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Approximated EU GHG inventory: proxy GHG estimates for 2017

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European Environment Agency

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Abbreviations

AR4	IPCC Fourth Assessment Report: Climate Change 2007
BP	British Petroleum
CH_4	Methane
CO_2	Carbon dioxide
CO_2-eq	Carbon dioxide equivalent
CRF	Common reporting format
EC	European Commission
EEA	European Environment Agency The EEA has 33 member countries: the 28 European Union Member States together with Iceland, Liechtenstein, Norway, Switzerland and Turkey
ESD	Effort Sharing Decision
ETC/ACM	European Topic Centre on Air Pollution and Climate Change Mitigation
ETS	Emissions Trading System
EU	European Union
EU-28	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom
EU plus Iceland	'EU plus Iceland' refers to the EU plus Iceland. In figures and tables this may be abbreviated to EU + IS. The attribution 'EU-28' is used in contexts where Iceland is not included.
EUTL	European Union Transaction Log
F-gas	Fluorinated greenhouse gas; umbrella term including HFC, PFC, SF_6 and NF_3
GDP	Gross domestic product
GHG	Greenhouse gas
GWP	Global warming potential
HDD	Heating degree days
HFCs	Hydrofluorocarbons
IEA	International Energy Agency
IEF	Implied emission factor
kt	Kilotons (thousand tons)

IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial processes and product use
LULUCF	Land use, land-use change and forestry
MMR	Monitoring Mechanism Regulation (Regulation (EU) 525/2013)
Mt	Megatons (million tons)
N_2O	Nitrous oxide
NF_3	Nitrogen trifluoride
ODS	Ozone-depleting substance
PFCs	Perfluorocarbons
QA/QC	Quality assurance and quality control
QELRC	Quantified emission limitation and reduction commitment
SF_6	Sulphur Hexafluoride
UNFCCC	United Nations Framework Convention on Climate Change

Abbreviations of Member States

AT	Austria	IT	Italy
BE	Belgium	IS	Iceland
BG	Bulgaria	LT	Lithuania
CH	Switzerland	LU	Luxembourg
CY	Cyprus	LV	Latvia
CZ	Czech Republic	MT	Malta
DE	Germany	NL	Netherlands
DK	Denmark	NO	Norway
EE	Estonia	PL	Poland
ES	Spain	PT	Portugal
FI	Finland	RO	Romania
FR	France	SE	Sweden
GR	Greece	SI	Slovenia
HR	Croatia	SK	Slovakia
HU	Hungary	UK	United Kingdom
IE	Ireland		

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Executive Summary

This report provides GHG emissions estimates for the EU-28 plus Iceland for 2017. This Executive Summary includes an analysis of the important changes in GHG emissions across the EU, by sector and by Member State.

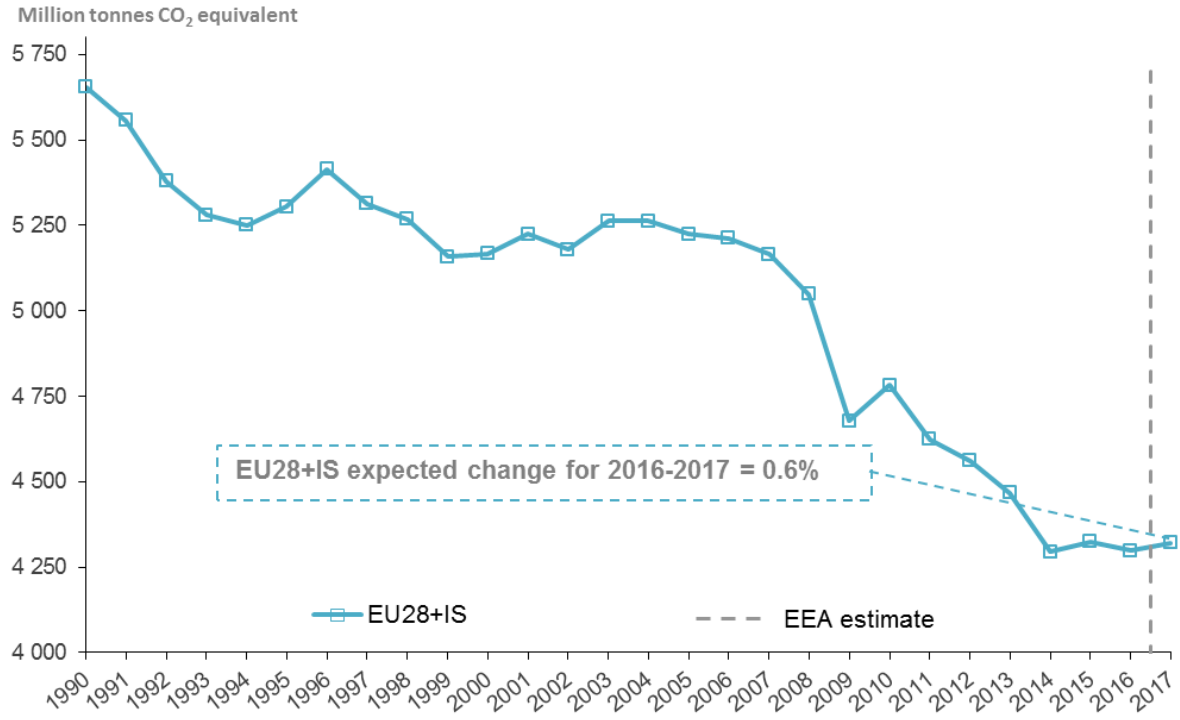
Emissions for EU plus Iceland have increased by 24 million tonnes of CO_2-equivalents (Mt CO_2-eq) or 0.6 % (total GHG emissions without LULUCF, including indirect CO_2 and not including international aviation emissions).

This summary begins by looking at the long-term trends and then provides detail on the changes in EU GHG emissions by sector and by Member State. The final figure in this summary (Figure ES.4) allows a comparison of the 2016-2017 changes in Member States' emissions.

Changes in GHG emissions across the EU

The estimates for 2017 show a pause in the long-term trend of emissions reduction. Emissions levelled off between 2014 and 2016 (Figure ES.1), and the estimate for 2017 shows a 0.6% increase. The 2017 emissions (4321.4 million tonnes of CO_2-equivalents (Mt CO_2-eq)), are higher than in the years 2014 to 2016 but they are lower than 2013 or any previous year. The increase in emissions between 2016 and 2017 is estimated to be 24.0 Mt CO_2-eq or 0.6 % for the EU plus Iceland (total GHG emissions without LULUCF and including indirect CO_2). The 2017 emissions total is 23.6 % below 1990 levels.

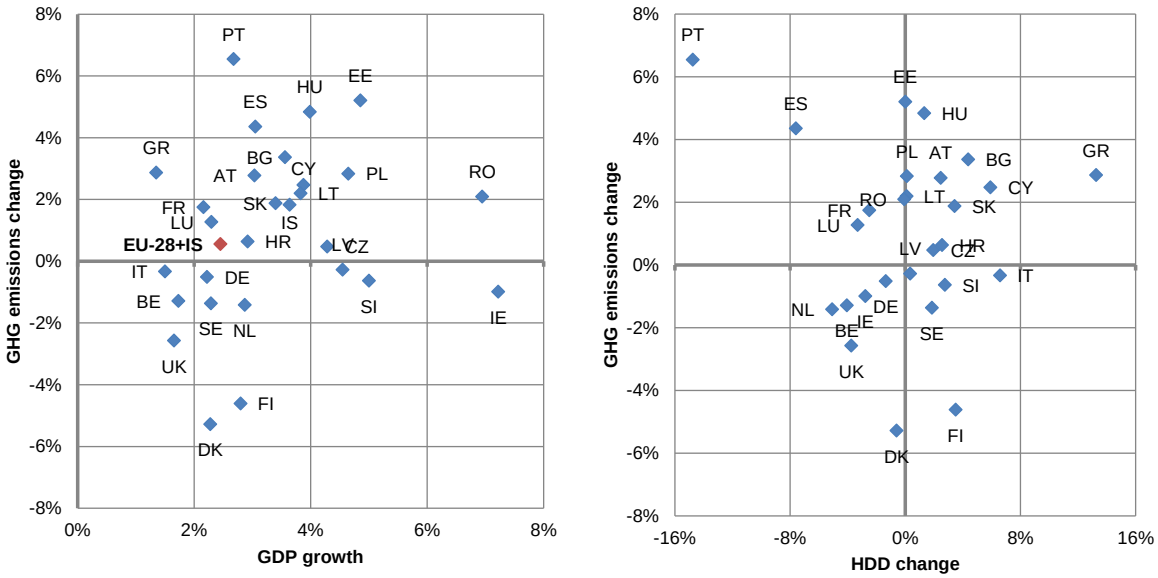
Figure ES.1 Trends in total GHG emissions, 1990-2017



Note: Total GHG emissions without LULUCF including indirect CO_2.
Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

The 0.6 % increase in emissions for the EU plus Iceland since 2016 is lower than the GDP growth of 2.5 % in the same year (Figure ES.2). While there does not appear to be a clear pattern between GDP and GHG emissions for 2016 across the EU, it can be seen that for all Member States the economic situation continued to improve again (GDP in 2017 was lower than in 2016 for some Member States, even though GDP growth was positive in all Member States) and eleven Member States achieved decreases in emissions.

Figure ES.2 GHG emissions, GDP growth and heating degree days change 2016-2017



Note: Heating Degree Days (HDDs) are an indication of heat demand based on outdoor temperatures. Positive HDD change can correlate with increased heating demand. The situation of Malta could not be presented at this scale. As GHG emission change in Malta (13.1%) is much stronger than in all other Member States it is not shown here. GDP growth in Malta is 6.4% and HDD change 50.6%. HDD data was not available for Iceland.

Climatic factors have a significant effect on energy demand, behaviour and GHG emission trends. In the year 2017 virtually all of Europe was warmer than the reference period 1981-2010, but colder than the three preceding years (Copernicus, 2018). Lower winter temperatures led to higher heating demand in most Member States and higher emissions from the residential and commercial sectors, which partly explain the emission changes. Figure ES.2 also shows that the 17 Member States with increases in heating degree days (a standardized measure for linking heating demand and weather conditions) are not necessarily identical to those Member States where total emissions also increased.

Changes in EU GHG emissions by sector

On a sectoral basis, the largest absolute emission increase in the EU occurred in the energy sector (i.e. all combustion activities and fugitive emissions). Energy related emissions grew by 20.0 Mt CO_2-eq (+0.6 %) across the EU plus Iceland. Within the energy sector, emissions increased strongly in transport (+14.4 Mt CO_2-eq) and manufacturing industries and construction (+8.5 Mt CO_2-eq) while they declined slightly in energy industries (−2.8 Mt CO_2-eq). Emission changes in residential and commercial (Other sectors), other and fugitive emissions are only minor. This is consistent with the

increase in emissions in the largest ESD sectors: transport, residential and agriculture. The decline in energy industries partly compensated the increases in manufacturing industries and industrial processes. Therefore ETS emissions grew slower than ESD emissions.

These changes in emissions reflect changes visible in the energy statistics. After a period of decrease between 2010 and 2014, primary fossil energy consumption has increased for the third year in a row: by 1.6 % in 2017. The contribution of oil, gas and renewable fuels to the energy mix increased in 2017 while the share of coal and nuclear energy decreased.

Monthly consumption data for solid, liquid and gaseous fuels show different trends for the different fossil fuel types. In 2017 the consumption of natural gas grew by 3.7% and consumption of liquid fuels increased by 2.2 %. Solid fossil fuel consumption (excluding peat) fell by 2.8%.

GHG emissions from industrial processes increased in 2017 compared to 2016, by 1.3 % in the EU plus Iceland. The largest contribution to this emission decrease was from mineral products (+2.4 %) and chemical industry (+3.3 %).

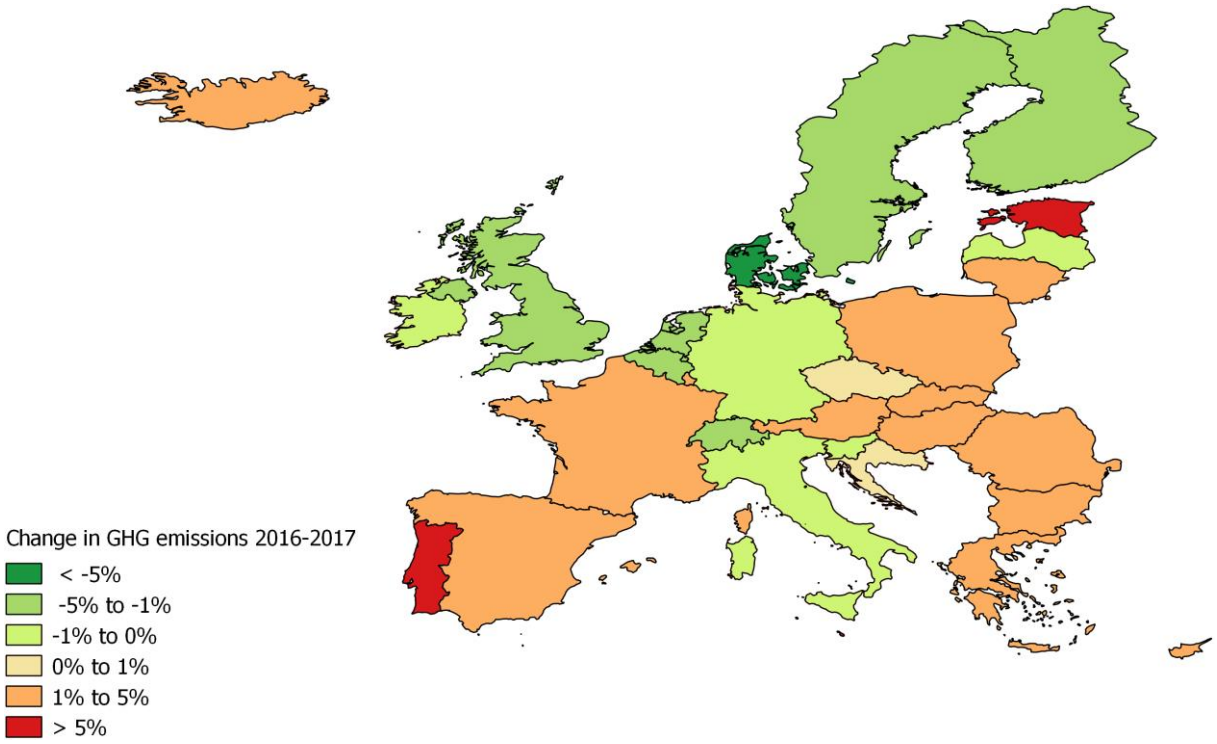
Agriculture emissions increased by 0.4 %, mainly from emission increases from agricultural soils and due to enteric fermentation. The trend in emissions from waste (−1.8 %) continues the decrease seen in previous years with largest reduction being in emissions from solid waste disposal.

Reporting under the Monitoring Mechanism Regulation requires separate detail for the EU ETS and non-ETS sectors. Between 2016 and 2017 the emissions increased by 0.2 % across stationary installations covered by the European Emissions Trading System for the EU plus Iceland, whereas emissions not covered by the ETS increased by 0.8 %. This is consistent with the increase in emissions in the largest ESD sectors: transport, residential and agriculture.

Change in Member State GHG emissions

Greenhouse gas emissions increased in more than half of the EU Member States with gains outweighing falls by 0.6 %. Figure ES.3 depicts the regional distribution of these changes which differ significantly between different regions: Emission increases occurred mainly in south-western, south-eastern and central-eastern Europe while most of the emission reduction can be in northern and central-western Europe.

Figure ES.3 Regional trends in total GHG emissions change 2016-2017

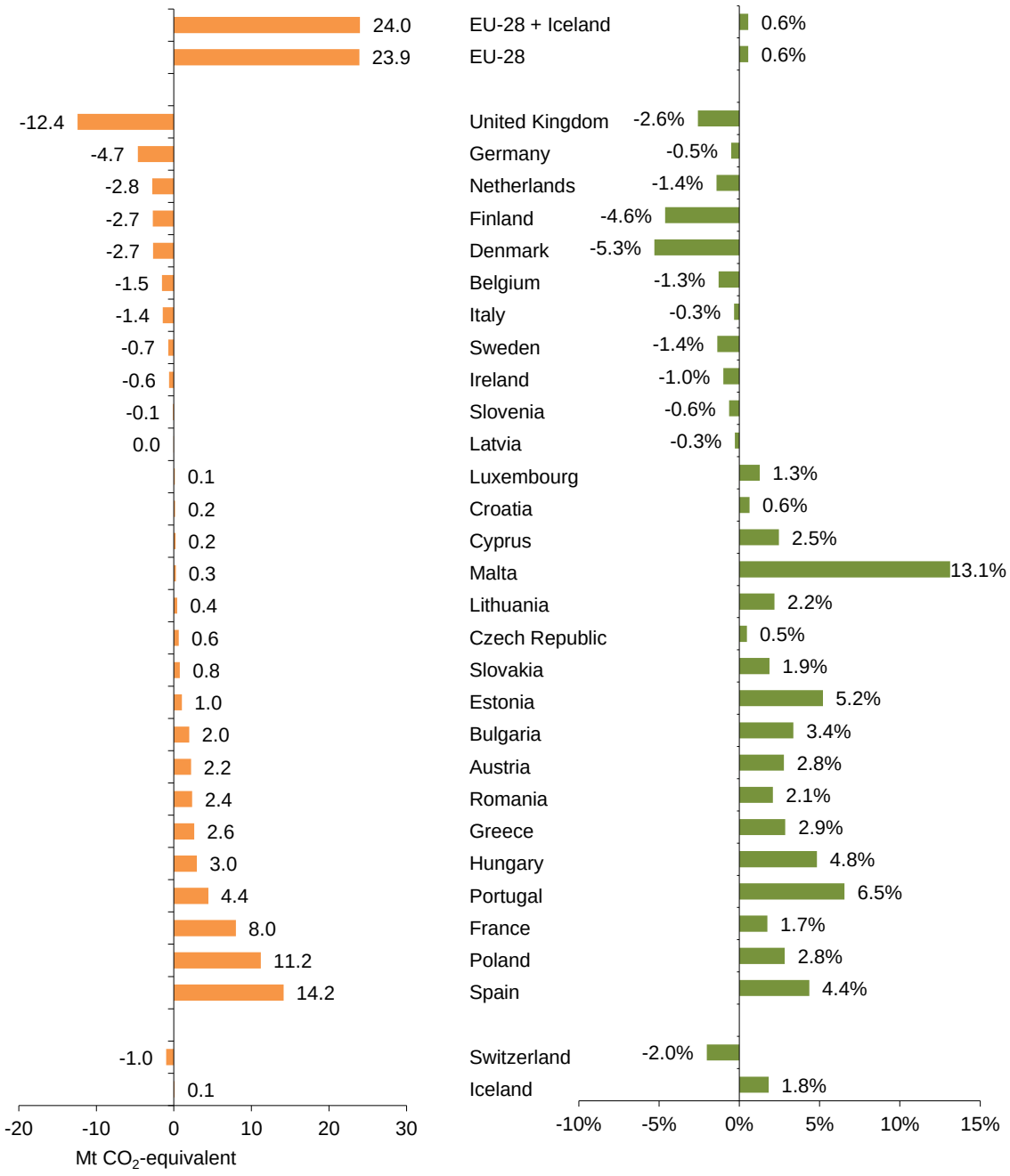


Note: Change in total GHG emissions excluding LULUCF and including indirect CO_2.

Comparing the changes across Member States (Figure ES.4), the largest absolute emission change occurred in Spain, where emissions increased by 14.2 Mt CO_2-eq. In contrast the largest emission decrease was in the United Kingdom (−12.4 Mt CO_2-eq), followed by Germany (−4.7 Mt CO_2-eq).

Large absolute emissions increases also occurred in Poland (+11.2 Mt CO_2-eq), France (+8.0 Mt CO_2-eq) and Portugal (+4.4 Mt CO_2-eq). The largest relative increase in emissions compared to the previous year took place in Malta (+13.1 %), followed by Portugal (6.5 %), Estonia (5.2 %), Hungary (+4.8 %) and Spain (+4.4 %). The largest relative declines were in Denmark (−5.3%), Finland (−4.6 %) and the United Kingdom (−2.6%). In the non-EU member countries of the EEA, emissions decreased in Switzerland (-1.0 Mt CO_2-eq / -2.0%) while emissions were estimated to increase for Iceland (+1.8 %).

Figure ES. 4 Member States' emissions, change 2016-2017



Note: Total GHG emissions without LULUCF including indirect CO_2.

Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

1. Background and objective

This approximated GHG inventory is an early estimate of the GHG emissions for the preceding year and is available by 30 September each year. The legal basis for the approximated GHG emission estimates is Regulation (EU) 525/2013 of the European Parliament and of the Council on a mechanism for monitoring and reporting greenhouse gas emissions (EU MMR). Article 8 requires Member States to submit to the Commission approximated greenhouse gas inventories for the year *t*-1 by 31 July every year. Iceland is not an EU Member State but has to report its approximated inventory, where possible, as any other EU Member State. The European Environment Agency (EEA) assists the Commission in the compilation of the Union approximated greenhouse gas inventory. These estimates are referred to as approximated ('proxy') estimates or inventories as they cover the year for which no official GHG inventories have been prepared. Should a Member State not provide their own proxy emission estimate, the EEA produces and uses gap-filled estimates in order to have a complete approximated GHG inventory for the European Union. Non-EU member countries of the EEA are invited to submit their proxy estimates on a voluntarily basis.

The scope of the proxy estimates covers total GHG emissions, for all gases, sectors, years and Member States, as reported under the Kyoto Protocol and the UNFCCC excluding the land use, land-use change and forestry (LULUCF) sector but including indirect CO_2.

Member States are responsible for the methodological choice regarding their own estimates. For gap-filling where a Member State has not provided their own estimate the EEA has used the latest Eurostat and EU ETS data to carry forward reported emissions from the energy and industrial processes sectors. These two source categories typically account for the bulk of emissions and have the largest annual change. The agriculture and waste sectors are set to repeat the previous year's values. The estimates assume no change in emission factors or methodologies as compared to the latest official inventory submissions to UNFCCC for the year *t*-2.

The second commitment period of the Kyoto Protocol (2013–2020) was established in Doha in 2012 (COP 18/CMP8). The so-called Doha amendment includes new quantified emission limitation and reduction commitments (QELRCs) for Annex I Parties intending to take part in the second commitment period. The EU, its 28 Member States (EU-28) and Iceland agreed to a joint QELRC, corresponding to a 20 % reduction compared to the base year. They declared that they intended to fulfil this commitment jointly, under Article 4 of the Kyoto Protocol[1]. For this reason, the aggregates in this report will refer to the EU-28 and Iceland to the extent possible. The Doha Amendment's entry into force is subject to acceptance by at least three quarters of the Parties to the Kyoto Protocol.

When Member States set national emission caps for installations under the ETS for the period 2013–2020, they allocated part of their Kyoto emission budget (Kyoto Assigned Amounts) to the EU ETS and fixed the overall contribution of the ETS sectors towards reaching Kyoto national targets. ETS information is available on a year *t*-1 timeline but success in reducing emissions from sectors not

[1] Submission by Denmark and the European Commission on behalf of the European Union and its Member States (19 April 2012): http://unfccc.int/files/meetings/ad_hoc_working_groups/kp/application/pdf/awgkp_eu_19042012.pdf
Submission by Iceland (10 May 2012), available at:
http://unfccc.int/resource/docs/2012/awg17/eng/misc01a01.pdf

covered by the EU ETS (running on a year *t*-2 timeline) will determine whether governments need to use Kyoto flexible mechanisms to achieve their targets.

The official submission of 2017 inventories to the United Nations Framework Convention on Climate Change (UNFCCC) will take place in 2019.

Table 1 provides an overview of different emission estimates by EU bodies. More information can be found on the EEA website 'Note on different emission estimates by EU institutions': www.eea.europa.eu/publications/different-emission-estimates-by-eu-bodies-2

Table 1 Overview of EU data sources for GHG estimates

What	Who	When	Time	Geographical scope	Sectoral Scope	Obligation
GHG inventory to UNFCCC	EEA and DG CLIMA	15 April (draft) and 30 May(final)	*t*-2	EU and its 28 Member States	All gases and sectors (100% of emissions)	EU MMR (525/2013)
Approximated / Proxy GHG inventory	EEA, DG Climate Action	30 September	*t*-1	EU and its 28 Member States, Iceland and other EEA member countries when available	All gases and sectors (100% of emissions) except LULUCF	EU MMR (525/2013)
EU ETS	DG Climate Action, EEA	Early April, May and summer (between July and September)	*t*-1	EU-28, Iceland, Norway and Liechtenstein	About 11,000 installations (~40% of total emissions)	EU ETS Directive (2003/87/EC)
CO_2 early estimates from fossil fuel combustion	Eurostat	April / May	*t*-1	EU and its 28 Member States	CO_2 from fossil fuel combustion (~70% of total emissions)	Eurostat's work programme
Air emissions accounts, air emission intensities and air emission footprints	Eurostat	annual	t-2	EU-28	Six greenhouse gases including CO_2 and seven air pollutants	Regulation (EU) 691/2011 (Annex I)
EDGAR global database	DG JRC	August / September	*t*-1	Global coverage	All gases and sectors (100% of emissions)	JRC's work programme

Source: Adapted from www.eea.europa.eu/publications/different-emission-estimates-by-eu-bodies-2 .

2. European GHG emissions in 2017

A total of twenty-five Member States submitted preliminary 2017 GHG data to the European Commission and the EEA by 31 July 2018[2]. Austria, Belgium, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Slovakia, Slovenia[3], Spain, Sweden and the United Kingdom all submitted emissions data in the form of largely[4] complete CRF Summary2 tables. The methodologies used for any gap-filling are described in chapter 4.3.1.

These 25 Member States that submitted 2017 proxy estimates represent more than 95 % of EU-28's total emissions.

The EEA used gap-filled estimates for Bulgaria, Cyprus, and Romania in order to have a complete approximated GHG inventory for the European Union (section 4.3).

Additionally two EEA member countries submitted preliminary 2017 GHG data by 31 July 2018: Iceland and Switzerland.[5]

Approximated GHG inventories in CRF Summary2 table format are presented for the EU-28 and EU plus Iceland in chapter 2.1.5. Chapter 6 provides the CRF Summary2 tables for each of the 28 EU Member States and also for Iceland and Switzerland.

[2] Where LULUCF data were provided, these data were not used, as for the approximated GHG inventories for EU-28 and EU plus Iceland, emissions from LULUCF are not calculated.

[3] Slovenia submitted updated proxy estimates on 14 September 2018.

[4] Where sub-sector emissions detail was not available it was gap-filled using simple allocation based on the previous year's splits. In some instances sub-sectors emissions needed to be summed for sectors. These minor modifications were performed for Denmark, Germany, Greece, Hungary, Ireland, Luxembourg, Sweden and the United Kingdom.

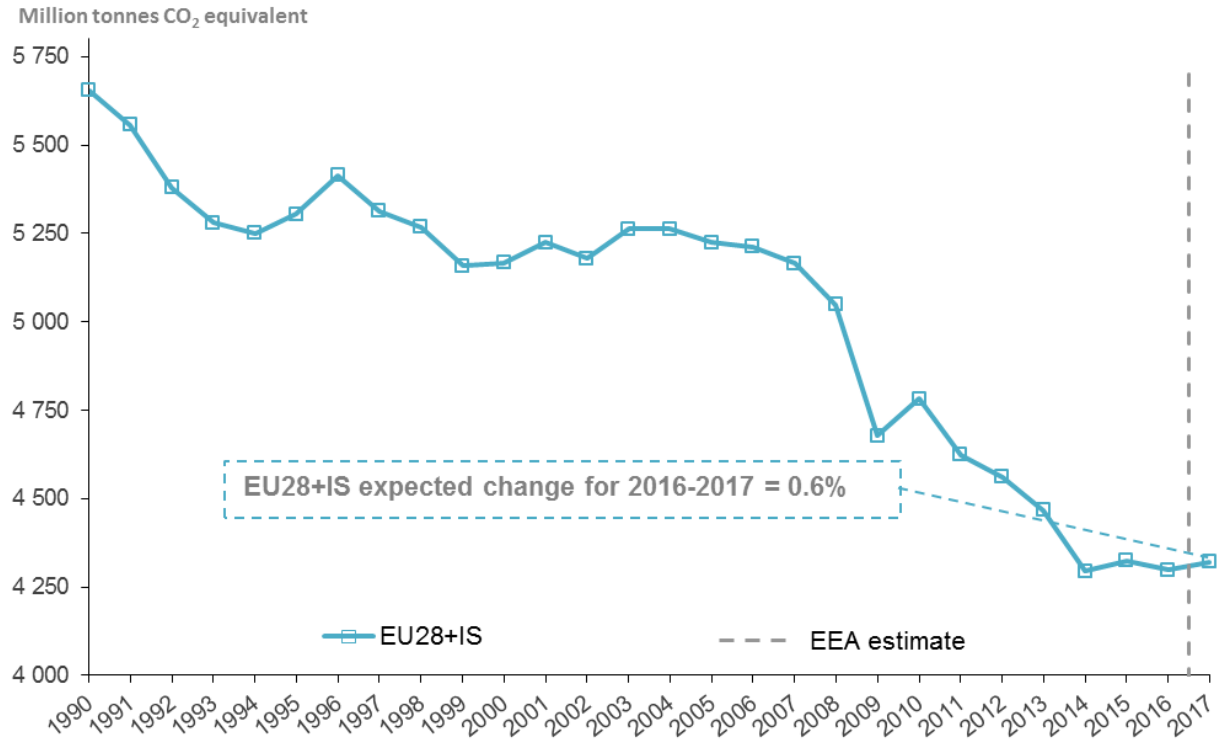
[5] Other non-EU Member States of the EEA are Liechtenstein, Norway and Turkey. As these countries did not submit any GHG data for 2017 these countries are not considered in this report.

2.1 Trends and general results

2.1.1 Changes in GHG emissions across the EU

The estimates for 2017 show a pause in the long-term trend of emissions reduction. Emissions levelled off between 2014 and 2016 (Figure 1) and the estimate for 2017 shows only a 0.6% increase. The 2017 emissions (4321.4 million tonnes of CO_2-equivalents (Mt CO_2-eq)), are higher than in the years 2014 to 2016 but they are lower than 2013 or any previous year. The increase in emissions between 2016 and 2017 is estimated to be 24.0 Mt CO_2-eq or 0.6 % for the EU plus Iceland[6] (total GHG emissions without LULUCF and including indirect CO_2)[7]. The 2017 emissions total is 23.6 % below 1990 levels[8].

Figure 1 Trends in total greenhouse gas emissions, 1990-2017



Note: Total GHG emissions without LULUCF including indirect CO_2.
Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

The 0.6 % increase in emissions for the EU plus Iceland since 2016 is lower than the GDP growth of 2.5 % over the same period (Figure 2). While there does not appear to be a clear pattern between GDP

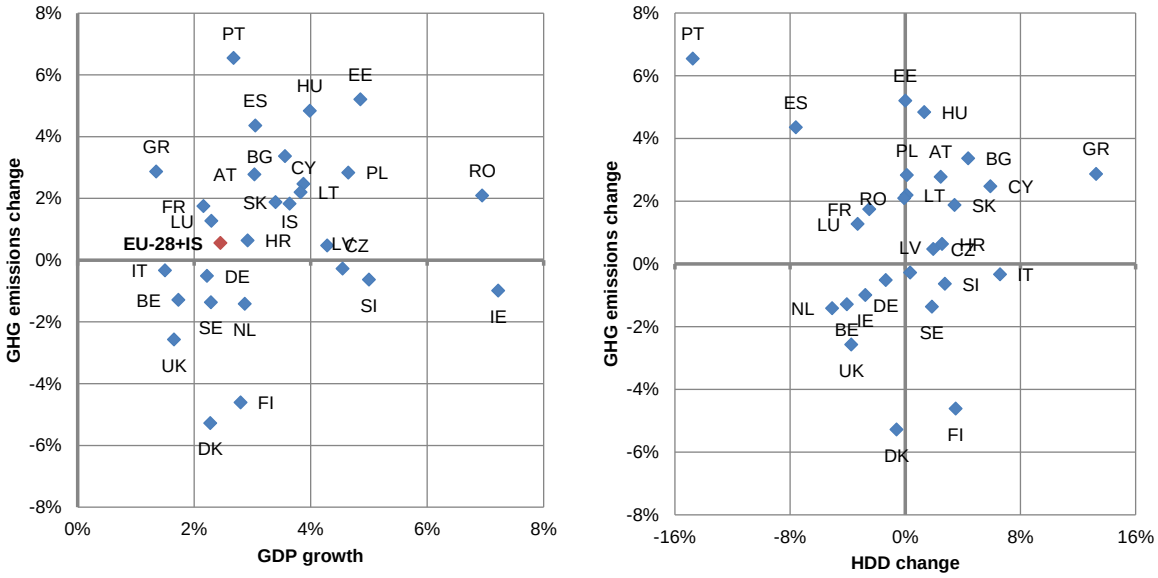
[6] EU plus Iceland refers to the EU-28 plus Iceland. In figures and tables this may be abbreviated to EU-28 + IS. The attribution 'EU-28' is used in contexts where Iceland is not included.

[7] According to the UNFCCC reporting guidelines, Annex I Parties may report indirect CO_2 from the atmospheric oxidation of CH_4, CO and NMVOCs. For Parties that decide to report indirect CO_2 the national totals shall be presented with and without indirect CO_2. The EU proxy estimates are based on national totals excluding LULUCF and including indirect CO_2 if reported by Member States.

[8] Change since 1990 is not necessarily equivalent to the change since the base year. Accounting rules such as the selection of the base year for fluorinated gases (F-gases) and the continuing recalculations of GHG inventories varies from country to country.

and GHG emissions for 2016 across the EU, it can be seen that for all Member States the economic situation continued to improve again (GDP grew in all Member States) and eleven Member States achieved decreases in emissions.

Figure 2 GHG emissions, GDP growth and heating degree days change 2016-2017



Note: Heating Degree Days (HDDs) are an indication of heat demand based on outdoor temperatures. Positive HDD change can correlate with increased heating demand. The situation of Malta could not be presented at this scale. As GHG emission change in Malta (13.1%) is much stronger than in all other Member States it is not shown here. GDP growth in Malta is 6.4% and HDD change 50.6%. HDD data was not available for Iceland.

Source: GDP and HDD data from Eurostat

Climatic factors have a significant effect on energy demand, behaviour and GHG emission trends. In the year 2017 virtually all of Europe was warmer than the reference period 1981-2010, but colder than the three preceding years (Copernicus, 2018). Lower winter temperatures led to higher heating demand in most Member States and higher emissions from the residential and commercial sectors, which partly explain the emission changes. Figure 2 also shows that the 17 Member States with increases in heating degree days (a standardized measure for linking heating demand and weather conditions) are not necessarily identical to those Member States where total emissions also increased.

The strongest increases of HDD occurred in Malta (+50.6 %), Greece (+13.3 %), Italy (+6.6 %) and Cyprus (+6.1 %). Further thirteen Member States had HDD increases. The strongest decline of HDD occurred in Portugal (−14.8 %), Spain (−7.6 %) and the Netherlands (−5.1 %). In further eight Member States the HDD decrease was less than 4 %.

Also hydraulic conditions are an important climatic factor: low rainfall led to reduced hydroelectricity production in south-western Europe, especially in Spain and Portugal.

2.1.2 Changes in EU GHG emissions by sector

On a sectoral basis, the largest absolute emission increase in the EU occurred in the energy sector (i.e. all combustion activities and fugitive emissions). Energy related emissions grew by 20.0 Mt CO_2-eq (+0.6 %) across the EU plus Iceland. Within the energy sector, emissions increased strongly in

transport (+14.4 Mt CO_2-eq) and manufacturing industries and construction (+8.5 Mt CO_2-eq) while they declined slightly in energy industries (−2.8 Mt CO_2-eq). Emission changes in residential and commercial (Other sectors), other and fugitive emissions are only minor. This is consistent with the increase in emissions in the largest ESD sectors: transport, residential and agriculture. The decline in energy industries partly compensated the increases in manufacturing industries and industrial processes. Therefore ETS emissions grew slower than ESD emissions.

These changes in emissions reflect changes visible in the energy statistics. After a period of decrease between 2010 and 2014, primary fossil energy consumption has increased for the third year in a row - by 1.6 % in 2017. The contribution of oil, gas and renewable fuels to the energy mix increased in 2017 while the share of coal and nuclear energy decreased (BP 2018).

Monthly consumption data for solid, liquid and gaseous fuels (Eurostat, 2018), show different trends for the different fossil fuel types. In 2017 the consumption of natural gas grew by 3.7% and consumption of liquid fuels increased by 2.2 %. Solid fossil fuel consumption (excluding peat) fell by 2.8%.

Natural gas consumption increased in eighteen Member States with three Member States having increases of more than 10 %: Greece by 20.5%, Croatia by 13.1% and Portugal by 22.2%.

In eight Member States natural gas consumption fell with the largest decrease in Sweden (−18%) followed by Latvia (−10%).

Liquid fossil consumption grew in eighteen EU-28 Member States with the largest increases being in the Czech Republic (17.9%), Hungary (8.9%) and Poland (11.6%). A decrease of liquid fuel consumption was observed in ten EU-28 Member States with largest decreases in Belgium (-5.3%), Malta (-20.1%) and Sweden (-14.3%).

Fifteen Member States showed decreasing solid fossil fuel consumption (excluding peat). These changes in fossil fuel consumption are not only related to heating degree day (HDD) effects as described in section 2.1.1 but also strongly connected to the trends in electricity generation from fossil fuels. Conventional thermal generation increased by 6% across the EU where increases were seen in 18 Member States.

Renewable electricity generation continues to play an important role in GHG mitigation efforts by the EU and its Member States. Hydroelectric generation (without pumped storage) decreased by 14% across the EU with 18 Member States experiencing lower hydro electricity production in 2017 than in 2016. Regional effects are visible with Portugal, Spain and France all appearing to have less favourable hydro conditions and higher fossil generation. Hydro production increased in eight Member States. The largest increases in gross hydro production were in Sweden, Austria and Latvia.

Electricity production from renewable sources other than hydro increased significantly. Gross generation electricity generation from wind energy grew by 17% in the EU across 22 Member States (EurObserv'ER, 2018a).[9] The largest relative increases were in Luxembourg (109%), Finland (57%) and

[9] Eurostat data were also analysed, however these data were partially incomplete for some EU Member States and were therefore not used for the assessment of trends.

