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Annual European Union approximated greenhouse gas inventory for the year 2018

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Executive summary

This report provides preliminary ('approximated' or proxy) estimates of greenhouse (GHG) emissions for the year 2018 in the European Union (EU) and other member countries of the European Environment Agency (EEA).

The report shows that in 2018, EU GHG emissions decreased in 2018, with the largest emission reduction observed since 2014. Total emissions, including international aviation (i.e. consistent with the EU's domestic GHG emission targets) decreased by 2.0 % from 2017 levels. This is a reduction of 23.2 % when compared to 1990. Emissions covered by the EU Emissions Trading System (ETS) decreased by 4.2 % and emissions in the other sectors (i.e. covered by the Effort Sharing Decision) decreased by 0.8 %.

This overall decrease can be explained by warmer conditions in 2018 than in 2017, meaning a lower demand for heating. 2018 was one of the warmest years on record.

ETS sectors are delivering higher emission reductions than ESD sectors. Energy industries accounted for 69 % of the EU net reduction in 2018. Emissions in the residential/commercial sector showed the second largest reduction, which was consistent with the evolution of climatic conditions compared with 2017. Transport continued to increase emissions for the fifth year in a row.

The energy system was less carbon-intensive in 2018 than in the previous year. Fossil fuel consumption decreased by 1.7 % (particularly solid fuels by 4.9 % and natural gas by 2 %). Consumption of renewable energy continued to increase strongly.

At country level, GHG emissions decreased in 16 Member States in 2018. France and Germany accounted for two-thirds of the total net reduction.

EU greenhouse gas emissions decreased in 2018

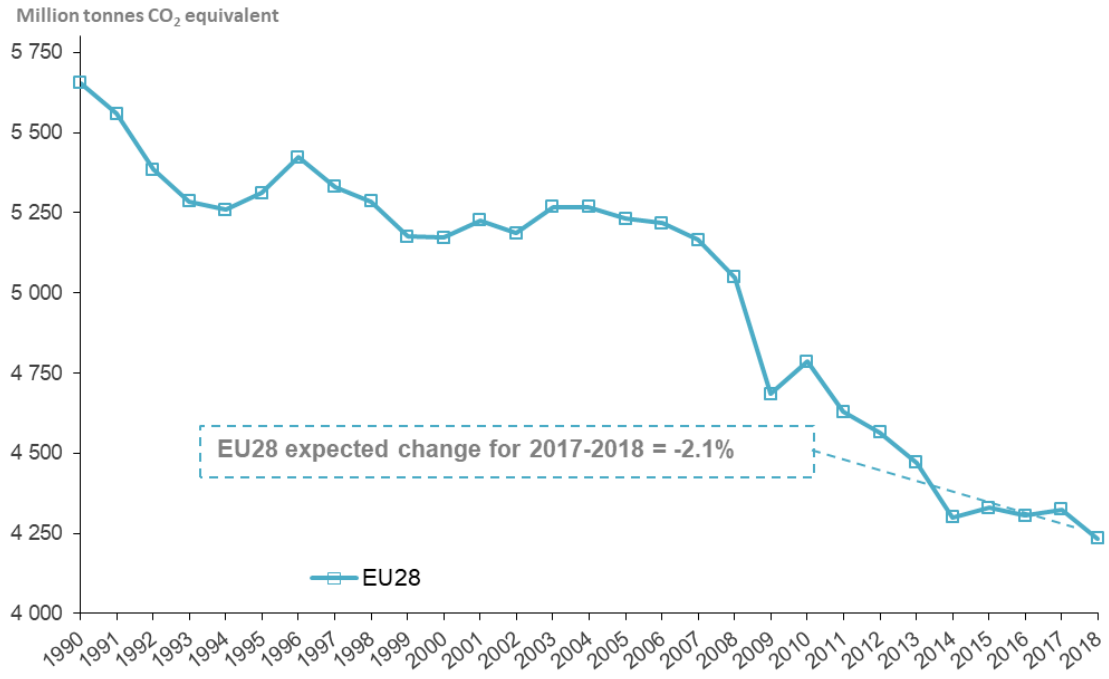
After EU GHG emissions ([1]) levelled off between 2014 and 2016 and slightly increased in 2017, the estimates for 2018 shows a 2 % decrease for 2018 :

- EU GHG emissions, without international aviation, were equal to 4 233 million tonnes of CO_2 equivalents (Mt CO2 eq.), which was 91.8 Mt CO2 eq. less than in 2017 (Figure ES.1).
- GHG emissions for EU plus Iceland (4 237.9 Mt CO2 eq.) were lower than any preceding year. The decrease in emissions between 2017 and 2018 is estimated to be 91.6 Mt CO2 eq. or 2.1 %. The 2018 emissions total is 25.1 % below 1990 levels.
- Emissions from international aviation were equal to 160.9 Mt CO2 eq. in 2018, which represents an increase of 1.7 % in comparison to 2017.
- EU GHG emissions, including international aviation, decreased by 2.0 % compared to 2017. This is a reduction of 23.2 % when compared to 1990.

Climatic factors have a significant effect on energy demand, behaviour and GHG emission trends. 2018 was one of the three warmest years for Europe (Copernicus, 2019). Highest amount of the cooling degree days was in 2018 observed for Cyprus, Malta and Greece, as it is to be expected for these countries. A relatively cold period at the beginning of the year indicated also higher emissions from the residential and commercial sectors.

[1] Without net emissions from land use, land-use change and forestry, including indirect CO_2 emissions

Figure ES.1 Trends in total GHG emissions, 1990-2018



Note: Total GHG emissions without LULUCF including indirect CO2 and without international aviation.

Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

Energy-related emissions decreased, except in the transport sector

On a sectoral basis, the largest absolute emission decrease in the EU occurred in the energy sector (i.e. all combustion activities and fugitive emissions). Energy-related emissions decreased by 82.5 Mt CO2 eq. (-2.5 %) across the EU. Within the energy sector, emissions increased in transport (+4.8 Mt CO2 eq.) while they declined in energy industries (−62.4 Mt CO2 eq.), in residential and commercial ('Other sectors') (-19.7 Mt CO2 eq.) and slightly in manufacturing industries and construction (-3.4 Mt CO2 eq.). Emission changes in other and fugitive emissions are only minor.

CO_2 emissions from 'Road transportation' had the highest increase in absolute terms of all energy-related emissions, while CO_2 emissions from '1.A.1.a Public electricity and heat production' as well as '1.A.2 Manufacturing industries' decreased substantially between in the whole time-series, also between 2017 and 2018. The decreases in 'Public Electricity and Heat Production' and 'Manufacturing industries' as well as the increases in 'Road transportation' occurred in almost all Member States. The decline of 'Fugitive emissions from fuels' (CH4) and decreasing CO_2 emissions from '1.A.1.c Manufacture of solid fuels and other energy industries' are the main reasons for the large absolute emission reductions from "remaining energy categories".

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 fourth year in a row until a decrease in 2018 by -1.7 % in 2018. The contribution of coal and gas to the energy mix decreased in 2018 while the share of renewable fuels increased.

Monthly consumption data for solid, liquid and gaseous fuels show different trends for the different fossil fuel types. In 2018 the consumption of natural gas decreased by 2.0 % and consumption of liquid fuels decreased by -0.2 %. Solid fossil fuel consumption (excluding peat) fell by 4.9 %.

The emissions from the sector Industrial Processes and Product Use decreased by 0.8 % between 2017 and 2018 in the EU-28. The largest contribution to this emission decrease was from product uses as substitutes for Ozone Depleting Substances, which decreased by 2.5 %.

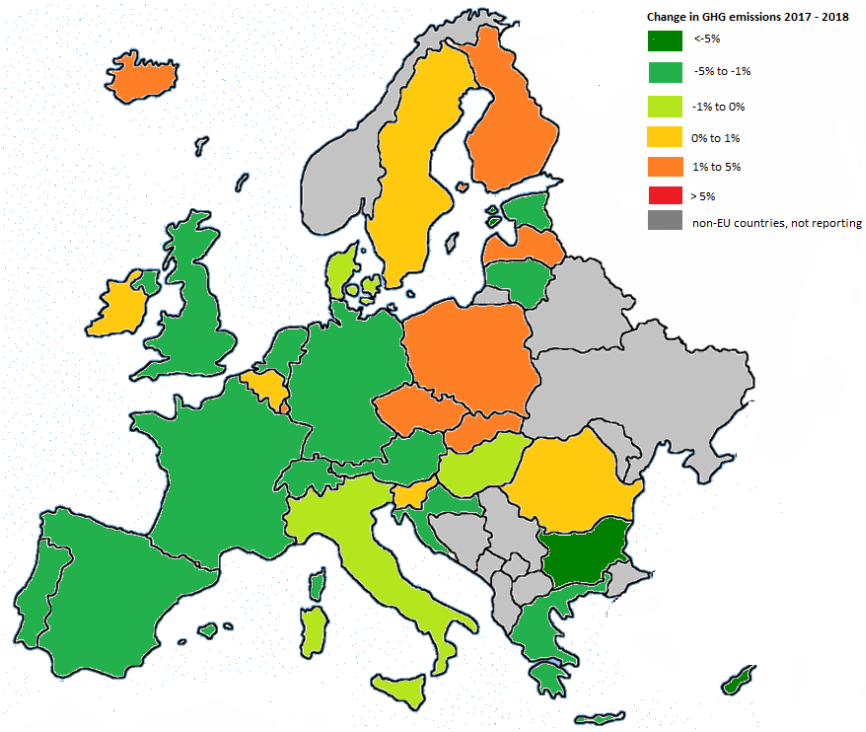
Agriculture emissions decreased by 0.7 % mainly from emission decreases from agricultural soils and due to enteric fermentation. The trend in emissions from waste (−2 % compared to previous year) continues the decrease seen in previous years with largest reduction being in emissions from solid waste disposal.

Reporting under the EU Monitoring Mechanism Regulation requires separate detail for emissions covered by the EU ETS and other 'non-ETS' emissions. Between 2017 and 2018, the emissions decreased by 4.2 % across stationary installations covered by the European Emissions Trading System for the EU, whereas emissions covered by the Effort Sharing Decision (ESD) decreased by 0.8 %.

Most emission decreases took place in western and southern Europe

Greenhouse gas emissions increased in half of the EU Member States with decreases outweighing gains by 2.1 %. Figure ES.2 depicts the regional distribution of these changes, which differ significantly between different regions: emission increases occurred mainly in north-eastern and central eastern Europe while most of the emission reduction can be in the rest of Europe.

