as well as on capacity development models for, among other things, wind power and solar PV, and partly based on a coupling to DH-Invest, which is a new investment model for small-scale district heating areas.

• IntERACT, which models energy consumption by industry and services and households. The model comprises two sub models: An economic model which describes the macroeconomic correlations using a neoclassical, general equilibrium model and a technical energy system model based on the IEA' s TIMES model (IEA-ETSAP, 2018). The model describes fundamental energy-technology, thermodynamic and physical relationships on a theoretical energy-economics basis. The model uses output data from RAMSES on electricity prices and district heating prices.

• DH-INVEST, which is an investment model for small-scale district heating areas. The model simulates operations and investments for each district heating area in order to determine investment scenarios that are optimal from the perspective of corporate finances. The investment scenarios include decommissioning of existing facility units. The investment model is integrated with RAMSES and uses a common assumptions basis, after which the calculated changes in capacity for the individual district heating area are used by RAMSES in its modelling of Denmark's electricity and district heating system.

• SISYFOS, which simulates the capacity adequacy (security of supply) of the electricity system. SISYFOS is a Monte Carlo simulation model which, based on rolls of dice, simulates different situations with outages of power plants and/or power lines in the electricity system. Using time series for electricity demand, wind power, solar PV, etc., the model identifies combinations of events which can lead to capacity shortages. Loss-of-probability (LOLP) is calculated and converted into number of minutes' capacity shortage per year. Furthermore, expected unserved energy (EUE) is calculated using a methodology developed by Energinet, along with the associated average number of outage minutes.

• FREM, which models energy consumption in the transport sector. Amongst other things, FREM is based on input from the Danish Transport, Construction and Housing Authority, which uses the National Transport Model (LTM) (Technical University of Denmark, 2018) to describe developments in road traffic and energy consumption by railways. FREM projects road transport based on projections for growth in traffic volume, developments in the energy efficiency of vehicles by 44 vehicle categories and survival rates, journeys as a function of the age of vehicles, as well as choice of vehicle. FREM projects energy consumption in air transport based on developments in GDP and population numbers, as well as expected developments in energy efficiency in aviation.

• The PSO model, which is used to calculate expected future expenditure on subsidies for electricity production. The model calculates expenses for offshore wind, onshore wind, biogas, solar PV, CHP production and more. The results are used to determine the PSO tariff and in connection with fiscal budgeting. The model uses output data from RAMSES on electricity prices, electricity consumption and electricity production. The model also models relevant technology subsidy schemes.

• Technology Deployment Models for offshore wind, onshore wind, solar PV and biogas use, which model the profitability of technology investments in terms of corporate finances against the profitability requirements of relevant investors, which means the models model the most probable capacity deployment scenario against the current investment and operating conditions.

Appendix 5. Why are there discrepancies between DECO19 figures and energy statistics?

DECO19 was prepared and produced at a time when 2017 was the most recent final statistical year, and so all references to climate and energy figures for 2017 and earlier are based on statistical statements. Results for 2018 and onward, on the other hand, are based on calculation of normal years for wind production, precipitation (of significance for foreign, hydro-based electricity production), degree days (of significance for heating demand) and standard production conditions in foreign electricity supplies, for example.

At the time of writing, it was clear, for example, that wind production in 2018 was 10-15% lower than in a normal year, just as it was well known that a particularly warm summer led to extraordinary electricity production conditions in Europe, which meant that several German coal plants and French nuclear power plants had to limit their production for longer periods due to cooling demand. This influenced the electricity market and the composition of electricity production in Denmark in 2018, which could mean that fuels breakdown and emissions will deviate from an expected normal year.

Since, at the time of writing, there is no final and overall statistical basis available for 2018, the projected results for 2018 have been based on a normal year. Because of this methodological approach, the projected results for 2018 are expected to deviate from the upcoming final energy statistics for 2018.

DECO19's model platform will accurately model statistical years where all assumptions turn out to be correct and any deviations from the normal year are known.

Note in general that statistical years may be characterised by large fluctuations. DECO19 describes trends over a longer period of years, while the statistics report observed (actual) conditions in historical years. DECO19 focuses on average trends up to 2030, and model results for normal years in the intervening period, including greenhouse gas emissions, are likely to deviate from subsequent statistical statements.