Germany (33%). The largest absolute contributions from wind energy were in Germany, Spain and the United Kingdom.

Increases in electricity production from photovoltaics were seen in most Member States and production grew by 8% across Europe (EurObserv'ER, 2018b), with very large relative increases in Hungary (82%), Finland (67%), Ireland (50%), and Poland (43%). The largest absolute generation from photovoltaics was in Germany followed by Italy, the United Kingdom and Spain.

In 2017 nuclear energy production across the EU-28 decreased by 1.1 % compared to 2016. The largest decreases in nuclear electricity generation occurred in the Germany (−10 %) followed by the United Kingdom (-2%) and France (−1%). Nuclear electricity generation increased very strongly in the Netherlands (35%), Czech Republic (18%) and Slovenia (+10%).

GHG emissions from industrial processes increased in 2017 compared to 2016, by 1.3 % in the EU plus Iceland. The largest contribution to this emission increase was from mineral products (+2.4 %) and chemical industry (+3.3 %).

Agriculture emissions increased by 0.4 %, mainly from emission increases from agricultural soils and due to enteric fermentation. The trend in emissions from waste (−1.8 %) continues the decrease seen in previous years with largest reduction being in emissions from solid waste disposal.

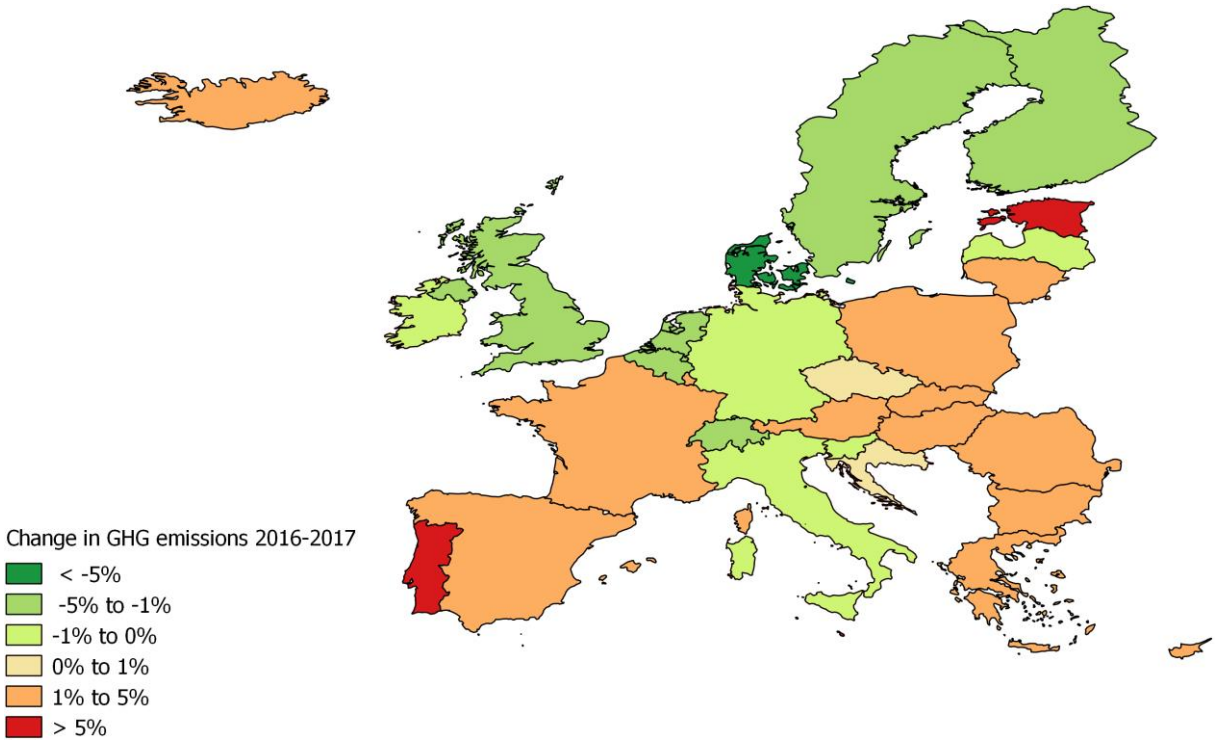
Reporting under the Monitoring Mechanism Regulation requires separate detail for the EU ETS and non-ETS sectors. Between 2016 and 2017 the emissions increased by only 0.2 %[10] across stationary installations covered by the European Emissions Trading System in the EU, whereas emissions in the non-ETS (= emissions covered by the Effort Sharing Decision (ESD)) sectors increased by 0.8 %.

2.1.3 Change in Member State GHG emissions 2016 to 2017

Greenhouse gas emissions increased in more than half of the EU Member States with gains outweighing falls by 0.6 %. Figure 3 depicts the regional distribution of these changes which differ significantly between different regions: Emission increases occurred mainly in south-western, south-eastern and central-eastern Europe while most of the emission reduction can be in northern and central-western Europe.

[10] The European Commission announced on 18 May 2018 (European Commission, 2018a) an increase of ETS emissions of 0.3 % for all participating countries (EU-28, Iceland, Liechtenstein and Norway). In this report the 0.2 % increase refers to the EU-28 and is calculated on the basis of verified emissions of all stationary installations with data from the European Commission as of 16 July 2018.

Figure 3 Regional trends in total GHG emissions change 2016-2017



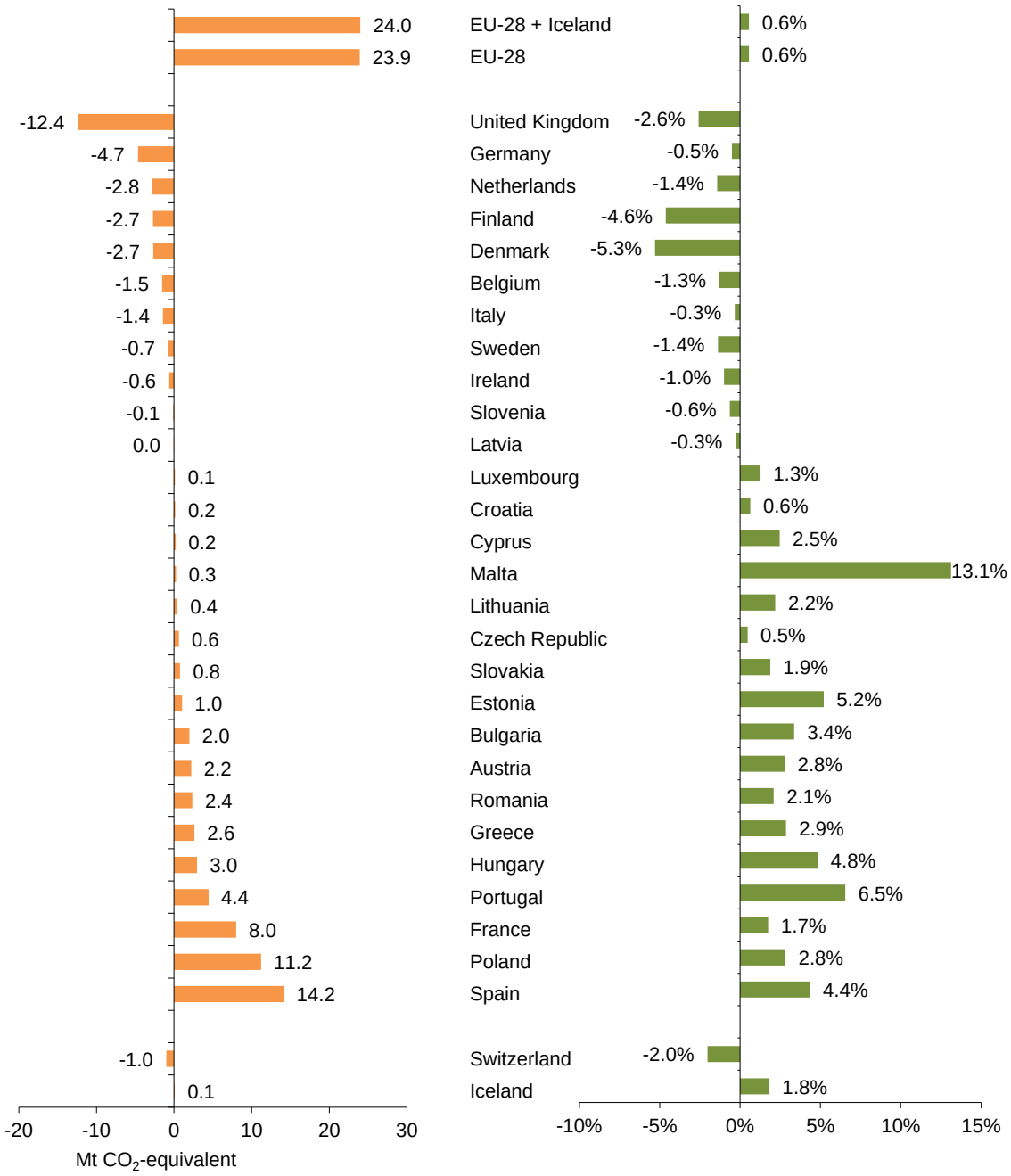
Note: Change in total GHG emissions excluding LULUCF and including indirect CO_2.

Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to the UNFCCC for 1990-2016 and proxy estimates for 2017.

Comparing the changes across Member States (Figure 4), the largest absolute emission change occurred in the Spain, where emissions increased by 14.2 Mt CO_2-eq. In contrast the largest emission decrease was in the United Kingdom (−12.4 Mt CO_2-eq), followed by Germany (−4.7 Mt CO_2-eq).

Large absolute emissions increases also occurred in Spain (+14.2 Mt CO_2-eq), Poland (+11.2 Mt CO_2-eq), France (+8.0 Mt CO_2-eq) and Portugal (+4.4 Mt CO_2-eq). The largest relative increase in emissions compared to the previous year took place in Malta (+13.1 %), followed by Portugal (6.5 %), Estonia (+5.2%), Hungary (+4.8 %) and Spain (+4.4 %). The largest relative declines were in Denmark (−5.3%), Finland (−4.6 %) and the United Kingdom (−2.6%). In the non-EU member countries of the EEA, emissions decreased in Switzerland (-1.0 Mt CO_2-eq / +-2.0%) while emissions were estimated to increase for Iceland (+1.8 %).

Figure 4 Member States emissions change 2016-2017



Note: Total GHG emissions without LULUCF including indirect CO_2.
Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

The six Member States Germany, United Kingdom, France, Italy, Poland and Spain together contribute to about 70 % of total EU emissions. The following section examines the emission trends for these six as well as for Denmark, Finland, Malta and Portugal which showed pronounced positive or negative changes in emissions compared to the previous year. The data source for the explanation of energy trends is BP (2018) unless otherwise noted.

Member States with decreasing 2016 to 2017 emission trends

The largest absolute decrease was seen in the **United Kingdom**, the second largest GHG emitter in the European Union. Emissions in the UK decreased by 12.4 Mt CO_2-eq or 2.6%, significantly more than in any other Member State and more than half the total decline of EU plus Iceland emissions (−24.0 Mt CO_2-eq). Consumption of oil, UK's most important fuel stayed almost constant, while consumption of natural gas decreased by 3 %. Consumption of coal (which has due to a strong decline in previous years now only a minor importance) fell by 20 %. Consumption of renewable energies (including hydro) increased by 19 % while nuclear energy decreased by 2 %. The largest share of the emissions decrease was in sub-category 1.A.1 Energy Industries (−8.8 Mt CO_2-eq or −8.0 %). According to national statistics[11] the emissions decrease of energy industries was mainly due to a shift from coal (−27 %) and natural gas (−5 %) to renewable energies (+20 %) in electricity generation, partly due to closure of coal power stations. The second largest emission decrease was in sub-category 1.A.4 Other sectors where emissions fell by 3.4 Mt CO_2-eq or 3.7 % as 2017 was slightly warmer than 2016 (heating degree days 4 % lower). Other energy-related emissions changed by only ±0.1 Mt CO_2-eq or less. Emissions of Industrial processes and product use grew by 0.1 Mt CO_2-eq (+0.3 %), mainly from chemical industry while emissions other subsectors fell. Emissions of Agriculture and Waste are estimated to stay almost constant (changes of only ±0.1 %).

In **Germany**, GHG emissions only fell slightly by 0.5 %. But as Germany is the largest GHG emitter in the European Union this small relative change is still the second largest absolute emission decrease (−4.7 Mt CO_2-eq) of all Member States. There has been a strong decline in the use of coal (−6 %), while both oil (+2 %) and natural gas consumption (+6 %) grew. The increase of renewable energy (+15 %) was much stronger than the decrease in nuclear energy (−10 %). The largest emission decrease was in 1.A.1 Energy industries (−13.7 Mt CO_2-eq or −4.1 %). According to national analyses the main reason is a higher level of electricity generation from wind energy (+34%) replacing electricity generation from hard coal (−16 %). Also coal power plants (both lignite and hard coal) were decommissioned or mothballed.[12] [13] In contrast other sector saw increasing emissions, most pronounced in industry and transport. Those two rose due to economic growth and additionally the transport sector saw growing numbers of both private cars and heavy good vehicles. Almost constant emissions in residential/commercial and other energy sectors (1.A.4+1.A.5) are consistent with only small changes of heating degree days (HDD). Emissions from Industrial processes and product use grew stronger

[11] Department for Business, Energy & Industrial Strategy: 2017 UK Greenhouse Gas Emissions, Provisional Figures,
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/695930/2017_Provisional_Emissions_statistics_2.pdf
Digest of UK Energy Statistics DUKES 2018 Chapter 5: Electricity
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/729379/Ch5.pdf

[12] German Environment Agency & Federal Ministry for Environment, Nature Conservation and Nuclear Safety: Green house gas emissions 2017 on the decline, slightly. Energy sector emissions lower, transport sector higher. https://www.umweltbundesamt.de/en/press/pressinformation/green-house-gas-emissions-2017-on-the-decline

[13] Arbeitsgemeinschaft Energiebilanzen: Bruttostromerzeugung in Deutschland ab 1990 nach Energieträgern, https://ag-energiebilanzen.de/index.php?article_id=29&fileName=20171221_brd_stromerzeugung1990-2017.xlsx

(+1.0 Mt CO_2-eq or +1.6 %) than emission from Agriculture (+0.2 Mt CO_2-eq or +0.3 %). Emissions from Waste continued to decrease (−0.4 Mt CO_2-eq or −4.3%).

Finland had the second largest relative emission decrease of all Member States: −2.7 Mt CO_2-eq or −4.6 %. Consumption of all fossil fuels decreased: Coal and other solid fossil fuels by 6 %, oil by 3 % and natural gas by 8 %. Renewable energies including hydro increased by 3 % while nuclear energy decreased by 3 %. In total emissions decreased in most energy sectors: The strongest emission decline was in 1.A.1 Energy industries (−1.4 Mt CO_2-eq or −7.4 %). Increased biofuel consumption led to a significant emission reduction in 1.A.3 Transport (−0.80 Mt CO_2-eq or −6.4 %). A similar relative emission reduction showed 1.A.2 Manufacturing industries and construction (−0.46 Mt CO_2-eq or −6.3 %). The emission increase in 1.A.4 Other energy sectors (+0.14 Mt CO_2-eq resp. +3.5) is in line with a 3.5 % increase of heating degree days (HDD). All of the non-energy energy sectors showed emission reductions: Strongest in the Waste sector (−0.12 Mt CO_2-eq or −6.1 %), followed by emissions from Industrial processes and product use (−0.07 Mt CO_2-eq or −1.1 %) and the Agriculture sector (−0.03 Mt CO_2-eq or −0.5 %).

The largest relative emission decrease occurred in **Denmark** where emissions fell by 2.7 Mt CO_2-eq or 5.3 %. Consumption of all fossil fuels declined between 2016 and 2017: Consumption of oil, the most important fuel, was reduced by about 1 % while natural gas consumption declined by 4 % and coal consumption fell by a quarter. Renewable energies, already second most important after oil, consumption grew by 14 %. According to national data[14], renewable energy increases are mainly from biomass and wind energy and a smaller increase from biogas leading to a strong decrease of coal consumption in power stations. Emissions from Industrial processes and product use increased slightly (+0.02 Mt CO_2-eq or 1.2 %) while emissions from Agriculture and Waste were estimated to stay constant.

In **Italy** 2017, emissions were 1.4 Mt CO_2eq or 0.3 % lower than in 2016. Fossil fuel consumption showed mixed changes: Natural gas consumption increased by 6 % and consumption of liquid fossil fuels grew by 1 % while consumption of coal which has only minor importance fell by 11 %. Also consumption of renewable energies decreased due to lower hydroelectricity production. The largest emission decrease was in 1.A.2 Transport while the largest emission increase was in 1.A.4 Other Sectors (1.4 Mt CO_2-eq or 1.7 %) which corresponds to an increased natural gas consumption and more heating degree days (+7 %) due to a colder winter. The emissions of other energy sectors changed only slightly (±0.2 Mt CO_2-eq or less).The largest emission change in the non-energy sectors was in Waste (−0.8 Mt CO_2-eq or −4.1 %), mainly from landfill management. Emissions of Industrial processes and product use grew (+0.4 Mt CO_2-eq or +1.2 %) while emissions from Agriculture fell slightly (−0.1 Mt CO_2-eq or −0.3 %).

Member States with increasing 2016 to 2017 emission trends

[14] Danish Energy Agency: Significant increase in the consumption of renewable energy in 2017, http://en-press.ens.dk/pressreleases/significant-increase-in-the-consumption-of-renewable-energy-in-2017-2470744
Danish Energy Agency: Development in consumption of renewable energy from 2016-2017, https://ens.dk/sites/ens.dk/files/Statistik/fact_sheet_renewable_energy.pdf

Spain experienced in 2017 the largest absolute emission increases of all Member States: +14.2 Mt CO_2-eq or +4.4 %. Energy consumption from fossil fuels grew: strongest for coal (+28 %), also gas consumption grew significantly (+10 %) while oil consumption only grew slightly (+1 %). In contrast hydro energy decreased by 49 % (while other renewable energies increased by 2 %) and also nuclear energy decreased by 1 %. The change of the fuel consumption pattern is most pronounced in 1.A.1 Energy industries where emissions grew by 10.9 Mt CO_2-eq (+15.3 %). According to national data[15] the most important changes in the electricity sector were besides the strong decrease of hydroelectricity a 21 % increase of electricity generation from coal and a 27 % increase of electricity generation in combined cycle power stations which are usually natural-gas fired. The second largest emission change in the energy sector was from 1.A.3 Transport (+2.2 Mt CO_2-eq or +2.6 %) which corresponds well to increased consumption of diesel, gasoline and kerosene. Also emissions in 1.A.2 Manufacturing industries and construction (+1.7 Mt CO_2-eq or +4.2 %) grew due to increased industrial activity while other energy-related emission changes were within ±0.1 Mt CO_2-eq. Emission of Industrial processes and product use decreased by 1.4 Mt CO_2-eq (−4.6 %). This is mainly due to a strong decline of fluorinated gas consumption (−17 %) while emissions of other activities increased slightly. Emissions in the Agriculture sector increased by 1.0 Mt CO_2-eq or 2.9 % due to both increased livestock and increased mineral fertiliser consumption. Emissions of Waste are estimated to stay almost constant (−0.1 %).

In **Poland** emissions increased by 11.2 Mt CO_2-eq or 2.8 % which is the second largest absolute emission increase within the EU. Consumption of coal decreased by 2 % while oil increased by 8 % and natural gas increased by 5 %. Even so, renewable energy grew by 4 %. These changes of fossil fuels are in line with the emission increases in all energy sectors. The strongest reported increases were in 1.A.3 Transport (5.9 Mt CO_2-eq or 11.1 %) and in 1.A.4 Other sectors (2.3 t CO_2-eq or 3.9 %). In transport fuel consumption grew strongly: petrol by 8 %, diesel by 17 % and LPG by 3 % as Poland reported. The emission increases in 1.A.4 is despite almost constant heating degree days (+0.1 %). In contrast emissions in 1.A.1 Energy industries grew by only 0.7 Mt CO_2-eq or 0.4 % and in 1.A.2 Manufacturing industries and construction by 0.9 Mt CO_2-eq or 3.1 %. Emissions from Industrial processes and process use grew (0.3 Mt CO_2-eq or 1.1 %), mainly due to increased production of clinker and ammonia. Emissions from Agriculture also grew (1.1 Mt CO_2-eq or 3.7 %), mainly from higher livestock population and increased use of inorganic fertilisers. Emissions from Waste are estimated to decrease slightly (−0.03 Mt or −0.3 %).

France, the third largest GHG emitter within the European Union, had the third largest absolute emission increase: emissions were 8.0 Mt CO_2-eq or 1.7 % higher. Nuclear energy, France's most important energy source, decreased by 1 % and also renewables (including hydro) fell by 7 %. In contrast coal consumption grew by 11 % while consumption of oil and gas grew less than 1 %. Largest emission increases were in 1.A.1 Energy industries (which includes coal and gas fired electricity generation and district heating as well as refineries) with +4.3 Mt CO_2-eq or +9.6 %. The second largest increases were in 1.A.4 Other sectors (which includes residential and commercial) with +2.0 Mt CO_2-eq or +2.2 %. This is despite a warmer winter (heating degree days: −2 %). Emissions from 1.A.2 Manufacturing industries and construction increased by 1.2 Mt CO_2-eq (+2.5 %) and from 1.A.3

[15] Red Eléctrica de España (REE): Estadística diaria del sistema eléctrico español nacional http://www.ree.es/es/balance-diario/nacional/2017/12/31

Transport increased by 0.6 Mt CO_2-eq (+0.4 %). The largest emissions change in the non-energy sector was the 0.4 Mt CO_2-eq (or 2.6 %) decrease in the Waste sector followed by a 0.2 Mt CO_2-eq (0.6 %) increase from IPPU while Agriculture emissions were estimated as constant.

Portugal had the second largest relative emission increase: 2017 emissions were 4.4 Mt CO_2-eq resp. 6.5 % higher than 2016. Due to a dry hydraulic year, hydro energy (which accounted for 13 % of the 2016 primary consumption) declined by 63 %. In contrast, consumption of all fossil fuels increased: Oil by 5 %, coal by 10 % and gas by even 21 %. The resulting emission increase occurred mainly in 1.A.1 Energies (+3.8 Mt CO_2-eq resp. 21.7 %). Emission increases in 1.A.3 Transport (+0.32 Mt CO_2-eq resp. +1.9 %), 1.A.2 Manufacturing industries and construction (0.13 Mt CO_2-eq resp. +1.7 %) and 1.A.4 Other sectors (+0.02 resp. +0.4 %) are comparatively low. Emission changes in non-energy sectors were diverse: Emissions of Industrial processes and product use (+0.26 Mt CO_2-eq resp. +3.6 %). Increase of livestock numbers led to growing Agriculture emissions (+0.13 Mt CO_2-eq resp. +1.9 %) while diversion from land deposition and biogas recovery led to falling Waste emissions (−0.18 Mt CO_2-eq resp. −2.8 %).

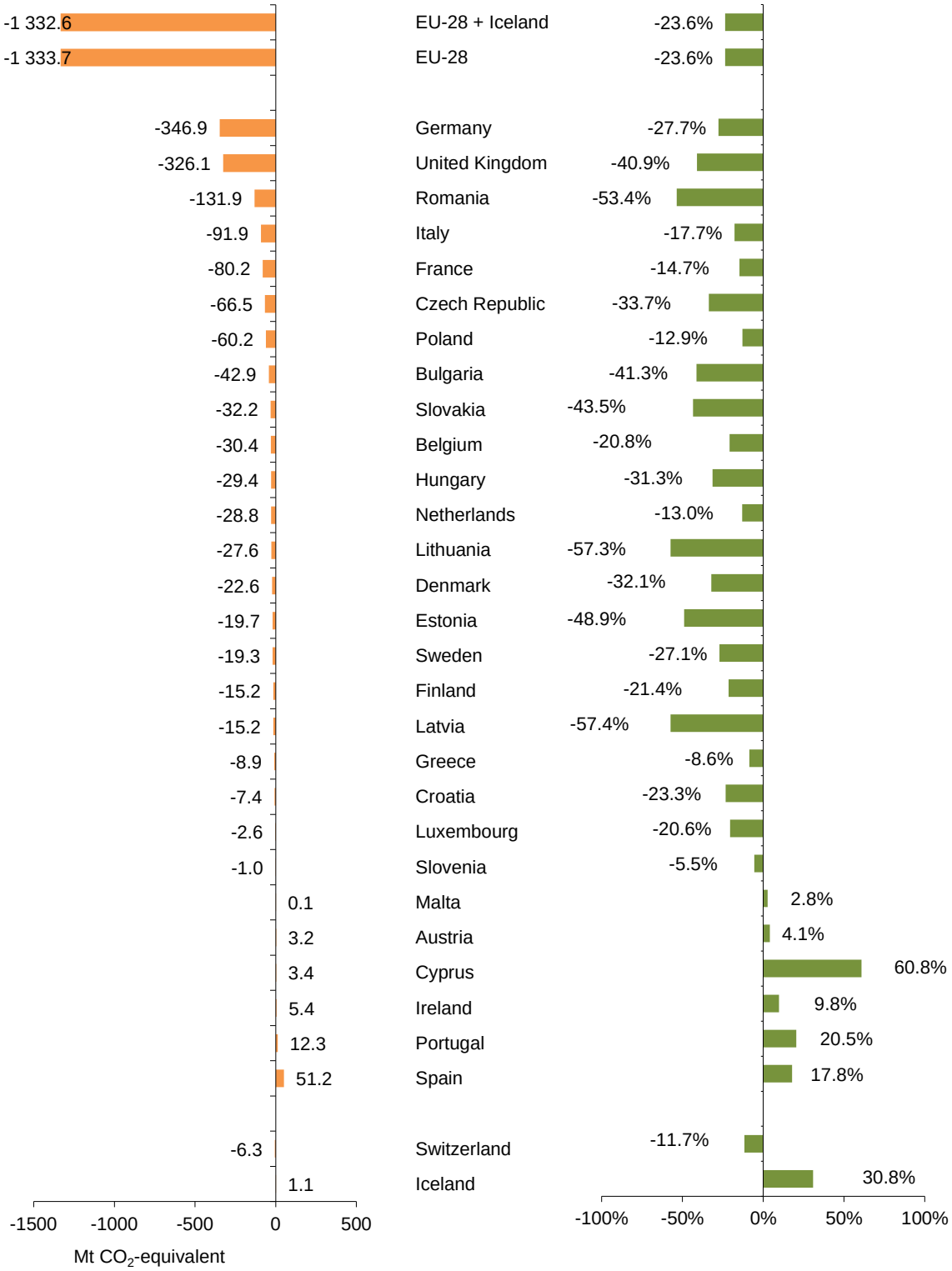
Malta increased its GHG emissions by 0.25 Mt CO_2-eq in 2017 compared to 2016. As Malta is the smallest GHG emitter within the European Union this corresponds to a relative increase of 13.1 %, by far the largest relative emission change of all Member States. According to Eurostat's monthly data liquid fuel consumption decreased by 28 % while in contrast Malta consumed in 2017 significant amounts of natural gas for the first time offsetting electricity imports over the interconnector with Sicily which stood at an exceptionally high level the previous year to make up for the decommissioning of the HFO power plants. In fact, Eurostat's monthly electricity data shows more than a doubling of electricity generation while electricity imports halved. In 2017 Malta commissioned its first natural-gas fired power station which is combined with an LNG terminal.[16] Emissions of 1.A.1 Energy industries subsequently increased by 0.18 Mt CO_2-eq or 12.9 %. The second largest emission change was a 0.06 Mt CO_2-eq (+23.3 %) growth in 2.F Product uses as ODS substitutes. Further emission increases occurred in 1.A.4 Other sectors (+0.03 Mt CO_2-eq resp. +15.8 %) and in 1.A.3 Transport (+0.01 Mt CO_2-eq resp. +2.0 %). Emissions changes in all other sectors are less than ±0.01 Mt CO_2-eq.

2.1.4 Change in Member State GHG emissions 1990 to 2017

Total EU plus Iceland GHG emissions in 2017 are estimated to be −23.6 % or −1332.6 Mt CO_2eq below 1990 levels as shown in Figure 5. Emissions for most EU-28 Member States were lower compared to 1990 while emissions in Austria, Cyprus, Ireland, Malta, Portugal and Spain all saw increases. The largest absolute decrease was in Germany, followed by the United Kingdom and Romania which all reduced their GHG emissions by more than 100 Mt CO_2-eq. The largest absolute increase was experienced Spain with 51.2 Mt CO_2-eq. The absolute emission increases in the remaining five Member States are lower by an order of magnitude.

[16] Enemalta: Delimara Power Station, https://www.enemalta.com.mt/about-us/delimara-power-station/, accessed 21 August 2018.
Power Technology: Malta LNG-to-Power Project, Marsaxlokk, https://www.power-technology.com/projects/malta-lng-to-power-project-marsaxlokk/, accessed 21 August 2018.

Figure 5 Member States emissions, change 1990-2017



Note: Total GHG emissions without LULUCF including indirect CO_2.

Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

The largest relative emission decreases in 2017 were in Lithuania, Latvia and Romania which all reduced their emissions by more than 50 % compared to 1990. The relative emission decreases of further nine Member States are stronger than the EU plus Iceland average. By far the largest relative emission increase was in Cyprus (+60.8 %) while the changes in other EU Member States with increased emissions compared to 1990 are all below +21 %.

Of the two non-EU member countries of the EEA considered in this report only Switzerland had in 2017 lower GHG emissions compared to 1990 level, while Iceland shows an increase.

2.1.5 Detailed results for the EU-28 and EU plus Iceland

This section begins with a brief comparison of the effect of including emissions from international aviation in the totals. Table 2 summarises the emissions as CO_2-eq and percentage changes. Note that in their proxy submissions, a number of Member States repeated the 2016 amount for emissions from international aviation. The same approach was used for gap filling where Member States did not include an estimate. For the EU plus Iceland 2017 proxy, 2016 values for international aviation emissions were repeated for 15 countries.

Table 2 Emissions including international aviation (kt CO_2-eq)

European Union (EU28)	**1990**	**2016**	**2017**	**2017-2016**	**2017/2016**	**2017-1990**	**2017/1990**
Total excl. LULUCF incl. indirect CO_2	**5 650 361**	**4 292 742**	**4 316 659**	**23 917**	**0.56%**	**-1 333 702**	**-23.60%**
International aviation	**69 210**	**148 033**	**149 836**	**1 803**	**1.22%**	**80 626**	**116.49%**
Total CO_2e including international aviation	**5 719 571**	**4 440 775**	**4 466 495**	**25 720**	**0.58%**	**-1 253 076**	**-21.91%**
European Union (EU28) plus Iceland							
Total excl. LULUCF incl. indirect CO_2	**5 653 995**	**4 297 411**	**4 321 414**	**24 002**	**0.56%**	**-1 332 581**	**-23.57%**
International aviation	**69 432**	**148 958**	**150 761**	**1 803**	**1.21%**	**81 329**	**117.14%**
Total CO_2e including international aviation	**5 723 427**	**4 446 369**	**4 472 174**	**25 805**	**0.58%**	**-1 251 252**	**-21.86%**

Table 3 and Table 4 show the detailed results for the EU-28 and the EU plus Iceland for 2017. Summary tables for 2017 for each Member State as submitted by the Member States or by EEA for Member States which did not submit their own approximated emissions report are provided in section 6.

Table 3 Summary table of approximated GHG emissions for 2017 for EU-28 (total emissions without LULUCF including indirect CO_2)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)
This sheet is a sum of the 28 MS_2016 (submitted or gapfilled) proxy sheets

Year 2017
Submission 2018
Country EU28
Geographical scope Sum of the 28 MS

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	3 514 375	445 317	234 954	108 587	4 143	6 386	1 349	61	4 315 171		
1. Energy	3 254 234	84 055	30 001						3 368 290		
A. Fuel combustion (sectoral approach)	3 229 840	24 678	29 888						3 284 406		
1. Energy industries	1 180 274	4 470	7 707						1 192 451		
2. Manufacturing industries and construction	476 623	2 060	4 177						482 860		
3. Transport	935 045	1 215	9 615						945 876		
4. Other sectors	632 185	16 919	8 306						657 410		
5. Other	5 713	14	83						5 809		
B. Fugitive emissions from fuels	24 395	59 377	113						83 885		
1. Solid fuels	2 940	26 404	0						29 344		
2. Oil and natural gas	21 454	32 974	113						54 541		
C. CO_2 transport and storage	-								-		
2. Industrial processes and product use	246 287	1 696	10 603	108 587	4 143	6 386	1 349	61	379 111		
A. Mineral industry	110 512								110 512		
B. Chemical industry	53 234	1 430	7 053	410	2 341	90	-	-	64 558		
C. Metal industry	71 649	172	22	74	505	144	60	-	72 626		
D. Non-energy products from fuels and solvent use	10 171	2	5						10 178		
E. Electronic Industry				58	548	133	2	61	803		
F. Product uses as ODS substitutes				108 030	98	-	842	-	108 970		
G. Other product manufacture and use	526	78	3 444	12	647	5 982	444	-	11 134		
H. Other	195	14	79	3	4	37	-	-	331		
3. Agriculture	10 518	237 694	183 511						431 724		
A. Enteric fermentation		191 531							191 531		
B. Manure management		41 617	22 605						64 223		
C. Rice cultivation		2 578							2 578		
D. Agricultural soils		-	160 414						160 414		
E. Prescribed burning of savannas		-	-						-		
F. Field burning of agricultural residues		633	230						863		
G. Liming	5 532								5 532		
H. Urea application	4 670								4 670		
I. Other carbon-containing fertilizers	316								316		
J. Other	-	1 335	263						1 598		
4. Land use, land-use change and forestry[1]	NE	NE	NE						NE		
A. Forest land	NE	NE	NE						NE		
B. Cropland	NE	NE	NE						NE		
C. Grassland	NE	NE	NE						NE		
D. Wetlands	NE	NE	NE						NE		
E. Settlements	NE	NE	NE						NE		
F. Other land	NE	NE	NE						NE		
G. Harvested wood products	NE								NE		
H. Other	NE	NE	NE						NE		
5. Waste	3 336	121 872	10 838						136 045		
A. Solid waste disposal	-	97 119							97 119		
B. Biological treatment of solid waste		4 552	2 955						7 507		
C. Incineration and open burning of waste	3 319	400	524						4 242		
D. Waste water treatment and discharge		19 794	7 287						27 081		
E. Other	17	6	72						96		
6. Other *(as specified in summary 1.A)*	-	-	-						-		

Memo items:[2]									-		
International bunkers	164 703	169	1 367						224 690		
Aviation	121 731	37	1 100						149 836		
Navigation	86 812	137	689						119 121		
Multilateral operations	2	0	0						2		
CO_2 emissions from biomass	361 419								448 784		
CO_2 captured	134	-							134		
Long-term storage of C in waste disposal sites	185 206	-							185 206		
Indirect N_2O			3 200								
Indirect CO_2 [3]	1 488										
Total CO_2 equivalent emissions without land use, land-use change and forestry									4 315 171		
Total CO_2 equivalent emissions with land use, land-use change and forestry									NE		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									4 316 659	1 726 613	2 590 046
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NE		

Source: Member States' proxy estimates, gap filled with EEA's proxy estimates

Table 4 Summary table of approximated GHG emissions for 2017 for EU plus Iceland (total emissions without LULUCF including indirect CO_2)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)
This sheet is a sum of the 28 MS_2016 plus IS_2016 (submitted or gapfilled) proxy sheets

Year 2017
Submission 2018
Country EU28+IS
Geographical scope Sum of the 28 MS plus IS

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	3 525 884	448 146	235 331	108 779	4 211	6 387	1 349	61	4 330 147		
1. Energy	3 256 029	84 063	30 054						3 370 147		
A. Fuel combustion (sectoral approach)	3 231 486	24 682	29 942						3 286 109		
1. Energy industries	1 180 276	4 470	7 707						1 192 453		
2. Manufacturing industries and construction	476 808	2 060	4 190						483 059		
3. Transport	935 979	1 218	9 652						946 849		
4. Other sectors	632 708	16 920	8 310						657 939		
5. Other	5 713	14	83						5 809		
B. Fugitive emissions from fuels	24 544	59 381	113						84 037		
1. Solid fuels	2 940	26 404	0						29 344		
2. Oil and natural gas	21 603	32 977	113						54 693		
C. CO_2 transport and storage	-								-		
2. Industrial processes and product use	248 079	1 699	10 606	108 779	4 211	6 387	1 349	61	381 171		
A. Mineral industry	110 512								110 512		
B. Chemical industry	53 234	1 430	7 053	410	2 341	90	-	-	64 558		
C. Metal industry	73 436	176	22	74	573	144	60	-	74 484		
D. Non-energy products from fuels and solvent use	10 176	2	5						10 183		
E. Electronic Industry				58	548	133	2	61	803		
F. Product uses as ODS substitutes				108 222	98	-	842	-	109 162		
G. Other product manufacture and use	526	78	3 447	12	647	5 984	444	-	11 138		
H. Other	195	14	79	3	4	37	-	-	331		
3. Agriculture	10 523	238 056	183 747						432 325		
A. Enteric fermentation		191 837							191 837		
B. Manure management		41 673	22 656						64 329		
C. Rice cultivation		2 578							2 578		
D. Agricultural soils		-	160 598						160 598		
E. Prescribed burning of savannas		-	-						-		
F. Field burning of agricultural residues		633	230						863		
G. Liming	5 534								5 534		
H. Urea application	4 670								4 670		
I. Other carbon-containing fertilizers	318								318		
J. Other	-	1 335	263						1 598		
4. Land use, land-use change and forestry[1]	NE	NE	NE						NE		
A. Forest land	NE	NE	NE						NE		
B. Cropland	NE	NE	NE						NE		
C. Grassland	NE	NE	NE						NE		
D. Wetlands	NE	NE	NE						NE		
E. Settlements	NE	NE							NE		
F. Other land	NE	NE	NE						NE		
G. Harvested wood products	NE	NE	NE						NE		
H. Other	NE	NE	NE						NE		
5. Waste	3 342	122 093	10 847						136 283		
A. Solid waste disposal	-	97 332							97 332		
B. Biological treatment of solid waste		4 555	2 956						7 511		
C. Incineration and open burning of waste	3 325	400	524						4 250		
D. Waste water treatment and discharge		19 800	7 294						27 094		
E. Other	17	6	72						96		
6. Other ***(as specified in summary 1.A)***											

Memo items:[2]											
International bunkers	NE	NE	NE						NE		
Aviation	122 648	37	1 108						150 761		
Navigation	NE	NE	NE						NE		
Multilateral operations	NE								NE		
CO_2 emissions from biomass	NE								NE		
CO_2 captured	NE	NE							NE		
Long-term storage of C in waste disposal sites	NE	NE							NE		
Indirect N_2O			NE								
Indirect CO_2 [3]	1 488										
Total CO_2 equivalent emissions without land use, land-use change and forestry									4 319 925		
Total CO_2 equivalent emissions with land use, land-use change and forestry									NE		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									4 321 414	1 728 444	2 592 969
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NE		

Source: Member States' proxy estimates, gap filled with EEA's proxy estimates

2.2 Sectoral results

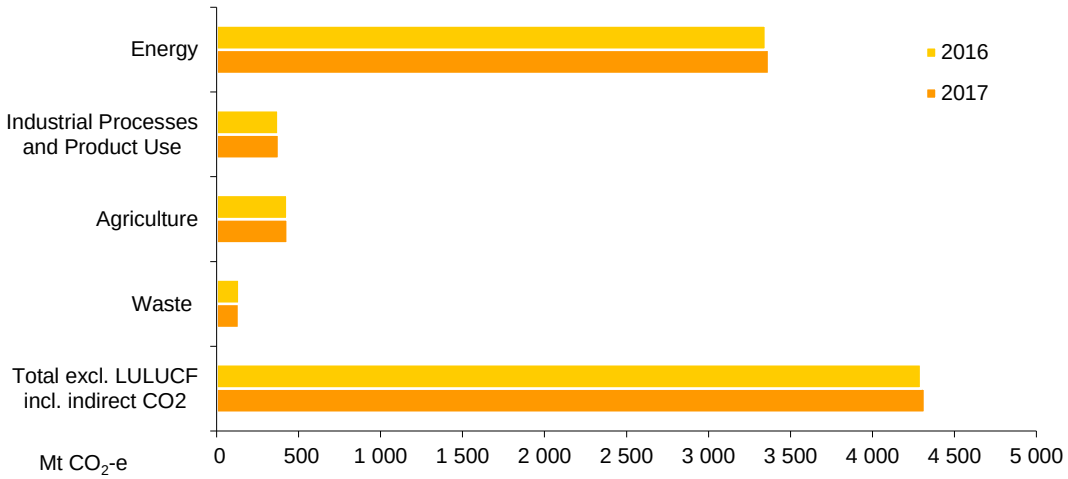
Table 5 and Figure 6 show the changes between 2016 and 2017 at sectoral level for the EU plus Iceland.