Figure ES.2 Regional trends in total GHG emissions change 2017-2018



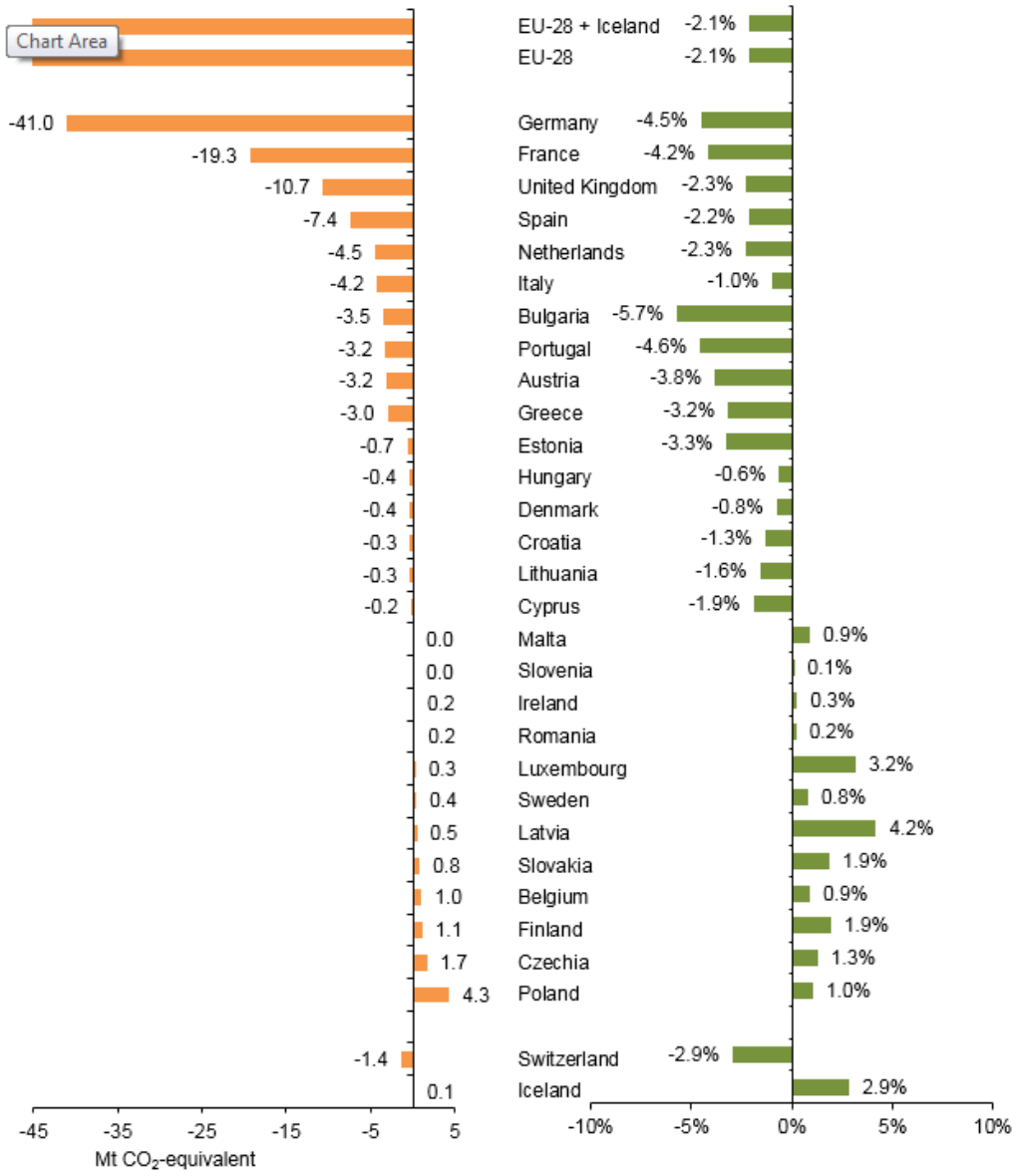
Note: Change in total GHG emissions excluding LULUCF and including indirect CO2.

Comparing the changes across Member States (Figure ES.4), the largest absolute emission change occurred in Poland, where emissions increased by 4.3 Mt CO2 eq. In contrast the

largest emission decrease was in Germany (−41.0 Mt CO2 eq.), followed by France (−19.3 Mt CO2 eq.).Large absolute emissions decreases also occurred in Spain (-7.4 Mt CO2 eq.) and the United Kingdom (-10.7 Mt CO2 eq.).

The largest relative increase in emissions compared to 2017 took place in Latvia (4.2 %) followed by Luxembourg (3.2 %). The largest relative declines were in Bulgaria (-5.7 %), Portugal (−4.6 %) and Germany (−4.5 %). In the non-EU member countries of the EEA, emissions decreased in Switzerland (-2.9 %, or -1.4 Mt CO2 eq.) while emissions were estimated to increase for Iceland (+2.9 % or 0.1 Mt CO2 eq.) and Norway (+0.4 % or 0.2 Mt CO2 eq.).

Figure ES. 3 Member States' emissions, change 2017-2018



Note: Total GHG emissions without LULUCF including indirect CO2.
Outside the range of Figure 3 are EU-28 total GHG (-91.8 kt) and EU-28+IS total GHG (-91.6 kt).

Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

1. Background and objective

This approximated GHG inventory is an early estimate of the GHG emissions for the preceding 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, 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 the UNFCCC for the year *t*-2.

EU is aiming to have a leading role in the emission reduction and for this purpose, number of measures have been accepted. One of the important is Effort sharing decision, which covers sectors of economy, which fall outside the scope of the EU Emission Trading Scheme. These sectors, which include transport, buildings, agriculture, non-ETS industry and waste, are accounting up to 60 % of the total EU emissions (EU 2018).

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[2]. The Doha Amendment's entry into force is subject to acceptance by at least three quarters of the Parties to the Kyoto Protocol.

The official submission of 2018 inventories to the United Nations Framework Convention on Climate Change (UNFCCC) will take place in 2020.

2 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

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 (~45 % 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 (~80 % 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 2018

A total of twenty-five Member States submitted preliminary 2018 GHG data to the European Commission and the EEA by 31 July 2019[3]. Austria, Belgium, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Slovakia, Slovenia, 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 0.

These 25 Member States that submitted 2018 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 three EEA member countries submitted preliminary 2018 GHG data by 31 July 2019: Iceland, Switzerland and Norway.[5]

Approximated GHG inventories in CRF Summary2 table format are presented for the EU-28 and EU plus Iceland in chapter 0. Chapter 5 provides the CRF Summary2 tables for each of the 28 EU Member States and also for Iceland, Switzerland and Norway.

2.1 Trends and general results

2.1.1 Changes in GHG emissions across the EU

After a slight increase in 2017, the estimates for 2018 show a decrease in emissions. Emissions levelled off between 2014 and 2016 (Figure 1) and the estimate for 2018 shows a 2.1 % decrease compared to 2017.

For EU-28 the 2018 emissions equalled to 4233 million tonnes of CO_2 equivalents (Mt CO2 eq.), which indicates a decrease from 2017 for 91.8 million tonnes of CO_2 equivalents (Mt CO2 eq.), or 2.1 %. International aviation equalled for EU-28 to 160.9 million tonnes of CO_2 equivalents in 2018, which shows increase for 1.7 % in comparison to the 2017 levels.

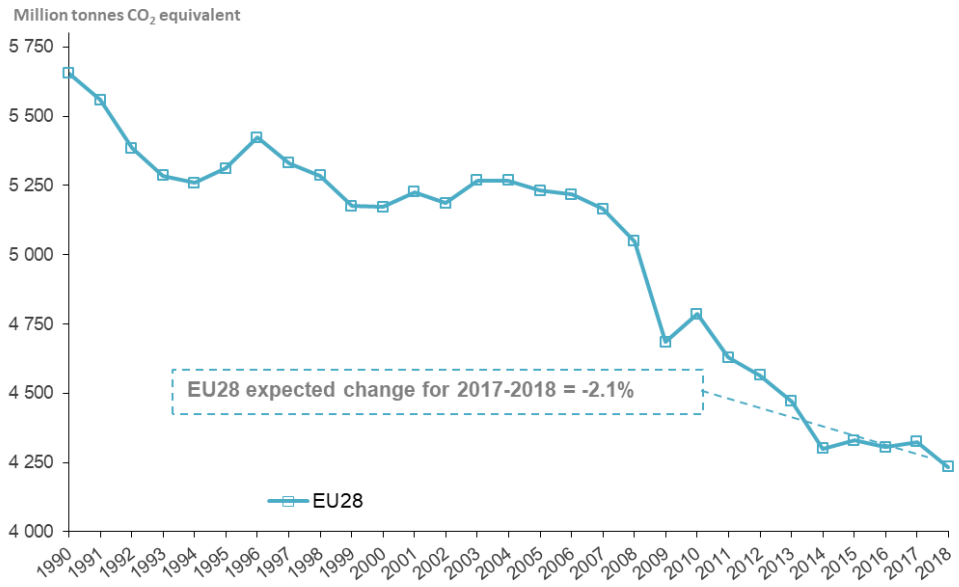
The 2018 emissions for EU plus Iceland (4237.9 million tonnes of CO_2 equivalents (Mt CO2 eq.), are lower than any preceding year. The decrease in emissions between 2017 and 2018 is estimated to be 91.6 Mt CO2 eq. or 2.1 % (total GHG emissions without LULUCF and including indirect CO_2). The 2018 emissions total is 25.1 % below 1990 levels.

3 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.

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 and Turkey. As these countries did not submit any GHG data for 2018 these countries are not considered in this report.

Figure 1 **Trends in total greenhouse gas emissions, 1990-2018**

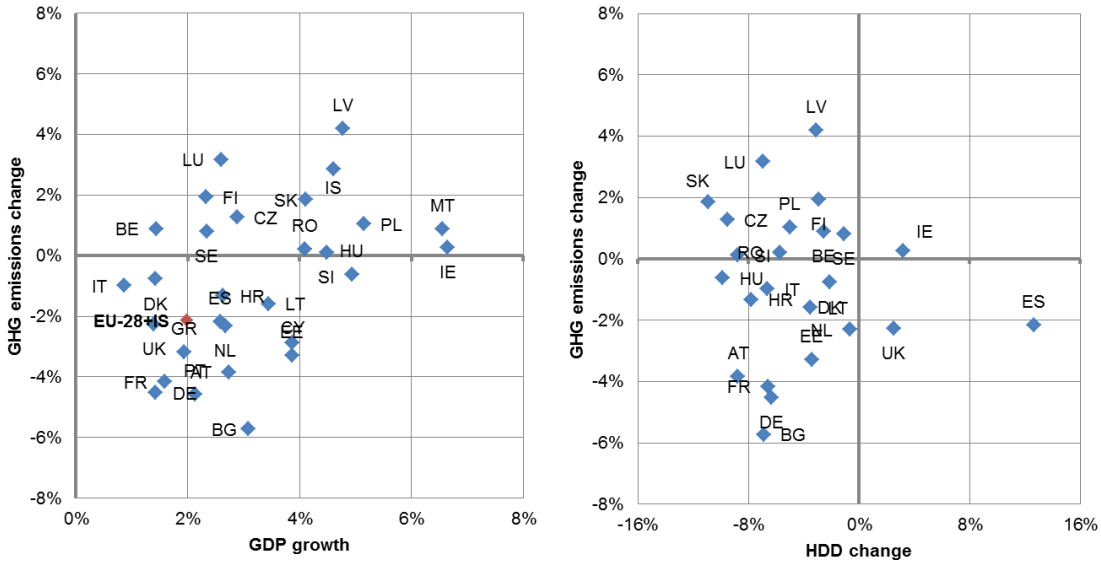


Note: Total GHG emissions without LULUCF including indirect CO2.

Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

The trend shows 2.1 % decrease in emissions for the EU plus Iceland since 2017 while the GDP growth is showing positive trend of 2.0 % in the same year (Figure 2). If there is a common pattern between GDP and GHG emissions for 2016 across the EU, it is that for all Member States the economic situation continued to improve again (GDP grew in all Member States) nonetheless sixteen Member States achieved decreases in emissions.

Figure 2 **GHG emissions, GDP growth and heating degree days change 2017-2018**



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 HDD value of Malta, Portugal and Cyprus

could not be presented at this scale. Malta has HDD change (-24.5 %), Portugal has (23.7 %) and Cyprus has (-33.8 %).

Source: GDP and HDD data from Eurostat

Climatic factors have a significant effect on energy demand, behaviour and GHG emission trends. The year 2018 virtually was one of the three warmest years for Europe (Copernicus, 2019). Relatively cold period at the beginning of the year indicated also higher emissions from the residential and commercial sectors. Figure 2 also shows that the 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. On the examples from Poland and Finland is apparent also increase in the emissions from the '1.A.4 Other sectors' (i.e. Commercial, institutional, residential and agriculture).

Four Member States had HDD increases; Portugal (+23.7 %), Spain (+12.6 %), Ireland (+3.2 %) and United Kingdom (2.5 %). The strongest decline of HDD occurred in Cyprus (−33.8 %), Malta (−24.5 %) and Greece (−16.6 %). 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 decrease in the EU occurred in the energy sector (i.e. all combustion activities and fugitive emissions). Energy related emissions decreased by 82.5 Mt CO2 eq. (-2.5 %) across the EU. Within the energy sector, emissions increased in transport (+4.8 Mt CO2 eq.) while they declined in energy industries (−62.4 Mt CO2 eq.), in residential and commercial (Other sectors) (-19.7 Mt CO2 eq.) and slightly in manufacturing industries and construction (-3.4 Mt CO2 eq.). Emission changes in other and fugitive emissions are only minor. This is consistent with the increase in emissions in transport.

These changes in emissions reflect changes visible in the energy statistics. After a period of increase between 2015 and 2017, primary fossil energy consumption has decreased by 1.7 % in 2018. The contribution of coal and gas to the energy mix decreased in 2018 while the share of renewable fuels increased (BP 2018).

Monthly consumption data for solid, liquid and gaseous fuels (Eurostat, 2018), show different trends for the different fossil fuel types. In 2018 the consumption of natural gas fell by 2.4 % and consumption of liquid fuels decreased by 0.2 %. Solid fossil fuel consumption (excluding peat) fell by 3.6 %.

Natural gas consumption increased in eight Member States with highest increases in Malta (21.3 %), Finland (11.4 %) and Latvia (9.4 %).

In eighteen Member States natural gas consumption fell with the largest decrease in Croatia (−8.3 %) followed by Portugal (−7.9 %) and Germany (-7.7 %).

Liquid fossil consumption grew in eighteen Member States with the largest increases being in Sweden (14.9 %), Finland (11.2 %) and Lithuania (6.8 %). A decrease of liquid fuel consumption was observed in nine Member States with largest decreases in Germany (-4.8 %), Netherlands (-4.5 %) and Greece (-3.8 %).

Eighteen Member States showed decreasing solid fossil fuel consumption (excluding peat). The largest decreases were in Spain (-19.1 %), Portugal (-17.2 %) and United Kingdom (-14.0 %).

Consumption grew the most in Latvia (28.0 %), Lithuania (7.4 %), Belgium (5.2 %) and Slovakia (2.4 %). 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.

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) increased by 16 % across the EU with 15 Member States experiencing higher hydro electricity production in 2018 than in 2017. Hydro production decreased in 11 Member States. The largest absolute decreases in gross hydro production were in Germany, Sweden and Latvia.

Electricity production from renewable sources increased significantly. Gross electricity generation from wind energy grew by 7.4 % in the EU across 22 Member States (EurObserv'ER, 2019a).[6] The largest relative increases were in Luxembourg (27 %), Finland (22 %) and United Kingdom (23 %). The largest absolute contributions from wind energy were in Germany, France and the United Kingdom.

Increases in electricity production from photovoltaics were seen in most Member States and production grew by 9 % across Europe (EurObserv'ER, 2019b), with very large relative increases in Hungary (110 %), Finland (440 %), Ireland (233 %), and Poland (69 %). The largest absolute generation from photovoltaics was in Germany followed by France, the United Kingdom and Netherlands.

In 2018 nuclear energy production across the EU-28 decreased by 0.3 % compared to 2017. The largest decreases in nuclear electricity generation occurred in Belgium (−32 %) followed by Slovenia (-8 %) and United Kingdom (−7 %). Nuclear electricity generation increased in Czechia (6 %), Sweden (4 %) and Bulgaria (4 %) (BP 2019).

The emissions from the sector Industrial Processes and Product Use decreased by 3.2 Mt CO2 eq. (-0.8 %) between 2017 and 2019. The largest contribution to this emission decrease was from product uses as substitutes for ODS, which decreased by 2.5 %.

Agriculture emissions decreased by 3.3 Mt CO2 eq. (-0.7 %), mainly from emission decreases from agricultural soils and due to enteric fermentation. The trend in emissions from waste (−2 % compared to previous year) continues the decrease seen in previous years with largest reduction being in emissions from solid waste disposal.

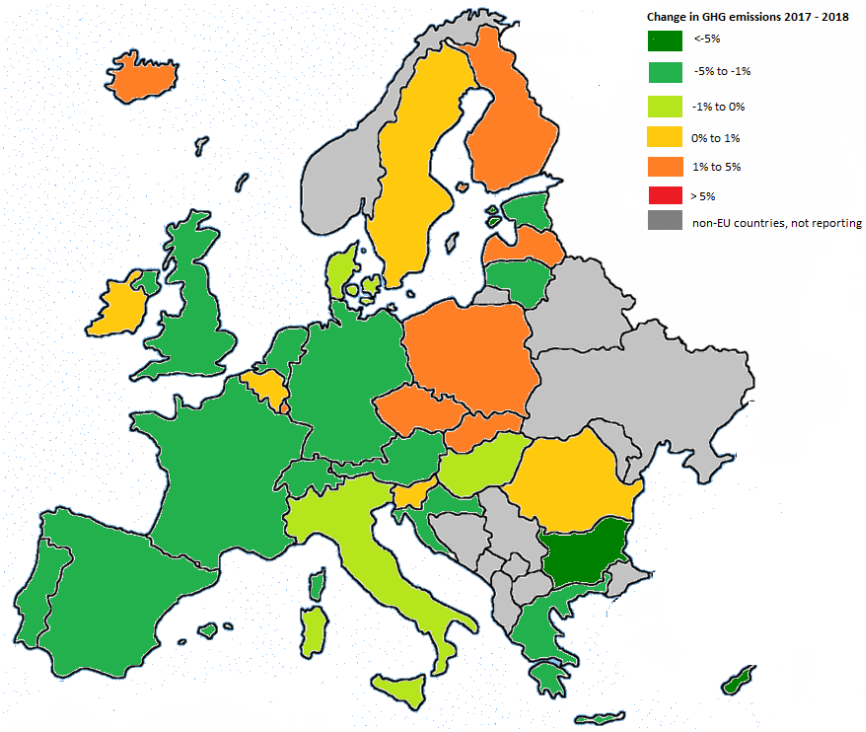
Reporting under the Monitoring Mechanism Regulation requires separate detail for the EU ETS and non-ETS sectors. Between 2017 and 2018 the emissions decreased by 4.2 % across stationary installations covered by the European Emissions Trading System for the EU, whereas emissions covered by the Effort Sharing Decision (ESD) decreased by 0.8 %.

2.1.3 Change in Member State GHG emissions 2017 to 2018

Greenhouse gas emissions increased in half of the EU Member States with decreases outweighing gains by 2.1 %. Figure 3 depicts the regional distribution of these changes which differ significantly between different regions: Emission increases occurred mainly in north-eastern and central eastern Europe while most of the emission reduction can be in western and southern Europe.

6 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.

Figure 3 Regional trends in total GHG emissions change 2017-2018



Note: Change in total GHG emissions excluding LULUCF and including indirect CO2.