DECO19 projects and describes trends over a number of years. As a consequence of this, result values for 2018 and 2019 have been omitted in the results tables in the accompanying spreadsheets. However, the figures in this report include all model-calculated figures to best illustrate trends.

Due to the model platform's indirect management of the energy statistics, there could also be marginal differences between DECO19 and the energy statistics with regard to the statement of statistical values. For an accurate energy statistics statement, see the Danish Energy Agency's energy statistics (Danish Energy Agency, 2019g).

Appendix 6. Result of sensitivity analyses

Table 2 shows result values for partial sensitivity analyses with reference to the list in Table 1

Table 2: Sensitivity results for 2030 calculated as delta values (differences) relative to the baseline. Values are stated for 2030."~" indicates an approximate value. "NA" (Not Applicable) indicates that no calculation was performed.

				Electricity			Carbon emissions	
	Description	Renewables share (RES) [Percentage points]	Fossil gross energy consumption [PJ]	Consumption [TWh]	Price [DKK/MWh]	Imports [TWh]	Non-ETS [Mill. tonnes CO2-eq.]	Total [Mill. tonnes CO2-eq.]
-	DECO19 Baseline	54	378	45	344	-6.2	30	38
A	Data centres 'Denmark deselected'	+1.6	-0.4	-5.7	-8.2	-5.6	~0	~0
B+	Higher carbon price	+0.5	+0.4	-0.1	+99.8	-1.1	+0.1	-0.1
B-	Lower carbon price	-0.2	+0.5	~0	-27.9	+0.2	~0	~0
C+	Increased offshore wind deployment	+0.9	-0.1	-	-3.4	-1.7	~0	~0
C-	No new solar PV and onshore wind after 2024	-3.6	+0.3	-	+9.6	+7.1	~0	~0
D+	Increased sales of electrified vehicles	+0.4	-8.7	+0.9	+1.3	+0.9	-0.6	-0.6
D-	Reduced sales of electrified vehicles	-0.2	+4.4	-0.5	-0.7	-0.5	+0.3	+0.3
E+	More efficiency improvement, industry/services	~0	-1.5	-0.1	~0	~0	-0.1	-0.1
E-	Less efficiency improvement, industry/services	~0	+0.6	+0.1	+0.1	~0	~0	~0
F+	More dairy cows	-	-	-	-	-	+0.5	+0.5
F-	Fewer dairy cows	-	-	-	-	-	-0.5	-0.5
G+	Increased share of biofuels in aviation	+0.6	-4.6	-	-	-	NA	NA
H+	More coal-fired electricity production capacity	~0	+22.6	+0.1	-44.3	-2.7	~0	+2.2
H-	Less coal-fired electricity production capacity	+0.2	-4.9	+0.2	+1.1	+0.9	~0	-0.5

Appendix 7. Background appendices

Background appendices (in Danish) have been published along with DECO19 documenting assumptions and detailed results, and including spreadsheets with key figures presented in the report.

The background appendices can be downloaded from http://ens.dk/outlook.

0. Spreadsheet with selected assumptions
1. Fuel prices and carbon prices
2. Greenhouse gasses and agriculture
3. Overarching assumptions
4. Taxes and subsidies
5. Transport
6. Electricity and district heating, as well as interconnectors
7. Offshore wind
8. Onshore wind
9. Solar PV
10. Waste incineration
11. Biogas
12. Oil and gas
13. Electricity price

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Glossary

Gross energy consumption: Gross energy consumption describes the total input of primary energy to the energy system. In statistical summaries, gross energy consumption may be adjusted for fuel consumption linked to foreign trade in electricity (adjusted for electricity trade), and for fluctuations in outdoor temperature relative to a normal year (climate-adjusted).