Table 5 Emissions by sector, change 2016-2017

Change 2016 / 2017, EU plus Iceland	Mt CO_2-eq	%
Energy	+20.0	+0.6%
Industrial Processes and Product Use	+4.7	+1.3%
Agriculture	+1.7	+0.4%
Waste	−2.5	−1.8%
Total excl. LULUCF incl. indirect CO_2	+24.0	+0.6%

Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

Figure 6 Emissions by sector, EU plus Iceland 2016-2017



Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

On a sectoral basis, the largest absolute emission change occurred in the Energy sector (i.e. all combustion activities and fugitive emissions from energy). GHG emissions grew by 20.0 Mt CO_2-eq (+0.6 %) across the EU plus Iceland. More detailed explanations for the trends in the energy sector are provided in section 2.2.1 Energy.

The greenhouse gas emissions from Industrial Processes and Product Use increased by 4.7 Mt CO_2-eq (+1.3 %) and the agricultural sector saw an increase of 1.7 Mt CO_2-eq (+0.4 %). The waste sector is the only sector where emissions were reduced, the emissions decreased by 2.5 Mt CO_2-eq (−1.8 %).

2.2.1 Energy

Emissions from the energy sector contributed about 78 % of total EU plus Iceland emissions in 2017. Emissions from fuel combustion saw an increase of 20.5 Mt CO_2-eq or 0.6 % since 2016. Table 6 shows

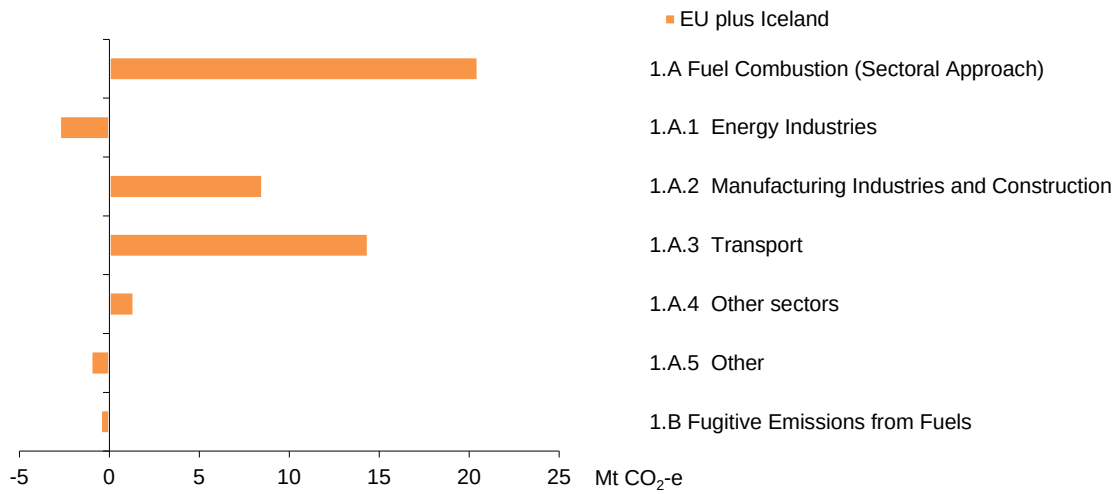
that by far the largest change in fuel combustion emissions occurred in 1.A.3 Transport with an increase of 14.4 Mt CO_2-eq (+1.5 %). In the sector 1.A.2 Manufacturing industries and construction emissions also increased emissions (+8.5 Mt CO_2-eq resp. +1.5 %). Emissions in 1.A.4 Other sectors (+1.4 Mt CO_2-eq or +0.2 %) increased only slightly. 1.A.4 Other sectors, which mainly consists of residential and commercial activities, saw a relatively small increase (+0.2 %). The change of 1.A.5 is mainly an artefact.[17] The sum of the sectors 1.A.4 and 1.A.5 is almost constant. In the sector 1.A.1 Energy industries emissions fell by 2.8 Mt CO_2-eq (−0.2 %) and 1.B Fugitive emissions from fuels decreased by 0.50 Mt CO_2-eq (−0.6 %).

Table 6 Energy sector emissions, change 2016-2017

Change 2016 / 2017, EU plus Iceland	Mt CO_2eq	%
1.A Fuel Combustion (Sectoral Approach)	+20.5	+0.6%
1.A.1 Energy Industries	−2.8	−0.2%
1.A.2 Manufacturing Industries and Construction	+8.5	+1.8%
1.A.3 Transport	+14.4	+1.5%
1.A.4 Other sectors	+1.4	+0.2%
1.A.5 Other	−1.0	−14.7%
1.B. Fugitive Emissions from Fuels	−0.5	−0.6%

Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

Figure 7 Energy sector emissions, EU plus Iceland change 2016-2017



Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

[17] In its 2018 GHG inventory submission, Germany reported 1.0 Mt CO2eq emissions in source category 1.A.5 for year 2016. In the 2017 proxy these emissions were reported "included elsewhere" (IE) and included in 1.A.4 Other sectors. EEA and its ETC/ACM did not re-allocate these emissions.

The largest emissions increase for 1.A Fuel Combustion on Member States level was in Spain (+14.7 Mt CO_2-eq) followed by Poland (+9.8 Mt CO_2-eq) France (+8.1 Mt CO_2-eq) and Portugal (+4.2 Mt CO_2-eq). Largest emission decrease was in the United Kingdom (−12.5 Mt CO_2-eq) followed by Germany (−5.4 Mt CO_2-eq), Denmark (−2.7 Mt CO_2-eq) and Finland and the Netherlands (−2.5 Mt CO_2-eq each). Emissions from Fuel Combustion increased in 17 Member States and decreased in 11 Member States. Iceland estimated constant emissions.

Going to more detail in the sub category 1.A.1 Energy Industries, largest reduction was in Germany (−13.7 Mt CO_2-eq), followed by the United Kingdom (−8.8 Mt CO_2-eq) and the Netherlands (−3.9 Mt CO_2-eq). Largest increases were in Spain (+10.9 Mt CO_2-eq) followed by France (+4.3 Mt CO_2-eq), Portugal (+3.8 Mt CO_2-eq) and Greece (+3.7 Mt CO_2-eq).

Emissions changes in the sector 1.A.2 Manufacturing Industries and Construction were significantly smaller. The largest increase was in Germany (+3.7 Mt CO_2-eq) followed by Spain (+1.7 Mt CO_2-eq), France and the Netherlands (+1.2 Mt CO_2-eq each) and the largest decrease in the Czech Republic (−0.8 Mt CO_2-eq) followed by Sweden and Finland (−0.5 Mt CO_2-eq).

Emissions from 1.A.3 Transport increased in 21 Member States. The largest increases were in Poland (+5.9 Mt CO_2-eq), Germany (+3.8 Mt CO_2-eq), Spain (+2.2 Mt CO_2-eq) and the Czech Republic (+2.2 Mt CO_2-eq), while largest decreases was in Italy (−2.1 Mt CO_2-eq) followed by Denmark (−1.0 Mt CO_2-eq) and Finland (−0.8 Mt CO_2-eq).

In 1.A.4 Other Sectors (which include residential and commercial) emissions increased in half of the Member States. The largest increases occurred in Poland (+2.3 Mt CO_2-eq), France (+2.0 Mt CO_2-eq), Germany (+1.7 Mt CO_2-eq) and Italy (+1.4 Mt CO_2-eq). The largest decrease was in the United Kingdom (−3.4 Mt CO_2-eq) followed by Belgium (−2.0 Mt CO_2-eq).

Emission changes in the sector 1.A.5 Other in all Member States are less than ±0.1 Mt CO_2-eq.[18]

1.B Fugitive Emissions from fuels both increased or decreased in ten Member States each while eight member states report constant emissions or notation keys. The largest decrease was in the Netherlands (−0.3 Mt CO_2-eq) and the largest increase in Sweden and Hungary (+0.1 Mt CO_2-eq each).

2.2.2 Industrial Processes and Product Use

Industrial Processes and Product Use (IPPU) contribute to about 9 % of total EU plus Iceland emissions and are the third most important source after energy and agriculture. Emissions from Industrial Processes increased by 4.7 Mt CO_2-eq for the EU plus Iceland (+1.3 %). Table 7 and Figure 8 show the sub-sector contribution to this trend in emissions. The largest emission increase occurred in the subsector 2.A Mineral products followed by subsector 2.B Chemical industry. For all other subsectors emissions changes are only small.

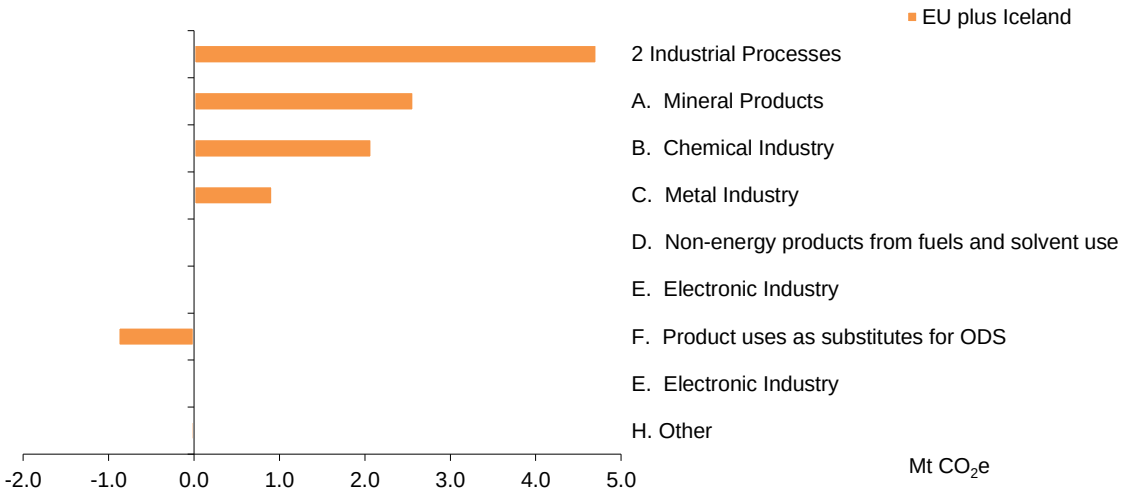
[18] For Germany see footnote 17.

Table 7 Industrial Processes and Product Use emissions, change 2016-2017

Change 2016 / 2017, EU plus Iceland	Mt CO_2-eq	%
2 Industrial Processes	+4.7	+1.3%
A. Mineral Products	+2.6	+2.4%
B. Chemical Industry	+2.1	+3.3%
C. Metal Industry	+0.9	+1.2%
D. Non-energy products from fuels and solvent use	0.0	+0.2%
E. Electronic Industry	0.0	−3.5%
F. Product uses as substitutes for ODS	−0.9	−0.8%
G. Other Product Manufacture and Use	+0.1	+0.7%
H. Other	0.0	−9.4%

Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

Figure 8 Industrial Processes and Product Use emissions, EU plus Iceland, change 2016-2017



Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

In 21 of the EU-28 Member States and also in Iceland emissions from IPPU increased, in only seven they decreased. The largest increase of IPPU emissions was in Germany and Hungary (+1.0 Mt CO_2-eq) followed by Austria (+0.8 Mt CO_2-eq) and the Netherlands and the Czech Republic (+0.6 Mt CO_2-eq each) while the largest decreases were in Spain (−1.4 Mt CO_2-eq) followed by Greece (−0.4 Mt CO_2-eq) and Sweden (−0.3 Mt CO_2-eq).

The largest IPPU subsector increase was in 2.A Mineral Products where emissions increased by 2.5 Mt CO_2-eq or 2.4 %. The largest increase was in Poland (+0.45 Mt CO_2-eq), Germany (+0.38 Mt CO_2-eq) and France (+0.32 Mt CO_2-eq) while the largest decreases were in Greece (−0.18 Mt CO_2-eq) and Belgium (−0.16 Mt CO_2-eq).

Emissions from 2.B Chemical Products significantly increased in the EU plus Iceland (+2.1 Mt CO_2-eq or −+3.3 %). The largest increases were in the Netherlands (+0.56 Mt CO_2-eq) followed by Slovakia (+0.41 Mt CO_2-eq), Lithuania (+0.33 Mt CO_2-eq) and Hungary (+0.31 Mt CO_2-eq) while the largest decrease was in Greece (−0.24 Mt CO_2-eq) followed by France (−0.10 Mt CO_2-eq).

Emissions from 2.C Metal Industry increased by +0.9 Mt CO_2-eq or +1.2 % with the largest increase in Austria (+0.82 Mt CO_2-eq) followed by Germany (+0.60 Mt CO_2-eq) and Hungary (+0.38 Mt CO_2-eq). The largest decrease occurred in Poland (−0.27 Mt CO_2-eq).

The IPPU sub-sector 2.D Non-energy Products from Fuels and Solvent Use has for the EU plus Iceland had almost constant emissions (+0.02 Mt CO_2-eq or +0.2 %). Largest emission changes were in Ireland (+0.06 Mt CO_2-eq) and the United Kingdom (−0.05 Mt CO_2-eq).

The IPPU sub-sector 2.E Electronic Industry showed for whole EU plus Iceland only slight absolute emission changes (−0.03 Mt CO_2-eq) but significant relative emission decrease (−3.5 %). Emissions changes for individual Member States were within ±0.02 Mt CO_2-eq and the strongest emission change was found for the Netherlands (−0.05 Mt CO_2-eq).

The IPPU sub-sector 2.F Product uses as substitutes for ODS saw emissions decrease by 0.9 Mt CO_2-eq (−0.8 %). In seven Member States emissions increased in this source category, for twelve Member States and Iceland constant 2.F emissions were estimated and in only three Member States emissions decreased. By far the largest change of emissions was in Spain, where 2.F emissions fell by 1.7 Mt CO_2-eq. In contrast, emissions increased significantly in Italy (+0.23 Mt CO_2-eq), Hungary (+0.21 Mt CO_2-eq) and Greece (+0.14 Mt CO_2-eq). All other emission changes where less than ±0.1 Mt CO_2-eq.

Emissions from 2.G Other Product Manufacture and Use increased slightly for whole EU plus Iceland (+0.07 Mt CO_2-eq or +0.67 %). Emission changes of all other Member States are less than ±0.1 Mt CO_2-eq.

The decrease of emissions from 2.H Other is almost irrelevant by absolute terms (−0.03 Mt CO_2-eq) but significant in relative terms (−9.4 %).

2.2.3 Agriculture

Agriculture (excluding LULUCF) contributes to 10 % of European GHG emissions. Emissions from agriculture increased by only 1.7 Mt CO_2-eq or 0.4 % since 2016. The largest greenhouse gas emitting activities within the sector are CH_4 from livestock and N_2O from soils. Enteric fermentation and soils contributed about 44 % and 37 % of the of the sector's emissions respectively. As shown in Table 8 and Figure 9 the increase in agriculture sector emissions is largely due to increased emissions from soils and enteric fermentation. Manure management, which contributes to about 15 % of agricultural emissions, saw a small decrease.

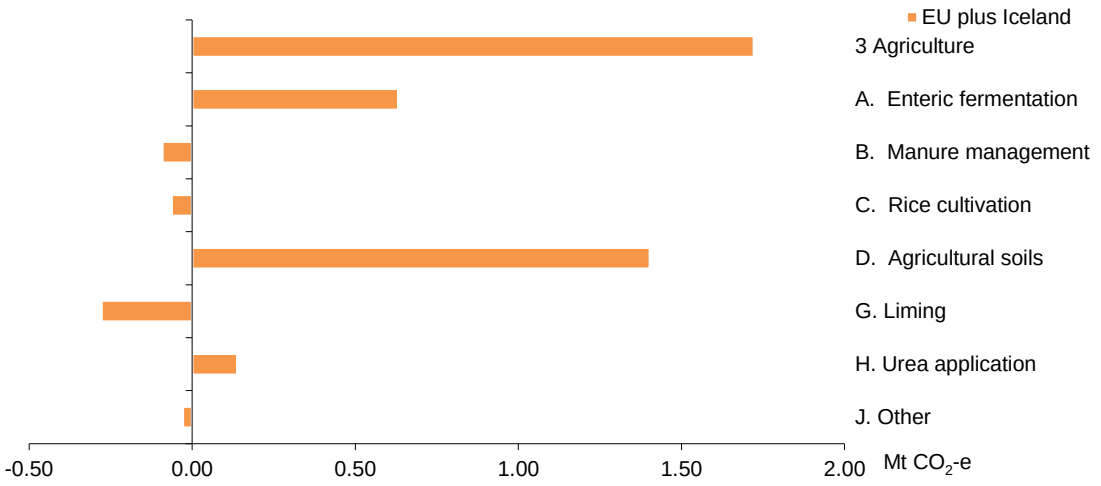
Table 8 and Figure 9 show the sub-sector 2016-2017 change, with CH_4 and N_2O emissions shown as CO_2 equivalents (Mt CO_2-eq).

Table 8 Agriculture sector emissions, change 2016-207

Change 2016 / 2017, EU plus Iceland	Mt CO_2-eq	%
3 Agriculture	+1.7	+0.4%
A. Enteric fermentation	+0.6	+0.3%
B. Manure management	−0.1	−0.1%
C. Rice cultivation	−0.1	−2.4%
D. Agricultural soils	+1.4	+0.9%
E. Prescribed burning of savannas	-	-
F. Field burning of agricultural residues	0.0	+0.3%
G. Liming	−0.3	−4.8%
H. Urea application	+0.1	+3.0%
I. Other carbon-containing fertilizers	0.0	+2.5%
J. Other	0.0	−1.8%

Source: The EEA's ETC/ACM, based on 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

Figure 9 Agriculture sector emissions, EU plus Iceland, change 2016-2017



Note: Although sub-sectors E. Prescribed burning of savannas, F. Field burning of agricultural residues, and I. Other carbon containing fertilizers are shown in Table 8, they only contribute to about 2% of EU Agricultural emissions and barely change over time so they are not shown in Figure 9.

Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

Emissions from Enteric Fermentation increased with an overall rise of 0.6 Mt CO_2-eq or 0.3 %. The largest absolute and relative increases were in Poland (0.4 Mt CO_2-eq or 2.9 %), Ireland (0.3 Mt CO_2-eq or 3.1 %) and Spain (0.2 Mt CO_2-eq or 1.3 %).

Emissions of CH_4 and N_2O from manure management contribute to about 15 % of agriculture sector and have changed very little over the last year with decreases just outweighing increases. The largest increase was in Spain (0.2 Mt CO_2-eq or 2.3 %) and the largest decrease was in Greece (0.3 Mt CO_2-eq or 31 %).

Agricultural soils contribute to about 37 % of the emissions from agriculture and show a marked increase on 2016 (1.4 Mt CO_2-eq, 0.9 %). Large increases were seen in Poland (0.7 Mt CO_2-eq, 6 %)

Spain (0.5 Mt CO_2-eq, 5 %) and Ireland (0.3 Mt CO_2-eq, 5 %). The largest decrease was in Austria (0.1 Mt CO_2-eq, 6 %).

2.2.4 Waste

The Waste sector contributes to about 3 % of European emissions. Waste related emissions continue to decrease reflecting the large relative proportion of emissions from solid waste disposal (71 % of Waste emissions are from Solid waste disposal) and the ongoing effect of restrictions on landfilling of organic degradable waste that was implemented decades ago.

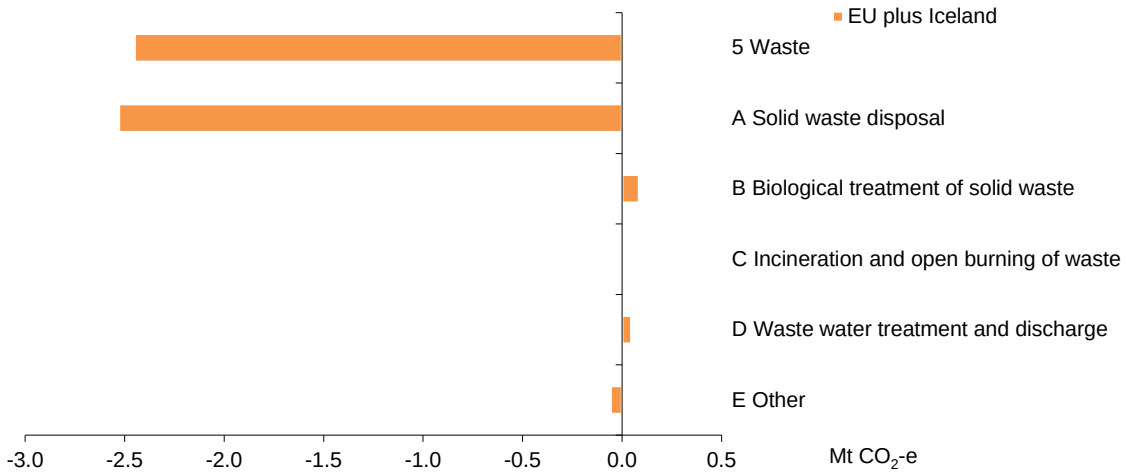
Emissions from the Waste sector decreased by −2.5 Mt CO_2-eq compared to 2016. Table 9 and Figure 10 show the sub-sector contributions to this trend in emissions.

Table 9 Waste sector emissions, change 2016-2017

Change 2016 / 2017, EU plus Iceland	Mt CO_2-eq	%
5 Waste	−2.5	−1.8%
A Solid Waste Disposal	−2.5	−2.5%
B Biological Treatment of Solid Waste	+0.1	+1.2%
C Incineration and Open burning of Waste	0.0	+0.1%
D Waste Water Treatment and Discharge	0.0	+0.2%
E Other	−0.1	−37.6%

Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016 and proxy estimates for 2017.

Figure 10 Waste sector emissions, EU plus Iceland, change 2016-2017



Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to the UNFCCC for 1990-2016 and proxy estimates for 2017

In most Member States there was very little change in emissions from waste. In twenty-one Member States the increase or decrease was less than 100 kt CO_2-eq with the largest increase being less than 40 kt CO_2-eq. The largest decrease of waste emissions was in Italy (−0.7 Mt CO_2-eq), followed by Germany (−0.5 Mt CO_2-eq).

The trends of 5.A Solid Waste emissions dominate the waste sector. Fourteen Member States decreased emissions from solid waste (largest decrease in Italy with −0.8 Mt CO_2-eq) while only seven Member States had increases in emissions (largest Estonia with +50 kt CO_2-eq). For the remaining Member States constant emissions were estimated.

2.3 ETS versus ESD emissions

Within the European Union, to achieve short-term GHG emission targets, the emissions covered by the EU Emissions Trading System (ETS) are subject to an EU-wide cap, while non-ETS emissions are subject to national targets as stated in Effort Sharing Decision (ESD). From 2021, they will be accompanied by national no debit commitments with respect to LULUCF. ESD emissions are calculated by deducting ETS emissions, CO_2 emissions from domestic aviation, and NF_3 emissions from national total GHG emissions (including indirect CO_2 emissions and excluding emissions from LULUCF, international aviation and international shipping), see Equation 1.

Equation 1

$E_{ESD} = E_{total} - E_{ETS} - E_{1A3a,CO2} - E_{NF3}$	
With:	
E_{ESD}	Emission under Effort Sharing Decision
E_{total}	Total emissions excl. LULUCF incl. indirect CO_2
E_{ETS}	Emissions under the Emissions Trading Scheme without aviation
$E_{1A3a,CO2}$	CO_2 emissions from domestic aviation
E_{NF3}	NF_3 emissions

In this approximated inventory report ESD emissions will approximate emissions not falling under the ETS (non-ETS).

Table 10 shows total, ETS and ESD emissions per country. 2016 total emissions come from the latest inventory, 2017 total emissions from the proxies. ETS emissions are taken from the European Union Transaction Log (EUTL; European Commission, 2018b) for stationary installations, ESD emissions are calculated as described in the formula above. Relative changes in emissions between the years 2016 and 2017 can be seen on the right.

Table 10 Total, ETS and ESD emissions 2016 and 2017, kt CO_2-eq

MS	2016 GHG emissions			2017 GHG emissions			Change 2017 versus 2016		
	Total	ETS	ESD	Total	ETS	ESD	Total	ETS	ESD
AT	79 673	29 000	50 619	81 884	30 555	51 269	2.8%	5.4%	1.3%
BE	117 727	43 656	74 063	116 210	43 773	72 429	-1.3%	0.3%	-2.2%
BG	59 060	33 411	25 588	61 049	34 908	26 080	3.4%	4.5%	1.9%
CY	8 773	4 649	4 123	8 990	4 673	4 317	2.5%	0.5%	4.7%
CZ	129 583	67 531	62 040	130 968	66 976	63 979	1.1%	-0.8%	3.1%
DE	909 404	452 891	454 146	904 745	437 647	464 730	-0.5%	-3.4%	2.3%
DK	50 478	17 220	33 125	47 812	15 078	32 600	-5.3%	-12.4%	-1.6%
EE	19 627	13 448	6 178	20 649	14 671	5 976	5.2%	9.1%	-3.3%
ES	324 707	123 556	198 472	338 860	136 319	199 863	4.4%	10.3%	0.7%
FI	58 790	27 245	31 358	56 078	25 123	30 769	-4.6%	-7.8%	-1.9%
FR	458 165	101 615	351 878	466 164	106 766	354 726	1.7%	5.1%	0.8%
GR	91 607	46 300	44 897	94 233	49 572	44 251	2.9%	7.1%	-1.4%
HR	24 304	8 267	16 006	24 459	8 368	16 060	0.6%	1.2%	0.3%
HU	61 464	19 401	42 060	64 438	20 642	43 792	4.8%	6.4%	4.1%
IE	61 546	17 737	43 798	60 937	16 896	44 029	-1.0%	-4.7%	0.5%
IT	427 862	154 994	270 685	426 436	155 314	268 939	-0.3%	0.2%	-0.6%
LT	20 083	6 160	13 922	20 524	6 283	14 239	2.2%	2.0%	2.3%
LU	10 028	1 503	8 524	10 156	1 492	8 663	1.3%	-0.8%	1.6%
LV	11 306	2 197	9 107	11 275	2 050	9 224	-0.3%	-6.7%	1.3%
MT	1 910	580	1 326	2 161	724	1 433	13.1%	24.9%	8.0%
NL	195 242	93 870	101 342	192 475	91 357	101 088	-1.4%	-2.7%	-0.3%
PL	395 824	198 052	197 656	407 036	202 167	204 753	2.8%	2.1%	3.6%
PT	67 776	25 745	41 583	72 211	30 065	41 698	6.5%	16.8%	0.3%
RO	112 542	39 778	72 680	114 897	40 617	74 196	2.1%	2.1%	2.1%
SE	52 893	19 736	32 612	52 170	18 917	32 708	-1.4%	-4.1%	0.3%
SI	17 718	6 479	11 237	17 605	6 570	11 033	-0.6%	1.4%	-1.8%
SK	41 037	21 264	19 770	41 807	22 063	19 740	1.9%	3.8%	-0.1%
UK	482 848	147 421	333 889	470 432	137 025	331 869	-2.6%	-7.1%	-0.6%
EU28	**4 292 742**	**1 723 704**	**2 553 451**	**4 316 659**	**1 726 613**	**2 574 453**	**0.6%**	**0.2%**	**0.8%**
IS	4 669	1 781	2 866	4 755	1 832	2 900	1.8%	2.8%	1.2%
EU28+IS	**4 297 411**	**1 725 485**	**2 556 316**	**4 321 414**	**1 728 444**	**2 577 415**	**0.6%**	**0.2%**	**0.8%**

Note: Only emissions from stationary installations are included in these ETS data hence emission from aviation is excluded.

Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016, proxy estimates for 2017 totals. ETS data is from EUTL (verified emissions for 2016 and 2017, not from the Member States proxies).

In total, emissions changed by +0.6 % for EU plus Iceland between 2016 and 2017. They increased in the ETS sector and in the ESD sector but the increase in the ESD sector (+0.8 %) was much stronger than in the ETS sector (+0.2 %). Figure 11 illustrates all emission trend changes.

In absolute terms, the total emission increase in the EU plus Iceland was 24.0 Mt CO_2-eq. Of this increase 21.0 Mt CO_2-eq occurred in the ESD sector and only 2.9 Mt CO_2-eq in the ETS sector.

At Member State level the trend change in emissions separated between ETS and ESD looks similar. ETS emissions increased in eighteen Member States (Austria, Belgium, Bulgaria, Croatia, Cyprus, Estonia, France, Greece, Hungary, Italy, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, Slovenia and Spain) as well as in the EEA member country Iceland. By absolute amounts the largest increase occurred in Spain (+12.8 Mt CO_2-eq) followed by France (5.2 Mt CO_2-eq), Portugal (+4.3 Mt

CO_2-eq) and Poland (+4.1 Mt CO_2-eq). The largest relative increase of ETS emissions was in Malta (+24.9 %) followed by Portugal (+16.8 %), and Spain(+10.3 %).

In ten EU Member States (the Czech Republic, Denmark, Finland, Germany, Ireland, Latvia, Luxembourg, the Netherlands, Sweden and the United Kingdom) ETS emissions decreased. The largest absolute decrease was experienced in Germany (−15.2 Mt CO_2-eq) followed by the United Kingdom (−10.4 Mt CO_2-eq), the Netherlands (−2.5 Mt CO_2-eq) and Denmark and Finland (−2.1 Mt CO_2-eq each). Denmark saw the highest relative ETS emission decrease (−12.4 %), followed by Finland (−7.8 %), the United Kingdom (−7.1 %) and Latvia (−6.7 %).

Also ESD emissions increased in eighteen Member States (Austria, Bulgaria, Croatia, Cyprus, the Czech Republic, France, Germany, Hungary, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania Spain and Sweden) and the EEA member country Iceland. The largest absolute increase can be observed in the Germany (+10.6 Mt CO_2-eq), followed by Poland (+7.1 Mt CO_2-eq) and France (+2.8 Mt CO_2-eq). The largest relative increase was in Malta (+8.0 %), the second largest was in Cyprus (+4.7 %) and Hungary (+4.1 %).

Again ten Member States saw decreases in ESD emissions. The largest absolute ESD emission declines were in the United Kingdom (−2.0 Mt CO_2-eq) followed by Italy (−1.7 Mt CO_2-eq) and Belgium (−1.6 Mt CO_2-eq). The largest relative decrease of ESD emissions was in Estonia (−3.3 %) followed by Belgium (−2.2 %), Spain (−1.9 %) and Slovenia (−1.8 %).

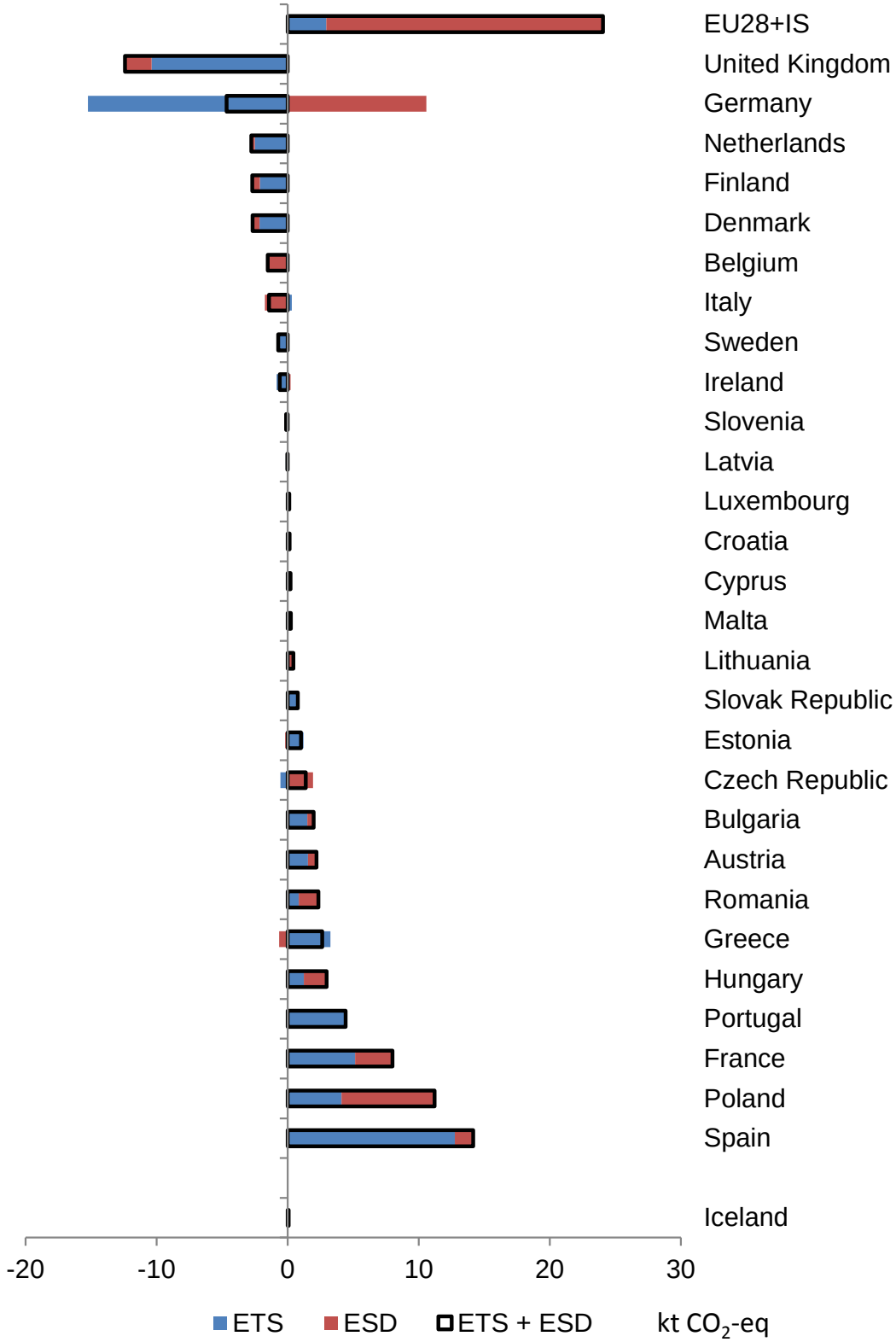
Increases of both ETS and ESD emissions can hence be seen for twelve Member States (Austria, Bulgaria, Croatia, Cyprus, France, Hungary, Lithuania, Malta, Poland, Portugal, Romania and Spain) as well as in Iceland. In contrary, there are only four Member States which had decreases in both ETS and ESD emissions: Denmark, Finland, the Netherlands and the United Kingdom.

In six Member States (the Czech Republic, Germany, Ireland, Latvia, Luxembourg and Sweden) emissions in the ETS sector decreased while emissions in the ESD sector increased. A contrasting development can be observed in further six Member States: Belgium, Estonia, Greece, Italy, Slovenia and Slovakia where ETS emissions increased and ESD emissions decreased.

The emission trends both in the ETS and the ESD resemble the emission changes discussed in chapter 2.2. Especially the strong increase of the ESD emissions is consistent with the strong emission increase in the transport sector.

Switzerland is not presented in this chapter as it does neither participate in the EU ETS nor the ESD.

Figure 11 ETS and ESD emissions, change 2016-2017



Source: The EEA's ETC/ACM, based on the 2018 Member States' GHG inventories submitted to UNFCCC for the years 1990-2016, proxy estimates for 2017 totals. ETS data is from EUTL (verified emissions for 2016 and 2017, not from the Member States proxies).

3. Performance of last year's EU proxy

National GHG inventories are required to fulfil certain principles as laid out in the UNFCCC reporting guidelines for GHG inventories: inventories must be transparent, consistent, comparable, complete and accurate (TCCCA). The IPCC Good Practice Guidance recommends Parties to perform QA/QC procedures that are important information to enable continuous improvement to inventory estimates. Through the quantification of deviations at the source level and for the inventory as a whole, improvements can be prioritised. Thus Parties may change methodologies in order to improve their greenhouse gas estimates at source level (e.g. moving from Tier 2 to Tier 3). Such methodological changes at Member States level cannot be captured in the calculation of the approximated GHG inventory for the EU. On-going quality improvements in Member States' inventories to take effect in next year's official submissions to UNFCCC are therefore a source of uncertainty for the EU proxy inventory.