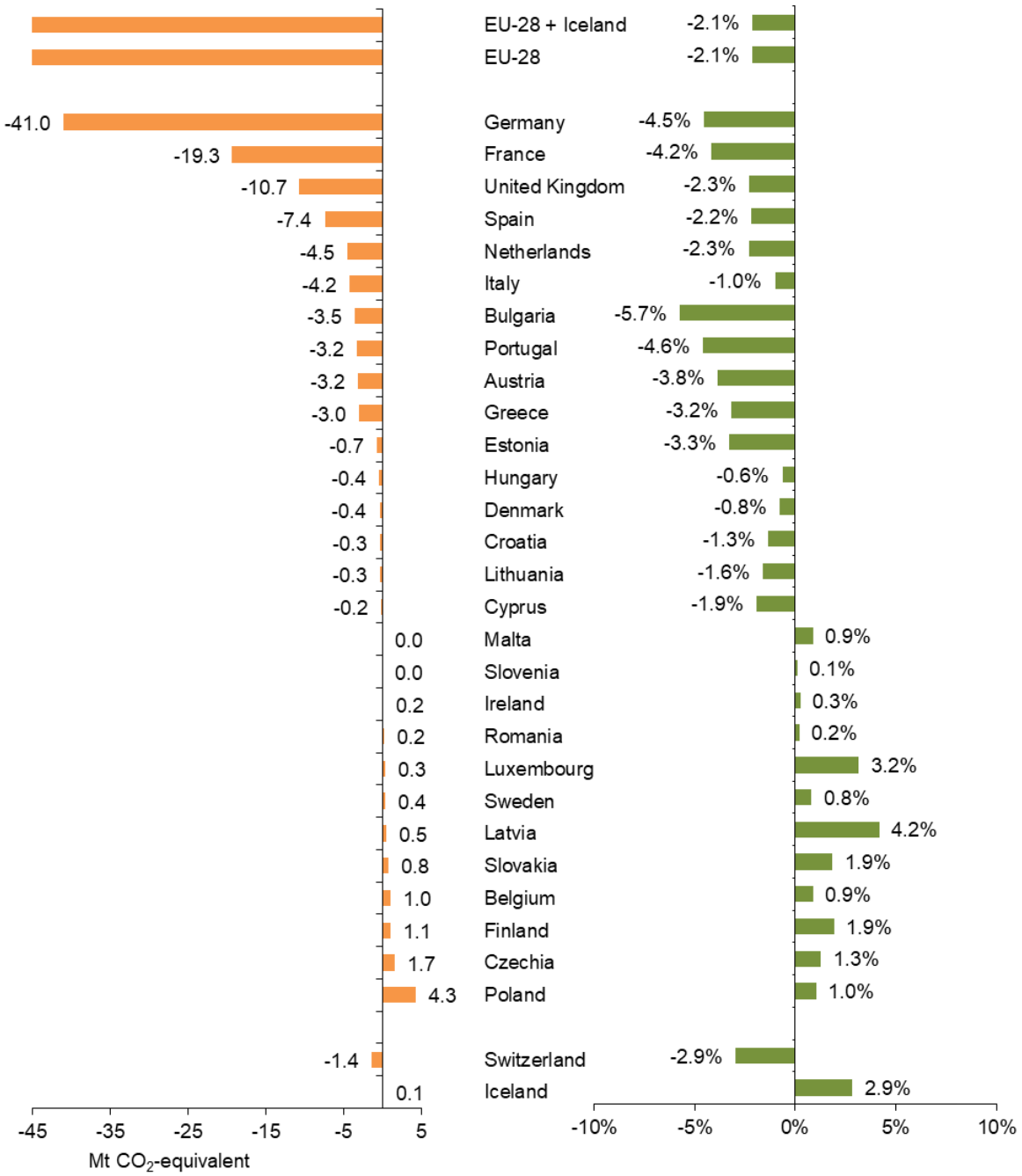
Source: EEA, based on the 2019 Member States' GHG inventories submitted to the UNFCCC for 1990-2017 and proxy estimates for 2018.

Comparing the changes across Member States (Figure 4), the largest absolute emission change occurred in Poland, where emissions increased by 4.3 Mt CO2 eq. In contrast the largest emission decrease was in Germany (−41.0 Mt CO2 eq.), followed by France (−19.3 Mt CO2 eq.).

The largest relative increase in emissions compared to the previous year took place in Latvia (4.2 %) followed by Luxembourg (3.2 %). The largest relative declines were in Bulgaria (-5.7 %), Portugal (−4.6 %) and Germany (−4.5 %). In the non-EU member countries of the EEA, emissions decreased in Switzerland (-2.9 %, or -1.4 Mt CO2 eq.) while emissions were estimated to increase for Iceland (+2.9 % or 0.1 Mt CO_2 eq) and Norway (+0.4 % or 0.2 Mt CO2 eq.).

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 Latvia, Finland, Czechia, Belgium 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.

Figure 4 **Member States emissions change 2017-2018**



Note: Total GHG emissions without LULUCF including indirect CO2.

Outside the range of Figure 4 are EU-28 total GHG (-91.8 kt) and EU-28+IS total GHG (-91.6 kt).

Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

Member States with decreasing 2017 to 2018 emission trends

The largest absolute decrease was seen in **Germany**, the largest GHG emitter in the European Union. Emissions in Germany decreased by 41.0 Mt CO2 eq. or 4.5 %, significantly more than in any other Member State. Consumption of oil decreased by 4.8 %, while consumption of

natural gas decreased by 1.6 %. Consumption of coal fell by 7.2 %. Consumption of renewable energies increased by 6.6 % while nuclear energy decreased by 0.3 %. The largest share of the emissions decrease was in sub-category '1.A.4 Other sectors' (−14.3 Mt CO2 eq. or −10.5 %) due to 2018 being slightly warmer than 2017 (heating degree days 6.4 % lower). Renewables contributed to the shift with increasing wind power (+6 %) and solar power (+16 %). The second largest emission decrease was in sub-category '1.A.1 Energy industries' where emissions fell by 13.9 Mt CO2 eq. or 4.5 %. Emissions of Industrial processes and product use grew by 0.2 Mt CO2 eq. (+0.4 %), mainly from mineral industry. Emissions of Agriculture grew by 2.7 Mt CO2 eq. or 4.1 % and emissions from Waste are estimated to fall by 0.5 Mt CO2 eq. or 4.1 %.

In **France**, GHG emissions fell by 19.3 Mt CO2 eq. or 4.2 %. France is the third largest GHG emitter in the European Union. There has been a strong decline in the use of coal (−9.6 %), while oil fell slightly by 0.2 % and natural gas consumption fell by (-4.6 %). The increase of renewable energy (+13.0 %) was much stronger than the increase in nuclear energy (3.7 %). Higher level of electricity generation from wind energy (+15.3 %), hydro energy (+27.3 %) with decrease in coal is reflected in emissions. The largest emission decrease was in '1.A.1 Energy industries' (−8.0 Mt CO2 eq. or −16.3 %). Emissions decreased slightly in '1.A.3 Transport' (-1.6 %). In contrast other sectors saw fewer changes in emissions. Industry sector grew (0.1 %) and Waste sector continued to decrease (−0.3 Mt CO2 eq. or −2.0 %).

In the **United Kingdom,** emissions decreased −10.7 Mt CO2 eq. or −2.3 %. Consumption of coal decreased by 16.6 %, oil by 1.1 % but natural gas rose by 0.1 %. Renewable energies including hydro increased by 13.1 % while nuclear energy decreased by 7.5 %. In total emissions decreased in most energy sectors: The strongest emission decline was in '1.A.1 Energy industries' (−7.8 Mt CO2 eq. or −7.6 %). Increased biofuel consumption led to a significant emission reduction in '1.A.3 Transport' (−2.9 Mt CO2 eq. or −2.4 %). Only a slight reduction of emissions was observed in '1.A.2 Manufacturing industries and construction' (−0.1 Mt CO2 eq. or −1.2 %). The emission increase in 1.A.4 Other energy sectors (+2.5 Mt CO2 eq. or +2.8 %) is in line with a 2.5 % increase of heating degree days (HDD). All of the non-energy energy sectors showed emission reductions: Strongest in the Waste sector (−0.48 Mt CO2 eq. or −2.4 %), followed by emissions from Industrial processes and product use (−0.67 Mt CO2 eq. or −2.2 %) and the Agriculture sector (−0.16 Mt CO2 eq. or −0.4 %).

In **Spain,** emissions fell by 7.4 Mt CO2 eq. or 2.2 %. Consumption of oil increased by 2.5 % while natural gas consumption declined by 0.8 % and coal consumption fell by 17.3 %. Consumption of renewable energies grew by 1.7 %. Wind energy grew by 3.4 %, but solar energy decreased by 12.6 % in 2018. Hydropower grew significantly by 87.4 %, showing the second largest relative growth rate within the member states. Emissions from '1.A.1 Energy industries' fell the most by (+10.1 Mt CO2 eq. or 10.6 %). Industrial processes and product use decreased (-1 Mt CO2 eq. or -3.4 %) while emissions from Agriculture is estimated to stay constant and Waste decreased slightly by 0.05 Mt CO2 eq. or 0.4 %.

In Italy, emissions decreased by 4.2 Mt CO2 eq. or 1.0 %. Emission reductions are related to a fall in consumption of fossil fuels and an increase in hydro energy. Natural gas consumption decreased by 3.3 %, oil consumption fell by 1.9 % and coal decreased by 7.7 %. Hydro energy rose significantly by 33.4 %, but renewables decreased by 2.5 %, mainly from decrease in solar energy by 4.7 % and wind by 1.5 %. The largest fall in emissions was in '1.A.1 Energy industries' by 8.9 Mt CO2 eq. or 8.5 % and the largest increase was in '1.A.2 Manufacturing industries' by 4.0 Mt CO2 eq. or 8.0 %. In '1.A.4 Other sectors', emissions fell by 2.7 Mt CO2 eq. or 3.3 % with 6.6 % less heating degree days in 2018. In all non-energy sectors emissions decreased, the most in Waste by 0.79 Mt CO2 eq. or 4.4 %, then in Agriculture by 0.13 Mt CO2 eq. or 0.5 % and in Industrial processes by 0.06 Mt CO2 eq. or 0.2 %.

Portugal had the second largest percentage decrease in emissions from all the member state countries in 2018. Emissions were 3.2 Mt CO_2eq or 4.6 % lower than in 2017. Consumption of all fossil fuels fell: Natural gas consumption decreased by 7.6 % and consumption of oil fell by 3.3 % while consumption of coal fell by 16.1 %. Consumption of renewable energies increased by 2.6 %. Solar power increased by 11 %. The largest emission decrease was in '1.A.1 Energy industries' by 3.1 Mt CO2 eq. or 15.2 % while having 23 % more heating degree days. The largest emission increase was in '1.A.3 Transport' (0.15 Mt CO2 eq. or 0.9 %). The emissions changed only slightly in non-energy sectors. Emissions from Industry decreased by (−0.07 Mt CO2 eq. or −0.9 %), from Waste 0.03 Mt CO2 eq. or 0.5 %. The emissions from Agriculture rose by 0.03 Mt CO2 eq. or 0.4 %.

Member States with increasing 2017 to 2018 emission trends

Poland experienced in 2018 the largest absolute emission increases of all Member States: 4.3 Mt CO2 eq. or +1.0 %. Energy consumption from fossil fuels grew strongest for oil by 3.5 %, gas grew by 2.9 % and coal consumption grew 1.5 %. Also renewable energy decreased by 9.7 % and hydro energy fell by 23 %, because of a dry year. In contrast, wind energy grew by 4 % and solar energy by 70 % (EurObserv'ER 2019a,b). The largest change in emissions was in '1.A.3 Transport' which grew by 2.5 Mt CO2 eq. or 4.0 %. Emissions in '1.A.1 Energy industries' decreased slightly by -0.19 Mt CO2 eq. or-0.1 % while having 5 % less heating degree days. The second largest emission increase in the energy sector was from '1.A.4 Other sectors' by 1.2 Mt CO2 eq. or 2.1 %. Emissions in '1.A.2 Manufacturing industries and construction' grew only slightly by 0.18 Mt CO2 eq. or 0.6 %. Emissions of Industrial processes and product use increased by 0.03 Mt CO2 eq. or 0.5 %. Emissions in the Agriculture sector increased by 0.4 Mt CO2 eq. or 1.3 %. Emissions of Waste are estimated to stay almost constant.