Final energy consumption: The final energy consumption expresses energy consumption delivered to end users, i.e. private and public enterprises as well as households. Uses include: manufacturing of goods and services, space heating, lighting and other appliance consumption as well as transport. Added to this is oil consumption for non-energy purposes, i.e. lubrication and cleaning as well as bitumen for paving surfaces. Energy consumption in connection with extraction of energy, refining and conversion is not included in final energy consumption. The definition and breakdown of final energy consumption follow the International Energy Agency's (IEA's) and Eurostat's guidelines. Energy consumption for transport by road and railway, by sea, by air, and by pipeline - irrespective of consumer - is subsequently taken out of the total final energy consumption figure as an independent main category. This means that energy consumption by industry and services and households is calculated exclusive of consumption for transportation purposes. Moreover, final energy consumption excludes cross-border trade in oil products, defined as the quantity of petrol, gas/diesel fuel and petroleum coke, which due to differences in price is purchased by private individuals and transport operators etc. on one side of the border and consumed on the other side of the border.

Gross final energy consumption: Energy products for energy purposes in industry and services, the transport sector, households, and the service sector, as well as energy products for agriculture, forestry and fisheries, including electricity and heating consumption by the energy sector in connection with electricity and heat production and including electricity and heat losses in connection with distribution and transmission. Thus, unlike final energy consumption, gross final energy consumption excludes consumption for non-energy purposes, including own consumption and distribution losses in energy supply as well as cross-border trade. Gross final energy consumption is used as the basis for calculating renewables' shares.

Observed (actual) energy consumption: Observed (actual) energy consumption is found by adding distribution losses and energy consumption in connection with energy extraction and refining to final energy consumption. Additionally, own consumption of energy in connection with production of electricity and district heating is added to this figure.

RE (renewable energy): Defined as solar energy, wind power, hydropower, geothermal energy, ambient heat for heat pumps and bioenergy (straw, wood chips, firewood, wood pellets, wood waste, bioliquids, biogas, biodegradable waste and bio-natural gas). Bio-natural gas is biogas that has been upgraded to meet the supply requirements for gas in the grid.

Renewables shares: Renewables shares are calculated according to the Eurostat EU calculation method. For a detailed description of this, see the Renewable Energy Directive (EU 2009) and Eurostat SHARES (Eurostat, 2018).

- RES: Total renewables share. Calculated as observed (actual) final domestic renewable energy consumption divided by gross final energy consumption.
- RES-E: Renewables share in electricity consumption. Calculated as the observed (actual) final domestic renewable energy consumption in electricity production, divided by domestic electricity consumption plus grid losses and own consumption. RES-E is included in calculations of other renewables shares. If RES-E exceeds 100%, a RES-E of 100% must be used in subsequent calculations.

• RES-H&C: Renewables share in heating and cooling consumption. Calculated as observed (actual) final domestic renewable energy consumption in production of district heating and district cooling plus industry and services and household consumption of other energy from renewable energy sources for heating, cooling and processing, divided by the sum of domestic final energy consumption as well as district heating/cooling production.

• RES-DH: Renewables share in district heating. Not defined in the Renewable Energy Directive, but calculated to supplement the other renewables shares. Calculated as the observed (actual) final domestic renewable energy consumption in district heating production divided by domestic district heating consumption plus distribution losses and own consumption.

• RES-T: Renewables share in transport. Calculated as observed (actual) renewable energy consumption for electricity used for transport purposes (up to 2020 based on RES-E two years ago, and, from 2021, based on RES-E for the preceding two-year period) plus consumption of biofuels divided by total fuel consumption for transport purposes using a number of multipliers. A distinction is made between uses and between first and second generation biofuels. Multipliers: 2x renewable energy from second generation biofuels and bio-natural gas for all modes of transport; 5x renewables share of electric road transport (4x from 2021); 2.5x renewables share of electric rail transport and other renewable energy (including hydrogen) (1.5x from 2021), as well as 1.2x renewable energy for sustainable biofuels used in aviation and maritime transport from 2021. The numerator is divided by total electricity and fuel consumption for transport using similar multipliers (except for the multiplier for electric road transport, which is only used in the numerator).

Greenhouse gases: Emissions of greenhouse gases are not measured but assessed using emission factors linked to emission activities such as fuel consumption, for example. These emission factors are adjusted regularly as new knowledge comes to light. When this happens, the projections and historical figures are also adjusted to produce a more correct presentation of historical emissions. This means that projections can vary solely on the basis of altered emission factors. In order to compare the climate impact of emissions, greenhouse gas emissions are converted into CO_2 equivalents (CO_2-eq.) corresponding to their climate impact. Primary greenhouse gases are:

• CO_2 (carbon dioxide, literally referred to as CO_2): Primarily burning of fossil fuels such as coal, oil and natural gas.