This section compares the differences between the previous proxy estimates and the subsequent official inventory submissions.

Last year's proxy GHG estimates for 2016 underestimated the GHG emissions for EU plus Iceland by 13.9 Mt CO_2-eq or 0.3 %.

The effect of Member States' recalculations of GHG estimates and methodological improvements dominate the differences of the 2016 proxy emission estimates compared to 2016 emissions officially reported in 2018. After taking these recalculations into account difference between the proxy GHG inventory for 2015 and final GHG inventory submission was only 0.1 % for total emissions (including indirect CO_2, excluding LULUCF) for EU plus Iceland.

3.1 Difference between MS proxy and final GHG inventories

The proxy submissions by Member States closely mirrored the slight decrease in official emissions as reported to the UNFCCC this year. The differences per Member State given in Table 11 arise from several factors: different methodologies and data with varying precision used across the Member States (resp. ETC/ACM for gap-filling); the lack of updated (t-1) activity data for some key emission sources; and, from Member States' own recalculations of GHG estimates and methodological improvements which mainly cannot be reflected in the approximated data where usually constant methodologies and emission factors are assumed.

Table 11 Difference per Member State for year 2016 between proxy and final GHG inventories

MS	Inventory 2016 (Submission 2018)	Proxy 2016 (Submission 2017)	Deviation 2016		Recalcu-lations	Deviation 2016 cleared of impact of recalculations	Proxy calculated by
	kt CO2eq			%			
AT	79 673	79 222	-450	-0.6%	0.0%	-0.6%	MS
BE	117 727	118 194	467	0.4%	0.1%	0.5%	MS
BG	59 060	58 405	-655	-1.1%	0.4%	-0.7%	ETC/ACM
CY	8 773	8 841	68	0.8%	-1.2%	-0.4%	ETC/ACM
CZ	130 349	125 664	-4 685	-3.6%	0.4%	-3.2%	MS
DE	909 404	905 545	-3 860	-0.4%	0.5%	0.1%	MS
DK	50 478	49 690	-788	-1.6%	0.4%	-1.2%	MS
EE	19 627	19 289	-338	-1.7%	0.0%	-1.7%	MS
ES	324 707	323 855	-851	-0.3%	0.0%	-0.2%	MS
FI	58 790	58 758	-32	-0.1%	-0.3%	-0.3%	MS
FR	458 165	463 129	4 964	1.1%	0.2%	1.3%	MS
GR	91 607	93 171	1 564	1.7%	-0.4%	1.3%	MS
HR	24 304	22 577	-1 727	-7.1%	2.9%	-4.2%	MS
HU	61 464	61 539	74	0.1%	-0.1%	0.0%	MS
IE	61 546	62 287	741	1.2%	-0.8%	0.4%	MS
IT	427 862	434 588	6 726	1.6%	0.0%	1.5%	MS
LT	20 083	19 165	-918	-4.6%	0.4%	-4.2%	MS
LU	10 028	10 019	-9	-0.1%	0.1%	0.0%	MS
LV	11 306	11 066	-240	-2.1%	0.1%	-2.0%	MS
MT	1 910	1 926	16	0.8%	-0.1%	0.8%	MS
NL	195 242	196 560	1 318	0.7%	-0.2%	0.4%	MS
PL	395 824	390 979	-4 845	-1.2%	-0.2%	-1.4%	MS
PT	67 776	66 482	-1 294	-1.9%	1.0%	-0.9%	MS
RO	112 542	112 562	20	0.0%	-0.2%	-0.2%	ETC/ACM
SE	52 893	53 610	717	1.4%	0.1%	1.5%	MS
SI	17 718	17 520	-198	-1.1%	0.2%	-0.9%	MS
SK	41 037	41 007	-30	-0.1%	-0.9%	-1.0%	MS
UK	482 848	473 363	-9 485	-2.0%	0.2%	-1.7%	MS
EU28	4 292 742	4 279 013	-13 729	-0.3%	0.2%	-0.1%	ETC/ACM
IS	4 669	4 539	-130	-2.8%	4.6%	1.8%	MS
EU28+IS	4 297 411	4 283 552	-13 860	-0.3%	0.2%	-0.1%	ETC/ACM

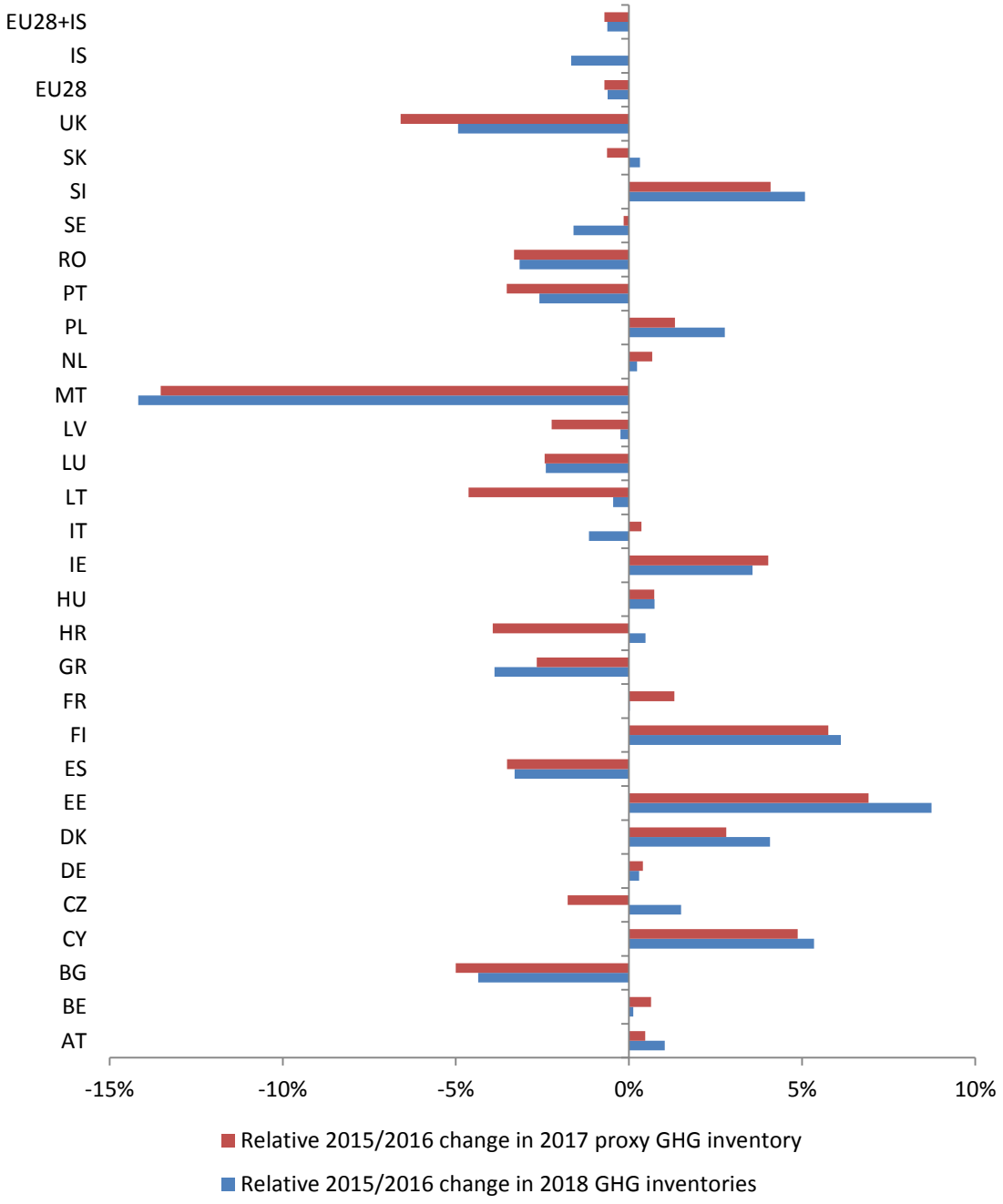
Source: Member States submissions to UNFCCC and proxy estimates for 2016

The largest deviations in relative terms occurred for Croatia (proxy 7.1 % lower), followed by Lithuania (proxy 4.6 % lower), the Czech Republic (proxy 3.6 % lower), Iceland (proxy 2.8 % lower) and Latvia (proxy 2.1 % lower). In absolute terms the deviations were highest for the United Kingdom[19] (underestimate by proxy of 9.5 Mt CO_2-eq), Italy (overestimate of proxy by 6.7 Mt CO_2-eq), France (overestimate by proxy of 5.0 Mt CO_2-eq), Poland (underestimate by proxy of 4.9 Mt CO_2-eq) and the Czech Republic (underestimate by proxy of 4.7 Mt CO_2-eq). By comparing the percentage changes in emission levels 2015/2016 as derived from the 2017 proxy GHG inventory on the one hand and from the 2018 official GHG inventory submissions to UNFCCC on the other, the deviations are in almost all cases in the same order of magnitude, see Figure 12. Also the direction of the emission trend (increasing or decreasing) was estimated correctly except for the Czech Republic, Croatia and Slovakia. Both the Czech Republic and Croatia estimated emission decreases in their proxies while the emissions increased in the final inventories. For Slovakia both the emission changes in the proxy and

[19] The United Kingdom reports in its proxy data only for a geographical scope excluding Crown Dependencies and Overseas Territories.

in the final inventory were quite small. Iceland estimated emissions to stay constant in its proxy while emissions increased in the final inventory.

Figure 12 Relative difference between proxy and submitted inventories by Member State 2015/2016



Source: Member States submissions to UNFCCC and proxy estimates for 2016

After taking into account recalculations, the relative differences were largest for Croatia and Lithuania (-4.2 %), the Czech Republic (-3.2 %), Latvia (-2.0 %) and Iceland (1.8 %).

3.2 Sectoral differences between proxy and final GHG inventories

At the sectoral level, the largest difference between the proxy and the final GHG inventory in absolute terms was in 1.A.1 Energy industries and 1.A.3 Transport (−7.1 Mt CO_2-eq each). The next largest differences were in 1.A.4 Other sectors (−6.6 Mt CO_2-eq), sector 5.A Solid waste disposal (−5.8 Mt CO_2-eq) and 3.D Agricultural soils (+4.4 Mt CO_2-eq). After accounting for recalculation effects, the differences for most of these sectors are significantly smaller. Only in the sector 5.A Solid waste disposal, the differences were not dominated by recalculation effects. Sectors with highest relative deviation after allowing for recalculation effects were 3.I Other carbon-containing fertilizers (+202 %), 5.E Other [waste] (−26 %), 1.A.5 Other [energy] (-19 %), 3.J Other [Agriculture] (+17 %) and 3.F Field burning of agricultural residues, see Table 12. So largest relative deviations occur mainly in "other" categories which are compound items and usually comparatively low in absolute emission levels.

Table 12 Difference per sector for year 2016 between proxy and final GHG inventories

Sector	Inventory 2016 (Submission 2018)	Proxy 2016 (Submission 2017)	Deviation 2016		Recalcu-lations	Deviation 2016 cleared of impact of recalculations
	kt CO2eq			%		
Total incl. indirect CO2 excl. LULUCF	4 297 411	4 283 552	-13 860	-0.3%	0.2%	-0.1%
1 Energy	3 350 128	3 334 703	-15 425	-0.5%	0.4%	-0.1%
1.A Fuel combustion	3 265 620	3 246 349	-19 271	-0.6%	0.4%	-0.1%
1.A.1 Energy industries	1 195 213	1 188 116	-7 097	-0.6%	0.3%	-0.3%
1.A.2 Manufacturing industries	474 548	477 161	2 614	0.6%	0.1%	0.7%
1.A.3 Transport	932 470	925 402	-7 068	-0.8%	0.5%	-0.2%
1.A.4 Other sectors	656 578	650 019	-6 559	-1.0%	0.9%	-0.1%
1.A.5 Other	6 811	5 650	-1 161	-17.0%	-1.7%	-18.8%
1.B Fugitive emissions	84 507	88 354	3 846	4.6%	-1.4%	3.2%
2 Industrial processes & product use	376 457	372 960	-3 497	-0.9%	0.8%	-0.2%
2.A Mineral products	107 940	108 993	1 053	1.0%	0.3%	1.2%
2.B Chemical industry	62 477	60 970	-1 507	-2.4%	2.1%	-0.3%
2.C Metal production	73 566	73 837	271	0.4%	-2.8%	-2.5%
2.D Non-energy products	10 163	9 754	-409	-4.0%	0.7%	-3.3%
2.E Electronic Industry	832	809	-23	-2.7%	-5.1%	-7.9%
2.F Product uses as ODS substitutes	110 052	107 909	-2 143	-1.9%	2.6%	0.7%
2.G Other product manufacture and use	11 064	10 371	-693	-6.3%	4.9%	-1.4%
2.H Other	365	319	-46	-12.6%	11.6%	-1.0%
3 Agriculture	430 603	440 567	9 964	2.3%	-1.7%	0.7%
3.A Enteric fermentation	191 205	195 089	3 884	2.0%	-1.0%	1.0%
3.B Manure management	64 420	65 894	1 474	2.3%	-1.4%	0.9%
3.C Rice cultivation	2 641	2 658	17	0.6%	-0.4%	0.3%
3.D Agricultural soils	159 195	163 592	4 397	2.8%	-2.7%	0.0%
3.F Field burning of agricultural residues	860	958	98	11.4%	-1.0%	10.4%
3.G Liming	5 812	6 059	247	4.3%	-1.7%	2.6%
3.H Urea application	4 532	4 399	-133	-2.9%	-3.5%	-6.4%
3.I Other carbon-containing fertilizers	310	92	-218	-70.3%	272.3%	202.0%
3.J Other	1 627	1 825	198	12.2%	4.7%	16.9%
5 Waste	138 734	133 625	-5 109	-3.7%	0.9%	-2.8%
5.A Solid waste disposal	99 862	94 098	-5 764	-5.8%	1.5%	-4.3%
5.B Biological treatment of solid waste	7 425	7 771	346	4.7%	-3.0%	1.7%
5.C Incineration & open burning of waste	4 246	4 098	-148	-3.5%	-4.6%	-8.1%
5.D Waste water treatment & discharge	27 047	27 533	486	1.8%	0.8%	2.6%
5.E Other	153	125	-28	-18.5%	-7.2%	-25.7%
Indirect CO2	1 490	1 697	207	13.9%	-6.0%	7.9%

Source: Member States submissions to UNFCCC and proxy estimates for 2016

In the Energy sector, deviations after recalculation are very small. They are highest for 1.A.5 Other (-18.8 %) and within ±1% for all other energy combustion sectors. For 1.B Fugitive emissions deviations after recalculations are larger (+3.2%).

In Sector 2 (Industrial processes & product use) there were considerable recalculations for some subsectors. The largest relative deviations occurred in 2.H Other (-12.6 %). This is also the subsector with the largest recalculation effect. The largest absolute difference was in subsector 2.F Product use as ODS substitutes (−2.1 Mt CO_2-eq or −1.9 %) followed by 2.B Chemical industry (−1.5 Mt CO_2-eq resp. −2.4 %). Both are significantly reduced after taking recalculation effects into account. For the IPPU sector overall after allowing for recalculations, the proxy results align well with inventory results (−0.2 %).

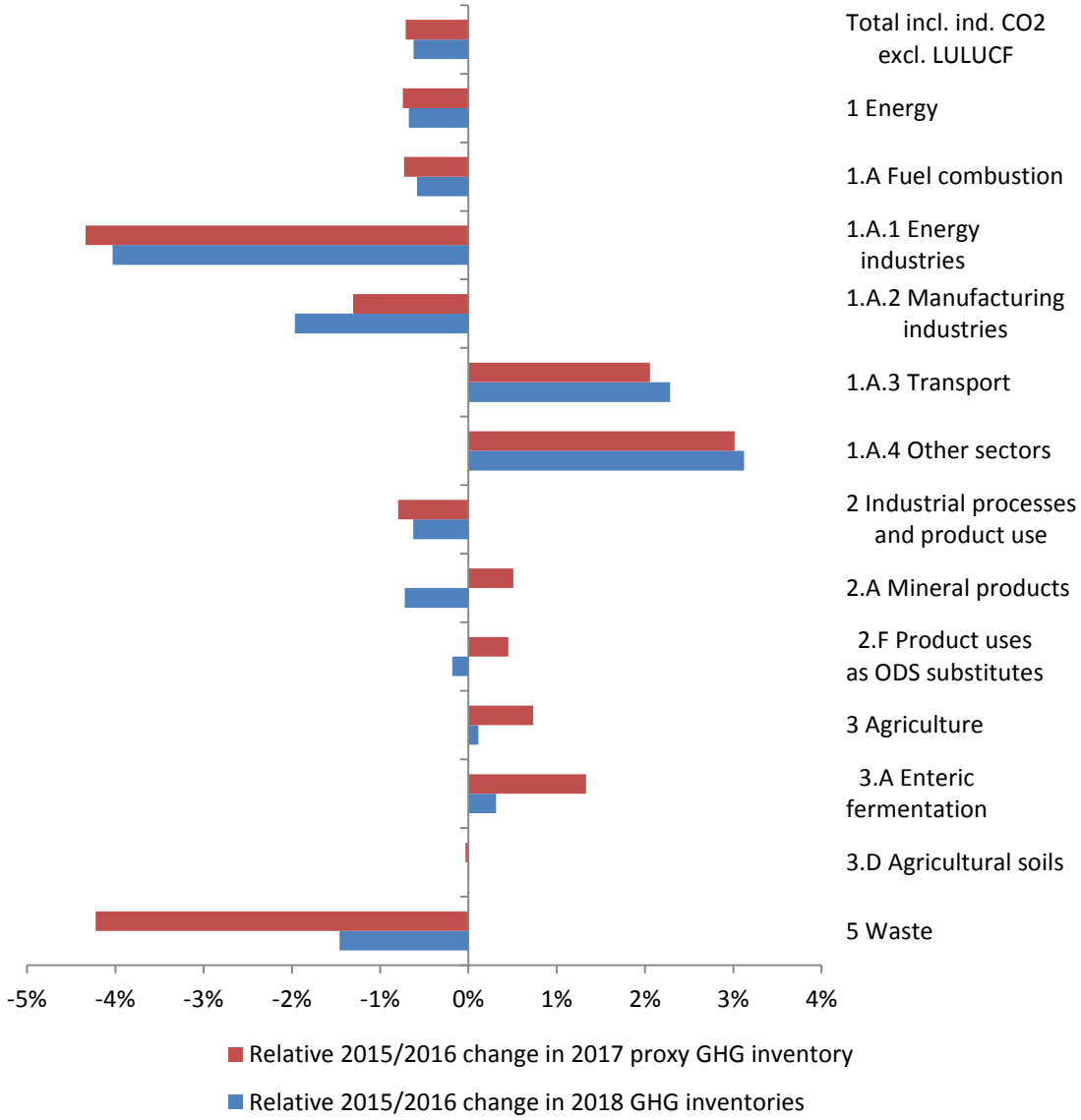
The agricultural sector has still a relative large deviation (−0.7 %) after allowing for recalculations. The largest absolute deviations were in 3.D Agricultural soils (+4.4 Mt CO_2-eq resp. 2.8 %) and 3.A Enteric fermentation (+3.9 Mt CO_2-eq resp. +2.0 %). After considering recalculation effects the deviation for subsector 3.A fermentation was reduced to only 1.0 % and disappears almost completely for subsector 3.D.

The waste sector has the largest deviations even after taking recalculations effects into account: Emissions in the waste sector were still underestimated by 2.8 % after The largest absolute deviation was found in subsector 5.A Solid waste disposal (-5.7 Mt CO_2-eq or -5.8 %). The emission of these sector dominate the total waste sector emissions and even after considering recalculations the deviation of 5.A emissions were still significantly underestimated (-4.3 %). The deviations of all other waste subsectors are less than 0.5 Mt CO_2-eq.

The differences for estimates for indirect CO_2 are significant (-13.9 % before and -7.9 % after considering recalculation effects). However the absolute amounts of indirect CO_2 emissions have only a very small share in total EU plus Iceland emissions.

By comparing the percentage changes in emission levels 2015/2016 as derived from the 2016 proxy GHG inventory on the one hand and from the 2018 official GHG inventory submissions to UNFCCC on the other by sectors, the differences are in the same order of magnitude in sectors with more than 100 Mt CO_2-eq, see Figure 13. Also the direction of the emission trend (increasing or decreasing) was estimated correctly except for 2.A Mineral products and 2.F Product uses as ODS substitutes which both had only comparatively small 2015/2016 emission changes.

Figure 13 Relative difference between proxy and submitted inventories by sector 2015/2016



Note: Only sectors with GHG emissions of more than 100 Mt CO_2-eq in 2016 are shown.
Source: Member States submissions to UNFCCC and proxy estimates for 2016

4. Methodologies and data sources at Member State level

4.1 Description of different approaches

This report presents the estimated GHG emissions for 2017 based on Member State emissions estimates, submitted to EEA by 31 July. The aggregated EU plus Iceland proxy GHG emission estimates are based on these submissions and gap filling where necessary.

Under the Regulation (EU) 525/2013 on the mechanism for monitoring and reporting GHG emissions (EU MMR) and its implementing provisions, Member States submit, where possible, to the European Commission approximated GHG inventories by 31 July every year for the preceding year *t*–1. Where a Member State has not submitted a 'proxy' inventory, the EEA uses its own estimates for gap-filling purposes in order to have a complete approximated GHG inventory at EU level.

In previous years the EEA and its ETC/ACM developed and used the latest activity data available at country level to estimate the emissions. For emission sources for which no appropriate data sets exist, emissions were extrapolated from past trends, or emissions from the previous year are kept constant where historic data do not show a clear linear trend. That methodology which estimated emissions using a 'bottom-up' approach was complex and time-consuming. In recent years submissions of approximated greenhouse gas inventories were only missing for Bulgaria, Cyprus and Romania. These three countries combined have only a share of 4 % of the emissions of whole EU plus Iceland. Therefore these were gap-filled this year by ETC/ACM for EEA with a more simplified approach.

In some cases it has been necessary to allocate or distribute the reported emissions to sectors or within sub-sectors. This is done to allow for the aggregation and explanation of trends at EU level. Details are given in section 4.4.

4.2 MS proxies submitted under the EEA MMR

Member States are responsible for the methodological choice regarding their own estimates. The MS proxies should submit approximated GHG inventories for the preceding year (*t*–1) in accordance with the Summary2 table of the Common Reporting Format (CRF). The implementing regulation of the EU MMR requires the calculation at a level of disaggregation of source categories reflecting the activity data and methods available for the preparation of the proxy estimates. Therefore it is in line with the MMR if Member States submit only partially complete aggregated Summary2 tables with their proxy estimates.

Additionally Member States should split emissions – where available –into ETS and non-ETS emissions and shall provide information on drivers and trends for *t*–1.

4.3 Gap-filling for MS not submitting a 'proxy' inventory

This year, estimates by the EEA and ETC/ACM are made only for the major source categories the energy and IPPU sectors. Relevant data sources with updated activity or emissions data for the year *t*-1 were identified and used to calculate emissions. For source categories for which no international data sets with updated activity data exist or which are too complex for a simple approach, emissions from the previous year were kept constant. On this basis, a simple approach was developed covering the full scope of emissions included in a GHG inventory submission.

The EEA estimates are based on publicly available data sets at the European level. For the estimation of approximated emissions, the following data sources for emissions or activities were used:

- Verified emissions reported under the EU-ETS and recorded in the EUTL[20];
- Eurostat monthly data on gross inland deliveries (calculated) of solid fuels (data set nrg_101m, indicator code B_100500);
- Eurostat monthly data on gross inland deliveries (calculated) of oil (data set nrg_102m, indicator code B_100500);
- Eurostat monthly data on gross inland deliveries (calculated) of natural gas (data set nrg_103m, indicator code B_100500);

Based on these data sources, 2018 emission estimates for year 2017 were made for the following source categories:

- 1. Energy
  - 1.A Fuel Combustion
    - 1.A.1 Energy Industries
    - 1.A.2 Manufacturing Industries and Construction
    - 1.A.3 Transport
    - 1.A.4 Other sectors
    - 1.A.5 Other
- 2. Industrial Processes and Product Use
  - 2.A Mineral Industry
  - 2.C Metal Production

All other source categories were filled by using previous year emissions.

The timing of these calculations depends on the release of the underlying data sources. The availability of data sources (including the MS GHG inventories) is shown in Table 13.

Table 13 Time of availability of data used for the proxy inventory

Data source	**Availability**
EUTL verified emissions	Data as of 16 July 2018 was used
Eurostat monthly data for solid fuels	3 months after reporting period
Eurostat monthly data for liquid fuels	3 months after reporting period
Eurostat monthly data for natural gas	3 months after reporting period
GHG inventory data from CRF files (via UNFCCC)	early June

Source: EEA's ETC/ACM

National GHG inventories are required to fulfil certain principles as laid out in the UNFCCC reporting guidelines for GHG inventories: inventories must be transparent, consistent, comparable, complete and accurate (TCCCA). The IPCC Good Practice Guidance recommends Parties to perform QA/QC procedures that are important information to enable continuous improvement to inventory estimates. Through the quantification of uncertainty at the source level and for the inventory as a

[20] European Commission 2018a, EUTL data extract for EEA, July 16, 2018 www.eea.europa.eu/data-and-maps/dashboards/emissions-trading-viewer-1

whole, improvements can be prioritised. Thus Parties may change methodologies in order to improve their greenhouse gas estimates at source level (e.g. moving from Tier 2 to Tier 3). Such methodological changes at Member States level cannot be captured in the calculation of the approximated GHG inventory for the EU. On-going quality improvements in Member States' inventories to take effect in next year's official submissions to UNFCCC are therefore a source of uncertainty for the proxy inventory.

It has to be taken into account that any recent national improvements of GHG reporting methodologies could not be considered for approximated GHG inventories calculated centrally by EEA and its ETC/ACM, as the 2018 estimates for the 2017 proxy inventory were based on the national methodologies used for 2018 inventory submissions (covering emissions until 2016). Thus, revised methodologies and parameters at Member States level can result in differences between the final inventory and the proxy inventory.

4.3.1 Energy emissions from fuel combustion

In a first step GHG emissions of combustion from fossil fuels were calculated. The calculation splits – in line with the fuel categories in the CRF files of the national inventory submissions – into five different fossil fuel categories:

- Liquid fuels
- Solid fuels
- Gaseous fuels
- Other fossil fuels
- Peat

For each of the fuel categories except "other fossil fuels" and for each of the relevant greenhouse gases (CO_2, CH_4 and N_2O) the following calculation was performed:

Equation 2

$$E^{Y}_{1A,fuel,GHG} = \frac{C^{Y}_{fuel}}{C^{Y-1}_{fuel}} \cdot E^{Y-1}_{1A,fuel,GHG}$$

With:

$E^{Y}_{1A,fuel,GHG}$	Emission of CO_2, CH_4 or N_2O per fuel in source category 1.A in the proxy year
$E^{Y-1}_{1A,fuel,GHG}$	Emission of CO_2, CH_4 or N_2O per fuel in source category 1.A in the previous year
C^{Y}_{fuel}	Consumption of liquid, solid, gaseous of peat fuels in the proxy year
C^{Y-1}_{fuel}	Consumption of liquid, solid, gaseous of peat fuels in the previous year

Source: EEA's ETC/ACM

As fuel consumption data "Gross inland consumption (calculated)" from Eurostat's monthly data on supply and transform of fuels was used (Eurostat indicator B_105000). The following table shows which fuels from Eurostat were aggregated for the calculation.

Table 14 Matching of Eurostat's fuels to inventory fuel categories

Liquid fuels	Solid fuels	Gaseous fuel	Peat
Crude oil (without NGL)	Hard coal	Natural gas	Peat
Natural gas liquids (NGL)	Patent Fuels		
Refinery feedstocks	Coke Oven Coke		
Other hydrocarbons	Lignite/Brown Coal		
Refinery gas	BKB (brown coal briquettes)		
Ethane			
Liquefied petroleum gas (LPG)			
Gasoline (without bio components)			
Aviation gasoline			
Other kerosene			
Gasoline type jet fuel			
Kerosene type jet fuel (without bio components)			
Naphtha			
Gas/diesel oil (without bio components)			
Total fuel oil			
Petroleum coke			
Other products			

Note: In Eurostat's fuel aggregation, peat is part of solid fuels
Source: EEA's ETC/ACM

For "other fossil fuels" no calculation was performed but previous year values were used.

The emissions per fuel were then aggregated:

Equation 3

$$E^{Y}_{1A,GHG} = E^{Y}_{1A,liquid,GHG} + E^{Y}_{1A,solid,GHG} + E^{Y}_{1A,gaseous,GHG} + E^{Y}_{1A,peat,GHG} + E^{Y-1}_{1A,other,GHG}$$

With:

$E^{Y}_{1A,GHG}$	Emission of CO_2, CH_4 or N_2O in source category 1.A in the proxy year
$E^{Y}_{1A,liquid,GHG}$	Emission of CO_2, CH_4 or N_2O from liquid fuels in source category 1.A (see above)
$E^{Y}_{1A,solid,GHG}$	Emission of CO_2, CH_4 or N_2O from solid fuels in source category 1.A (see above)
$E^{Y}_{1A,liquid,GHG}$	Emission of CO_2, CH_4 or N_2O from gaseous fuels in source category 1.A (see above)
$E^{Y}_{1A,liquid,GHG}$	Emission of CO_2, CH_4 or N_2O from peat in source category 1.A (see above)
$E^{Y-1}_{1A,other,GHG}$	Emission of CO_2, CH_4 or N_2O from other fossil fuels in source category 1.A from previous year

Source: EEA's ETC/ACM

4.3.2 Energy emissions from fuel combustion subsectors

In a second step, the total 1.A emissions per greenhouse gas (GHG) were divided into subsector emissions using the following formula:

Equation 4

$$E^{Y}_{1Ax,GHG} = \frac{E^{Y-1}_{1Ax,GHG}}{E^{Y-1}_{1A,GHG}} \cdot E^{Y}_{1A,GHG}$$

With:

$E^{Y}_{1Ax,GHG}$	Emission of CO_2, CH_4 or N_2O in subsector 1.A.x in the proxy year
$E^{Y-1}_{1Ax,GHG}$	Emission of CO_2, CH_4 or N_2O in subsector 1.A.x in the previous year
$E^{Y-1}_{1A,GHG}$	Emission of CO_2, CH_4 or N_2O in source category 1.A in the previous year
$E^{Y}_{1A,GHG}$	Emission of CO_2, CH_4 or N_2O in source category 1.A in the proxy year (see above)

Source: EEA's ETC/ACM

4.3.3 IPPU emissions from mineral industry and metal industry

To estimate CO_2 emissions from 2.A Mineral industry and CO_2, CH_4 and N_2O emissions from 2.C Metal industry, the following calculation was performed:

Equation 4

$$E^{Y}_{2A/2C,GHG} = \frac{E^{Y}_{ETS,Activities}}{E^{Y-1}_{ETS,Activities}} \cdot E^{Y-1}_{2A/2C,GHG}$$

With:

$E^{Y}_{2A/2C,GHG}$	Emission of CO_2, CH_4 or N_2O in source category 2.A or 2.C in the proxy year
$E^{Y}_{ETS,Activities}$	ETS emissions for some activities in the proxy year
$E^{Y-1}_{ETS,Activities}$	ETS emissions for some activities in the previous year
$E^{Y-1}_{2A/2C,GHG}$	Emission of CO_2, CH_4 or N_2O in source category 2.A or 2.C in the previous year

Source: EEA's ETC/ACM

ETS emission data from the European Transaction Log (EUTL) was used. The following table shows the ETS activities that were aggregated for the calculation.

Table 15 Matching of ETS activity codes to inventory categories

Mineral industry	Metal industry
29 Production of cement clinker	23 Metal ore roasting or sintering
30 Production of lime, or calcination of dolomite/magnesite	24 Production of pig iron or steel
31 Manufacture of glass	25 Production or processing of ferrous metals
32 Manufacture of ceramics	26 Production of primary aluminium
33 Manufacture of mineral wool	27 Production of secondary aluminium
34 Production or processing of gypsum or plasterboard	28 Production or processing of non-ferrous metals

Source: EEA's ETC/ACM

4.3.4 Other emissions

For the source categories not mentioned before the emission values from previous year (2016) were used as proxy estimates for the year 2017. Also for all emissions of fluorinated greenhouse gases (HFCs, PFCs, SF_6, NF_3) previous year values were used as proxy estimates.

4.4 Method for gap-filling partially complete proxy submissions

The approximated GHG emissions data are submitted by Member States in a form consistent with CRF Summary2 tables. However, these tables are not always submitted with complete sub-sector level disaggregation. Because EU emissions are the sum of the Member States' emissions, in order to achieve a complete EU proxy inventory, some gap filling has been required. For some MS proxies the reported emissions have been allocated or distributed within sub-sectors. This is done to allow for the aggregation and explanation of trends at EU level. Allocations were needed for Belgium, Denmark, Germany, Greece, Hungary, Ireland, Luxembourg, Sweden and the United Kingdom. Details are provided below – except for Germany, Hungary, Ireland and Luxemburg where the amendments involved simply including subtotals or totals.

4.4.1 Total CO2-eq, including indirect CO2, without LULUCF in ETS and non-ETS

Most Member States did report *Total CO_2 equivalent emissions, without LULUCF*. There has however been some ambiguity about how to report included indirect CO_2 emissions. In previous years, a total was included in cell J68 whether or not the total included indirect CO_2 emissions. Many MS leave this cell blank even if they do report indirect CO_2 emissions. For consistency we edited this cell (J68 =SUM J66,B65), in all proxy sheets so that there is a total shown in cell J68 whether or not the MS has calculated any indirect CO_2 emissions.

Most Member States provided a split of ETS and non-ETS emissions in their submissions.

4.4.2 F-gases

Emissions from fluorinated greenhouse gases (F-gases[21]) can appear in the following source categories of industrial processes and product use:

- 2.B Chemical industry
- 2.C Metal industry
- 2.E Electronic industry
- 2.F Product uses as ODS substitutes
- 2.G Other product manufacture and use
- 2.H Other

Germany, Ireland and the United Kingdom reported F-gas emissions but did not disaggregate into source categories. Reported F-gas emissions were allocated using the shares of F-gas emissions per source categories of the latest available GHG inventories.

Sweden submitted IPPU rounded emissions totals. The gap-filling described in chapter 4.4.5 was combined with the F-gas gap-filing method.

The gap-filling approach used for Bulgaria, Cyprus, and Romania (described in section 4.3), calculates proxy estimates for whole of the IPPU sector. For these Member States the F-gas emissions were distributed in the same way as for Germany, Ireland and the United Kingdom using allocations derived from reports for the previous year.

4.4.3 Denmark

The Danish Summary2 proxy for 2016 contains GHG estimates for source category 1.A (Fuel Combustion), but not disaggregated into subcategories. Energy sub-sector emissions were allocated based on the report for the preceding year.

4.4.4 Greece

Greece provided detailed emission estimates on detailed source category level but did not include sector totals for Energy, Fuel combustion, Fugitive emissions, Industrial processes and product use, Agriculture and Waste. This was gap-filled by inserting totals for the respective detailed data. The results of these summations are consistent with the total emissions of all gases.

4.4.5 Sweden

The submission contained only total GHG estimates, and apart from Fuel combustion, were not disaggregated into subsectors. To gap-fill these subcategories emissions were allocated against relevant gases and sub-sectors based on the subsector to sector ratios of Sweden's 2016 inventory Summary2 table.

The level of detail provided reflects the uncertainties of the estimates, given the limited data availability and differences in the methods used compared to the reported inventory, in line with Commission Implementing Regulation 749/2014, Article 17.1a.

[21] F-gas emissions include emission of the following gases or groups of gases: hydrofluorocarbons = HFCs; perfluorocarbons = PFCs; sulphur hexafluoride = SF_6; nitrogen trifluoride =NF_3.

4.4.6 United Kingdom

In United Kingdom's Summary2 proxy for 2017 only CO_2 emissions are shown with detailed emissions per source category. Estimates for all other GHG emissions are only given as totals per gas. To gap-fill the CH_4 and N_2O for the relevant sub-categories total CH_4 and N_2O emission estimate for 2016 was split into the subcategories using shares based on the subsector to sector ratios of UK's 2016 inventory Summary2 table.

The total F-gas emissions of UK were allocated to individual source subcategories of Industrial Processes and Product Use as described in chapter 4.4.2.

As mentioned in the description box below the proxy Summary2 table, CH_4 and N_2O from LULUCF emissions were included in the CH_4 and N_2O net emission totals. This was adjusted by subtracting the 2016 amounts of CH_4 and N_2O LULUCF emissions reported from the most recent relevant submission.

The UK included ETS emissions per sector but did not provide a total of ETS emissions. And the non-ETS was only CO_2 non-ETS (no non-CO_2). For these reasons UK ETS was gap-filled with verified emissions amounts reported under the EU-ETS and recorded in the EUTL

4.4.7 Switzerland

The proxy GHG inventories submitted by Switzerland largely follow the structure of the common reporting format (CRF). Switzerland reported in its proxy GHG inventory emissions per sector but not on sub-sectoral level. Switzerland is not included in EU-28 total emissions or EU plus Iceland total emissions; therefore no gap-filling was performed.