In **Czechia** emissions increased by 1.7 Mt CO2 eq. or 1.3 % which is the second largest absolute emission increase within the EU. Consumption of coal increased by 1 % while oil increased by 2.5 % and natural gas decreased by 4.7 %. Also renewable energy fell by 0.9 % and hydro energy decreased by 13.0 %. In contrast, wind and solar energy increased both by 7 % (EurObserv'ER 2019a,b). Consumption of nuclear energy rose by 5.6 %. One reason for the increase of fossil fuel consumption and emissions is the increase in '1.A.3 Transport' (2.4 Mt CO2 eq. or 13.0 %). Emissions from '1.A.1 Energy industry' were only 0.16 Mt CO2 eq. or 0.3 % higher than 2017, and in '1.A.4 Other sectors' emissions fell slightly by 0.39 Mt CO2 eq. or 2.8 % while having 9.5 % less heating degree days than in 2017. In '1.A.2 Manufacturing industries and construction', decrease was 0.38 Mt CO2 eq. or 3.7 %. Emissions from Industrial processes and process use grew (0.4 Mt CO2 eq. or 2.6 %). Emissions from Agriculture were almost constant (0.03 Mt CO2 eq. or 0.4 %). Emissions from Waste are estimated to decrease slightly (−0.14 Mt or −2.6 %).

Finland had the third largest absolute emission increase: emissions were 1.1 Mt CO2 eq. or 1.9 % higher than the previous year. Consumption of all fossils grew. Coal consumption rose by 6.7 %, consumption of gas increased by 11.5 % and oil by 5.5 %. Renewables increased by 13.2 % and nuclear energy increased slightly by 1 %, but hydro energy fell by 10 %, because of a dry year. Wind energy rose by 22 % and photovoltaic rose by 440 % from 30 GWh to 162 GWh (EurObserv'ER 2019a,b). Consumption of peat grew by 24 % (Statistics Finland, 2019). Changes in fuel consumptions reflect the emissions. Largest emission increases were in '1.A.1 Energy industries' with 0.95 Mt CO2 eq. or +5.4 %. The second largest increases were in '1.A.4 Other sectors' with 0.18 Mt CO2 eq. or 4.7 %. This is despite a warmer winter with less heating degree days by 2.9 %. Emissions from '1.A.2 Manufacturing industries and construction' increased by 0.07 Mt CO2 eq. or 1 % and from '1.A.3 Transport' increased by 0.17 Mt CO2 eq. or 1.5 %. All the non-energy sectors had decreasing emissions. The 0.16 Mt CO2 eq. or 2.6 % decrease in the Agriculture sector followed by a 0.11 Mt CO2 eq. or 6.2 % decrease in the Waste sector, and a slight decrease in the Industrial sector by 0.01 Mt CO2 eq. or 0.2 %.

In **Belgium**, absolute emissions increased 1 Mt CO2 eq. or 0.9 % in 2018. The fossil liquid fuels decreased by less than 1 %, but gas consumption rose by 3 % and coal by 6 %. Nuclear energy fell by 32 % and hydro energy fell by 7 %. Renewables increased by 8 % with wind energy by 4 % and photovoltaics by 13 %. The large nuclear decrease occurred because of a scheduled maintenance break for the nuclear power plants in Belgium, while renewables, gas and imports were compensating the difference. (Reuters, 22 October 2018) The resulting emission increases occurred in '1.A.3 Transport' by 0.6 Mt CO2 eq. or 2.4 % and in 1.A.2 Manufacturing industries by 0.25 Mt CO2 eq. or 1.9 %. In contrast, in '1.A.1 Energy industries', emissions fell by 0.07 Mt CO2 eq. or 0.4 % and the '1.A.4 Other sectors' estimate was close to constant. In the Industry sector, emissions rose the most in '2.A.1 Mineral industry' by 0.2 Mt CO2 eq. or 4.1 % and in 2.A.3 Metal industry by 0.1 Mt CO2 eq. or 2.6 %. The Agriculture sector was estimated constant, and the Waste sector decreasing slightly by 0.01 Mt CO2 eq. or 0.8 % in year 2018.

Latvia increased its absolute GHG emissions by 0.5 Mt CO2 eq. in 2018 compared to 2017, and had the largest relative emission increase by 4.2 % of all the member state countries. Oil consumption increased by 3 %, coal consumption by 28 % and gas by 9 %. Renewables stayed constant, but hydro energy fell significantly by 44 %, because of the dry weather in 2018. The change in fossil fuel consumption shows significant emission increase in '1.A.1 Energy industries' by 0.38 Mt CO2 eq. or 24.8 % followed by '1.A.2 Manufacturing industries' by 0.09 Mt CO2 eq. or 14.0 %. The '2.A.1 Mineral industry' has the highest increase from non-energy subsectors by 0.11 Mt CO2 eq. or 24.9 %. Emissions fell in the Agriculture sector by 0.09 Mt CO2 eq. or 3.4 %, and in the Waste sector by 0.03 Mt CO2 eq. or 5.5 %.

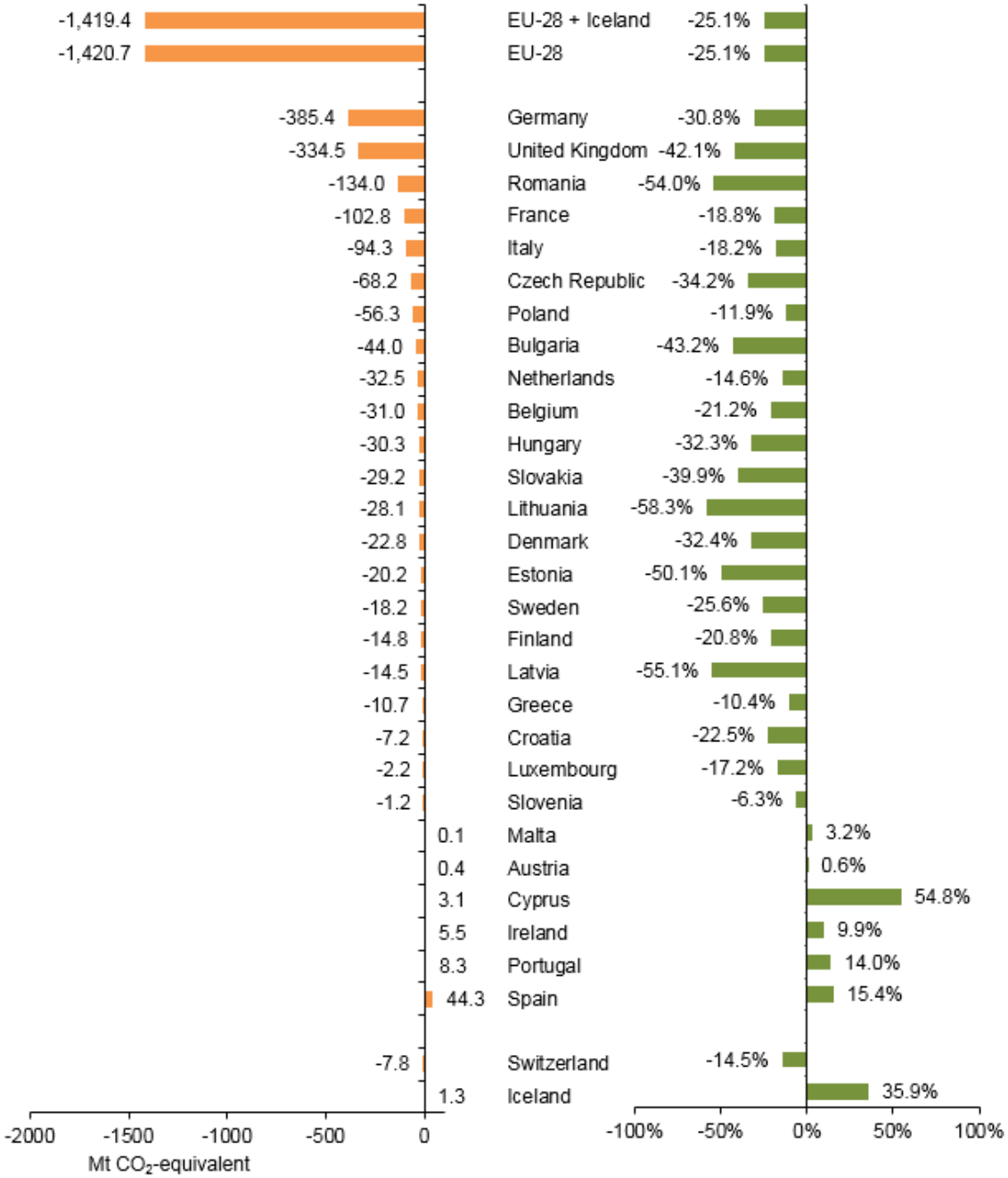
2.1.4 Change in Member State GHG emissions 1990 to 2018

Total EU GHG emissions in 2018 are estimated to be −25.1 % or −1420.7 Mt CO_2eq below 1990 levels as shown in Figure 5. Total emissions including emissions from international aviation are estimated to be 23.2 % below 1990 levels, showing a reduction of 1328.95 Mt CO_2eq. Emissions for most EU-28 Member States are lower than in 1990 while emissions in Malta, Austria, Cyprus, Ireland, Portugal and Spain are higher than in 1990. The largest absolute decrease was in Germany, followed by the United Kingdom, Romania and France, which all reduced their GHG emissions by more than 100 Mt CO2 eq. since 1990. The largest absolute increase was experienced by Spain with 44.3 Mt CO2 eq. The absolute emission increases in the remaining five Member States are lower by an order of magnitude.

The largest relative emission decreases were in Lithuania, Latvia, Romania and Estonia 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 (+53.2 %) while the changes in other EU Member States with increased emissions compared to 1990 are all below +16 %.

Of the three non-EU member countries of the EEA considered in this report only Switzerland had in 2018 lower GHG emissions compared to 1990 level, while Iceland shows an increase.

Figure 5 Member States emissions, change 1990-2018



Note: Total GHG emissions without LULUCF including indirect CO2.

Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

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. It should be noted, that in their proxy submissions, a number of Member States used the 2017 value for emissions from international aviation as an approximated value for 2018. The same approach was used

for gap filling where Member States did not include an estimate. For the EU 2018 proxy, 2017 values for international aviation emissions were repeated for 17 countries.