• CH_4 (methane): Primarily organic processes such as the digestion system of animals and waste composting.
• N_2O (nitrous oxide): Primarily nitrogen conversion.
• F gases: Primarily chemical processes.

Greenhouse gas emissions covered by the EU ETS system (ETS): ETS emissions includeemissions from energy production, heavy industry, aviation and other large point sources. The total number of emission allowances is set at EU level and this number is tightened annually. The allowances are traded on a common European market. Companies trade in emission allowances on the market, which means that direct regulation of emissions from the ETS sector cannot be implemented at national level.

Greenhouse gas emissions NOT covered by the EU ETS system (non-ETS): Non-ETSemissions primarily stem from transport, agriculture, households, other industries, waste, and a number of small-scale CHP plants, i.e. numerous large and small emissions sources. Regulation takes place through national initiatives by the individual countries which have received reduction targets relative to 2005 levels. The base year is 2005, as this year was the earliest year with data that made it possible to distinguish between ETS and non-ETS emissions. The European effort is shared between Member States according to an agreement for the periods 2013-2020 and 2021-2030.

Energy intensity: Energy intensity is a measure of the efficiency of energy use within the economy and is calculated as the relationship between energy consumption and financial output.

Biofuels: Biofuels are fuels produced from biological materials. Since 2010, biofuels have been mixed with fuels (petrol, diesel and natural gas) sold for land transport purposes. A distinction is made between first and second generation biofuels. First generation biofuels are primarily bioethanol and biodiesel produced on the basis of food crops. Bioethanol is typically produced from crops containing starches and sugar, such as cereal and sugar cane, while biodiesel is typically produced from oil crops, such as rapeseed, soybean and palm. Second generation biofuels are typically produced from residual products from agriculture and industry.

Abbreviations

Appls.	Appliances
CO2-eq., CO2e	CO_2 equivalents
DCE	Danish Centre for Environment and Energy, Aarhus University
DEA	The Danish Energy Agency
DECO18	Denmark's Energy and Climate Outlook 2018 (April 2018)
DECO19	Denmark's Energy and Climate Outlook 2019 (August 2019)
DK1	Electricity price area 'Western Denmark'
DK2	Electricity price area 'Eastern Denmark'
Eff.	Efficiency
ENTSO-E	European Network of Transmission System Operators for Electricity
ETS	The European Emission Trading System
EU+24	The 24 countries in the electricity market model are grouped into 15 market areas: DK1, DK2, NO, SE, FI, DE-AT-LU, NL, GB-NI-IE, FR-BE, ES-PT, CH, IT, EE-LV-LT, PL-CZ-SK, HU
GDP	Gross domestic product
GWP	Global Warming Potential
HP	Heat pump
IEA	International Energy Agency
LTM	National Transport Model (Technical University of Denmark)
LULUCF	Land Use, Land Use Change and Forestry
MAF	Mid-term Adequacy Forecast - ENTSO-E
MoF	The Danish Ministry of Finance
MSW	Municipal solid waste
MWe	MW electricity (electric power)
NECP	National Energy and Climate Plan for the EU
Non-ETS	Not covered by the EU Emission Trading Scheme
PPA	Power Purchase Agreement (bilateral electricity trade agreement between the producer and the consumer)
PSO	Public Service Obligations (financing system to support electricity production from renewable energy sources and small-scale CHP)
RE	Renewable energy
RES	Renewable Energy Share - total renewables share
RES-DH	Renewable Energy Share - District Heating – renewables share in district heating consumption.
RES-E	Renewable Energy Share - Electricity - renewables share in electricity consumption
RES-H&C	Renewable Energy Share - Heating and Cooling – renewables share in heating and cooling consumption.
RES-T	Renewable Energy Share - Transportation – renewables share in transport consumption
TYNDP	10-year Network Development Plan by ENTSO-E
Waste (bio)	The biodegradable share of combustible waste.
Waste (fossil)	The non-biodegradable share of combustible waste.