5. References

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- Monthly data on gross inland deliveries (calculated) of solid fuels (data set nrg_101m, indicator code B_100500);
- Monthly data for on gross inland deliveries (calculated) of natural gas (data set nrg_103m, indicator code B_1001500, product code 4100);
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6. Annex I. Detailed results for each Member State

Country	Compiled by	Submission date
Austria	Member State	25 July 2018
Belgium	Member State	31 July 2018
Bulgaria	EEA, ETC/ACM	
Cyprus	EEA, ETC/ACM	
Czech Republic	Member State	19 July 2018
Germany	Member State	26 July 2018
Denmark	Member State	19 July 2018
Estonia	Member State	25 July 2018
Spain	Member State	10 July 2018
Finland	Member State	06 June 2018
France	Member State	20 July 2018
Greece	Member State	20 July 2018
Croatia	Member State	30 July 2018
Hungary	Member State	31 July 2018
Ireland	Member State	31 July 2018
Italy	Member State	20 July 2018
Lithuania	Member State	30 July 2018
Luxembourg	Member State	28 July 2018
Latvia	Member State	24 July 2018
Malta	Member State	30 July 2018
Netherlands	Member State	12 July 2018
Poland	Member State	16 July 2018
Portugal	Member State	31 July 2018
Romania	EEA, ETC/ACM	
Sweden	Member State	12 July 2018
Slovenia	Member State	11 July 2018, update on 14 September 2018
Slovakia	Member State	11 July 2018
United Kingdom	Member State	27 July 2018
European Union	EEA, ETC/ACM	
Iceland	Country	03 July 2018
European Union and Iceland	EEA, ETC/ACM	
Switzerland		11 July 2018

Source: EEA's ETC/ACM

6.1 Austria (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission 2018
Country Austria
Geographical scope[4]

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	69.785,12	6.503,70	3.486,97	1.664,76	44,09	386,94	NO,NA	12,01	81.883,59		
1. Energy	54.702,35	618,75	601,35						55.922,45	**15.855,56**	**40.066,89**
A. Fuel combustion (sectoral approach)	54.571,10	358,18	601,35						55.530,62	15.855,56	**39.675,06**
1. Energy industries	10.995,64	25,90	102,80						11.124,34	8.952,05	**2.172,29**
2. Manufacturing industries and construction	11.025,77	23,19	136,33						11.185,28	6.269,90	**4.915,38**
3. Transport	23.840,08	10,79	208,32						24.059,18	633,62	**23.425,57**
4. Other sectors	8.659,97	298,26	152,93						9.111,16		**9.111,16**
5. Other	49,65	0,04	0,97						50,66		**50,66**
B. Fugitive emissions from fuels	131,25	260,58	0,00						391,83		**391,83**
1. Solid fuels	NO,IE,NA	NO,IE,NA	NO,IE,NA						0,00		**0,00**
2. Oil and natural gas	131,25	260,58	NO,IE,NA						391,83		**391,83**
C. CO_2 transport and storage	NO								0,00		**0,00**
2. Industrial processes and product use	14.964,52	46,55	169,49	1.664,76	44,09	386,94	NA	12,01	17.288,36	**14.699,66**	**2.588,69**
A. Mineral industry	2.800,51								2.800,51	2.800,51	**0,00**
B. Chemical industry	688,50	46,55	35,75	NA	NA	NA	NA	NA	770,79	653,09	**117,70**
C. Metal industry	11.270,66	NO,IE,NA	NO		0,00	2,35	NA		11.273,01	11.246,06	**26,95**
D. Non-energy products from fuels and solvent use	204,85	NA	NA						204,85		**204,85**
E. Electronic Industry				4,50	44,09	31,21	NA	12,01	91,81		**91,81**
F. Product uses as ODS substitutes				1.660,26	NO,IE		NO		1.660,26		**1.660,26**
G. Other product manufacture and use	NO	NO	133,74	NO	NO	353,38	NO		487,12		**487,12**
H. Other	NA	NA	NA				NO		NA		**0,00**
3. Agriculture	116,19	4.596,60	2.452,74						7.165,54		
A. Enteric fermentation		4.158,56							4.158,56		
B. Manure management		437,47	440,31						877,78		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NA	2.012,33						2.012,33		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		0,57	0,10						0,67		
G. Liming	84,90								84,90		
H. Urea application	31,30								31,30		
I. Other carbon-containing fertilizers	NA								NO		
J. Other	NA	NA	NA						NA		
4. Land use, land-use change and forestry[1]	NE	NE	NE						NE		
A. Forest land	NE	NE	NE						NE		
B. Cropland	NE	NE	NE						NE		
C. Grassland	NE	NE	NE						NE		
D. Wetlands	NE	NE	NE						NE		
E. Settlements	NE	NE	NE						NE		
F. Other land	NE	NE	NE						NE		
G. Harvested wood products	NE	NE	NE						NE		
H. Other	NE	NE	NE						NE		
5. Waste	2,06	1.241,80	263,39						1.507,25		
A. Solid waste disposal	NO,NA	1.136,43							1.136,43		
B. Biological treatment of solid waste		81,57	98,26						179,83		
C. Incineration and open burning of waste	2,06	0,00	0,01						2,07		
D. Waste water treatment and discharge		23,80	165,13						188,92		
E. Other	NO	NO	NO						NA		
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NA	NA	NA

Memo items:[2]											
International bunkers	2.203,20	0,43	23,40						2.227,04		
Aviation	2.145,19	0,40	19,07						2.164,67		
Navigation	58,01	0,03	4,32						62,37		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass											
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	30.204,64								30.204,64		
Indirect N_2O			NO,NE,NA								
Indirect CO_2[3]	NO,IE,NA										
Total CO_2 equivalent emissions without land use, land-use change and forestry									81.883,59	30.555,23	51.328,36
Total CO_2 equivalent emissions with land use, land-use change and forestry									NE		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									81.883,59		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NE		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
The trend of 1.A fuel combustion widely follows the trend in preliminary energy statistics (http://www.statistik.at/web_de/statistiken/energie_umwelt_innovation_mobilitaet/energie_und_umwelt/energie/energiebilanzen/index.html) **The most significant trends 2016-2017 in fuel consumption by type of fuel are:** Sales of transport diesel increased by 2.9% (approx. +0.5 Mt of CO2 from diesel and gasoline). (https://www.wko.at/branchen/industrie/mineraloelindustrie/verbrauchsstatistik.html) Coal consumption of power plants decreased (-0.2 Mt CO2). Natural gas consumption (other than non energy use) increased by 8.8% (approx. +1.4 Mt of CO2) (http://www.e-control.at/de/statistik/gas) CO2 emissions from iron and steel industries (1.A.2.a and 2.C.1) increased by 7% (approx +0.9 Mt CO2) due to an increase in crude steel production (+9%). (https://www.worldsteel.org/steel-by-topic/statistics.html) **Agriculture:** **Fertilizer Use:** two-year mean value decreased by 5.0% (https://www.ama.at/Marktinformationen/Getreide-und-Olsaaten/Dungemittel) **Animals numbers:** total cattle decreased by 0,6%, whereas milk cows increased by 0.7 % (and milk yield increased by 1.6%); swine number increased by 1.0% (https://www.ama.at/Marktinformationen/Vieh-und-Fleisch/Produktion)

6.2 Belgium (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS (Sheet 1 of 1)

Year: Proxy 2017 | Submission: July 2018 | Country: Belgium

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	**97342,05**	**8043,36**	**5982,10**	**2939,17**	**658,55**	**94,67**	**0,00**	**0,71**	**115060,61**		
1. Energy	**82635,80**	**1069,55**	**639,29**						**84344,65**	**27591,18**	**56753,46**
A. Fuel combustion (sectoral approach)	82536,86	504,40	639,29						83680,55	27492,73	56187,82
1. Energy industries	20001,23	29,40	160,19						20190,82	17765,69	2425,13
2. Manufacturing industries and construction	13414,91	39,21	83,93						13538,05	9607,45	3930,60
3. Transport	26122,51	16,96	279,78						26419,25	52,67	26366,58
4. Other sectors	22889,48	418,66	114,26						23422,40	66,92	23355,48
5. Other	108,73	0,17	1,12						110,03		110,03
B. Fugitive emissions from fuels	98,94	565,16	0,00						664,10	98,46	565,64
1. Solid fuels	NO	42,03	NO,NA						42,03		42,03
2. Oil and natural gas and other emissions from energy production	98,94	523,13	NO,IE,NA						622,07	98,46	523,62
C. CO_2 transport and storage	NO										
2. Industrial processes and product use	**15563,80886**	**30,20203**	**1156,63**	**2.939,17**	**658,55**	**94,67**	**NO,NA**	**0,71**	**20443,74120**	**15825,74**	**4618,00**
A. Mineral industry	4212,39217								4212,39217	4212,39	0,00
B. Chemical industry	6956,75182	6,31	1075,32900	NO,NA	645,75	NO,NA	NA	NA	8.684,14	7318,77	1365,37
C. Metal industry	4135,87717	23,89	NO						4.159,77	4135,88	23,89
D. Non-energy products from fuels and solvent use	100,08938	NO,NA	NO,NA						100,09		100,09
E. Electronic Industry				4,33	11,01	6,61	NO	0,71	22,67		22,67
F. Product uses as ODS substitutes				2.934,84	1,79				2936,63		2936,63
G. Other product manufacture and use	NO	NO	81,30	NO	NO	88,05	NO	NO	169,35		169,35
H. Other	158,69832	NO,NA	NO,NA	NO	NO	NO	NO	NO	158,69832	158,70	0,00
3. Agriculture	**174,76**	**5.838,79**	**3.883,51**						**9897,06**		**9897,06**
A. Enteric fermentation		4.590,84							4590,84		4590,84
B. Manure management		1.247,95	691,48						1939,43		1939,43
C. Rice cultivation		NO							NO		NO
D. Agricultural soils		NA	3.192,03						3192,03		3192,03
E. Prescribed burning of savannahs		NO	NO						NO		NO
F. Field burning of agricultural residues		NO	NO						NO		NO
G. Liming	127,93								127,93		127,93
H. Urea application	46,83								46,83		46,83
I. Other carbon-containing fertilizers	NO								NO		NO
J. Other	NO	NO	NO						NO		NO
4. Land use, land-use change and forestry[1]	**-1.310,72**	**NO,NA**	**161,18**						**-1149,54**		
A. Forest land	-3.230,53	NO	0,02						-3230,51		
B. Cropland	1.239,19	NO	102,92						1342,11		
C. Grassland	-487,74	NO	5,63						-482,11		
D. Wetlands	-10,17	NO,NA	0,14						-10,02		
E. Settlements	877,43	NO	52,47						929,89		
F. Other land	NO	NO	NO						NO		
G. Harvested wood products	301,11								301,11		
H. Other	NO	NO	NO						NO		
5. Waste	**278,39**	**1.104,82**	**141,49**						**1524,70**		
A. Solid waste disposal	NO,NA	888,40							888,39649		888,40
B. Biological treatment of solid waste		25,31	38,62						63,94		63,94
C. Incineration and open burning of waste	278,39163	0,00	0,18						278,56913	255,37	23,19
D. Waste water treatment and discharge		191,11	102,69						293,80		
E. Other	NO	NO	NO						NO		
6. Other *(as specified in summary 1.A)*	**NO**	**NO**	**NO**						**NO**		
Memo items:[2]											
International bunkers	4.373,01	0,76	37,90						4.411,66		
Aviation	21.636,74	0,68	7,15						21.644,57		
Navigation	NO	NO	NO						NO		
Multilateral operations	12.666,69								12.666,69		
CO_2 emissions from biomass	NO								NO		
CO_2 captured	NA								NA		
Long-term storage of C in waste disposal sites											
Indirect N_2O											
Indirect CO_2 [3]											

Total CO_2 equivalent emissions without land use, land-use change and forestry	**116.210,15**		
Total CO_2 equivalent emissions with land use, land-use change and forestry	**115.060,61**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**116.210,15**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**115.060,61**		

(1) For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
First estimate of the total greenhouse gas emissions in 2017 in Belgium shows a decrease of emissions of 1517 kt CO2eq or -1.29% compared to 2016 emissions (i.e. excl. LULUCF). This decrease is mainly due the category 1A4 (warmer year).
A first estimate of greenhouse gas emissions in Flanders for 2017 shows a decrease compared to the year 2016 (-1006 kt CO2eq). This decrease is mainly due to a decrease in energy consumption in the residential sector. However, this decrease must be interpreted with caution as the emission figures in this sector will also been optimized for the year 2016. The definitive emission figures for the entire timeseries from 1990 onwards will be available against the reporting to the EU of 15/01/2019.
The proxy 2017 in Wallonia shows a decrease in emissions compared to 2016, due to a warmer year (emission in residential and commercial), but also to a decrease in the ETS sector.
First estimate of the emissions in the Brussels region shows a decrease of emissions. This decrease is mainly due to the category 1A4 due to a warmer winter.

6.3 Bulgaria (EEA calculations)

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Proxy inventory 2017
EEA calculations 2018
BULGARIA

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2(1)	CH4	N2O	HFCs	PFCs	SF6	Unspecified mix of HFCs and PFCs	NF3	Total	ETS	non-ETS
	CO2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)(1)	40394.48	6816.05	5882.99	1400.45	0.02	18.75	NO,NA	NO,NA	54512.74		
1. Energy	43019.16	1120.33	253.84						44393.33		
A. Fuel combustion (sectoral approach)	43013.60	92.56	253.84						43360.00		
1. Energy industries	28538.92	61.41	168.42						28768.75		
2. Manufacturing industries and construction	3035.05	6.53	17.91						3059.49		
3. Transport	9760.54	21.00	57.60						9839.14		
4. Other sectors	1626.76	3.50	9.60						1639.86		
5. Other	52.33	0.11	0.31						52.75		
B. Fugitive emissions from fuels	5.56	1027.76	0.01						1033.33		
1. Solid fuels	NO	823.64	NO						823.64		
2. Oil and natural gas	5.56	204.13	0.01						209.69		
C. CO2 transport and storage	NO								NO		
2. Industrial processes and product use	4499.79	0.00	125.89	1400.45	0.02	18.75	NO,NA	NO,NA	6044.90		
A. Mineral industry	2434.77								2434.77		
B. Chemical industry	1724.48	NO,NA	113.40	NA	NA	NA	NA	NA	1837.89		
C. Metal industry	222.54	0.00	NA	NA	NA	NA	NA	NA	222.55		
D. Non-energy products from fuels and solvent use	88.51	NO,NA	NO,NA						88.51		
E. Electronic Industry				NO	NO	NO	NO	NO	NO		
F. Product uses as ODS substitutes				1400.45	0.02	NO	NO	NO	1400.47		
G. Other product manufacture and use	24.63	NO	12.49		NO	18.75			55.86		
H. Other	4.85	NA	NA						4.85		
3. Agriculture	35.93	1772.91	4720.23						6529.07		
A. Enteric fermentation		1519.70							1519.70		
B. Manure management		119.56	484.73						604.29		
C. Rice cultivation		107.97							107.97		
D. Agricultural soils		NO	4228.29						4228.29		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		25.69	7.22						32.91		
G. Liming	NO								NO		
H. Urea application	35.93								35.93		
I. Other carbon-containing fertilizers	NO								NO		
J. Other											
4. Land use, land-use change and forestry(1)	-7172.68	14.78	621.52						-6536.39		
A. Forest land	-6096.04	14.78	154.15						-5927.11		
B. Cropland	834.92	NO	75.44						910.35		
C. Grassland	-1767.85	NO	NO						-1767.85		
D. Wetlands	272.49	NO	22.99						295.48		
E. Settlements	718.94	NO							785.13		
F. Other land	-591.13	NO	190.38						-400.74		
G. Harvested wood products	-544.01								-544.01		
H. Other	NO	NO	NO						NO		
5. Waste	12.27	3908.03	161.52						4081.82		
A. Solid waste disposal	NO	3006.58							3006.58		
B. Biological treatment of solid waste		26.30	18.81						45.11		
C. Incineration and open burning of waste	12.27	0.00	0.96						13.23		
D. Waste water treatment and discharge		875.14	141.75						1016.89		
E. Other											
6. Other (as specified in summary 1.A)	NO	NO	NO	NO	NO	NO	NO	NO	NO		

Memo items:(2)											
International bunkers	878.88	0.68	7.23						886.79		
Aviation	636.42	0.11	5.30						641.84		
Navigation	242.46	0.57	1.93						244.95		
Multilateral operations	NO	NO	NO						NO		
CO2 emissions from biomass	5734.44								5734.44		
CO2 captured	NO								NO		
Long-term storage of C in waste disposal sites											
Indirect N2O			1095.79								
Indirect CO2 (3)	NO										
Total CO2 equivalent emissions without land use, land-use change and forestry									61049.12	34908.095	26141.03
Total CO2 equivalent emissions with land use, land-use change and forestry									54512.74		
Total CO2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry									NA		
Total CO2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry									NA		

Color codes	
	Calculated value
	Previous year value
	ETS value
	No value

6.4 Croatia (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission 2018
Country CROATIA
Geographical scope[4]

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	18.443,06	3.967,00	1.621,60	419,49	NA,NO	7,57	NA,NO	NA,NO	24.458,72		
1. Energy	16.247,84	585,47	213,60						17.046,91	**6.261,51**	**10.785,40**
A. Fuel combustion (sectoral approach)	16.067,94	383,77	213,39						16.665,09	6.261,51	**10.403,58**
1. Energy industries	4.743,37	5,29	22,34						4.771,00	4.268,40	**502,60**
2. Manufacturing industries and construction	2.336,81	3,04	5,52						2.345,37	1.993,11	**352,26**
3. Transport	6.227,68	11,12	60,72						6.299,52	NO	NO
4. Other sectors	2.760,08	364,32	124,81						3.249,21	NO	NO
5. Other	NO	NO	NO						NO	NO	NO
B. Fugitive emissions from fuels	179,90	201,70	0,22						381,82	NO	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO
2. Oil and natural gas	179,90	201,70	0,22						381,82	NO	NO
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	2.133,62	0,16	154,81	419,49	NA,NO	7,57	NA,NO	NA,NO	2.715,64	**2.106,26**	**609,38**
A. Mineral industry	1.464,99								1.464,99	1.425,54	**39,45**
B. Chemical industry	580,12	0,16	98,79	NA	NA	NA	NA	NA	679,08	678,72	**0,36**
C. Metal industry	2,00	NA	NA	NA	NA	NA	NA	NA	2,00	2,00	**0,00**
D. Non-energy products from fuels and solvent use	86,50	NA	NA						86,50	NO	NO
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				419,49	NO	NA	NA	NA	419,49	NO	NO
G. Other product manufacture and use	NA	NA	56,02	NA	NA	7,57	NA	NA	63,59	NO	NO
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NO	NO
3. Agriculture	61,56	1.607,26	1.162,23						2.831,05		
A. Enteric fermentation		1.168,41							1.168,41		
B. Manure management		438,85	162,44						601,29		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NA	999,79						999,79		
E. Prescribed burning of savannas		NA	NA						NA		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	11,85								11,85		
H. Urea application	49,71								49,71		
I. Other carbon-containing fertilizers	NA								NA		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	NE	NE	NE						NE		
A. Forest land	NE	NE	NE						NE		
B. Cropland	NE	NE	NE						NE		
C. Grassland	NE	NE	NE						NE		
D. Wetlands	NE	NE	NE						NE		
E. Settlements	NE	NE	NE						NE		
F. Other land	NE	NE	NE						NE		
G. Harvested wood products	NE								NE		
H. Other	NE	NE	NE						NE		
5. Waste	0,05	1.774,11	90,95						1.865,11		
A. Solid waste disposal	NA	1.300,76							1.300,76		
B. Biological treatment of solid waste		2,74	1,96						4,71		
C. Incineration and open burning of waste	0,05	NA	NA						0,05		
D. Waste water treatment and discharge		470,61	88,99						559,60		
E. Other	NO	NO	NO						NO		
6. Other ***(as specified in summary 1.A)***	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[2]											
International bunkers	388,96	0,10	3,19						392,25		
Aviation	375,75	0,06	3,09						378,91		
Navigation	13,21	0,03	0,10						13,35		
Multilateral operations	C	C	C						C		
CO_2 emissions from biomass	5.893,14								5.893,14		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	NE								NE		
Indirect N_2O			NO,NA								
Indirect CO_2[3]	NO,NA										
Total CO_2 equivalent emissions without land use, land-use change and forestry									24.458,72	8.367,77	16.090,94
Total CO_2 equivalent emissions with land use, land-use change and forestry									NE		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NO		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NO		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
1. Energy
1A1 - 90% of total CO2 emissisons is from ETS, according to 2017. It is assumed that the distribution stayed the same in 2016. For CH4 and N2O emissions is assumed that ratio CH4/CO2 and N2O/CO2 in
1A2 -106.1% of total CO2 emissisons is from ETS, according to data for 2016. It is assumed that the distribution stayed the same in 2017. For CH4 and N2O emissions is assumed that ratio CH4/CO2 and
1A3 - Transport, 1A4. Other Sectors, 1B2. Oil and Natural Gas all GHG were extrapolated based on emissions from 2013-2016
1B2 - all GHG are extrapolated based on emissions from 2013-2016
2. Industrial processes and product use
2.A - ETS: CO2 emissions from 2.A.1; 2.A.2; 2.A.3; 2.A.4.a and 2.A.4.d; non-ETS: CO2 emission from 2.A.4.b. Verified ETS emissions for 2.A.1; 2.A.2 (lime factories); 2.A.3; 2.A.4.a and 2.A.4.d are provided by Croatian Agency for the Environment and Nature. The differences between verified ETS emissions and the emissions included in the NIR for category 2.A.2 (lime factories and sugar refineries): according to the TERT recommendation during 2017 ESD review, emissions from sugar refineries are included in the NIR. However, EU ETS reports for sugar refineries contain only data on combustion. According to the Directive 2003/87/EC, the threshold values for combustion installation is 20 MW, and for production of lime is 50 tonnes per day. Because sugar refineries do not have production capacity of 50 tonnes of lime per day, those do not report on emissions from production process in the verified ETS reports. Emission for 2.A.4.b is assessed by extrapolation, according to emissions trend from 2015 to 2016, due to the lack of the information.
2.B.1 - ETS: natural gas consumption as fuel and feedstock in ammonia production is included, CO2 recovered is subtracted according to 2006 IPCC Guidelines. Verified ETS CO2 emission for 2.B.1 is provided by Croatian Agency for the Environment and Nature. Non-ETS: CH4 and N2O emissions from combustion of natural gas as fuels are assessed according to CO2 emissions trend from 2016 to 2017, due to the lack of the information.
2.B.2 - ETS: The methodology used to determine N2O emission is based on the measurement. Catalytic decomposition is implemented as a measure for N2O emission reduction in nitric acid production. Verified N2O emission is provided by Croatian Agency for the Environment and Nature.
2.B.8 - non-ETS: CO2 and CH4 emissions are assessed according to data for 2016 due to the lack of the information.
2.C.1 - ETS: Verified CO2 emission from steel production is included. Data are provided by Croatian Agency for the Environment and Nature.
2.D.1; 2.D.2; 2.D.3 - non-ETS: CO2 emission is assessed by extrapolation, according to emissions trend from 2015 to 2016, due to the lack of the information.
2.E - Activities do not exist within a country.
2.F - non-ETS: HFC emissions are assessed by extrapolation, according to emissions trend from 2015 to 2016, due to the lack of the information. PFC emissions do not exist within a country.
2.G.1 - non-ETS: SF6 emission is assessed by extrapolation, according to emissions trend from 2015 to 2016, due to the lack of the information.
2.G.3 - non-ETS: N2O emission is assessed according to data for 2016, due to the lack of the information.
2.H.1; 2.H.2; 2.H.3 - non-ETS: Only information on CO2 emission of non-biogenic origin should be reported.
3. Agriculture
3.A-3.H. linear extrapolation is based on trend from 2012 to 2016
5. Waste
5.A.1; 5.A.2 - non-ETS: CH4 emissions are assessed by extrapolation, according to emissions trend from 2015 to 2016, due to the lack of the information.
5.B - non-ETS: CH4 and N2O emissions are assessed according to data for 2016, due to the lack of the information.
5.C.1 - non-ETS: CO2 and N2O emissions are assessed according to data for 2016, due to the lack of the information.
5.D.1- non-ETS: CH4 emission is assessed by extrapolation, according to emissions trend from 2015 to 2016, due to the lack of the information.
5.D.1 - non-ETS: N2O emission is assessed by extrapolation, according to emissions trend from 2015 to 2016, due to the lack of the information.
5.D.2 - non-ETS: CH4 emission is assessed by extrapolation, according to emissions trend from 2015 to 2016, due to the lack of the information.

6.5 Cyprus (EEA calculations)

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Proxy inventory 2017
EEA calculations 2018
CYPRUS

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2(1)	CH4	N2O	HFCs	PFCs	SF6	Unspecified mix of HFCs and PFCs	NF3	Total	ETS	non-ETS
	CO2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)(1)	7594.97	859.95	339.27	278.73	NO	0.17	NO	NO	9073.09		
1. Energy	6592.83	17.35	63.37						6673.56		
A. Fuel combustion (sectoral approach)	6592.78	17.21	63.37						6673.35		
1. Energy industries	3401.38	8.88	32.70						3442.95		
2. Manufacturing industries and construction	617.39	1.61	5.93						624.94		
3. Transport	2019.69	5.27	19.41						2044.37		
4. Other sectors	531.36	1.39	5.11						537.85		
5. Other	22.96	0.06	0.22						23.24		
B. Fugitive emissions from fuels	0.06	0.15	NO						0.20		
1. Solid fuels	NO	NO	NO						NO		
2. Oil and natural gas	0.06	0.15	NO						0.20		
C. CO2 transport and storage	NO								NO		
2. Industrial processes and product use	934.86	0.00	60.17	278.73	NO	0.17	NO	NO	1273.93		
A. Mineral industry	920.21								920.21		
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO		
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO		
D. Non-energy products from fuels and solvent use	14.64	NE,NA	NE,NA						14.64		
E. Electronic Industry				NO	NO	NO	NO	NO	NO		
F. Product uses as ODS substitutes				278.73					278.73		
G. Other product manufacture and use	0.01	NE	60.17		NO	0.17			60.34		
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO		
3. Agriculture	0.39	297.17	192.00						489.57		
A. Enteric fermentation		243.59							243.59		
B. Manure management		53.49	66.57						120.06		
C. Rice cultivation		NO							NO		
D. Agricultural soils			125.40						125.40		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		0.09	0.03						0.12		
G. Liming	NO								NO		
H. Urea application	0.39								0.39		
I. Other carbon-containing fertilizers	NO								NO		
J. Other											
4. Land use, land-use change and forestry(1)	66.88	12.01	4.21						83.09		
A. Forest land	309.08	12.01	4.21						325.30		
B. Cropland	-158.28	NO,NE	NE						-158.28		
C. Grassland	-124.46	NO,NE	NE						-124.46		
D. Wetlands	-10.76	NO,NE	NO,NE						-10.76		
E. Settlements	20.09	NE							20.09		
F. Other land	6.51	NE	NO,NE						6.51		
G. Harvested wood products	24.69								24.69		
H. Other	NO	NO	NO						NO		
5. Waste	NO,NA	533.42	19.52						552.94		
A. Solid waste disposal	NO,NA	467.24							467.24		
B. Biological treatment of solid waste		4.35	3.11						7.46		
C. Incineration and open burning of waste	NO	NO	NO						NO		
D. Waste water treatment and discharge		61.83	16.41						78.24		
E. Other											
6. Other (as specified in summary 1.A)											
Memo items:(2)											
International bunkers	1783.35	1.92	16.71						1801.97		
Aviation	877.15	0.15	7.31						884.62		
Navigation	906.20	1.76	9.39						917.36		
Multilateral operations	NO	NO	NO						NO		
CO2 emissions from biomass	191.42								191.42		
CO2 captured	NO								NO		
Long-term storage of C in waste disposal sites	NE								NE		
Indirect N2O			NO								
Indirect CO2 (3)	NO										
Total CO2 equivalent emissions without land use, land-use change and forestry									8989.99	4672.87	4317.12
Total CO2 equivalent emissions with land use, land-use change and forestry									9073.09		
Total CO2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry									NA		
Total CO2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry									NA		

Color codes	
	Calculated value
	Previous year value
	ETS value
	No value

The 2017 emissions of Cyprus are based on 2016 emissions and do not necessarily reflect the trend.

6.6 Czech Republic (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year: 2017
Submission:
Country: Czech Republic
Geographical scope[4]:

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	105946,83	13593,25	6059,48	3271,48	0,93	77,62	NO,NE	2,52	128952,12		
1. Energy	94901,54	4869,88	865,79						100637,21	**53.610**	**43.000**
A. Fuel combustion (sectoral approach)	94743,85	1000,42	865,76						96610,03	53609,86	**43.000**
1. Energy industries	54004,24	33,31	254,98						54292,53	IE	IE
2. Manufacturing industries and construction	8550,22	35,95	57,49						8643,66	IE	IE
3. Transport	19340,28	27,93	404,80						19773,01	IE	IE
4. Other sectors	12479,07	902,21	137,42						13518,70	IE	IE
5. Other	370,04	1,02	11,07						382,13	IE	IE
B. Fugitive emissions from fuels	157,69	3869,46	0,02						4027,17	NO	**4.027**
1. Solid fuels	153,29	3264,17	NO,NA						3417,47	NO	**3.417**
2. Oil and natural gas	4,40	605,29	0,02						609,71	NO	**610**
C. CO_2 transport and storage	NO								NO	NO	**NO**
2. Industrial processes and product use	11867,38	44,95	540,17	3271,48	0,93	77,62	NO	2,52	15805,06	9632	**6.173**
A. Mineral industry	2901,62								2901,62	2.856	**46**
B. Chemical industry	1437,02	29,70	316,67	NO	NO	NO	NO	NO	1783,40	1.106	**678**
C. Metal industry	7377,75	15,25	NA	NO	NO	NO	NO	NO	7393,00	5.671	**1.722**
D. Non-energy products from fuels and solvent use	150,98	NO	NO,NA						150,98	0	**151**
E. Electronic Industry				NO	0,40	4,06	NO	2,52	6,98	0	**7**
F. Product uses as ODS substitutes				3271,48	0,53	NO	NO	NO	3272,02	0	**3.272**
G. Other product manufacture and use	NO	NO	223,50	NO	NO	73,57	NO	NO	297,07	0	**297**
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	**NO**
3. Agriculture	372,88	3692,30	4351,53						8416,71		
A. Enteric fermentation		2966,41							2966,41		
B. Manure management		725,89	834,83						1560,72		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NO	3516,70						3516,70		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	168,59								168,59		
H. Urea application	204,29								204,29		
I. Other carbon-containing fertilizers	NO								0,00		
J. Other	NO	NO	NO						0,00		
4. Land use, land-use change and forestry[1]	-1310,26	32,87	27,41						-1249,98		
A. Forest land	-486,69	32,87	21,67						-432,16		
B. Cropland	119,67	NO	4,69						124,36		
C. Grassland	-661,65	NO	NO,NA						-661,65		
D. Wetlands	25,03	NO	NO						25,03		
E. Settlements	124,06	NO,NA	NO						124,06		
F. Other land	NO,NA	NO,NA	NO,NA						NO,NA		
G. Harvested wood products	-430,67								-430,67		
H. Other	NO	NO	NO						NO		
5. Waste	115,30	4953,25	274,57						5343,12		
A. Solid waste disposal	0,00	3395,00							3395,00		
B. Biological treatment of solid waste		683,75	74,50						758,25		
C. Incineration and open burning of waste	115,30	0,00	2,20						117,50		
D. Waste water treatment and discharge		874,50	197,87						1072,37		
E. Other	NO	NO	NO						NO		
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[2]											
International bunkers	1073,38	0,19	9,05						1082,62		
Aviation	1073,38	0,19	9,05						1082,62		
Navigation	NO	NO	NO						NO		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	15118,54								15118,54		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	40945,18								40945,18		
Indirect N_2O			366,51								
Indirect CO_2[3]	765,49										
Total CO_2 equivalent emissions without land use, land-use change and forestry									130202,10	63241,79	66960,31
Total CO_2 equivalent emissions with land use, land-use change and forestry									128952,12		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									130967,59		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									129717,61		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
Energy: Approximated GHG inventory was created using linear regression (in same cases with using quadratic polynom) for the last 5 years and further extrapolation for year 2017. Linear regression was applied on the lowest levels of sectors and subsectors. This way a better accuracy was reached. IPPU: Approximated GHG inventory was created using prediction model. Prediction model produces predicted values, obtained by evaluating the regression function in the selected time frame (in most cases time series 2010-2016). Standard errors of the predictions are also calculated. For more accurate estimations outliers from the activity data were removed, also overall trend across whole time series was checked. In some cases, input for prediction model was based on expert judgement, mainly in cases where was observed trend change and it is expected that trend will be very similar as in few past years after the change of trend. Agriculture: The approximate GHG inventory of the Agriculture sector was prepared partly with the most actual activity data (population of livestock, yield, consumption of mineral fertilizers) and partly based on the data from 2016 (urea application and sewage sludge used for cultivation). No regression trend was feasible for trend estimations because of the accidental fluctuation of activity data registered during the recent period. The total emissions are expected to remain almost at the same level as reported in the previous submission. No significant change of the total emissions from Agriculture is expected in comparison with the previous year. LULUCF: Within LULUCF, only the most important kategory 4A1 and C-stock change in biomass was updated in the absence of AD for other categories, hence assumed identical as of 2016. The estimated decrese of C-sink (inherently increasing in GHG emissions in the total GHG inventory) is the result of increased wood harvest, reaching its maximum level since 1990. Source: Czech Statistical Office (information released 20th June 2018)

6.7 Denmark (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year
Submission
Country

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	**34.548,99**	**7.017,06**	**5.328,43**	**549,06**	**3,53**	**77,55**	**0,00**	**0,00**	**47524,62**		
1. Energy	**32.820,48**	**363,52**	**386,76**						**33570,76**	**13788,16**	**19782,60**
A. Fuel combustion (sectoral approach)	32.560,63	264,02	340,56						33165,21	13548,45	19616,76
1. Energy industries											
2. Manufacturing industries and construction											
3. Transport											
4. Other sectors											
5. Other											
B. Fugitive emissions from fuels	259,85	99,50	46,19						405,55	239,71	165,84
1. Solid fuels	NA,NO	NA,NO	NA,NO						NA,NO		
2. Oil and natural gas and other emissions from energy production	259,85	99,50	46,19						405,55	239,71	165,84
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	**1.494,81**	**3,88**	**19,86**	**549,06**	**3,53**	**77,55**	**0,00**	**0,00**	**2148,69**	**1290,18**	**858,51**
A. Mineral industry	1.328,99								1328,99	1290,18	38,81
B. Chemical industry	1,39	NA,NO	NA,NO	NA	NA	NA	NA	NA	1,39	0	1,39
C. Metal industry	0,15	NO	NO		NO	NO			0,15	0	0,15
D. Non-energy products from fuels and solvent use	164,04	0,46	0,16						164,67	0	164,67
E. Electronic Industry				NO	NO	NO	NO	NO	0,00	0	0,00
F. Product uses as ODS substitutes				549,06	3,53	NA	NA	NA	552,59	0	552,59
G. Other product manufacture and use	0,25	3,41	19,70	NA	NA	77,55	NA	NA	100,91	0	100,91
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA		
3. Agriculture	**216,59**	**5.561,25**	**4.756,04**						**10533,89**	**0,00**	**10533,89**
A. Enteric fermentation		3.712,02							3712,02	0	3712,02
B. Manure management		1.846,62	725,26						2571,88	0	2571,88
C. Rice cultivation		NO							NO		
D. Agricultural soils		NE	4.029,97						4029,97	0	4029,97
E. Prescribed burning of savannahs		NO	NO						NO		
F. Field burning of agricultural residues		2,61	0,81						3,42	0	3,42
G. Liming	211,76								211,76	0	211,76
H. Urea application	1,61								1,61	0	1,61
I. Other carbon-containing fertilizers	3,22								3,22	0	3,22
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]											
A. Forest land											
B. Cropland											
C. Grassland											
D. Wetlands											
E. Settlements											
F. Other land											
G. Harvested wood products											
H. Other											
5. Waste	**17,10**	**1.088,40**	**165,78**						**1271,28**	**0,00**	**1271,28**
A. Solid waste disposal	NO,NA	618,46							618,46	0	618,46
B. Biological treatment of solid waste		357,09	100,16						457,25	0	457,25
C. Incineration and open burning of waste	NA,NO	0,02	0,27						0,29	0	0,29
D. Waste water treatment and discharge		110,90	65,34						176,24	0	176,24
E. Other	17,10	1,94	NA						19,05	0	19,05
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO		

Memo items:[2]											
International bunkers											
Aviation											
Navigation											
Multilateral operations											
CO_2 emissions from biomass											
CO_2 captured											
Long-term storage of C in waste disposal sites											
Indirect N_2O											

Indirect CO_2 [3]	286,94										

Total CO_2 equivalent emissions without land use, land-use change and forestry	**47.524,62**	**15.078,33**	**32.446,29**
Total CO_2 equivalent emissions with land use, land-use change and forestry			
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**47.811,56**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry			

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

[2] See footnote 7 to table Summary 1.A.

[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
The short term trend in Danish greenhouse gas emissions is dominated by the trend in the energy sector. This is caused by the open electricity market and especially the import/export of electricity within the Nordic electricity market. Changes in production of renewable energy (mainly hydropower) in the Nordic countries influences directly the need for fossil power generation in Denmark. In 2017, there was not a big change in electricity import/export compared to 2016. However, the production of renewable energy increased significantly, i.e. by 10.8 % mainly driven by increases in biomass and wind energy with a smaller contribution coming from biogas. As a result the coal consumption in the Danish power plants decreased by about 26 %. The consumption of natural gas also decreased albeit to a smaller extent as a decrease of about 5 % is observed. The consumption of oil products (mainly related to transport and mobile sources) increased by about 3 %. The overall result is a decrease in the CO2 emission from fuel combustion. More information on the preliminary energy statistics is available from the Danish Energy Agency (http://en-press.ens.dk/pressreleases/significant-increase-in-the-consumption-of-renewable-energy-in-2017-2470744 & https://ens.dk/sites/ens.dk/files/Statistik/fact_sheet_renewable_energy.pdf). For industrial processes, most emissions of CO2, CH4 and N2O have been assumed constant at 2016 levels. However, 2016 ETS infomation has been taken into account for cement production. For f-gases, the emissions of HFCs are expected to continue to decrease due to the measures in place to reduce the use of HFCs. For SF6, the emissions have peaked, this is caused by the fact that SF6 was used in double glazed windows and according to the model the lifetime of these windows started to expire in 2011 causing the remaining SF6 to be emitted. Hence, the emissions of SF6 increased since 2011 and now they decrease again. Emissions from agriculture and waste have been kept constant at the 2016 level for the purpose of this proxy.