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

European Union (EU28)	1990	2017	2018	2018-2017	2018/2017	2018-1990	2018/1990
Total excl. LULUCF incl. indirect CO_2	5 653 747	4 324 868	4 233 085	-91 783	-2.12 %	-1 420 662	-25.13 %
International aviation	69 141	158 268	160 944	2 676	1.69 %	91 803	132.78 %
Total CO_2e including international aviation	5 722 889	4 483 136	4 394 029	-89 107	-1.99 %	-1 328 859	-23.22 %
European Union (EU28) plus Iceland							
Total excl. LULUCF incl. indirect CO_2	5 657 346	4 329 623	4 237 975	-91 648	-2.12 %	-1 419 371	-25.09 %
International aviation	69 362	159 425	162 101	2 676	1.68 %	92 738	133.70 %
Total CO_2e including international aviation	5 726 709	4 489 048	4 400 076	-88 972	-1.98 %	-1 326 633	-23.17 %

Table 3 and Table 4 show the detailed results for the EU-28 and the EU plus Iceland for 2018. Summary tables for 2018 for each Member State as submitted by the Member States or gap-filled by EEA for Member States which did not submit their own approximated emissions report are provided in chapter 5.

Table 3 Summary table of approximated GHG emissions for 2018 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 2018
Submission 2019
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]	3 433 963	447 250	235 498	101 979	3 755	7 637	1 255	47	4 231 384		
1. Energy	3 172 931	83 897	28 452						3 285 280		
A. Fuel combustion (sectoral approach)	3 146 459	25 210	28 337						3 200 006		
1. Energy industries	1 105 326	4 270	7 350						1 116 946		
2. Manufacturing industries and construction	490 167	2 219	4 050						496 436		
3. Transport	939 690	1 237	9 763						950 690		
4. Other sectors	605 542	17 452	7 128						630 122		
5. Other	5 734	31	47						5 812		
B. Fugitive emissions from fuels	26 472	58 688	115						85 274		
1. Solid fuels	4 147	30 482	0						34 629		
2. Oil and natural gas	22 325	28 206	115						50 645		
C. CO_2 transport and storage	-								-		
2. Industrial processes and product use	247 450	1 556	10 630	101 979	3 755	7 637	1 255	47	374 310		
A. Mineral industry	112 015								112 015		
B. Chemical industry	54 470	1 277	7 054	550	1 901	99	-	-	65 350		
C. Metal industry	70 231	184	21	38	633	299	-	-	71 407		
D. Non-energy products from fuels and solvent use	10 091	2	5						10 098		
E. Electronic Industry				45	383	170	19	47	665		
F. Product uses as ODS substitutes				101 338	103	-	1 236	-	102 677		
G. Other product manufacture and use	583	78	3 469	6	730	7 032	-	-	11 897		
H. Other	86	14	80	2	5	38	-	-	224		
3. Agriculture	10 458	239 570	185 697						435 726		
A. Enteric fermentation		193 563							193 563		
B. Manure management		41 581	22 163						63 744		
C. Rice cultivation		2 587							2 587		
D. Agricultural soils		-	163 087						163 087		
E. Prescribed burning of savannas		-	-						-		
F. Field burning of agricultural residues		514	188						701		
G. Liming	5 908								5 908		
H. Urea application	4 246								4 246		
I. Other carbon-containing fertilizers	304								304		
J. Other	-	1 326	260						1 586		
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	3 124	122 226	10 719						136 069		
A. Solid waste disposal	-	97 638							97 638		
B. Biological treatment of solid waste		4 607	3 118						7 726		
C. Incineration and open burning of waste	3 109	143	301						3 553		
D. Waste water treatment and discharge		19 831	7 229						27 060		
E. Other	16	6	69						90		
6. Other *(as specified in summary 1.A)*	-	-	-						-		

Memo items:[2]									-		
International bunkers	173 377	156	1 598						235 586		
Aviation	129 703	18	1 208						160 944		
Navigation	89 506	143	831						120 921		
Multilateral operations	1	-	-						1		
CO_2 emissions from biomass	340 467								432 325		
CO_2 captured	127	-							127		
Long-term storage of C in waste disposal sites	152 514	-							152 514		
Indirect N_2O			3 231								
Indirect CO_2 [3]	1 701										
Total CO_2 equivalent emissions without land use, land-use change and forestry									4 231 384		
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									4 233 085	1 655 042	2 578 043
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 2018 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 2018
Submission 2019
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]	3 443 217	451 519	235 849	102 184	3 824	7 639	1 255	47	4 236 274		
1. Energy	3 174 775	83 905	28 508						3 287 189		
A. Fuel combustion (sectoral approach)	3 148 157	25 214	28 394						3 201 765		
1. Energy industries	1 105 328	4 270	7 350						1 116 948		
2. Manufacturing industries and construction	490 336	2 219	4 063						496 618		
3. Transport	940 678	1 240	9 802						951 720		
4. Other sectors	606 082	17 454	7 132						630 668		
5. Other	5 734	31	47						5 812		
B. Fugitive emissions from fuels	26 618	58 691	115						85 424		
1. Solid fuels	4 147	30 482	0						34 629		
2. Oil and natural gas	22 472	28 209	115						50 794		
C. CO_2 transport and storage	-								-		
2. Industrial processes and product use	249 230	1 559	10 632	102 184	3 824	7 639	1 255	47	376 371		
A. Mineral industry	112 016								112 016		
B. Chemical industry	54 470	1 277	7 054	550	1 901	99	-	-	65 350		
C. Metal industry	72 004	187	21	38	702	299	-	-	73 253		
D. Non-energy products from fuels and solvent use	10 096	2	5						10 103		
E. Electronic Industry				45	383	170	19	47	665		
F. Product uses as ODS substitutes				101 543	103	-	1 236	-	102 882		
G. Other product manufacture and use	583	78	3 471	6	730	7 034	-	-	11 901		
H. Other	86	14	80	2	5	38	-	-	224		
3. Agriculture	10 463	239 937	185 979						436 379		
A. Enteric fermentation		193 868							193 868		
B. Manure management		41 642	22 184						63 826		
C. Rice cultivation		2 587							2 587		
D. Agricultural soils		-	163 348						163 348		
E. Prescribed burning of savannas		-	-						-		
F. Field burning of agricultural residues		514	188						701		
G. Liming	5 910								5 910		
H. Urea application	4 247								4 247		
I. Other carbon-containing fertilizers	306								306		
J. Other	-	1 326	260						1 586		
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	3 132	122 477	10 728						136 336		
A. Solid waste disposal	-	97 844							97 844		
B. Biological treatment of solid waste		4 609	3 120						7 729		
C. Incineration and open burning of waste	3 116	144	302						3 561		
D. Waste water treatment and discharge		19 874	7 236						27 110		
E. Other	16	6	69						90		
6. Other *(as specified in summary 1.A)*											

Memo items:[2]											
International bunkers	NE	NE	NE						NE		
Aviation	130 850	18	1 217						162 101		
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]	1 701										
Total CO_2 equivalent emissions without land use, land-use change and forestry									4 236 274		
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									4 237 975	1 656 896	2 581 079
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

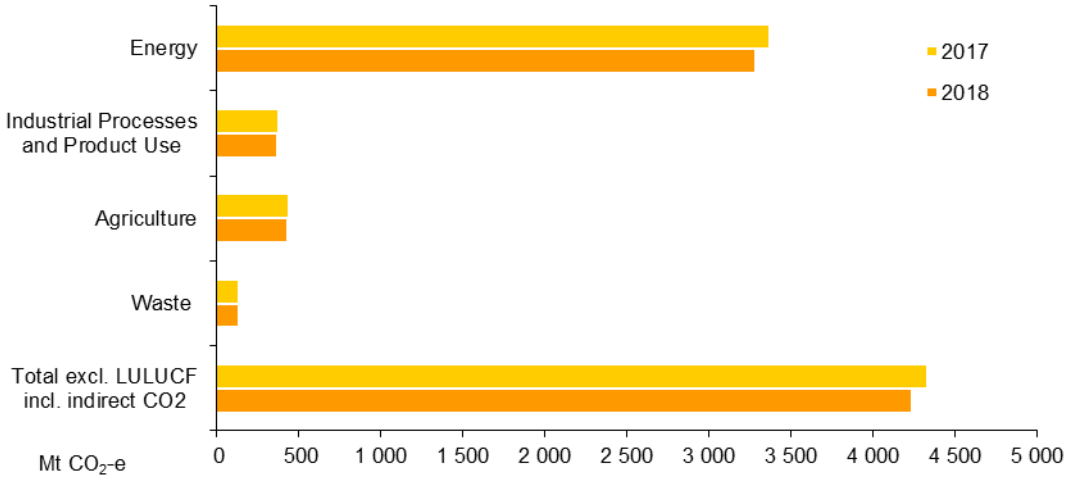
Figure 6 show the changes between 2017 and 2018 at sectoral level for the EU 28.

Table 5 Emissions by sector, change 2017-2018

Change 2017 / 2018, EU plus Iceland	Mt CO2 eq.	%
Energy	-82.5	-2.5 %
Industrial Processes and Product Use	-3.2	-0.8 %
Agriculture	-3.3	-0.7 %
Waste	-2.8	-2.0 %
Total excl. LULUCF incl. indirect $_{CO2}$	-91.8	-2.1 %

Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

Figure 6 Emissions by sector, EU plus Iceland 2017-2018



Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

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 decreased by 82.5 Mt CO2 eq. (-2.5 %) across the EU. More detailed explanations for the trends in the energy sector are provided in section 0

Energy.

The greenhouse gas emissions from Industrial Processes and Product Use decreased by 3.2 Mt CO2 eq. (-0.8 %), the agricultural sector saw a decrease of 3.3 Mt CO2 eq. (-0.7 %) and the waste sector indicated decrease of 2.8 Mt CO2 eq. (−2.0 %).

2.2.1 Energy

Emissions from the energy sector contributed about 78 % of total EU emissions in 2018. Emissions from fuel combustion saw a decrease of 81.6 Mt CO2 eq. or 2.5 % since 2017.