6.8 Estonia (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission 2018
Country Estonia
Geographical scope[4]

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	18455,81	1075,63	872,25	242,96	NO	2,43	NO	NO	20649,07		
1. Energy	18035,07	172,17	120,88						18328,12	**14.298,50**	**4.029,62**
A. Fuel combustion (sectoral approach)	18035,04	153,63	120,88						18309,55	14.298,50	4.011,05
1. Energy industries	14465,12	20,99	40,29						14526,41	13.944,12	582,28
2. Manufacturing industries and construction	486,59	2,15	3,56						492,29	347,41	144,88
3. Transport	2475,00	4,05	21,97						2501,03	2,30	2.498,73
4. Other sectors	560,82	126,44	55,05						742,31	4,67	737,64
5. Other	47,51	0,00	0,00						47,52	0,00	47,52
B. Fugitive emissions from fuels	0,03	18,53	NO						18,57	0,00	18,57
1. Solid fuels	NO	NO	NO						NO	0,00	0,00
2. Oil and natural gas	0,03	18,53	NO						18,57	0,00	18,57
C. CO_2 transport and storage	NO								NO	0,00	0,00
2. Industrial processes and product use	402,13	NO	2,84	242,96	NO	2,43	NO	NO	650,36	**374,50**	**275,87**
A. Mineral industry	374,67								374,67	374,50	0,18
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00	0,00
C. Metal industry	5,14	NO	NO	NO	NO	NO	NO	NO	5,14	0,00	5,14
D. Non-energy products from fuels and solvent use	22,32	NO	NO						22,32	0,00	22,32
E. Electronic Industry				NO	NO	NO	NO	NO	NO	0,00	0,00
F. Product uses as ODS substitutes				242,96	NO	NO	NO	NO	242,96	0,00	242,96
G. Other product manufacture and use	NO	NO	2,84	NO	NO	2,43	NO	NO	5,28	0,00	5,28
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00	0,00
3. Agriculture	17,55	609,94	699,82						1327,31	**0,00**	**1.327,31**
A. Enteric fermentation		535,21							535,21	0,00	535,21
B. Manure management		74,73	58,19						132,93	0,00	132,93
C. Rice cultivation		NO							NO	0,00	0,00
D. Agricultural soils		NO	641,63						641,63	0,00	641,63
E. Prescribed burning of savannas		NO	NO						NO	0,00	0,00
F. Field burning of agricultural residues		NO	NO						NO	0,00	0,00
G. Liming	14,87								14,87	0,00	14,87
H. Urea application	2,68								2,68	0,00	2,68
I. Other carbon-containing fertilizers	NO								NO	0,00	0,00
J. Other	NO	NO	NO						NO	0,00	0,00
4. Land use, land-use change and forestry[1]											
A. Forest land											
B. Cropland											
C. Grassland											
D. Wetlands											
E. Settlements											
F. Other land											
G. Harvested wood products											
H. Other											
5. Waste	1,06	293,52	48,70						343,28	**0,00**	**343,28**
A. Solid waste disposal	NO	210,78							210,78	0,00	210,78
B. Biological treatment of solid waste		25,72	18,40						44,12	0,00	44,12
C. Incineration and open burning of waste	1,06	0,47	0,09						1,62	0,00	1,62
D. Waste water treatment and discharge		56,35	30,13						86,48	0,00	86,48
E. Other	NO	0,20	0,07						0,27	0,00	0,27
6. Other ***(as specified in summary 1.A)***	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00	0,00

Memo items:[2]											
International bunkers	895,66	2,04	7,33						905,03		
Aviation	64,74	0,04	0,53						65,32		
Navigation	830,92	2,00	6,79						839,71		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	4629,67								4629,67		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites									NO		
Indirect N_2O			NE, NO								
Indirect CO_2[3]	NE, NO, IE										
Total CO_2 equivalent emissions without land use, land-use change and forestry									20649,07	14.673,00	5.976,07
Total CO_2 equivalent emissions with land use, land-use change and forestry									NE		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									20649,07		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NE		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
TOTAL GHG emissions: Total GHG emissions in 2017 increased 5.2% compared to 2016 mainly due to increased emissions in Energy sector. The drivers underpinning the total increase are elaborated below. **Energy:** Total 2017 GHG emissions from energy sector have increased 4.6% compared to year 2016 due to an increase in emissions from Energy industries and the Transport sector, which increased 5.1% and 5.2%, respectively. Emissions mainly increased because of increase in electricity production, shale oil production and fuel demand in the transport sector. GHG emissions in non-ETS sectors have decreased 3.9% compared to 2016 due to an increase in biomass usage. **IPPU:** Total GHG emissions in 2017 from Industrial Processes and Product Use increased 30.03% in comparison with 2016 mainly due to larger volume of Mineral Industry produce, notably in Cement Production and Lime Production categories. **Agriculture:** Total emissions from agriculture sector in 2017 increased 2.4% compared to 2016. The emissions from Enteric fermentation and Manure management have increased due to the rising numbers of dairy cattle and swine. The number of dairy cattle in 2017 increased 1.2% in comparison with 2016. In 2017, the number of swine population increased by 7%, which is the first rise of the number of swines after the outbreak of African swine fever in the region, in 2014. The emissions from Agricultural soils in 2017 increased 4.1% compared to the previous year as the cereal production and the amounts of fertilizers used increased. **Waste:** Compared to 2016, the total waste sector emissions in 2017 increased 12.1%. This is due to the correction of the amount of methane flared in Solid waste disposal and Other sector (Biogas burnt in a flare). The preliminary data used for calculating the proxy emissions is under inspection by the Estonian Environment Agency.

6.9 Finland (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory 2017
Submission 2018 proxy
FINLAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	16155,45	5502,25	5877,08	1381,43	4,48	48,03	NO	NO	28968,71		
1. Energy	40756,15	295,87	549,14						41601,17	**20.870**	**20.542**
A. Fuel combustion (sectoral approach)	40652,00	262,89	548,00						41462,89		
1. Energy industries	17440,00	26,00	245,00						17711,00		
2. Manufacturing industries and construction	6560,00	20,89	143,00						6723,89		
3. Transport	11710,00	17,00	85,00						11812,00		
4. Other sectors	3790,00	196,00	67,00						4053,00		
5. Other	1152,00	3,00	8,00						1163,00		
B. Fugitive emissions from fuels	104,15	32,98	1,14						138,28		
1. Solid fuels	NO	NO	NO						NO		
2. Oil and natural gas	104,15	32,98	1,14						138,28		
C. CO_2 transport and storage	NA,NO								NA,NO		
2. Industrial processes and product use	4377,82	0,10	238,00	1381,43	4,48	48,03	NO	NO	6049,86	**4.250**	**1.800**
A. Mineral industry	1128,47								1128,47		
B. Chemical industry	1121,90	NA,NO	212,83	NO	NO	NO	NO	NO	1334,73		
C. Metal industry	2022,39	0,00	NO	NO	NO	NA,NO	NO	NO	2022,40		
D. Non-energy products from fuels and solvent use	105,06	0,10	0,60						105,76		
E. Electronic Industry				NO,IE	NO,IE	NO,IE	NO	NO	NO,IE		
F. Product uses as ODS substitutes				1378,62	0,94	NO	NO	NO	1379,56		
G. Other product manufacture and use	NO	NO	24,58	NO	NO	11,41	NO	NO	35,99		
H. Other	NO	NO	NO	2,81	3,53	36,62	NO	NO	42,96		
3. Agriculture	268,35	2536,51	3697,97						6502,83	**0**	**6.503**
A. Enteric fermentation		2081,90							2081,90		
B. Manure management		452,51	278,16						730,67		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NE,NO	3419,16						3419,16		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		2,09	0,65						2,74		
G. Liming	265,58								265,58		
H. Urea application	2,77								2,77		
I. Other carbon-containing fertilizers	NA								NA		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	-29246,88	919,45	1270,97						-27056,46		
A. Forest land	-36102,34	843,25	1131,98						-34127,11		
B. Cropland	7158,43	IE,NA	12,81						7171,24		
C. Grassland	669,02	0,03	1,52						670,57		
D. Wetlands	2099,76	76,18	99,96						2275,89		
E. Settlements	570,66	NE,NA	21,46						592,11		
F. Other land	NO,NA	NA	NA						NO,NA		
G. Harvested wood products	-3642,41								-3642,41		
H. Other	NA	NA	NA						NA		
5. Waste	NE,NO,IE	1750,32	120,99						1871,32	**0**	**1.871**
A. Solid waste disposal	NO	1517,40							1517,40		
B. Biological treatment of solid waste		62,55	38,46						101,02		
C. Incineration and open burning of waste	NE,NO,IE	NE,NO,IE	NE,NO,IE						NE,NO,IE		
D. Waste water treatment and discharge		170,37	82,53						252,90		
E. Other	NO	NO	NO						NO		
6. Other ***(as specified in summary 1.A)***	NO	NO	NO	NO	NO	NO	NO	NO	NO		
Memo items:[2]											
International bunkers	3165,50	2,57	24,53						3192,59		
Aviation	2097,42	0,28	17,08						2114,78		
Navigation	1068,08	2,28	7,45						1077,81		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	41861,88								41861,88		
CO_2 captured	133,85								133,85		
Long-term storage of C in waste disposal sites	54751,58								54751,58		
Indirect N_2O			178,94								
Indirect CO_2 [3]	52,88										
Total CO_2 equivalent emissions without land use, land-use change and forestry									56025,17	**25.120**	**30.716**
Total CO_2 equivalent emissions with land use, land-use change and forestry									28968,71		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									56078,05	**25.120**	**30.769**
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									29021,59		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for

[2] See footnote 7 to table Summary 1.A.

[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
According to Statistics Finland's instant preliminary data, the total emissions of greenhouse gases in 2017 corresponded with 56.1 million tonnes of carbon dioxide (CO_2 eq.). Emissions fell by almost five per cent compared with the previous year and were on level with 2015. The fall in emissions was most influenced by the decreased consumption of the main fossil fuels and the increased share of biofuels in traffic. Emissions outside the EU emissions trading system went down by two per cent from 2016, but they exceeded the emission allocation set by the EU for the second time. According to the instant preliminary data, total emissions in 2017 decreased by nearly five per cent compared with the previous year. Emissions in the energy sector diminished by six per cent and the fall in emissions was influenced most by the lower consumption of the main fossil fuels and the increased share of biofuels in traffic. Emissions from industrial processes and product use fell by one per cent, emissions from agriculture by half a per cent and emissions in the waste sector by six per cent from 2016 to 2017. According to the instant preliminary data, the carbon sink of the LULUCF sector was in 2017 equal to 2016, being around 27.1 million tonnes CO_2 equivalent. Emissions and removals in this sector are not included in total emissions. Emissions outside the EU emissions trading system are calculated as the difference between the total emissions and verified emissions of the emissions trading sector, excluding CO_2 emissions from domestic civil aviation as reported in the greenhouse gas inventory. The data on the verified emissions of the emissions trading sector are published by the Energy Authority. Annual emission allocations for the years 2013 to 2020 have been defined in the EU's effort sharing decision for emissions outside emissions trading sector. The emissions in question were below the target path defined by the annual emission allocations in 2013 to 2015. The 2016 emissions exceeded the target path as did the emissions according to the instant preliminary data for the year 2017. Emission allocations not used for 2013 to 2015 can be used to compensate for the emissions in 2016 and 2017 that exceed the target path.

http://tilastokeskus.fi/til/khki/2017/khki_2017_2018-05-24_tie_001_en.html

http://tilastokeskus.fi/til/ehk/2017/04/ehk_2017_04_2018-03-28_tie_001_en.html (Energy statistics, Preliminary data)

http://www.energiavirasto.fi/fi/-/suomen-paastokauppasektorin-paastot-pienenivat-2-1-miljoonaa-tonnia-vuonna-2017?redirect=http%3A%2F%2Fwww.energiavirasto.fi%2Ffi%2Fuutisarkisto%3Bjsessionid%3DE4247D037F2E45DEB0B8F93F02B39129%3Fp_p_id%3D101_INSTANCE_c1lTKRwQcXY6%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-1%26p_p_col_pos%3D1%26p_p_col_count%3D2 (Energy authority, EU Emissions trading Scheme, The data on the verified emissions of the emissions trading sector in Finland in 2017, in Finnish only)

6.10 France (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Inventory PROXY 2017
Submission 2018 v2
FRANCE (KP)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2(1)	CH4	N2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs(1)	SF6	NF3	Total	ETS	non-ETS
	CO2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)(1)	307.776,30	57.127,32	44.196,98	19.306,25	666,01	0,00	506,49	5,84	429.585,19		
1. Energy	323.063,98	3.044,50	3.948,26						330.056,74	**85.884,94**	**244.171,80**
A. Fuel combustion (sectoral approach)	320.071,21	1.812,23	3.934,41						325.817,85	**83.120,06**	**242.697,79**
1. Energy industries	49.173,35	39,94	307,81						49.521,09	**41.930,26**	**7.590,83**
2. Manufacturing industries and construction	49.700,42	155,84	463,14						50.319,41	**40.547,67**	**9.771,74**
3. Transport	131.680,50	144,21	1.585,71						133.410,41	**342,73**	**133.067,68**
4. Other sectors	89.516,94	1.472,24	1.577,75						92.566,94	**299,40**	**92.267,54**
5. Other	0,00	0,00	0,00						0,00	-	-
B. Fugitive emissions from fuels	2.992,77	1.232,27	13,85						4.238,89	**2.764,88**	**1.474,01**
1. Solid fuels	0,00	16,26	0,00						16,26	-	**16,26**
2. Oil and natural gas	2.992,77	1.216,01	13,85						4.222,63	**2.764,88**	**1.457,75**
C. CO2 transport and storage	0,00								0,00	-	-
2. Industrial processes and product use	22.035,37	53,68	1.027,74	19.306,25	666,01	0,00	506,49	5,84	43.601,38	**20.903,55**	**22.697,83**
A. Mineral industry	9.716,82								9.716,82	**8.903,29**	**813,54**
B. Chemical industry	6.342,00	43,73	892,44	288,36	2,15	0,00	0,00	0,00	7.568,68	**7.544,35**	**24,33**
C. Metal industry	4.349,91	9,75	0,00	0,00	109,27	0,00	60,16	0,00	4.529,09	**4.404,27**	**124,82**
D. Non-energy products from fuels and solvent use	1.208,61	0,20	2,68						1.211,50	**31,82**	**1.179,67**
E. Electronic Industry				2,80	97,68	0,00	2,11	5,84	108,42	-	**108,42**
F. Product uses as ODS substitutes				19.014,56	0,00	0,00	0,00	0,00	19.014,56	-	**19.014,56**
G. Other product manufacture and use	417,97	0,00	132,62	0,53	456,91	0,00	444,23	0,00	1.452,25	**19,77**	**1.432,48**
H. Other	0,05	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,05	**0,05**	**0,00**
Emissions indirectes de CO2	0,00								0,00	-	-
3. Agriculture	2.013,83	39.343,04	35.333,86						76.690,73	-	**76.690,73**
A. Enteric fermentation		35.144,70							35.144,70	-	**35.144,70**
B. Manure management		4.075,31	2.623,36						6.698,66	-	**6.698,66**
C. Rice cultivation		79,67							79,67	-	**79,67**
D. Agricultural soils		0,00	32.697,10						32.697,10	-	**32.697,10**
E. Prescribed burning of savannas		0,00	0,00						0,00	-	-
F. Field burning of agricultural residues		43,36	13,40						56,76	-	**56,76**
G. Liming	789,05								789,05	-	**789,05**
H. Urea application	1.224,78								1.224,78	-	**1.224,78**
I. Other carbon-containing fertilizers	0,00								0,00	-	-
J. Other	0,00	0,00	0,00						0,00	-	-
4. Land use, land-use change and forestry(1)	-40.916,78	1.212,18	3.125,87						-36.578,73	-	**- 36.578,73**
A. Forest land	-57.180,78	641,15	377,41						-56.162,22	-	**- 56.162,22**
B. Cropland	16.781,31	115,00	1.874,04						18.770,36	-	**18.770,36**
C. Grassland	-10.417,32	168,64	113,54						-10.135,15	-	**- 10.135,15**
D. Wetlands	498,21	9,16	0,75						508,12	-	**508,12**
E. Settlements	10.895,65	58,40	760,13						11.714,19	-	**11.714,19**
F. Other land	0,16	0,00	0,00						0,16	-	**0,16**
G. Harvested wood products	-1.562,86								-1.562,86	-	**- 1.562,86**
H. Other	68,83	219,83	0,00						288,67	-	**288,67**
5. Waste	1.579,90	13.473,92	761,24						15.815,07	-	**15.815,07**
A. Solid waste disposal	0,00	10.999,11							10.999,11	-	**10.999,11**
B. Biological treatment of solid waste		243,94	320,20						564,14	-	**564,14**
C. Incineration and open burning of waste	1.579,90	28,20	36,84						1.644,94	-	**1.644,94**
D. Waste water treatment and discharge		2.202,67	404,20						2.606,87	-	**2.606,87**
E. Other	0,00	0,00	0,00						0,00	-	-
6. Other (as specified in summary 1.A)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		

Memo items:(2)											
International bunkers	22.066,92	14,21	180,28						22.261,40		
Aviation	17.052,27	2,15	141,96						17.196,38		
Navigation	5.014,65	12,05	38,31						5.065,02		
Multilateral operations	1,35	NE	NE						1,35		
CO2 emissions from biomass	66.231,81								66.231,81		
CO2 captured	NO,NE								NO,NE		
Long-term storage of C in waste disposal sites	NE								NE		
Indirect N2O			NO,NE								
Indirect CO2 (3)	IE,NA										
Total CO2 equivalent emissions without land use, land-use change and forestry									**466.163,91**	**106.788,49**	**359.375,42**
Total CO2 equivalent emissions with land use, land-use change and forestry									**429.585,19**		
Total CO2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry									NA		
Total CO2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry									NA		

(1) For carbon dioxide (CO2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO2, the national totals shall be provided with and without indirect CO2.

6.11 Germany (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017 (proxy)
Submission 26.07.2018
Country GERMANY
Geographical scope[4] GERMANY

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO_2 equivalent (Gg)	
Total (net emissions)[1]	**781.098**	**54.923**	**38.944**	**11.028**	**280**	**3.982**	**IE**	**11**	**890.266**		
1. Energy	**748.659**	**12.309**	**5.492**						**766.460**	**396.759**	**369.700**
A. Fuel combustion (sectoral approach)	746.248	4.762	5.492						756.502	396.759	**359.743**
1. Energy industries	312.864	3.100	2.524						318.488	291.716	**26.772**
2. Manufacturing industries and construction	129.075	271	793						130.139	103.503	**26.636**
3. Transport	168.832	147	1.670						170.649	1.237	**169.411**
4. Other sectors	135.477	1.245	505						137.227	304	**136.923**
5. Other	IE	IE	IE						IE	IE	**IE**
B. Fugitive emissions from fuels	2.410	7.547	0						9.957	IE	**9.957**
1. Solid fuels	707	2.481	NO						3.187	IE	**3.187**
2. Oil and natural gas	1.704	5.066	0						6.770	IE	**6.770**
C. CO_2 transport and storage	NO								NO	NO	**NO**
2. Industrial processes and product use	45.857	527	1.130	11.028	280	3.982	IE	11	62.815	**40.817**	**21.998**
A. Mineral industry	19.993								19.993	14.139	**5.854**
B. Chemical industry	5.642	488	707						6.837	11.672	**-4.835**
C. Metal industry	17.682	7	16	IE	IE	IE	IE	IE	17.705	15.001	**2.704**
D. Non-energy products from fuels and solvent use	2.541	NO	1						2.542	6	**2.536**
E. Electronic Industry				IE	IE	IE	IE	IE	IE	0	**IE**
F. Product uses as ODS substitutes				IE	IE	IE	IE	IE	IE	0	**IE**
G. Other product manufacture and use	NO	32	406	IE	IE	IE	IE	IE	438	0	**438**
H. Other	NA	NA	NA	IE	IE	IE	IE	IE	IE	IE	**NA**
3. Agriculture	2.786	32.028	30.628						65.441		
A. Enteric fermentation		24.535							24.535		
B. Manure management		6.158	3.807						9.964		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NO	26.558						26.558		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	1.734								1.734		
H. Urea application	836								836		
I. Other carbon-containing fertilizers	216								216		
J. Other	NO,NA	1.335	263						1.598		
4. Land use, land-use change and forestry[1]	-16.204	865	860						-14.479		
A. Forest land	-57.840	19	154						-57.667		
B. Cropland	14.577	248	357						15.182		
C. Grassland	21.997	510	105						22.612		
D. Wetlands	4.020	44	23						4.086		
E. Settlements	3.370	44	222						3.636		
F. Other land	NO	NO	NO						NO		
G. Harvested wood products	-2.328								-2.328		
H. Other		NA	Vert vorhanden						0		
5. Waste	NA, NO	9.195	834						10.028		
A. Solid waste disposal	NA	7.925							7.925		
B. Biological treatment of solid waste		690	304						994		
C. Incineration and open burning of waste	NO	NO	NO						NO		
D. Waste water treatment and discharge		575	458						1.033		
E. Other		4	72						76		
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO		

Memo items:[2]											
International bunkers	34.384	5	348						34.737		
Aviation	26.173	3	245						26.420		
Navigation	8.212	2	103						8.317		
Multilateral operations	NE	NE	NE						NE		
CO_2 emissions from biomass	108.285								108.285		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	NO								NO		
Indirect N_2O			NO						NO		
Indirect CO_2[3]											
Total CO_2 equivalent emissions without land use, land-use change and forestry									**904.745**	**437.577**	**467.168**
Total CO_2 equivalent emissions with land use, land-use change and forestry											
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry											
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry											

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

[2] See footnote 7 to table Summary 1.A.

[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
more details available at: https://www.umweltbundesamt.de/en/press/pressinformation/green-house-gas-emissions-2017-on-the-decline

6.12 Greece (submitted by MS)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]											
1. Energy									**70.099**		
A. Fuel combustion (sectoral approach)									69.339		
1. Energy industries	40.541,58	12,98	122,53						40.677	40.114	563
2. Manufacturing industries and construction	4.928,89	7,06	64,29						5.000	3.790	1.210
3. Transport	17.200,00	85,00	215,00						17.500		17.500
4. Other sectors	5.800,00	100,00	59,60						5.960		5.960
5. Other	200,00	0,05	1,79						202		202
B. Fugitive emissions from fuels									760		
1. Solid fuels	NO	625	NA,NO						625		625
2. Oil and natural gas and other emissions from energy production	10	125	0						135		135
C. CO_2 transport and storage	NO										
2. Industrial processes and product use									**12.042**		
A. Mineral industry	4.095								4.095	4.080	15
B. Chemical industry	217		20						237	237	
C. Metal industry	1.117	0	NO		82,18513987				1.199	1.041	158
D. Non-energy products from fuels and solvent use	30	NA,NO	NA,NO						30		30
E. Electronic Industry				NO	NO	NO	NO	NO	NO		
F. Product uses as ODS substitutes				6200	45				6.245		6.245
G. Other product manufacture and use	82	NA	149		NO	5,2			236		236
H. Other	NA	NA	NA								
3. Agriculture									**7.540**		
A. Enteric fermentation		3.625							3.625		3.625
B. Manure management		650	1						651		651
C. Rice cultivation		145							145		145
D. Agricultural soils			3.055						3.055		3.055
E. Prescribed burning of savannahs											
F. Field burning of agricultural residues		30	10						40		40
G. Liming	NO										
H. Urea application	25								25		25
I. Other carbon-containing fertilizers	NO										
J. Other											
4. Land use, land-use change and forestry[1]	-3.090	21	17						**-3.053**		
A. Forest land	-2.182	9	0,71						-2.173		
B. Cropland	155	NO	1,41						156		
C. Grassland	-1.344	12	1,27						-1.331		
D. Wetlands	2	NO	0,13						2		
E. Settlements	124	NO	6,59						130		
F. Other land	89	NO	6,80						96		
G. Harvested wood products	67	NA	NA						67		
H. Other	NO	NO	NO						NO		
5. Waste									**4.552**		
A. Solid waste disposal	NA,NO	3.185							3.185		3.185
B. Biological treatment of solid waste		25	21						46		46
C. Incineration and open burning of waste	5	0	1						6		6
D. Waste water treatment and discharge		988	328						1.315		1.315
E. Other	NO	NO	NO								
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO			
Memo items:[2]											
International bunkers	8.700,00	13,69	179,27						8.892,96		
Aviation	3.100,00	0,50	23,75						3.124,25		
Navigation	5.600,00	13,20	155,52						5.768,72		
Multilateral operations											
CO_2 emissions from biomass											
CO_2 captured											
Long-term storage of C in waste disposal sites											
Indirect N_2O											
Indirect CO_2 [3]											
Total CO_2 equivalent emissions without land use, land-use change and forestry									**94.233,41**	**49.262,14**	**44.971,27**
Total CO_2 equivalent emissions with land use, land-use change and forestry									**91.180,84**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry											
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry											

(1) For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
The ETS in column L does not include aviation. The emissions from national aviation are included in column M (non-ETS). The estimation of emissions from categories 1 (power sector, refineries and industry) and 2 is based on ETS data. The estimation of emissions from the rest sectors is based on extrapolation of historic emissions and expert judgement.

6.13 Hungary (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission Proxy
Country Hungary

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]											
1. Energy	**44.495,84**	**1.572,93**	**345,66**						**46414,43**	**15.880,86**	**30.533,57**
A. Fuel combustion (sectoral approach)	44.365,73	713,38	345,40						45424,52	15.808,55	29.615,97
1. Energy industries	13.772,88	25,29	63,50						13861,67	13.237,91	623,77
2. Manufacturing industries and construction	5.023,34	10,53	24,13						5058,00	2.438,75	2.619,26
3. Transport	12.767,47	26,54	141,82						12935,83	121,06	12.814,78
4. Other sectors	12.780,38	651,02	115,77						13547,16	10,84	13.536,33
5. Other	21,66	0,00	0,18						21,85	0,00	21,85
B. Fugitive emissions from fuels	130,11	859,54	0,26						989,91	72,32	917,60
1. Solid fuels	NA	52,76	NA						52,76	0,00	52,76
2. Oil and natural gas and other emissions from energy production	130,11	806,78	0,26						937,15	72,32	864,84
C. CO_2 transport and storage	NE								NE	NO	NO
2. Industrial processes and product use	**5233,43**	**49,94**	**80,25**	**1949,87**	**1,09**	**128,37**	**0,00**	**0,00**	**7442,93**	**4.761,22**	**2.681,71**
A. Mineral industry	1255,55								1255,55	1.251,81	3,74
B. Chemical industry	2609,45	44,65	47,71	NO	NO	NO	NO	NO	2701,82	2.390,93	310,89
C. Metal industry	1243,55	5,29	NO	NO	NO	NO	NO	NO	1248,84	1.118,48	130,35
D. Non-energy products from fuels and solvent use	124,88	NO,NA	NO,NA						124,88	0,00	124,88
E. Electronic Industry				NO	NO	NO	NO	NO	NO	0,00	0,00
F. Product uses as ODS substitutes				1949,87	1,09	NO	NO	NO	1950,96	0,00	1.950,96
G. Other product manufacture and use	NO	NO	32,53	NO	NO	128,37	NO	NO	160,90	0,00	160,90
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00	0,00
3. Agriculture	**214,16**	**2.742,62**	**4.150,70**						**7107,48**	**NA**	**7107,48**
A. Enteric fermentation		2084,49							2084,49	NA	2084,49
B. Manure management		638,23	467,94						1106,18	NA	1106,18
C. Rice cultivation		19,90							19,90	NA	19,90
D. Agricultural soils		NA	3682,75						3682,75	NA	3682,75
E. Prescribed burning of savannahs		NO	NO						NO	NA	NO
F. Field burning of agricultural residues		NO	NO						NO	NA	NO
G. Liming	13,15								13,15	NA	13,15
H. Urea application	104,09								104,09	NA	104,09
I. Other carbon-containing fertilizers	96,92								96,92	NA	96,92
J. Other									NO	NA	NO
4. Land use, land-use change and forestry[1]	**NE**	**NE**	**NE**						**NE**		
A. Forest land	NE	NE	NE						NE		
B. Cropland	NE	NE	NE						NE		
C. Grassland	NE	NE	NE						NE		
D. Wetlands	NE	NE	NE						NE		
E. Settlements	NE	NE	NE						NE		
F. Other land	NE	NE	NE						NE		
G. Harvested wood products	NE	NE	NE						NE		
H. Other	NE	NE	NE						NE		
5. Waste	**29,05**	**3.328,73**	**115,63**						**3.473,40**	**NA**	**3473,40**
A. Solid waste disposal	NO,NA	2.942,52							2942,52	NA	2942,52
B. Biological treatment of solid waste		106,15	39,23						145,38	NA	145,38
C. Incineration and open burning of waste	29,05	0,09	0,38						29,52	NA	29,52
D. Waste water treatment and discharge		279,97	76,01						355,98	NA	355,98
E. Other	NO	NO	NO						NO	NA	NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO						NO	NA	NO
Memo items:[2]											
International bunkers	**688,14**	**18,75**	**5,02**						**711,91**		
Aviation	688,14	18,75	5,02						711,91		
Navigation	NO,NE	NO,NE	NO,NE						NO,NE		
Multilateral operations	**NO**	**NO**	**NO**						NO		
CO_2 emissions from biomass	**12.475,06**								12.475,06		
CO_2 captured	**NO**								NO		
Long-term storage of C in waste disposal sites	**12.365,70**								12.365,70		
Indirect N_2O			NE								
Indirect CO_2 [3]	NE										

Total CO_2 equivalent emissions without land use, land-use change and forestry	**64.438,24**	**20.642,09**	**43.796,16**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**NE**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**NE**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**NE**		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

[2] See footnote 7 to table Summary 1.A.

[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
Compared to 2016, total emissions in 2017 were estimated to be higher by 5 per cent. ETS emissions increased by 6.4 per cent.
ENERGY (+4%)
Electricity production increased by 4% within which natural gas fired thermal plants had the greatest contribution.
Considering large power plants, natural gas based electricity production increased significantly whereas the share of coal and renewables decreased.
Motor gasoline and diesel oil sales increased by about 4 per cent which led to increased emissions in the transport sector;
Natural gas consumption increased further for the third consecutive year;
Higher natural gas consumption also increased fugitive emissions from natural gas.
IPPU (+15%)
Steel production increased more than 48% compared to 2016 according to eurofer.org. The favorable economic environment in 2017 increased production and investments in all sectors.
Emission of fluorinated gases has increased due to rising of import of refrigerants in the 2F1 subcategory (+12%).
AGRICULTURE (+3%)
Emissions continued to rise.
The main reason of the upward trends is the significantly increasing synthetic fertiliser use (14%).
WASTE (-1%)
The decreasing trend is expected to continue.

6.14 Ireland (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission 2019
Country Ireland

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	38680,02	14035,63	6934,62	1197,75	47,20	40,14	NO	1,26	60936,62		
1. Energy	36099,62	210,88	359,96						36670,45	14856,20	21814,25
A. Fuel combustion (sectoral approach)	36094,57	171,49	359,96						36626,02	14856,20	21769,82
1. Energy industries	11497,29	9,15	140,38						11646,82	11350,88	295,95
2. Manufacturing industries and construction	4566,06	9,42	15,78						4591,26	3461,98	1129,28
3. Transport	11861,08	13,21	131,33						12005,62	12,83	11992,79
4. Other sectors	8170,14	139,72	72,46						8382,32	30,51	8351,81
5. Other	IE	IE	IE						IE		
B. Fugitive emissions from fuels	5,04	39,39	NO						44,43		44,43
1. Solid fuels	NO	18,94	NO						18,94		18,94
2. Oil and natural gas and other emissions from energy production	5,04	20,44	NO						25,49		25,49
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	2189,52	NO	42,77	1197,75	47,20	40,14	NO	1,26	3518,64	2039,86	1478,78
A. Mineral industry	2039,86								2039,86	2039,86	0,00
B. Chemical industry	NO	NO	NO						NO		
C. Metal industry	NO	NO							NO		
D. Non-energy products from fuels and solvent use	149,67	NO	NO						149,67		149,67
E. Electronic Industry				1197,75	47,20	16,10		1,26	1262,31		1262,31
F. Product uses as ODS substitutes									0,00		0,00
G. Other product manufacture and use	NO	NO	42,77	NO	NO	24,04	NO	NO	66,81		66,81
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO		
3. Agriculture	367,79	13020,85	6426,63						19815,27		19815,27
A. Enteric fermentation		11592,12							11592,12		11592,12
B. Manure management		1428,73	548,57						1977,30		1977,30
C. Rice cultivation		NO							NO		
D. Agricultural soils		NE	5878,06						5878,06		5878,06
E. Prescribed burning of savannahs		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	332,75								332,75		332,75
H. Urea application	35,04								35,04		35,04
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]									0,00		
A. Forest land									0,00		
B. Cropland									0,00		
C. Grassland									0,00		
D. Wetlands									0,00		
E. Settlements									0,00		
F. Other land									0,00		
G. Harvested wood products									0,00		
H. Other											
5. Waste	23,09	803,90	105,26						932,26		932,26
A. Solid waste disposal	NO	741,81							741,81		741,81
B. Biological treatment of solid waste		10,98	7,85						18,83		18,83
C. Incineration and open burning of waste	23,09	0,12	0,25						23,47		23,47
D. Waste water treatment and discharge		51,00	97,15						148,15		148,15
E. Other	NO	NO	NO						NO		
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO		
Memo items:[2]											
International bunkers	3.518,52	1,36	33,44						3.553,32		
Aviation	3.044,23	0,23	29,59						3.074,06		
Navigation	474,29	1,13	3,84						479,26		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	2.397,25								2.397,25		
CO_2 captured	NO,IE								NO,IE		
Long-term storage of C in waste disposal sites	NE								NE		
Indirect N_2O			NO,NE								
Indirect CO_2 [3]											

Total CO_2 equivalent emissions without land use, land-use change and forestry	**60.936,62**	**16.896,06**	**44.040,56**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**60.936,62**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**60.936,62**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**60.936,62**		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

[2] See footnote 7 to table Summary 1.A.

[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.

Power Generation: 21% reduction in coal combustion, 6% reduction in peat, 51% reduction in oil, 4% increase in gas, 16% increase in renewables (incl 22% increase in Biomass & renewable waste and 21% increase in wind)
Transport: 2.3% reduction road fuel, 9.8% reduction in gasoline, 0.4% increase in diesel, 35.6% increase in renewables.
IPPU: 2.1% increase in clinker production
Agriculture: Dairy cow population increase of 3.1%, total cattle pop increase of 1.6%, sheep pop increase of 7.4%, milk yield per cow increase of 5.7% (9.2% increase in overall national milk production), in addition to 8.8% increase in fertilizer nitrogen use

6.15 Italy (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission 2018
Country Italy
Geographical scope[4]

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	316622,20	42888,52	18846,11	14911,63	1613,77	401,60	0,00	27,84	395311,68		
1. Energy	333479,49	8015,57	4630,11						346125,17	**140.473**	**205.652**
A. Fuel combustion (sectoral approach)	331158,65	3287,55	4620,86						339067,05	135.951	203.116
1. Energy industries	103573,98	131,74	409,86						104115,58	102.546	1.569
2. Manufacturing industries and construction	47035,59	277,87	711,50						48024,95	31.720	16.305
3. Transport	101353,91	161,40	842,61						102357,92	787	101.571
4. Other sectors	78611,49	2711,13	2628,83						83951,45	897	83.055
5. Other	583,69	5,41	28,06						617,16	0	617
B. Fugitive emissions from fuels	2320,84	4728,02	9,25						7058,11	4.522	2.536
1. Solid fuels	0,00	42,10	0,00						42,10	0	42
2. Oil and natural gas	2320,84	4685,93	9,25						7016,01	4.522	2.494
C. CO_2 transport and storage	0,00								0,00	0	0
2. Industrial processes and product use	14888,99	48,98	575,65	14911,63	1613,77	401,60	0,00	27,84	32468,46	**14.846**	**17.622**
A. Mineral industry	10705,83								10705,83	10.557	148
B. Chemical industry	1473,37	4,41	118,08	0,00	1478,00	0,00	0,00	NA	3073,86	2.489	585
C. Metal industry	1738,66	44,57	0,00	10,01	0,00	0,00	0,00	0,00	1793,24	1.793	0
D. Non-energy products from fuels and solvent use	971,13	0,00	0,00						971,13	7	964
E. Electronic Industry				9,83	135,77	45,31	0,00	27,84	218,75	0	219
F. Product uses as ODS substitutes				14891,79	0,00	0,00	0,00	NA	14891,79	0	14.892
G. Other product manufacture and use	0,00	0,00	457,56	0,00	0,00	356,29	0,00	NA	813,86	0	814
H. Other	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0	0
3. Agriculture	485,08	18860,97	10951,14						30297,20		
A. Enteric fermentation		14073,74							14073,74		
B. Manure management		3120,21	2127,80						5248,00		
C. Rice cultivation		1650,67							1650,67		
D. Agricultural soils		0,00	8819,23						8819,23		
E. Prescribed burning of savannas		0,00	0,00						0,00		
F. Field burning of agricultural residues		16,36	4,12						20,48		
G. Liming	12,20								12,20		
H. Urea application	472,88								472,88		
I. Other carbon-containing fertilizers	0,00								0,00		
J. Other	0,00	0,00	0,00						0,00		
4. Land use, land-use change and forestry[1]	-32325,60	446,22	754,76						-31124,63		
A. Forest land	-37379,24	313,37	1,17						-37064,69		
B. Cropland	2379,35	-0,58	21,06						2399,83		
C. Grassland	-6429,44	133,43	49,98						-6246,03		
D. Wetlands	0,00	NO	NO						0,00		
E. Settlements	9024,90	NO	677,76						9702,65		
F. Other land	0,00	NO	0,00						0,00		
G. Harvested wood products	78,82								78,82		
H. Other	NA	0,00	0,00						0,00		
5. Waste	94,25	15516,78	1934,46						17545,48		
A. Solid waste disposal	0,00	12836,04							12836,04		
B. Biological treatment of solid waste		122,82	530,31						653,13		
C. Incineration and open burning of waste	94,25	60,24	21,13						175,62		
D. Waste water treatment and discharge		2497,68	1383,02						3880,70		
E. Other	0,00	0,00	0,00						0,00		
6. Other *(as specified in summary 1.A)*	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0	0

Memo items:[2]											
International bunkers									17198,76		
Aviation									10116,82		
Navigation									7081,94		
Multilateral operations									0,00		
CO_2 emissions from biomass									52763,40		
CO_2 captured									0,00		
Long-term storage of C in waste disposal sites									0,00		
Indirect N_2O											
Indirect CO_2[3]											
Total CO_2 equivalent emissions without land use, land-use change and forestry									426436,31	**155.319**	**271.117**
Total CO_2 equivalent emissions with land use, land-use change and forestry									395311,68		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									426436,31		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									395311,68		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

6.16 Latvia (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission v1
Country Latvia
Geographical scope[4] Latvia

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	7244,21	1871,27	1878,16	254,56	NA,NO	9,53	NA,NO	NA,NO	11257,73		
1. Energy	6723,46	290,38	164,81						**7178,65**	**1.586**	**5592,90**
A. Fuel combustion (sectoral approach)	6723,44	172,15	164,81						7060,41	1.586	5474,66
1. Energy industries	1511,56	14,68	23,11						1549,36	1.194	355,00
2. Manufacturing industries and construction	624,89	12,86	20,46						658,21	331	327,33
3. Transport	3267,20	4,63	61,70						3333,53	NA	3333,53
4. Other sectors	1309,65	139,96	59,45						1509,06	61	1448,56
5. Other	10,14	0,02	0,08						10,24	NO	10,24
B. Fugitive emissions from fuels	0,01	118,23	NA,NO						118,24	NO	118,24
1. Solid fuels	NO	NO	NA,NO						NA,NO	NO,NA	NO,NA
2. Oil and natural gas	0,01	118,23	NO						118,24	NA	118,24
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	487,60	NO,NA	2,05	254,56	NO,NA	9,53	NO,NA	NO,NA	**753,74**	**464,05**	**307,80**
A. Mineral industry	445,94								445,94	464,05	NO
B. Chemical industry	NO	NO	NO	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NA,NO	NO,NA	NO,NA
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Non-energy products from fuels and solvent use	41,66	NO,NA	NO,NA						41,66	NA	41,66
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				254,56	NO	NO,NA	NO	NO,NA	254,56	NA	254,56
G. Other product manufacture and use	NA	NA	2,05	NO	NO,NA	9,53	NA	NO,NA	11,58	NO	11,58
H. Other	NO,NA	NO,NA	NO,NA	NA	NA	NA	NA	NA	NA,NO	NA,NO	NA,NO
3. Agriculture	32,86	935,31	1659,62						**2627,79**	**NA**	**2627,78881**
A. Enteric fermentation		836,74							836,74	NA	836,73556
B. Manure management		98,57	86,81						185,38	NA	185,382122
C. Rice cultivation		NO							NO	NA	NO
D. Agricultural soils		NE	1572,81						1572,81	NA	1572,80679
E. Prescribed burning of savannas		NO	NO						NO	NA	NO
F. Field burning of agricultural residues		NO	NO						NO	NA	NO
G. Liming	24,93								24,93	NA	24,9333333
H. Urea application	7,93								7,93	NA	7,931
I. Other carbon-containing fertilizers	NO								NO	NA	NO
J. Other	NO	NO	NO						NO	NA	NO
4. Land use, land-use change and forestry[1]	NE	NE	NE						**NE**		
A. Forest land	NE	NE	NE						NE		
B. Cropland	NE	NE	NE						NE		
C. Grassland	NE	NE	NE						NE		
D. Wetlands	NE	NE	NE						NE		
E. Settlements	NE	NE	NE						NE		
F. Other land	NE	NE	NE						NE		
G. Harvested wood products	NE	NE	NE						NE		
H. Other	NE	NE	NE						NE		
5. Waste	0,29	645,58	51,69						**697,55**	**NA**	**697,55**
A. Solid waste disposal	NA,NO	383,75							383,75	NA	383,75
B. Biological treatment of solid waste		27,60	19,74						47,34	NA	47,34
C. Incineration and open burning of waste	0,29	NA,NO	0,01						0,29	NA	0,29
D. Waste water treatment and discharge		234,23	31,95						266,17	NA	266,17
E. Other	NO	NO	NO						NO	NA	NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:[2]											
International bunkers	1253,70	2,48	58,70						1314,88		
Aviation	425,70	1,25	3,90						430,85		
Navigation	828,00	1,23	54,80						884,03		
Multilateral operations	NA	NA	NA						NA		
CO_2 emissions from biomass	6851,04								6851,04		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	NA								NA		
Indirect N_2O			NO,IE,NA								
Indirect CO_2[3]	17,70										
Total CO_2 equivalent emissions without land use, land-use change and forestry									11257,73	2049,80	9226,04
Total CO_2 equivalent emissions with land use, land-use change and forestry									NE		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									11275,43		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NE		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
General Latvia`s approximate GHG emissions for 2017 were estimated using available activity data from Central Statistical Bureau of Latvia, annual GHG reports under EU ETS and data from national databases or extrapolation in cases activity data were not available yet. In sectors where stable trend was not observed the emissions were left in 2016 levels. Compared to previous inventory (GHG inventory submission to UNFCCC on 13th of April 2018) Latvia`s total GHG emissions excluding LULUCF, including indirect CO2 have decreased by 0.3% in 2017. Under 2A1 (Cement production) two different CO2 emission calculation approaches are used . Under EU ETS clinker producer uses Monitoring reporting Regulation (COMMISSION REGULATION (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council) to calculate CO2 emissions from clinker and cement kiln dust using default EFs, but for GHG inventory CO2 emissions are calculated according to 2006 IPCC Guidelines and EFs are calculated using plant specific data. This results in a 4.2% (18.13 kt CO2 eq) difference between ETS CO2 emissions from clinker production reported under Article 21 of the ETS directive (column L) and GHG inventory (column J) calculated in 2017. Very minor differences occur also for glass production due to the same reason and rounding.
Energy Total GHG emissions in Energy sector (excluding Transport) have decreased by 5.0% in 2017 in comparison with 2016. In 2016 emissions in sector 1A1 Energy Industries have decreased by 16.5% compared to 2016 due to decrease in use of natural gas and coal. In sector 1A2 7.3% emission increase can be explained with increase use of coal and other fossil fuels. In 2017 emissions have increased by 4.5% compared to 2016 in 1A4 due to increase in consumption of liquid fossil fuels. **Transport** A proxy calculation indicates that total GHG emissions in a transport sector have been increased in 2017 by around 4.2% compare to 2016. The main reason for this trend is fuel consumption increasing by around 5.2% in road transport, mainly diesel oil consumption. GHG emissions have been decreased in 2017 compare to 2016 in railway by around 5.8%. The road transport constitutes a convincing majority of the total GHG emissions in the transport sector. In 2017, it gave around 93.3 % of total emissions but the next largest emission source is railway – 5.6 %.
IPPU For approximate emission calculations the annual EU ETS GHG reports for cement, lime, glass and bricks production as well as available provisional national statistics from CSB were used as activity data. For emission calculation from Lubricant, Paraffin wax and Urea use the proxy energobalance was used. For Road paving with asphalt and asphalt roofing data were taken from CSB as provisional data. Emissions from IPPU sector in 2017 have been increasing by 14.2% compared to 2016 mainly due to increase of emissions from mineral production ecpecially cement (in 2017 CO_2 emissions from Cement production increased by 25.8% in comparison to 2016). The only lime production company stopped lime production from dolomite since 2016 thus CO_2 emissions from 2.A.2 are NO. The same for the only iron and steel plant which didn`t produce steel anymore but only rolls armature not causing CO_2 emissions thus CO_2 and CH_4 emissions from 2.C.1 are NO. **F-gases** Activity data from annual F-gases reports for proxy emission calculation were not available yet, therefore emissions were calculated by either using previous three years average F-gases amounts filled into new manufactured products or keeping previous year`s emission amount. Total F-gases emissions (2.F + 2.G) have increased by 5.3% compared to 2016. **Solvents** Activity data for the Solvent Use sector was not available in 2017. There is a stability in trends of CO_2 emissions from Solvent use sector in last 3 years either, therefore emissions in 2017 were extrapolated taking into account emission rates from these previous years (average). There are negligible changes in emissions compared with the previous year (+1,78%). For N_2O from product use activity data wasn't available. There is a stability in trends of N_2O emissions from N_2O from product use sector in later 3 years therefore emissions were extrapolated taking into account emission rates from previous these years (average). There are negligible changes in emissions compared with the previous year (+1,67%).
Agriculture Total GHG emissions from agriculture sector have decreased by 1.3% in 2017 compared to 2016. Emissions have decreased in major emission categories: enteric fermentation (-2.7% or -23.59 kt CO2 equivalent), manure management (-1.9% or 16.2 kt CO2 equivalent) and soil management (-0.7% or 10.80 kt CO2 equivalent). Total sown area in 2017 reached 1214.3 thousand ha, that is about 2% less comparing to 2016. In 2017, 703.5 thousand ha of land were covered with cereals – or 1.7 % fewer than a year before. Consequently, the sown area of cereals went to reducing, and the harvested production of cereals was estimated about 0.4 % less than in 2016. In 2017, compared to 2016, sown area of rape grew by 16.3 thousand ha or 16.1 %, but the average yield stayed at the level registered last year. The sown areas of pulses were kept growing. In 2017, the total area of pulses increased by 15.6 thousand ha or 37.4 %. Compared to 2016, in 2017 planted areas and harvested production of vegetables and potatoes also reduced. In 2017, 133.5 thousand t of mineral fertilizers (expressed as 100 % of nutrients) were used on the sown area of agricultural crops – 0.6 % less than in 2016. However in 2017, use of nitrogen per one hectare of sown area increased slightly – from 63 kg/ha in 2016 to 64 kg/ha in 2017. At the end of 2017, agricultural holdings were breeding 405.8 thousand cattle, which is 6.5 thousand heads or 1.6 % less than a year ago. The number of dairy cows was reduced by 3.7 thousand or 2.4 %. African swine fever resulted in a decline in the pig number at the end of 2017 – by 15.8 thousand or 4.7 %. Over the year, the number of sheep rose by 5.2 %, also rose the number of poultry bu about 9%. At the end of 2017, compared to the year before, the number of goats declined by 0.4 thousand or 3.1 %, also declined the number of horses and rabbits. All activity data described above lead to total amount emissions of 2627,8 kt CO2 eq. from agriculture in 2017, resulting in emissions reduction by 1.3%.
Waste In proxy inventory is shown increase of waste incineration emissions. It is due to waste incineration on Latvia border, where border services reported 111 tons of incinerated plastic and rubber wastes and 4.422 tons of textile waste. Decrease of composted waste amounts leads to decrease of emissions from biological treatment. Main driving forces for slight decrease of emission from waste water treatment and discharge is slow decrease of national population and continous increase of population served by well managed biological waste water treatment plants.

6.17 Lithuania (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission 2018
Country Lithuania
Geographical scope[4]

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	6863,31	3258,20	3185,76	668,63	NO	4,59	NO	0,01	13980,49		
1. Energy	10803,93	512,51	141,15						11457,59	**3.247,51**	**8.208,44**
A. Fuel combustion (sectoral approach)	10800,18	208,24	141,14						11149,56	3.247,51	**7.900,40**
1. Energy industries	2649,17	20,19	32,25						2701,61	2.647,32	**54,29**
2. Manufacturing industries and construction	1166,23	4,30	11,43						1181,96	598,03	**583,93**
3. Transport	5700,34	13,31	53,40						5767,05	2,15	**5.763,26**
4. Other sectors	1259,48	170,44	43,84						1473,76	0,01	**1.473,75**
5. Other	24,97	0,00	0,21						25,18	NA	**25,18**
B. Fugitive emissions from fuels	3,76	304,26	0,02						308,03	NA	**308,03**
1. Solid fuels	NO	NO	NO						NO	NA	**NO**
2. Oil and natural gas	3,76	304,26	0,02						308,03	NA	**308,03**
C. CO_2 transport and storage	NO								NO	NO	**NO**
2. Industrial processes and product use	2734,79	NO	232,71	668,63	NO	4,59	NO	0,01	3640,73	**3.041,51**	**599,22**
A. Mineral industry	537,81								537,81	486,34	**51,47**
B. Chemical industry	2141,04	NO	227,63	NO	NO	NO	NO	NO	2368,67	2.555,18	**-186,50**
C. Metal industry	2,07	NO	NO	NO	NO	NO	NO	NO	2,07	NO	**2,07**
D. Non-energy products from fuels and solvent use	53,87	NO	NO						53,87	NO	**53,87**
E. Electronic Industry				NO	NO	3,97	NO	0,01	3,98	NO	**3,98**
F. Product uses as ODS substitutes				668,63	NO	NO	NO	NO	668,63	NO	**669**
G. Other product manufacture and use	NO	NO	5,08	NO	NO	0,62	NO	NO	5,69	NO	**5,69**
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	**NO**
3. Agriculture	33,43	1800,32	2577,92						4411,67		
A. Enteric fermentation		1552,15							1552,15		
B. Manure management		248,17	193,05						441,23		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NA	2384,87						2384,87		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	12,21								12,21		
H. Urea application	21,22								21,22		
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	-6709,96	0,69	166,03						-6543,24		
A. Forest land	-8762,51	0,04	35,58						-8726,89		
B. Cropland	2620,21	0,00	55,61						2675,82		
C. Grassland	-838,08	0,65	0,71						-836,72		
D. Wetlands	715,28	NO,NE	25,34						740,62		
E. Settlements	545,50	NO	44,27						589,77		
F. Other land	53,01	NO,NE	4,51						57,53		
G. Harvested wood products	-1043,37								-1043,37		
H. Other	NO	NO	NO						NO		
5. Waste	1,11	944,69	67,95						1013,74		
A. Solid waste disposal	NO,NA	771,34							771,34		
B. Biological treatment of solid waste		41,50	24,25						65,75		
C. Incineration and open burning of waste	1,11	0,00	0,03						1,14		
D. Waste water treatment and discharge		131,84	43,67						175,51		
E. Other	NO	NO	NO						NO		
6. Other ***(as specified in summary 1.A)***											

Memo items:[2]											
International bunkers	803,62	1,23	6,44						811,28		
Aviation	293,42	0,05	2,44						295,91		
Navigation	510,20	1,17	4,00						515,38		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	5520,27								5520,27		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	3856,13								3856,13		
Indirect N_2O			NO, NE								
Indirect CO_2[3]	NE										
Total CO_2 equivalent emissions without land use, land-use change and forestry									20523,74		
Total CO_2 equivalent emissions with land use, land-use change and forestry									13980,49		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2 the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.	
1. Energy	Although GHG emissions increased in transport subsector, they were compensated by a decrease in ETS sector in 2017, mostly in public electricity and heat production. This happened mainly because the largest Lithuanian electricity producer (Elektrėnai thermal power plant) reduced its electricity production more than 3 times (http://www.gamyba.le.lt/lt/veikla/pagrindiniai-veiklos-ir-pardavimu-rodikliai) and Kaunas thermal power plant reduced fuel consumption more than 5 times. The missing amount of electricity demand for Lithuania was imported and produced in wind and hydro power plants. As usual, larger share of biomass use put its contribution in reducing GHG emissions in public heat production subsector too. However, larger consumption of fossil fuel (which changed traditional wood) was observed in residential sector.
2. Industrial processes and product use	Emissions from IPPU in 2017 have increased by 11% compared to 2016 due to increase of production in mineral and chemical industry.
3. Agriculture	Emissions from agriculture sector in 2017 have decreased by 0.7% compared to 2016. Emissions from enteric fermentation and manure management has decreased due to decrease in livestock population which are responsible for the biggest share of agriculture emissions from these categories. Also decrease in consumption of liming materials had an impact of decrease of overall agriculture emissions.
5. Waste	Emissions from waste sector in 2017 have increased by 1.6% compared to 2016 due to increase of biodegradable waste composting and decrease of the recovered gas use for energy.

6.18 Luxembourg (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission 2018
Country Luxembourg
Geographical scope[4]

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	9137,56	633,91	309,34	65,84	NA,NO	9,37	NA,NO	NA,NO	10156,01		
1. Energy	8555,90	49,11	67,34						8672,35	947,67	7.724,69
A. Fuel combustion (sectoral approach)	8555,86	18,07	67,34						8641,27	947,67	7.693,60
1. Energy industries	226,97	2,10	3,32						232,39	59,68	172,71
2. Manufacturing industries and construction	1118,18	2,05	9,38						1129,60	887,98	241,62
3. Transport	5613,81	1,02	49,64						5664,46	NA	5.664,46
4. Other sectors	1596,79	12,90	5,00						1614,70	NA	1.614,70
5. Other	0,11	0,00	0,00						0,12	NA	0,12
B. Fugitive emissions from fuels	0,04	31,04	NA,NO						31,08	NA	31,08
1. Solid fuels	NO	NO	NO						NO	NO	NO
2. Oil and natural gas	0,04	31,04	NA,NO						31,08	NA	31,08
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	575,85	NA,NO	3,23	65,84	NA,NO	9,37	NA,NO	NA,NO	654,28	544,38	109,90
A. Mineral industry	434,89								434,89	434,89	0,00
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal industry	109,48	NA	NA	NA	NA	NA	NA	NA	109,48	109,48	NO
D. Non-energy products from fuels and solvent use	31,48	NA	NA						31,48	NA	31,48
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				63,79	NO	NO	NO	NO	63,79	NA	63,79
G. Other product manufacture and use	NO	NO	3,23	2,04	NO	9,37	NO	NO	14,64	NA	14,64
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
3. Agriculture	5,81	509,90	226,05						741,76		
A. Enteric fermentation		442,57							442,57		
B. Manure management		67,33	39,47						106,79		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NA	186,58						186,58		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	5,81								5,81		
H. Urea application	NO								NO		
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	-399,77	NO	7,81						-391,96		
A. Forest land	-453,71	NO	NO						-453,71		
B. Cropland	35,29	NO	3,46						38,75		
C. Grassland	-44,04	NO	0,21						-43,83		
D. Wetlands	4,28	NO	0,44						4,72		
E. Settlements	58,23	NO	3,70						61,93		
F. Other land	0,18	NO	0,02						0,20		
G. Harvested wood products	NO	NO	NO						NO		
H. Other	NO	NO	NO						NO		
5. Waste	NA,NO	74,90	12,72						87,62		
A. Solid waste disposal	NA	50,61	NO						50,61		
B. Biological treatment of solid waste		20,95	5,36						26,31		
C. Incineration and open burning of waste	IE	IE	IE						IE		
D. Waste water treatment and discharge		3,33	7,36						10,70		
E. Other	NO	NO	NO						NO		
6. Other *(as specified in summary 1.A)*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Memo items:[2]											
International bunkers									NE		
Aviation									NE		
Navigation									NE		
Multilateral operations									NE		
CO_2 emissions from biomass									NE		
CO_2 captured									NO		
Long-term storage of C in waste disposal sites									NE		
Indirect N_2O											
Indirect CO_2[3]											
Total CO_2 equivalent emissions without land use, land-use change and forestry									10156,01	1492,04	8663,96
Total CO_2 equivalent emissions with land use, land-use change and forestry									9764,05		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NE		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NE		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
The key drivers for the increase in GHG emissions in 2017 compared to 2016 are: a) the decreased gas consumption for public electricity & heat production (approx. -20 Gg CO2 eq); b) the increased liquid fuel consumption in road transportation (approx. + 185 Gg CO2 eq); c) the increased liquid fuel consumption for heating in commercial, institutional & residential buidings (approx. + 58 Gg CO2 eq); d) the decreased gas consumption for heating in commercial, institutional & residential buidings (approx. -92 Gg CO2 eq); resulting in an increase of total GHG emissions (without LULUCF) of +1.3 % in 2017 compared to 2016.

6.19 Malta (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission 2018
Country Malta
Geographical scope[4]

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	**1608,82**	**196,43**	**42,53**	**316,37**	**0,00**	**0,05**	**0,00**	**0,00**	**2164,20**		
1. Energy	**1600,51**	**4,26**	**5,79**						**1610,57**	**724,00**	**882,57**
A. Fuel combustion (sectoral approach)	1600,51	4,26	5,79						1610,57	724,00	882,57
1. Energy industries	724,00	0,92	2,19						727,11	724,00	3,11
2. Manufacturing industries and construction	29,89	0,03	0,06						29,98	0,00	29,98
3. Transport	640,87	1,75	3,05						645,67	0,00	641,67
4. Other sectors	202,12	0,98	0,48						203,58	0,00	203,58
5. Other	3,64	0,58	0,01						4,23	0,00	4,23
B. Fugitive emissions from fuels	NO	NO	NO						NO	0,00	0,00
1. Solid fuels	NO	NO	NO						NO	0,00	0,00
2. Oil and natural gas	NO	NO	NO						NO	0,00	0,00
C. CO_2 transport and storage	NO								NO	0,00	0,00
2. Industrial processes and product use	**3,88**	**0,00**	**0,79**	**316,37**	**0,00**	**0,05**	**NO, NA**	**NA**	**321,09**	**0,00**	**321,09**
A. Mineral industry	0,01								0,01	0,00	0,01
B. Chemical industry	0,06	NO,NA	NO,NA	NO,NA	NA	NA	NA	NA	0,06	0,00	0,06
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00	0,00
D. Non-energy products from fuels and solvent use	3,81	NA	NA						3,81	0,00	3,81
E. Electronic Industry				0,10	NO	NO	NO	NO	0,10	0,00	0,10
F. Product uses as ODS substitutes				316,27	NO	NO	NO	NO	316,27	0,00	316,27
G. Other product manufacture and use	NO	NO	0,79	NO	0,00	0,05	NO	NO	0,83	0,00	0,83
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00	0,00
3. Agriculture	**0,00**	**35,63**	**30,09**						**65,72**	**0,00**	**65,72**
A. Enteric fermentation		31,07							31,07		
B. Manure management		4,56	10,64						15,20		
C. Rice cultivation		NO							0,00		
D. Agricultural soils		NO	19,45						19,45		
E. Prescribed burning of savannas		NO	NO						0,00		
F. Field burning of agricultural residues		NO	NO						0,00		
G. Liming	NO								0,00		
H. Urea application	NE								0,00		
I. Other carbon-containing fertilizers	NO								0,00		
J. Other	NO	NO							0,00		
4. Land use, land-use change and forestry[1]	**3,65**	**0,00**	**0,00**						**3,65**	**0,00**	**3,65**
A. Forest land	NO	NO	NO						0,00		
B. Cropland	2,41	NO, NE	NO, NE, IE						2,41		
C. Grassland	-0,42	NO, NE	NO, NE						-0,42		
D. Wetlands	NO, NE	NO	NO						0,00		
E. Settlements	0,86	NO	NO						0,86		
F. Other land	0,79	NO	NO						0,79		
G. Harvested wood products	NO								0,00		
H. Other	NO	NO	NO						0,00		
5. Waste	**0,78**	**156,54**	**5,86**						**163,18**	**0,00**	**163,18**
A. Solid waste disposal	NO, NA	152,55							152,55		
B. Biological treatment of solid waste		0,81	NO, NA						0,81		
C. Incineration and open burning of waste	0,78	0,00	0,13						0,91		
D. Waste water treatment and discharge		3,17	5,73						8,90		
E. Other	NO	NO	NO						0,00		
6. Other *(as specified in summary 1.A)*	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0	0

Memo items:[2]											
International bunkers	**5386,65**	**17,60**	**12,59**						**5416,84**		
Aviation	355,77	1,24	0,89						357,91		
Navigation	5030,88	16,36	11,70						5058,94		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	NO								NO		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	NO								NO		
Indirect N_2O											
Indirect CO_2[3]											
Total CO_2 equivalent emissions without land use, land-use change and forestry									2160,55	724,00	1.432,56
Total CO_2 equivalent emissions with land use, land-use change and forestry									2164,20		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									2160,55		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									2164,20		

(1) For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive
(2) See footnote 7 to table Summary 1.A.
(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
(4) Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.

NOTE: The difference of 3.997 Gg CO2 equivalent between the total emissions for category 1.A.3 Transport and the value included for the same category in the non-ETS column represents the amount of emissions attributed to aviation activities which, for regulatory purposes, fall neither under the ETS nor the ESD.

An increase in total net GHG emissions for 2017 compared to 2016 emissions can be observed. This is primarily due to the increase in emissions from category 1.A.1 Energy Industries, resulting from a shift towards more indigenous production of electricity compared to 2016.

6.20 Netherlands (submitted by MS)

(Sheet 1 of 1)

Submission: Proxy (preliminary estimate 2
Country: NLD (the Netherlands)
Geographical scope[4]:

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	169622,09	17974,41	8790,09	2353,65	77,03	134,41	NO	NO,IE	198951,68		
1. Energy	156335,56	2257,67	634,43						159227,66	**85.695**	**73.533**
A. Fuel combustion (sectoral approach)	155434,82	1700,24	634,43						157769,49		
1. Energy industries	63355,01	107,20	286,69						63748,91		
2. Manufacturing industries and construction	27627,25	59,85	38,70						27725,80		
3. Transport	30868,25	59,80	254,11						31182,17		
4. Other sectors	33435,82	1473,07	52,67						34961,57		
5. Other	148,49	0,31	2,25						151,05		
B. Fugitive emissions from fuels	900,74	557,43	NO,IE,NA						1458,17		
1. Solid fuels	73,23	4,84	NO,IE						78,07		
2. Oil and natural gas	827,51	552,59	NO,IE,NA						1380,10		
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	6665,35	483,80	1575,46	2353,65	77,03	134,41	NO	NO,IE	11289,71	**5.662**	**5.628**
A. Mineral industry	1628,85								1628,85		
B. Chemical industry	4649,97	440,99	1489,43	114,20	21,40	NO	NO	NO,IE	6715,99		
C. Metal industry	59,89	NO,IE,NA	NO	NO	12,99	NO	NO		72,88		
D. Non-energy products from fuels and solvent use	303,36	0,31	NO,NA						303,67		
E. Electronic Industry				NO	42,64	NO,IE	NO	NO,IE	42,64		
F. Product uses as ODS substitutes				2239,46	NO	NO	NO	NO	2239,46		
G. Other product manufacture and use	0,71	42,50	86,04			134,41			263,66		
H. Other	22,56	NO	NO						22,56		
3. Agriculture	68,72	12331,14	6279,95						18679,80		
A. Enteric fermentation		8452,34							8452,34		
B. Manure management		3878,80	679,69						4558,49		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NO	5600,26						5600,26		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	68,72								68,72		
H. Urea application	IE								IE		
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	NA	NA						NO,NA		
4. Land use, land-use change and forestry[1]	6552,47	0,29	136,24						6689,00		
A. Forest land	-2322,83	0,24	5,50						-2317,09		
B. Cropland	2818,13	NO,NE,IE,NA	84,00						2902,13		
C. Grassland	4131,26	0,05	6,90						4138,21		
D. Wetlands	55,62	NO,NE,IE	3,30						58,92		
E. Settlements	1650,66	NO	28,77						1679,43		
F. Other land	134,06	NO	7,78						141,84		
G. Harvested wood products	85,57								85,57		
H. Other	IE,NE,NO	IE,NE,NO	IE,NE,NO						NO,NE,IE		
5. Waste	NO,IE,NA	2901,51	163,99						3065,51		
A. Solid waste disposal	NO,NA	2593,56							2593,56		
B. Biological treatment of solid waste		87,49	92,25						179,74		
C. Incineration and open burning of waste	NO,IE,NA	NO,IE,NA	NO,IE,NA						NO,IE,NA		
D. Waste water treatment and discharge		220,46	71,74						292,21		
E. Other	NO	NO	NO						NO		
6. Other ***(as specified in summary 1.A)***	NO	NO	NO	NO	NO	NO	NO	NO	NO		

Memo items:[2]											
International bunkers	47310,33	81,93	372,47						47764,73		
Aviation	12014,21	2,10	100,15						12116,46		
Navigation	35296,12	79,83	272,32						35648,28		
Multilateral operations	IE	IE	IE						IE		
CO_2 emissions from biomass	12810,27								12810,27		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	NO								NO		
Indirect N_2O			NO,NE								
Indirect CO_2[3]	212,27										
Total CO_2 equivalent emissions without land use, land-use change and forestry									192262,68	91356,983	100905,7
Total CO_2 equivalent emissions with land use, land-use change and forestry									198951,68		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									192474,96		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									199163,96		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.

All change can be explained by corresponding changes in activty level. The highlights are:

Energy

Energy industries: decrease due to less coal combustion partly counter balanced by increase in natural gass combustion

Industry

Increased CO2 emissions as result of economic growth in mineral and chemical sectors

Agriculture

Enteric fermentation: decreased number of cattle

Manure management: decreased number of cattle

6.21 Poland (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year **2017**
Submission **Proxy**
Country **Poland**
Geographical scope[4]

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]											
1. Energy	**310.417,33**	**23.393,70**	**2.551,90**						**336.362,92**		
A. Fuel combustion (sectoral approach)	306.988,65	3.827,20	2.551,36						313.367,20		
1. Energy industries	163.014,88	103,84	753,26						163.871,98		
2. Manufacturing industries and construction	29.113,09	105,39	173,11						29.391,59		
3. Transport	58.656,46	119,91	561,48						59.337,85		
4. Other sectors	56.204,21	3.498,07	1.063,51						60.765,79		
5. Other	NO,IE	NO,IE	NO,IE						NO,IE		
B. Fugitive emissions from fuels	3.428,69	19.566,50	0,54						22.995,72		
1. Solid fuels	1.523,21	16.996,54	NA						18.519,74		
2. Oil and natural gas	1.905,48	2.569,96	0,54						4.475,98		
C. CO_2 transport and storage											
2. Industrial processes and product use	**19.027,87**	**64,53**	**839,86**	8.957,35	12,55	78,38	NO,NA	NO,NA	**28.980,54**		
A. Mineral industry	10.840,52								10.840,52		
B. Chemical industry	5.161,27	50,35	707,43	NO	NO	NO	NO	NO	5.919,05		
C. Metal industry	2.278,79	14,18	NA	NA	NO,NA	4,15	NA	NA	2.297,12		
D. Non-energy products from fuels and solvent use	747,30	NO,NA	NO,NA						747,30		
E. Electronic Industry				NO	NO	NO	NO	NO	NO		
F. Product uses as ODS substitutes				8.957,35	12,55				8.969,90		
G. Other product manufacture and use	NA	NA	132,43	NA	NA	74,23	NA	NA	206,66		
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO		
3. Agriculture	**919,97**	**14.286,01**	**15.955,45**						**31.161,43**		
A. Enteric fermentation		12.631,68							12.631,68		
B. Manure management		1.629,57	2.078,28						3.707,85		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NA	13.865,32						13.865,32		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		24,76	11,85						36,61		
G. Liming	504,35								504,35		
H. Urea application	415,61								415,61		
I. Other carbon-containing fertilizers	NO								NO		
J. Other									NO		
4. Land use, land-use change and forestry[1]	**-29.219,16**	**44,83**	**1.222,53**						**-27.951,80**		
A. Forest land	-36.519,30	39,21	1,88						-36.478,22		
B. Cropland	733,07	NO,NA	NO,NA						733,07		
C. Grassland	-940,65	5,62	1,04						-934,00		
D. Wetlands	4.495,22	NO,NA	NO,NA						4.495,22		
E. Settlements	7.247,04	NO	1.219,61						8.466,65		
F. Other land	NO,NA	NO,NA	NO,NA						NO,NA		
G. Harvested wood products	-4.234,53								-4.234,53		
H. Other	NA	NA	NA						NA		
5. Waste	**763,83**	**8.800,39**	**966,62**						**10.530,84**		
A. Solid waste disposal	NO,NA	8101,73							8.101,73		
B. Biological treatment of solid waste		198,07	141,66						339,73		
C. Incineration and open burning of waste	763,83	0,00	64,51						828,34		
D. Waste water treatment and discharge		500,59	760,45						1.261,04		
E. Other											
6. Other ***(as specified in summary 1.A)***											

Memo items:[2]											
International bunkers	2.577,26	1,69	21,26						2.600,21		
Aviation	2.002,14	0,35	16,69						2.019,18		
Navigation	575,12	1,34	4,57						581,03		
Multilateral operations	NA	NA	NA						NA		
CO_2 emissions from biomass	33.272,18								33.272,18		
CO_2 captured	NO,IE,NA								NO,IE,NA		
Long-term storage of C in waste disposal sites	32.893,74								32.893,74		
Indirect N_2O			NA								
Indirect CO_2[3]	NA										
Total CO_2 equivalent emissions without land use, land-use change and forestry									**407.035,73**	**202.166,696**	**204.752,824**
Total CO_2 equivalent emissions with land use, land-use change and forestry											
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry											
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry											

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
Total GHG emissions increased by about 2.8% between 2016 and 2017 Main drivers for change in GHG emissions 2016/2017: **1. Energy - stationary fuel combustion** The main reason of increase of GHG emission from fuel combustion in stationary sources (by 1.5%) is increase in consumption of natural gas (by 7.2 %) and lignite (by 1.3 %) **1. Energy - transport:** Increase in emissions triggered by growing fuels use: petrol by 8%, diesel by 17% and LPG by 3% **2. Industrial processes and product use:** Generally slight increase in emissions by about 1.7% is observed, mostly due to increase in production of clinker (by almost 8%) and ammonia (by 6%) **3. Agriculture:** Increase in emissions (by about 3.7%) relates mostly to the higher livestock population (cattle by 3.4%, swine by 4.5%, poultry by 5.2%) as well as to increased use of inorganic fertilisers (by about 10%) **5. Waste** Decrease of emissions is driven by depopulation of Poland (-0.001%), decrease of amount of incinerated ISW (by 4.2%) and decrease of amount of composted non-municipal waste (by 3.8%) **4. LULUCF** - Emissions/removals the same as for 2016

6.22 Portugal (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year **Proxy 2017**
Submission **July 2018**
Country **Portugal**

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	**60.130,64**	**12.265,96**	**3.746,37**	**3.059,85**	**15,29**	**23,45**	**NO**	**NO**	**79.241,56**		
1. Energy	**50.308,75**	**413,79**	**567,01**						**51.289,55**	**27.262**	**24.028**
A. Fuel combustion (sectoral approach)	49.233,59	341,19	563,97						50.138,74	26.156	23.983
1. Energy industries	21.001,42	18,27	164,32						21.184,01	20.426	758
2. Manufacturing industries and construction	7.407,93	49,65	92,27						7.549,85	5.222	2.328
3. Transport	16.809,69	25,69	163,26						16.998,65	508	16.491
4. Other sectors	3.970,68	247,57	143,76						4.362,00	0	4.362
5. Other	43,87	0,01	0,37						44,24	0	44
B. Fugitive emissions from fuels	1.075,16	72,61	3,03						1.150,80	1.106	45
1. Solid fuels	0,00	8,48	0,00						8,48	8	0
2. Oil and natural gas and other emissions from energ	1.075,16	64,12	3,03						1.142,32	1.098	45
C. CO_2 transport and storage											
2. Industrial processes and product use	**4340,17**	**44,49**	**71,27**	**3059,85**	**15,29**	**23,45**	**0,00**	**0,00**	**7554,52**	**3.298**	**4.257**
A. Mineral industry	3408,66								3408,66	3.145	264
B. Chemical industry	671,86	26,93	24,51	NO	NO	NO	NO	NO	723,30	110	613
C. Metal industry	52,97	16,60	NO	NO	NO	NO	NO	NO	69,58	43	27
D. Non-energy products from fuels and solvent use	206,68	0,96	NO						207,63	0	208
E. Electronic Industry				NO	NO	NO	NO	NO	NO	0	NO
F. Product uses as ODS substitutes				3059,85	15,29				3075,14	0	3.075
G. Other product manufacture and use	NO	NO	46,77	NO	NO	23,45	NO	NO	70,21	0	70
H. Other	NO	NO	NO						NO	0	NO
3. Agriculture	**53,06**	**4.543,46**	**2.322,83**						**6.919,35**	**0**	**6.919**
A. Enteric fermentation		3.640,80							3.640,80	0	3.641
B. Manure management		738,97	175,95						914,92	0	915
C. Rice cultivation		134,72							134,72	0	135
D. Agricultural soils		0,00	2.130,30						2.130,30	0	2.130
E. Prescribed burning of savannahs		0,00	0,00						0,00	NO	0
F. Field burning of agricultural residues		28,97	16,57						45,55	0	46
G. Liming	6,89								6,89	0	7
H. Urea application	46,16								46,16	0	46
I. Other carbon-containing fertilizers	0,00								0,00	NO	0
J. Other	0,00	0,00	0,00						0,00	NO	0
4. Land use, land-use change and forestry[1]	**5.403,58**	**1.258,74**	**521,66**						**7.183,99**		
A. Forest land	3.235,10	808,29	155,17						4.198,56		
B. Cropland	545,40	43,13	54,52						643,05		
C. Grassland	13,59	8,14	28,07						49,80		
D. Wetlands	353,11	0,00	28,06						381,17		
E. Settlements	2.366,08	0,00	174,23						2.540,31		
F. Other land	-996,79	399,18	81,60						-516,01		
G. Harvested wood products	-112,90	NA	NA						-112,90		
H. Other	NO	NO	NO						NO		
5. Waste	**25,08**	**6.005,47**	**263,61**						**6.294,16**	**0**	**6.294**
A. Solid waste disposal	0,00	3.665,68	0,00						3.665,68	0	3.666
B. Biological treatment of solid waste		23,69	12,67						36,36	0	36
C. Incineration and open burning of waste	25,08	0,14	0,66						25,88	0	26
D. Waste water treatment and discharge		2.315,96	250,28						2.566,23	0	2.566
E. Other	0,00	0,002	0,002						0,004	0	0
6. Other ***(as specified in summary 1.A)***											
Memo items:[2]											
International bunkers	NE	NE	NE						NE		
Aviation	NE	NE	NE						NE		
Navigation	NE	NE	NE						NE		
Multilateral operations	NE	NE	NE						NE		
CO_2 emissions from biomass	NE								NE		
CO_2 captured	NE								NE		
Long-term storage of C in waste disposal sites	NE								NE		
Indirect N_2O			NE								
Indirect CO_2 [3]	153,13										

Total CO_2 equivalent emissions without land use, land-use change and forestry	**72.057,58**	**30.559,42**	**41.498,16**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**79.241,56**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**72.210,71**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**79.394,69**		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

[2] See footnote 7 to table Summary 1.A.