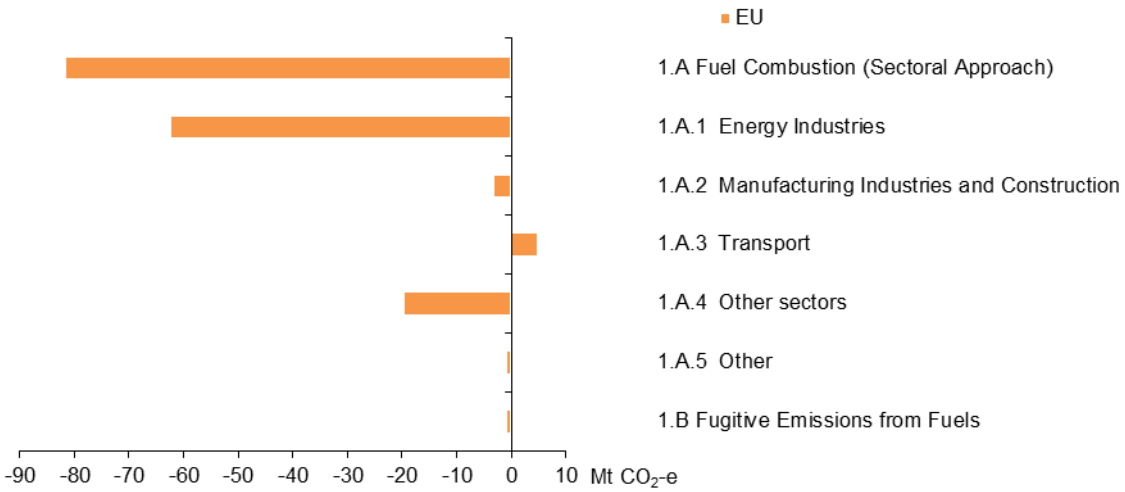
Table 6 shows that the largest change in fuel combustion emissions occurred in '1.A.1 Energy industries' with a decrease of 62.4 Mt CO2 eq. (-5.3 %). In the sector '1.A.2 Manufacturing industries and construction' emissions also decreased emissions (-3.4 Mt CO2 eq. resp. -0.7 %). Emissions in '1.A.4 Other sectors' (-19.7 Mt CO2 eq. or -3.0 %) decreased as well. An increase in emissions is apparent in '1.A.3 Transport' (+4.8 Mt CO2 eq. or +0.5 %) and very slight decrease is in 1.B Fugitive emissions from fuels (1.0 Mt CO2 eq. or−1.1 %).

Table 6 Energy sector emissions, change 2017-2018

Change 2016 / 2017, EU 28	Mt CO_2eq	%
1.A Fuel Combustion (Sectoral Approach)	-81.6	-2.5 %
1.A.1 Energy Industries	-62.4	-5.3 %
1.A.2 Manufacturing Industries and Construction	-3.4	-0.7 %
1.A.3 Transport	4.8	0.5 %
1.A.4 Other sectors	-19.7	-3.0 %
1.A.5 Other	-1.0	-14.1 %
1.B. Fugitive Emissions from Fuels	-1.0	-1.1 %

Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

Figure 7 Energy sector emissions, EU 28 change 2017-2018



Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

The emissions largest increase for 1.A Fuel Combustion on Member States level was noted for Poland (+3.7 Mt CO2 eq.) and Czechia (+1.8 Mt CO2 eq.). Largest emission decrease was in Germany (−38 Mt CO2 eq.) followed by France (−18.8 Mt CO2 eq.) and the United Kingdom (−9.2 Mt CO2 eq.). Emissions from Fuel Combustion increased in 10 Member States and decreased in 18 Member States. Iceland estimated constant emissions.

Going to more detail in the sub category '1.A.1 Energy industries', largest reduction was in Germany (−14.0 Mt CO2 eq.), followed by Spain (−10.5 Mt CO2 eq.) and Italy (−8.8 Mt CO2 eq.). The increases were only minor, largest one noted for Finland (+0.9 Mt CO2 eq.).

Emissions changes in the sector '1.A.2 Manufacturing industries and construction' were significantly smaller. The largest increase was in Italy (+3.9 Mt CO2 eq.) and the largest decrease in Germany (−3.8 Mt CO2 eq.).

Emissions from '1.A.3 Transport' increased in 20 Member States. The largest increases were in Italy (+4.1 Mt CO2 eq.), Poland (+2.5 Mt CO2 eq.), Spain (+2.3 Mt CO2 eq.) and Czechia (+2.4 Mt CO2 eq.), while largest decreases were in Germany (−4.9 Mt CO2 eq.) followed by the United Kingdom (−3.0 Mt CO2 eq.) and France (−2.2 Mt CO2 eq.).

In '1.A.4 Other sectors' (which include residential and commercial) emissions increased in 10 Member States. The largest increases occurred in The United Kingdom (+2.5 Mt CO2 eq.). The largest decrease was in Germany (−14.3 Mt CO2 eq.) followed by France (−6.2 Mt CO2 eq.).

Emission changes in the sector 1.A.5 Other in all Member States are less than ±0.1 Mt CO2 eq.[7]

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 Czech Republic (−0.5 Mt CO2 eq.) and the largest increase in Lithuania (+0.2 Mt CO2 eq.).

2.2.2 Industrial Processes and Product Use

Industrial Processes and Product Use (IPPU) contribute to about 9 % of total EU emissions and are the third most important source after energy and agriculture. Emissions from Industrial Processes decreased by 3.2 Mt CO2 eq. in the EU (-0.8 %).

Table 7 and Figure 8 show the sub-sector contribution to this trend in emissions. The largest emission decrease occurred in the subsector 2.F Product uses as substitutes for ODS. For all other subsectors emissions changes are only small.

Table 7 Industrial Processes and Product Use emissions, change 2017-2018

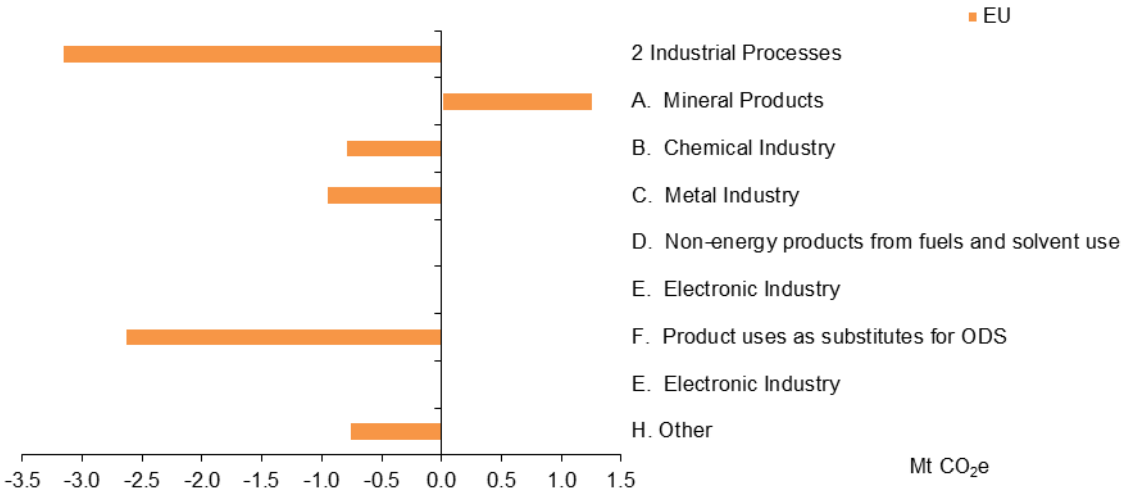
Change 2016 / 2017, EU 28	Mt CO2 eq.	%
2 Industrial Processes	-3.2	-0.8 %
A. Mineral Products	1.3	1.1 %
B. Chemical Industry	-0.8	-1.2 %
C. Metal Industry	-1.0	-1.3 %
D. Non-energy products from fuels and solvent use	0.0	-0.2 %
E. Electronic Industry	0.0	2.5 %

7 In its 2019 GHG inventory submission, Germany reported 1.0 Mt CO2eq emissions in source category 1.A.5 for year 2017. In the 2018 proxy these emissions were reported "included elsewhere" (IE) and included in 1.A.4 Other sectors. EEA and its ETC/CME did not reallocate these emissions

Change 2016 / 2017, EU 28	Mt CO2 eq.	%
F. Product uses as substitutes for ODS	-2.6	-2.5 %
G. Other Product Manufacture and Use	0.8	6.9 %
H. Other	-0.8	-77.5 %

Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

Figure 8 Industrial Processes and Product Use emissions, EU 28, change 2017-2018



Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

In 13 of the EU-28 Member States and also in Iceland emissions from IPPU increased. The largest increase of IPPU emissions was in Slovakia (+0.5 Mt CO2 eq.) followed by Romania (+0.4 Mt CO2 eq.) and Czechia (+0.4 Mt CO2 eq. each) while the largest decreases were in Austria (−1.6 Mt CO2 eq.) followed by Greece (−0.9 Mt CO2 eq.) and Spain (−1 Mt CO2 eq.).

The largest IPPU subsector increase was in 2.A Mineral Products where emissions increased by 1.3 Mt CO2 eq. or 1.1 %. The largest increase was in Poland (+0.57 Mt CO2 eq.), while the largest decreases were in Greece (−0.25 Mt CO2 eq.).

Emissions from '2.B Chemical Products' decreased in the EU (-0.8 Mt CO2 eq. or −1.2 %). The largest increases were in the Slovakia (+0.44 Mt CO2 eq.) while the largest decrease was in Greece (−0.59 Mt CO2 eq.).

Emissions from '2.C Metal Industry' decreased by -0.9 Mt CO2 eq. or -1.3 % with the largest increase in Czechia (+0.2 Mt CO2 eq.) while the largest decrease occurred in Austria (−1.4 Mt CO2 eq.).

The IPPU sub-sector '2.D Non-energy Products from Fuels and Solvent Use' has had almost constant emissions (-0.02 Mt CO2 eq. or -0.2 %). Largest emission changes were in Ireland (+0.08 Mt CO2 eq.) and Germany (−0.07 Mt CO2 eq.).

The IPPU sub-sector '2.E Electronic Industry' showed for whole EU only slight absolute emission changes (0.02 Mt CO2 eq.) but significant relative emission increase (2.5 %). Emissions changes for individual Member States were within ±0.02 Mt CO2 eq. and the strongest emission change was found for Ireland (+0.08 Mt CO2 eq.).

The IPPU sub-sector '2.F Product uses as substitutes for ODS' saw emissions decrease by 2.6 Mt CO2 eq. (−2.5 %). In six Member States emissions increased in this source category and in only nine Member States emissions decreased. By far the largest change of emissions was in Spain, where 2.F emissions fell by 1.5 Mt CO2 eq. In contrast, emissions increased significantly in Czechia (+0.18 Mt CO2 eq.). All other emission changes where less than ±0.5 Mt CO2 eq.

Emissions from '2.G Other Product Manufacture and Use' increased slightly for whole EU (+0.8 Mt CO2 eq. or +6.9 %). Emission changes of all other Member States are less than ±0.1 Mt CO2 eq.