[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
The +9.0% increase of emissions in the Energy sector is explained with the increase of consumption of solid and gaseous fuels, due to a dry hydrologic year and a reduction in hydraulic electric production, compensated by the increase of thermal produc Fuel/Energy consumption: http://www.dgeg.pt/
There is an increase of about 2.0% in the agriculture GHG emissions mostly due to an increase in the livestock numbers- dairy cattle (0.8%), non dairy cattle (3.1%), sheep (3.1%) and swine(0.6%)
The LULUCF sector has changed to a net emitter due to the exceptional year in terms of forets area burnt in 2017, which represented more than 400% of the area burned in relation to the annual average of the previous 10 years.
The -2.8% decrease of emissions in the waste sector are mainly related with the waste divertion from land deposition (5A) in latest years and biogas recovery.

6.23 Romania (EEA calculations)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Proxy inventory 2017
EEA calculations 2018
ROMANIA

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	52081.81	27565.87	9007.46	1894.11	5.44	49.88	NO	NO	90604.58		
1. Energy	67728.70	9822.20	326.76						77877.65		
A. Fuel combustion (sectoral approach)	66815.52	103.85	325.14						67244.51		
1. Energy industries	27097.81	42.12	131.87						27271.79		
2. Manufacturing industries and construction	11891.99	18.48	57.87						11968.34		
3. Transport	17485.87	27.18	85.09						17598.14		
4. Other sectors	9891.42	15.37	48.13						9954.93		
5. Other	448.43	0.70	2.18						451.31		
B. Fugitive emissions from fuels	913.18	9718.34	1.61						10633.14		
1. Solid fuels	NO,NA	906.57	NO,NA						906.57		
2. Oil and natural gas	913.18	8811.77	1.61						9726.57		
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	10544.14	11.88	345.38	1894.11	5.44	49.88	NO	NO	12850.84		
A. Mineral industry	4562.25								4562.25		
B. Chemical industry	1015.43	7.63	341.72	NO	NO	NO	NO	NO	1364.78		
C. Metal industry	3859.93	4.24	NO	NO	5.44	NO,NA	NO	NO	3869.61		
D. Non-energy products from fuels and solvent use	1106.53	NE	NE						1106.53		
E. Electronic Industry				NO	NO	NO	NO	NO	NO		
F. Product uses as ODS substitutes				1894.11	NO	NO	NO	NO	1894.11		
G. Other product manufacture and use	NO	NO	3.67	NO	NO	49.88	NO	NO	53.55		
H. Other	NO,NE	NO,NE	NO,NE	NO	NO	NO	NO	NO	NO,NE		
3. Agriculture	113.24	12445.42	5761.54						18320.20		
A. Enteric fermentation		10663.60							10663.60		
B. Manure management		1344.07	636.86						1980.93		
C. Rice cultivation		0.01							0.01		
D. Agricultural soils		NE	4965.24						4965.24		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		437.74	159.43						597.17		
G. Liming	52.53								52.53		
H. Urea application	60.71								60.71		
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	-26311.06	1.10	2017.64						-24292.32		
A. Forest land	-23919.51	1.10	27.15						-23891.27		
B. Cropland	-2146.87	NO	468.42						-1678.45		
C. Grassland	132.18	NO	34.47						166.66		
D. Wetlands	1502.16	NO	33.00						1535.16		
E. Settlements	3853.52	NO	271.07						4124.59		
F. Other land	843.78	NO,NA	1183.53						2027.31		
G. Harvested wood products	-6576.32								-6576.32		
H. Other	NA	NA	NA						NA		
5. Waste	6.79	5285.28	556.14						5848.21		
A. Solid waste disposal	NA	3566.81							3566.81		
B. Biological treatment of solid waste		35.21	25.18						60.39		
C. Incineration and open burning of waste	6.79	0.03	1.47						8.29		
D. Waste water treatment and discharge		1683.23	529.49						2212.72		
E. Other											
6. Other ***(as specified in summary 1.A)***											
Memo items:[2]											
International bunkers	970.21	0.99	8.64						979.84		
Aviation	869.81	0.77	7.89						878.46		
Navigation	100.41	0.22	0.75						101.38		
Multilateral operations											
CO_2 emissions from biomass	17638.06								17638.06		
CO_2 captured	NO,NA								NO,NA		
Long-term storage of C in waste disposal sites											
Indirect N_2O			1553.47								
Indirect CO_2 [3]	NO,NE										
Total CO_2 equivalent emissions without land use, land-use change and forestry									114896.90	40617.496	74279.40
Total CO_2 equivalent emissions with land use, land-use change and forestry									90604.58		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA		

Color codes	
	Calculated value
	Previous year value
	ETS value
	No value

6.24 Slovakia (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS									Year	2017	
(Sheet 1 of 1)									Submission	v1.1 (11-07-2018)	
									Country	Slovakia - total territ	
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	**28.342,78**	**4.231,49**	**1.938,45**	**680,10**	**8,62**	**5,93**	**NO**	**NO**	**35.207,39**		
1. Energy	**25.975,29**	**1.719,08**	**291,06**						**27.985,42**	**13.106,76**	**14.878,66**
A. Fuel combustion (sectoral approach)	25.953,82	243,26	291,05						26.488,13	13.106,76	13.381,37
1. Energy industries	7.341,68	13,92	35,17						7.390,77	6.340,44	1.050,33
2. Manufacturing industries and construction	6.768,33	16,83	33,84						6.819,00	6.434,54	384,46
3. Transport	7.253,67	32,44	165,52						7.451,63	319,11	7.132,52
4. Other sectors	4.530,54	179,57	55,95						4.766,06	12,67	4.753,39
5. Other	59,60	0,50	0,57						60,67	NO	60,67
B. Fugitive emissions from fuels	21,47	1.475,82	0,00						1.497,29	NO	1.497,29
1. Solid fuels	20,30	302,83	NO						323,13	NO	323,13
2. Oil and natural gas and other emissions from energy production	1,17	1.172,99	0,00						1.174,16	NO	1.174,16
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	**8.938,98**	**0,57**	**177,89**	**680,10**	**8,62**	**5,93**	**NO**	**NO**	**9.812,10**	**8.956,47**	**855,62**
A. Mineral industry	2.242,76								2.242,76	2.232,76	10,00
B. Chemical industry	1.770,29	0,57	105,66	NO	NO	NO	NO	NO	1.876,51	1.875,27	1,25
C. Metal industry	4.838,31	NO	NO	NO	8,62	NO	NO	NO	4.846,93	4.846,87	0,06
D. Non-energy products from fuels and solvent use	87,62	NO	NO						87,62	1,57	86,05
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				680,10	NO	NO	NO	NO	680,10	NO	680,10
G. Other product manufacture and use	NO	NO	72,23	NO	NO	5,93	NO	NO	78,16	NO	78,16
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
3. Agriculture	**79,64**	**1.124,96**	**1.321,24**						**2.525,85**	**NO**	**2.525,85**
A. Enteric fermentation		969,69							969,69	NO	969,69
B. Manure management		155,27	151,86						307,14	NO	307,14
C. Rice cultivation		NO							NO	NO	NO
D. Agricultural soils		NO	1.169,38						1.169,38	NO	1.169,38
E. Prescribed burning of savannahs		NO	NO						NO	NO	NO
F. Field burning of agricultural residues		NO	NO						NO	NO	NO
G. Liming	15,84								15,84	NO	15,84
H. Urea application	63,80								63,80	NO	63,80
I. Other carbon-containing fertilizers	NO								NO	NO	NO
J. Other	NO	NO	NO						NO	NO	NO
4. Land use, land-use change and forestry[1]	**-6.652,96**	**21,19**	**31,98**						**-6.599,78**		
A. Forest land	-4.448,84	21,19	13,97						-4.413,68		
B. Cropland	-1.223,26	NO	8,50						-1.214,76		
C. Grassland	-165,25	NO	0,30						-164,95		
D. Wetlands	NO	NO	NO						NO		
E. Settlements	99,17	NO	4,29						103,45		
F. Other land	93,72	NO	4,92						98,65		
G. Harvested wood products	-1.077,06	NO	NO						-1.077,06		
H. Other	NO	NO	NO						NO		
5. Waste	**1,83**	**1.365,70**	**116,28**						**1.483,80**	**NO**	**1.483,80**
A. Solid waste disposal	NO	972,15							972,15	NO	972,15
B. Biological treatment of solid waste		92,58	66,22						158,79	NO	158,79
C. Incineration and open burning of waste	1,83	0,55	1,07						3,45	NO	3,45
D. Waste water treatment and discharge		300,43	48,99						349,42	NO	349,42
E. Other	NO	NO	NO						NO	NO	NO
6. Other *(as specified in summary 1.A)*	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:[2]											
International bunkers	**172,73**	**0,08**	**1,40**						**174,21**		
Aviation	153,98	0,04	1,25						155,26		
Navigation	18,75	0,04	0,15						18,95		
Multilateral operations	**NO**	**NO**	**NO**						**NO**		
CO_2 emissions from biomass	**6.834,62**								**6.834,62**		
CO_2 captured	**NO**								**NO**		
Long-term storage of C in waste disposal sites	**3.256,25**								**3.256,25**		
Indirect N_2O			**5,00**								
	NO,NE,IE										
Indirect CO_2 [3]	**NO,NE,IE**										

Total CO_2 equivalent emissions without land use, land-use change and forestry	**41.807,17**	**22.063,23**	**19.743,94**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**35.207,39**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**41.807,17**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**35.207,39**		

(1) For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.

ENERGY: Emissions increased moderately what is also observed in the IPPU sector. Increase occurred in "big" energy industry (category 1.A.1.a) what is partly saturated by the decrease in fuel consumption in Slovak Electricity Plant (decrease of lignite consumption). In relative numbers, decrease occurred in services (caused by two sources shout-down). More significant changes occurred in the IEF (increase) of industrial waste incineration caused by the decrease of NCV.

TRANSPORT: Emissions increased in transport sector is caused by higher consumption of diesel oil in road transportation. The overall diesel oil prices were in the long term on their lowest.

MEMO ITEMS: Emissions are not significant and therefore are estimated on the same level as in the previous year 2016.

IPPU: Categories 2.A, 2.B and 2.C were estimated based on the EU ETS report of verified GHG emissions. ESD emissions in categories 2.A, 2.B, 2.C, 2.D and 2.G were extrapolated based on the 5-years increase. In the category 2.B significant increase is expected.

AGRICULTURE: Emissions were estimated based on the 2006 IPCC GL. Planned methodological changes were also considered in the proxy inventory. Activity data for estimated proxy inventory was almost complete except of amount of applied inorganic N-fertilizers, amount of applied compost, sewage sludge, urea and lime. Missing activity data was extrapolated using 5-years trend. The emissions decreased compared to 2017 submission. The interannual number of livestock decrease has influence on emission declining especially in cattle category.

LULUCF: A. FOREST LAND: Emissions of CO2, CH4 and N2O are preliminary calculated using new input data from 2017 and the same method as in the NIR. **4.B CROPLAND** - Emissions of CO2, CH4 and N2O are preliminary calculated using new input data from 2017 and the same method as in the NIR. **C. GRASSLAND:** Emissions of CO2, CH4 and N2O are preliminary calculated using new input data from 2017 and the same method as in the NIR. **D. WETLANDS**: Slovakia does not report this category. **E. SETTLEMENTS:** Emissions of CO2 and N2O are preliminary calculated using new input data from 2017. **F. OTHER LAND:** Emissions of CO2 and N2O are preliminary calculated using new input data from 2017. **G. HWP:** New input data for 2017 are not yet available. Emissions were estimated using the harvested wood volume from 2017.

WASTE: Emissions stable, on the same level as previous year. Significant changes are not expected.

6.25 Slovenia (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission 2018
Country Slovenia
Geographical scope[4] NA

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	**14336,36**	**2123,54**	**756,90**	**353,60**	**17,45**	**17,44**	**NO**	**NO**	**17605,28**		
1. Energy	**13512,86**	**438,25**	**148,39**						**14099,50**	**5.878**	**8.222**
A. Fuel combustion (sectoral approach)	13375,47	170,18	148,39						13694,04	5.804	7.890
1. Energy industries	4827,23	2,70	22,86						4852,79	4.742	111
2. Manufacturing industries and construction	1591,06	5,16	16,76						1612,98	1.062	551
3. Transport	5585,80	6,64	59,48						5651,92	NO	5.652
4. Other sectors	1367,78	155,67	49,26						1572,71	NO	1.573
5. Other	3,61	0,00	0,03						3,64	NO	4
B. Fugitive emissions from fuels	137,39	268,07	0,00						405,46	74	331
1. Solid fuels	137,31	228,49	NO, NA						365,80	74	292
2. Oil and natural gas	0,08	39,58	0,00						39,66	NO	40
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	**779,38**	**NO,NA**	**20,26**	**353,60**	**17,45**	**17,44**	**NO**	**NO**	**1188,13**	**692**	**496**
A. Mineral industry	497,13								497,13	479	18
B. Chemical industry	52,41	NO,NA	NO	NO	NO	NO	NO	NO	52,41	NO	52
C. Metal industry	204,80	NO,NA	NA	NO	17,45	NO	NO	NO	222,25	213	9
D. Non-energy products from fuels and solvent use	25,04	NA	NA						25,04	NO	25
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				353,60	NO	NO	NO	NO	353,60	NO	354
G. Other product manufacture and use	NO	NO	20,26	NO	NO	17,44	NO	NO	37,70	NO	38
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NO	NA
3. Agriculture	**20,60**	**1188,12**	**545,50**						**1754,21**		**1754,21**
A. Enteric fermentation		933,48							933,48		933,48
B. Manure management		254,64	101,44						356,08		356,08
C. Rice cultivation		NO							NO		NO
D. Agricultural soils		NO	444,06						444,06		444,06
E. Prescribed burning of savannas		NO	NO						NO		NO
F. Field burning of agricultural residues		NO	NO						NO		NO
G. Liming	11,14								11,14		11,14
H. Urea application	9,46								9,46		9,46
I. Other carbon-containing fertilizers	NO								NO		NO
J. Other	NO	NO	NO						NO		NO
4. Land use, land-use change and forestry[1]	**NE**	**NE**	**NE**						**NE**		**NE**
A. Forest land	NE	NE	NE						NE		NE
B. Cropland	NE	NE	NE						NE		NE
C. Grassland	NE	NE	NE						NE		NE
D. Wetlands	NE	NE	NE						NE		NE
E. Settlements	NE	NE	NE						NE		NE
F. Other land	NE	NE	NE						NE		NE
G. Harvested wood products	NE								NE		NE
H. Other	NE	NE	NE						NE		NE
5. Waste	**23,51**	**497,17**	**42,75**						**563,44**		**563,44**
A. Solid waste disposal	NO,NA	352,93							352,93		352,93
B. Biological treatment of solid waste		7,44	5,32						12,75		12,75
C. Incineration and open burning of waste	23,51	0,00	0,07						23,59		23,59
D. Waste water treatment and discharge		136,80	37,36						174,17		174,17
E. Other	NO	NO	NO						NO		NO
6. Other ***(as specified in summary 1.A)***	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Memo items:[2]											
International bunkers	**471,66**	**0,90**	**3,06**						**475,61**		
Aviation	74,71	0,00	0,00						74,72		
Navigation	396,44	0,90	3,05						400,39		
Multilateral operations	**0,51**	**0,00**	**0,00**						**0,51**		
CO_2 emissions from biomass	**3008,47**								**3008,47**		
CO_2 captured	**NO**								**NO**		
Long-term storage of C in waste disposal sites	**6933,26**								**6933,26**		
Indirect N_2O			**NO,NE**								
Indirect CO_2[3]	**NO,NE**										
Total CO_2 equivalent emissions without land use, land-use change and forestry									**17605,28**	**6.570**	**11.035**
Total CO_2 equivalent emissions with land use, land-use change and forestry									**NE**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									**NE**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									**NE**		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
In 2017, emissions of GHG decreased by 0,6% (- 112 kt CO2 eq.) compare to 2016. **Emissions in the Energy sector decreased by 1,0% (-142 kt CO2 eq.).** The reson is a decrease in electricity production in thermo power plants (-1,7%) and decrease in fuel consumption in road traffic (-1.5%). The trend of 1.A fuel combustion of gaseous and liquid fuels widely follows the trend in preliminary energy statistics: http://pxweb.stat.si/pxweb/Database/Environment/18_energy/01_18179_balance_indicators/01_18179_balance_indicators.asp Natural gas consumption increased by 5.0% (approx. +1.6 PJ) while consuption of solid and liquid fuels decresed by 0.6% (-0.3 PJ) and 5.5% (-3.3. PJ) respectivelly. **Emissions from IPPU increased by 4.7% (55 kt CO2 eq.).** The largest increase was in mineral industry by 13.1% **Emissions in agriculture sector decreased by 1.3% (-23 kt CO2 eq.).** The reason for the decrease is a decrease in animal population, mainly cattle and swine. http://pxweb.stat.si/pxweb/Database/Environment/15_agriculture_fishing/05_animal_production/01_15174_number_livestock/01_15174_number_livestock.asp **Emissions from waste sector decresed by 0.4%** This decrease is due to the 0.7% decrese of emissions from SWDS while emissions from other waste categories have not been updated, yet.

6.26 Spain (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission 1
Country Spain
Geographical scope[4] National total

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	236.045,52	38.021,90	17.654,61	7.158,37	128,64	229,62	842,10	NO,NA	300.080,76		
1. Energy	254.197,13	2.573,72	1.972,25						258.743,10	**120.912**	**137.831**
A. Fuel combustion (sectoral approach)	250.413,03	1.974,12	1.972,21						254.359,36	117.333	137.027
1. Energy industries	81.357,90	116,61	547,20						82.021,70	79.018	3.004
2. Manufacturing industries and construction	41.592,07	775,70	211,67						42.579,45	35.304	7.275
3. Transport	87.364,73	92,75	920,13						88.377,61	2.844	85.534
4. Other sectors	39.612,92	988,81	289,06						40.890,79	166	40.724
5. Other	485,41	0,25	4,14						489,81	0	490
B. Fugitive emissions from fuels	3.784,10	599,60	0,05						4.383,74	3.579	804
1. Solid fuels	7,60	83,53	NA,NE						91,13	0	91
2. Oil and natural gas	3.776,49	516,07	0,05						4.292,61	3.579	713
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	21.055,33	186,52	766,13	7.158,37	128,64	229,62	842,10	NO,NA	30.366,71	**18.251**	**12.115**
A. Mineral industry	12.327,25								12.327,25	12.166	161
B. Chemical industry	4.136,34	166,33	437,03	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	4.739,70	2.232	2.508
C. Metal industry	3.714,16	20,19	NA	NO,NA	119,81	NO,NA	NO,NA	NA	3.854,16	3.854	0
D. Non-energy products from fuels and solvent use	877,57	NA	NA						877,57	0	878
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				7.158,37	8,82	NO,NA	842,10	NO,NA	8.009,29	0	8.009
G. Other product manufacture and use	NO	NO	328,90	NO,NA	NO,NA	229,62	NO,NA	NO,NA	558,52	0	559
H. Other	IE,NA	IE,NA	0,20	NA	NA	NA	NA	NA	0,20	0	0
3. Agriculture	609,98	22.023,51	12.773,32						35.406,81		
A. Enteric fermentation		14.417,97							14.417,97		
B. Manure management		7.145,20	1.922,26						9.067,45		
C. Rice cultivation		439,99							439,99		
D. Agricultural soils		IE	10.844,77						10.844,77		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		20,35	6,29						26,65		
G. Liming	40,14								40,14		
H. Urea application	569,84								569,84		
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	-39.816,91	467,76	570,39						-38.778,76		
A. Forest land	-35.999,12	434,94	397,81						-35.166,37		
B. Cropland	-2.962,38	14,79	93,28						-2.869,10		
C. Grassland	-144,19	18,03	20,62						-105,54		
D. Wetlands	26,71	0,00	0,00						26,71		
E. Settlements	1.160,08	NO	54,97						1.215,05		
F. Other land	43,51	NO	3,70						47,21		
G. Harvested wood products	-1.941,53								43,51		
H. Other	NO	NO	NO						NO		
5. Waste	NO,IE,NA	12.770,40	1.572,51						14.342,91		
A. Solid waste disposal	NO,NA	10.657,66							10.657,66		
B. Biological treatment of solid waste		395,31	261,01						656,32		
C. Incineration and open burning of waste	NO,IE	301,23	346,67						647,91		
D. Waste water treatment and discharge		1.416,19	964,83						2.381,01		
E. Other	NA	0,00	NA						0,00		
6. Other *(as specified in summary 1.A)*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Memo items:[2]											
International bunkers									41.252,10		
Aviation									16.851,13		
Navigation									24.400,97		
Multilateral operations									NO		
CO_2 emissions from biomass									34.601,39		
CO_2 captured									NO		
Long-term storage of C in waste disposal sites									NE		
Indirect N_2O											
Indirect CO_2[3]											
Total CO_2 equivalent emissions without land use, land-use change and forestry									338.859,53	139.163	199.696
Total CO_2 equivalent emissions with land use, land-use change and forestry									300.080,76		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.

CRF1+CRF2: Interannual rise of ETS emissions by +10,3%. http://www.eea.europa.eu/data-and-maps/data/data-viewers/emissions-trading-viewer
1A1a: stagnation of electricity generation (+0,1%). Reduction of the participation of renewable energies in the mix (hydro: -49%) and increase of coal +20% and gas (+27%) compared to 2015). http://www.ree.es/es/estadisticas-del-sistema-electrico-espanol/balance-diario
1A1b: decrease of ETS emissions in refinery sector (-2,0%). http://www.eea.europa.eu/data-and-maps/data/data-viewers/emissions-trading-viewer
1A2: wide increase of industrial combustion activities (+4,2% in emissions).
1A3: rise of domestic aviation emissions (+6.2 %); rise of road fossil fuels (+2,5 % diesel; +2.3 % gasoline). http://www.cores.es/es/estadisticas
1A4: decrease of RCI emissions (-2,8%) in a warm year. [Several sources]
2F: decrease of fluorinated gas consumption (-17,2%).
3A-3B: cattle rise (Non dairy: +2,7% and swine: +3,8%). http://www.magrama.gob.es/es/estadistica/temas/estadisticas-agrarias/ganaderia/encuestas-ganaderas/#para4
3D: increase (+9,2%) of mineral fertilizers consumption http://www.magrama.gob.es/es/estadistica/temas/estadisticas-agrarias/agricultura/estadisticas-medios-produccion/fertilizantes.aspx

6.27 Sweden (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission Subm 2019 proxy
Country Sweden
Geographical scope[4]

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	**41.914**	**4.668**	**4.621**	**883**	**31**	**53**	**0**	**0**	**52.170**		
1. Energy									**37.392**		
A. Fuel combustion (sectoral approach)	35.462	388	654						36.505		
1. Energy industries	8.864	47	251						9.162		
2. Manufacturing industries and construction	6.858	27	146						7.032		
3. Transport	16.673	18	153						16.844		
4. Other sectors	2.881	297	101						3.279		
5. Other	186	0	3						189		
B. Fugitive emissions from fuels	824	63	1						887		
1. Solid fuels											
2. Oil and natural gas and other emissions from energy production											
C. CO_2 transport and storage											
2. Industrial processes and product use	**5.449**	**9**	**218**	**883**	**31**	**53**			**6.643**		
A. Mineral industry											
B. Chemical industry											
C. Metal industry											
D. Non-energy products from fuels and solvent use											
E. Electronic Industry											
F. Product uses as ODS substitutes											
G. Other product manufacture and use											
H. Other											
3. Agriculture	**125**	**3.252**	**3.503**						**6.879**		
A. Enteric fermentation											
B. Manure management											
C. Rice cultivation											
D. Agricultural soils											
E. Prescribed burning of savannahs											
F. Field burning of agricultural residues											
G. Liming											
H. Urea application											
I. Other carbon-containing fertilizers											
J. Other											
4. Land use, land-use change and forestry[1]											
A. Forest land											
B. Cropland											
C. Grassland											
D. Wetlands											
E. Settlements											
F. Other land											
G. Harvested wood products											
H. Other											
5. Waste	**55**	**956**	**245**						**1.256**		
A. Solid waste disposal											
B. Biological treatment of solid waste											
C. Incineration and open burning of waste											
D. Waste water treatment and discharge											
E. Other											
6. Other *(as specified in summary 1.A)*											

Memo items:[2]											
International bunkers											
Aviation											
Navigation											
Multilateral operations											
CO_2 emissions from biomass											
CO_2 captured											
Long-term storage of C in waste disposal sites											
Indirect N_2O											

Indirect CO_2[3]											

Total CO_2 equivalent emissions without land use, land-use change and forestry	**52.170**	**19.668**	**32.502**
Total CO_2 equivalent emissions with land use, land-use change and forestry			
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry			
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry			

(1) For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

(2) See footnote 7 to table Summary 1.A.

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.

(4) Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.

Key drivers for emission trend

Domestic transportation (CRF 1A3) accounts for one third of the total Swedish emissions and the emissions were at the same level, comparing the approximated greenhouse gas inventory for 2017 with the reported inventory for 2016. Increased use of biofuels and more fuel-efficient cars contribute to decreasing emissions while increased transportation limit the impact of these measures on the emissions. The estimates for 2017 are based on available energy statistics.

Energy industries (CRF 1A1) accounts for 18% of the total Swedish emissions and the emissions were at the same level, comparing the approximated greenhouse gas inventory for 2017 with the reported inventory for 2016. The estimates for the heat and power facilities are based on available energy statistics. Emissions from coke ovens and refineries were considered equal to 2016. Changes in emissions for these facilities were adjusted for other sectors (CRF 1A2, 1B and 2).

Industrial emissions (including stationary, fugitive and process from manufacturing industries, construction, refineries and coke ovens) emissions were at the same level, when comparing the approximated greenhouse gas inventory for 2017 with the reported inventory for 2016. Industrial emissions are described at the aggregate level since the method for allocation of facilities' emissions to different CRF-codes is based on a model in the case of the approximated greenhouse gas inventory. Industrial emissions are based on energy statistics and adjusted based on information provided from the ETS-reporting.

Emissions from waste (CRF 5) decreased by 5.5%, comparing the approximated greenhouse gas inventory for 2017 with the reported inventory for 2016, based on an assumed annual reduction rate due to lack of data. The waste sector has been decreasing steady since the beginning of 1990 because of extensively legislation on this sector.

Agricultural emissions (CRF 3) were assumed to be equal to the previous year due to lack of data to support an approximated estimate for 2017.

Additional information on the approximated greenhouse gas emissions inventory is available at (in Swedish):
http://www.naturvardsverket.se/snabbutslapp

Please note that the Swedish EPA use a different sectoral division than CRF-categories in national reporting that is more closely related to implemented and proposed policies and measures.

6.28 United Kingdom (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2018
Submission 2017 provisional inventory
Country United Kingdom of Great Britain and Northern Irel
Geographical scope[4]

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	**382.900**	**51.600**	**21.400**	**15.200**	**400**	**500**	**NO**	**0**	**471.900**		
1. Energy	**367.600**	**IE**	**IE**							**139.900**	**227.700**
A. Fuel combustion (sectoral approach)	363.100	IE	IE							136.500	226.600
1. Energy industries	100.500	IE	IE							94.000	6.500
2. Manufacturing industries and construction	50.900	IE	IE							28.300	22.500
3. Transport	122.100	IE	IE							12.500	109.500
4. Other sectors	88.200	IE	IE							1.600	86.600
5. Other	1.500	IE	IE							NO	1.500
B. Fugitive emissions from fuels	4.500	IE	IE							3.300	1.100
1. Solid fuels	300	IE	IE							NO	300
2. Oil and natural gas	4.100	IE	IE							3.300	800
C. CO_2 transport and storage	NO									NO	NO
2. Industrial processes and product use	**13.700**	**IE**	**IE**	**IE**	**IE**	**IE**	**NO**	**IE**		**11.500**	**2.200**
A. Mineral industry	6.300									IE	IE
B. Chemical industry	4.700	IE	IE	IE	IE	NO	NO	NO		IE	IE
C. Metal industry	2.400	IE	IE	IE	IE	IE	NO			IE	IE
D. Non-energy products from fuels and solvent use	300	NO,IE	NO,NE,IE							NO	300
E. Electronic Industry				IE	NO,IE	NO,IE	NO	IE		NO	NO
F. Product uses as ODS substitutes				IE	NO	NO	NO	NO		NO	NO
G. Other product manufacture and use	NO	NO	IE		IE	IE				NO	NO
H. Other	NO,NE,IE	IE	NO							NO	NO,NE,IE
3. Agriculture	**1.300**	**IE**	**IE**								
A. Enteric fermentation		IE									
B. Manure management		IE	IE								
C. Rice cultivation		NO									
D. Agricultural soils		NE	IE								
E. Prescribed burning of savannas		NO	NO								
F. Field burning of agricultural residues		NO	NO								
G. Liming	900										
H. Urea application	400										
I. Other carbon-containing fertilizers	NO										
J. Other	NO	NO	NO								
4. Land use, land-use change and forestry[1]											
A. Forest land											
B. Cropland											
C. Grassland											
D. Wetlands											
E. Settlements											
F. Other land											
G. Harvested wood products											
H. Other											
5. Waste	**300**	**IE**	**IE**								
A. Solid waste disposal	NO,NE	IE									
B. Biological treatment of solid waste		IE	IE								
C. Incineration and open burning of waste	300	IE	IE								
D. Waste water treatment and discharge		IE	IE								
E. Other	NO	NO	NO								
6. Other *(as specified in summary 1.A)*	0	0	0	0	0	0	0	0			

Memo items:[2]											
International bunkers											
Aviation											
Navigation											
Multilateral operations											
CO_2 emissions from biomass											
CO_2 captured											
Long-term storage of C in waste disposal sites											
Indirect N_2O											
Indirect CO_2[3]											
Total CO_2 equivalent emissions without land use, land-use change and forestry											
Total CO_2 equivalent emissions with land use, land-use change and forestry											
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry											
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry											

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.
Estimated CO2 emissions for 2017 have been calculated using the quarterly energy consumption statistics for the UK. The statistical release and methodology document describing the calculations are available below: https://www.gov.uk/government/statistics/provisional-uk-greenhouse-gas-emissions-national-statistics-2017 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416820/methodology_summary.pdf The calculations described in the above document are carried out using UK only data excluding the Crown Dependencies and Overseas Territories The data presented above is consistent with this data set, no changes have been made to the geographical coverage. Emissions are presented in Gg and rounded to the nearest 100 Gg, consistent with the UK's statistical release. Note that totals are rounded from full precision data, and therefore may not match the sum of the rounded data presented here CO2 from LULUCF is excluded in accordance with Article 17 of the Implementing Regulation 749/214 The non-CO2 emissions from LULUCF are included in the national total. Emissions from LULUCF in 2016 for non-CO2 gases were 0.035 MtCO2e CH4 and 1.442 MtCO2e for N2O. EU ETS emissions for sector 2 are presented at an aggregated level only. There is a small residual (<0.1%) of total EU ETS emissions that we have not been able to allocate to a category, these are not included in the totals above.

6.29 Iceland (submitted by country)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year
Submission
Country
Geographical scope[4]

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	11509,30	2829,28	376,93	191,97	68,00	1,28	NO	NO	14976,76		
1. Energy	1794,92	8,04	53,26						1856,21		
A. Fuel combustion (sectoral approach)	1645,96	4,51	53,26						1703,73		
1. Energy industries	2,21	0,00	0,01						2,21		
2. Manufacturing industries and construction	185,53	0,23	12,71						198,47	10,91	**187,56**
3. Transport	934,35	3,05	36,41						973,81		
4. Other sectors	523,87	1,23	4,13						529,23		
5. Other	NO	NO	NO						NO		
B. Fugitive emissions from fuels	148,96	3,53	NO,NA						152,49		
1. Solid fuels	NO	NO	NO						NO		
2. Oil and natural gas	148,96	3,53	NO,NA						152,49		
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	1792,59	3,48	2,29	191,97	68,00	1,28	NO	NO	2059,60		
A. Mineral industry	0,77								0,77		
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO		
C. Metal industry	1786,32	3,45	NO	NO	67,98	NO	NO	NO	1857,75	1.820,75	37,00
D. Non-energy products from fuels and solvent use	5,47	NO,NE,NA	NO,NE,NA						5,47		
E. Electronic Industry				NO	NO	NO	NO	NO	NO		
F. Product uses as ODS substitutes				191,97	0,02	NO	NO	NO	191,99		
G. Other product manufacture and use	0,03	0,03	2,29		NO	1,28			3,62		
H. Other	NA	NA	NA						NA		
3. Agriculture	4,72	361,66	235,18						601,56		
A. Enteric fermentation		306,50							306,50		
B. Manure management		55,17	50,84						106,01		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NA,NE,NO	184,34						184,34		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		NO,NA	NO,NA						NO,NA		
G. Liming	2,31								2,31		
H. Urea application	0,69								0,69		
I. Other carbon-containing fertilizers	1,72								1,72		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	7910,32	2234,51	77,22						10222,05		
A. Forest land	-325,43	0,70	0,83						-323,90		
B. Cropland	1615,91	81,48	NO,NA						1697,39		
C. Grassland	7205,96	548,93	0,44						7755,33		
D. Wetlands	-590,76	1603,40	NO,NE,NA						1012,64		
E. Settlements	4,72	NE	0,01						4,73		
F. Other land	NE,NA	NA	NA						NE,NA		
G. Harvested wood products	-0,07								-0,07		
H. Other	IE	IE	75,93						75,93		
5. Waste	6,75	221,58	8,99						237,33		
A. Solid waste disposal	NO,NE,NA	213,40							213,40		
B. Biological treatment of solid waste		2,28	1,63						3,91		
C. Incineration and open burning of waste	6,75	0,35	0,33						7,43		
D. Waste water treatment and discharge		5,56	7,03						12,59		
E. Other	NA	NO	NO						NO,NA		
6. Other ***(as specified in summary 1.A)***											

Memo items:[2]											
International bunkers	1102,00	0,59	9,11						1111,70		
Aviation	916,88	0,16	7,64						924,68		
Navigation	185,12	0,43	1,46						187,02		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	48,35								48,35		
CO_2 captured	NO,NA								NO,NA		
Long-term storage of C in waste disposal sites	NO								NO		
Indirect N_2O			NE								
Indirect CO_2[3]	NE										
Total CO_2 equivalent emissions without land use, land-use change and forestry									4754,71	1831,67	
Total CO_2 equivalent emissions with land use, land-use change and forestry									14976,76		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									NA		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NA		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

6.30 Switzerland (submitted by country)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Year 2017
Submission July 2018
Country Switzerland
Geographical scope[4]

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2[1]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)[1]	38271,95	4853,23	2297,49	1538,89	46,60	210,14	NO	0,51	47218,81		
1. Energy	36062,54	277,76	224,17						36564,47	NE	NE
A. Fuel combustion (sectoral approach)											
1. Energy industries											
2. Manufacturing industries and construction											
3. Transport											
4. Other sectors											
5. Other											
B. Fugitive emissions from fuels											
1. Solid fuels											
2. Oil and natural gas											
C. CO_2 transport and storage											
2. Industrial processes and product use	2140,83	2,70	46,40	1538,89	46,60	210,14	NO	0,51	3986,07	NE	NE
A. Mineral industry											
B. Chemical industry											
C. Metal industry											
D. Non-energy products from fuels and solvent use											
E. Electronic Industry											
F. Product uses as ODS substitutes											
G. Other product manufacture and use											
H. Other											
3. Agriculture	47,58	4043,14	1833,70						5924,42		
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											
H. Urea application											
I. Other carbon-containing fertilizers											
J. Other											
4. Land use, land-use change and forestry[1]	NE	NE	NE						NE		
A. Forest land											
B. Cropland											
C. Grassland											
D. Wetlands											
E. Settlements											
F. Other land											
G. Harvested wood products											
H. Other											
5. Waste	9,89	529,04	192,72						731,65		
A. Solid waste disposal											
B. Biological treatment of solid waste											
C. Incineration and open burning of waste											
D. Waste water treatment and discharge											
E. Other											
6. Other *(as specified in summary 1.A)*	11,11	0,59	0,50	NO	NO	NO	NO	NO	12,20	NE	NE

Memo items:[2]											
International bunkers	NE	NE	NE						NE		
Aviation											
Navigation											
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	NE								NE		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	NE								NE		
Indirect N_2O			250,00								
Indirect CO_2[3]	107,77										
Total CO_2 equivalent emissions without land use, land-use change and forestry									47218,81	NE	NE
Total CO_2 equivalent emissions with land use, land-use change and forestry									NE		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									47326,58		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									NE		

[1] For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for
[2] See footnote 7 to table Summary 1.A.
[3] In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO_2, the national totals shall be provided with and without indirect CO_2.
[4] Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-territory scope, and the Party coverage under the Convention, please clarify the geographical scope of the Proxy GHG inventory submitted under the EU Monitoring Mechanism Regulation.

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1 (proxy) compared to t-2 (inventory). If this information is publicly available please include the hyperlink to the relevant website.

The Swiss Kyoto target includes emissions of all greenhouse gases from the sectors 1, 2, 3 and 5, including indirect CO2 emissions from these sectors, excluding direct and indirect emissions from sector 6, excluding emissions and removals from land use, land-use change and forestry, and excluding emissions from international transport.
Indirect CO2 emissions from sector 6 account for 1.01 kt (and are included in the 107.77 kt indicated above as total indirect CO2 emissions).
Note, indirect N2O emissions are estimated but are not included in the Swiss Kyoto target.
Total approximated CO2 equivalent emissions in 2017 according to the Swiss Kyoto target are 47'313.38 kt.

Swiss climate reporting under the UNFCCC:
https://www.bafu.admin.ch/bafu/en/home/topics/climate/state/data/climate-reporting.html

In the different sectors, emission changes from 2016 to 2017 were mainly caused by the following drivers:

Sector 1 'Energy'
(i) Higher fraction of biogenic fuels leading to decreased fossil CO2 emissions.
(ii) Decrease in CO2 emissions from heating fuels: partly due to technical progress, partly due to slightly warmer meteorological conditions during wintertime.

Sector 2 'Industrial processes and product use'
(i) Slightly decreased CO2 emissions from cement production (based on data from cement plants).
(ii) Roughly constant F-gas emissions.

Sector 3 'Agriculture'
(i) The approximated emission estimate considered the updated Swiss ammonium emission model (AGRAMMON), new values for emissions from residuals from grasslands, updated animal numbers for most important animal categories, milk yield and total mineral fertilizers in 2017, in total leading to lower emission values from Agriculture.

Sector 5 'Waste'
(i) Reduced emissions of CH4 from waste disposal sites (based on model simulations, disposal of burnable solid waste is prohibited since the year 2000).

European Environment Agency

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