The decrease of emissions from '2.H Other' is almost irrelevant by absolute terms (−0.8 Mt CO2 eq.) but significant in relative terms (−77.5 %).

2.2.3 Agriculture

Agriculture (excluding LULUCF) contributes to 10 % of European GHG emissions. Emissions from agriculture decreased by 3.3 Mt CO2 eq. or 0.7 % since 2017. 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 decrease in agriculture sector emissions is largely due to decreased emissions from soils and enteric fermentation. Liming, which contributes to about 6 % of agricultural emissions, saw a small increase.

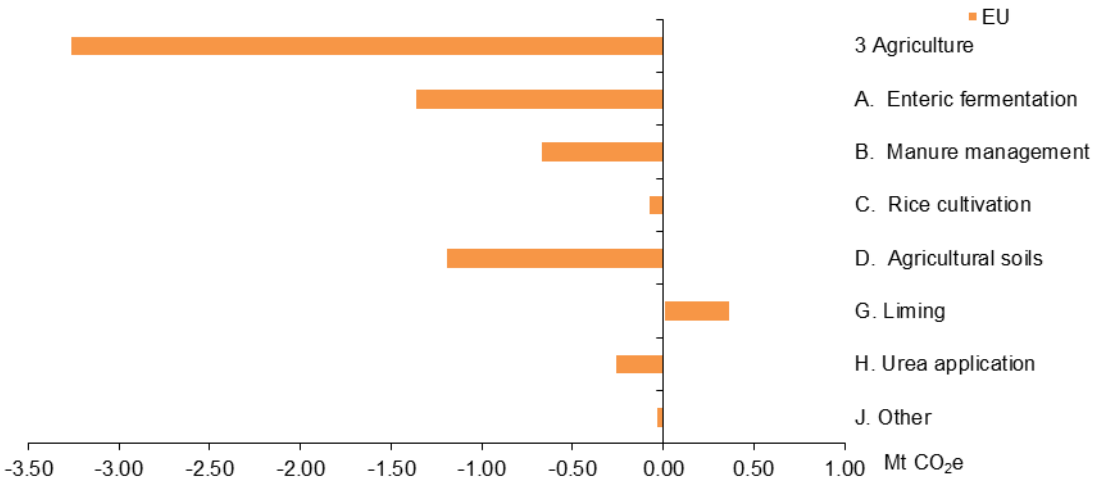
Table 8 and Figure 9 show the sub-sector 2016-2017 change, with CH_4 and N_2O emissions shown as CO_2 equivalents (Mt CO2 eq.).

Table 8 Agriculture sector emissions, change 2017-2018

Change 2016 / 2017, EU 28	Mt CO2 eq.	%
3 Agriculture	-3.3	-0.7 %
A. Enteric fermentation	-1.4	-0.7 %
B. Manure management	-0.7	-1.0 %
C. Rice cultivation	-0.1	-3.2 %
D. Agricultural soils	-1.2	-0.7 %
E. Prescribed burning of savannas	-	-
F. Field burning of agricultural residues	0.0	0.2 %
G. Liming	0.4	6.7 %
H. Urea application	-0.3	-5.9 %
I. Other carbon-containing fertilizers	0.0	-3.8 %
J. Other	0.0	-2.4 %

Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

Figure 9 Agriculture sector emissions, EU 28, change 2017-2018



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: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

Emissions from Enteric Fermentation decreased with an overall decrease of 1.4 Mt CO2 eq. or 0.7 %. The largest absolute and relative decreases were in Germany and the United Kingdom (-0.6 Mt CO2 eq. or -2.4 %, -2.9 %), Netherlands (-0.4 CO_2 eq. or -4.6 %).

Emissions of CH_4 and N_2O from manure management contribute to about 15 % of agriculture sector and have decreased by 0.7Mt CO2 eq. or -1.0 %. The largest increase was in Spain (0.2 Mt CO2 eq. or 3.0 %) and the largest decrease was in Czechia (-0.2 Mt CO2 eq. or -28.9 %).

Agricultural soils contribute to about 37 % of the emissions from agriculture and show a marked decrease on 2018 (-1.2 Mt CO2 eq., -0.7 %). The largest increases were seen in Poland (0.2 Mt CO2 eq. or 1.6 %), Czechia (0.4 Mt CO2 eq. or 12.7 %), the United Kingdom (0.5 Mt CO2 eq. or 4.1 %) and Ireland (0.2 Mt CO2 eq. or 3.6 %). The largest decrease was in Germany (-1.7 Mt CO2 eq. or -6.6 %).

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 −2.8 Mt CO2 eq. compared to 2017. Table 9 and Figure 10 show the sub-sector contributions to this trend in emissions.

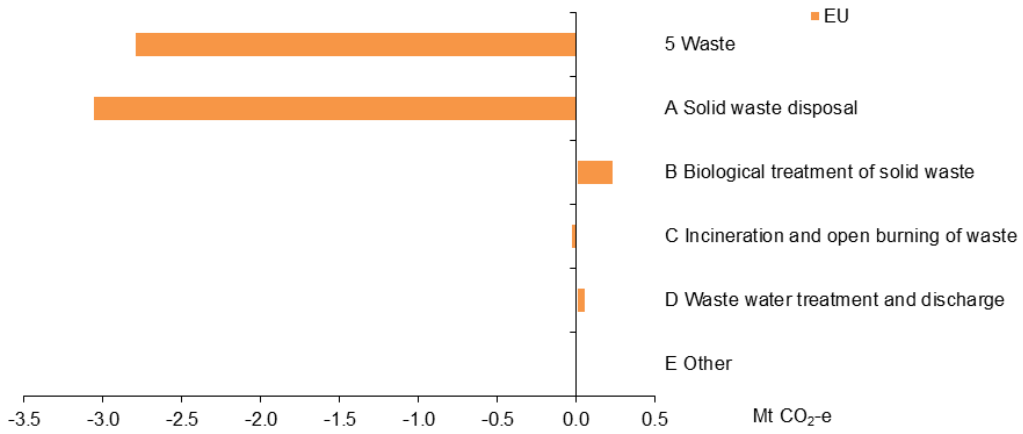
Table 9 Waste sector emissions, change 2017-2018

Change 2016 / 2017, EU 28	Mt CO2 eq.	%
5 Waste	-2.8	-2.0 %
A Solid Waste Disposal	-3.1	-3.0 %
B Biological Treatment of Solid Waste	0.2	3.2 %

C Incineration and Open burning of Waste	0.0	-0.9 %
D Waste Water Treatment and Discharge	0.1	0.4 %
E Other	0.0	-1.3 %

Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017 and proxy estimates for 2018.

Figure 10 Waste sector emissions, EU 28, change 2017-2018



Source: EEA, based on the 2019 Member States' GHG inventories submitted to the UNFCCC for 1990-2017 and proxy estimates for 2018.

In most Member States there was very little change in emissions from waste. In nineteen Member States the increase or decrease was less than 1 Mt CO2 eq. The largest decrease of waste emissions was in Italy (−0.8 Mt CO2 eq.), followed by Germany (−0.5 Mt CO2 eq.).

The trends of 5.A Solid Waste emissions dominate the waste sector. Fifteen Member States decreased emissions from solid waste (largest decrease in Italy with −0.9 Mt CO2 eq.) while four Member States had increase in emissions (largest one Croatia with +58 kt CO_2 eq.) and the rest has negligible difference. For the remaining Member States constant emissions were estimated.

2.3 ETS versus ESD emissions

Within the European Union there are two policy instruments for achieving the GHG emission reductions: One part is covered by the EU Emissions Trading System (ETS) while the other is the Effort Sharing Decision (ESD). ESD emissions are calculated by deducting ETS emissions, CO_2 emissions from domestic aviation and NF_3 emissions from total emissions including indirect CO_2 emissions, see Equation 1. LULUCF is excluded from ESD emissions.

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 included in the ETS
$E_{1A3a,CO2}$	CO_2 emissions from domestic aviation
E_{NF3}	NF_3 emissions

Table 10 shows total, ETS and ESD emissions per country. ETS emissions are taken from the EEA ETS data viewer (European Union Emissions Trading System data viewer, 04 July 2019) for stationary installations, ESD emissions are calculated as described in the formula above. Relative changes in emissions between the years 2017 and 2018 can be seen on the right.

Table 10 Total, ETS and ESD emissions 2017 and 2018, kt CO_2 eq.

	2017 GHG emissions			2018 GHG emissions			Change 2018 versus 2017						
	Total	ETS	ESD	Total	ETS	ESD	Total	ETS	ESD	Total	ETS	Non-ETS	ESD
AT	82 261	30 555	51 652	79 103	28 402	50 648	-3 158	-2 153	-1 004	-3.8%	-7.0%	-1.9%	-1.9%
BE	114 540	43 773	70 755	115 568	44 183	71 374	1 028	410	619	0.9%	0.9%	0.9%	0.9%
BG	61 367	34 908	26 397	57 854	31 028	26 764	-3 513	-3 880	367	-5.7%	-11.1%	1.4%	1.4%
CY	8 945	4 673	4 272	8 773	4 586	4 187	-172	-87	-85	-1.9%	-1.9%	-2.0%	-2.0%
CZ	129 384	66 976	62 395	131 036	66 913	64 109	1 652	-62	1 714	1.3%	-0.1%	2.7%	2.7%
DE	906 611	437 679	466 876	865 567	422 293	441 218	-41 044	-15 386	-25 659	-4.5%	-3.5%	-5.5%	-5.5%
DK	47 892	15 063	32 693	47 525	14 948	32 440	-367	-114	-253	-0.8%	-0.8%	-0.8%	-0.8%
EE	20 880	14 671	6 205	20 194	13 854	6 337	-686	-817	132	-3.3%	-5.6%	2.1%	2.1%
ES	340 231	136 319	201 107	332 842	127 374	202 663	-7 389	-8 945	1 556	-2.2%	-6.6%	0.8%	0.8%
FI	55 387	25 131	30 062	56 461	26 223	30 043	1 074	1 093	-19	1.9%	4.3%	-0.1%	-0.1%
FR	464 593	106 842	352 808	445 274	97 264	343 067	-19 319	-9 578	-9 741	-4.2%	-9.0%	-2.7%	-2.8%
GR	95 421	49 572	45 445	92 393	47 106	44 884	-3 028	-2 466	-562	-3.2%	-5.0%	-1.2%	-1.2%
HR	25 020	8 368	16 621	24 688	7 445	17 212	-331	-923	592	-1.3%	-11.0%	3.6%	3.6%
HU	63 788	20 642	43 142	63 388	20 054	43 330	-400	-588	188	-0.6%	-2.8%	0.4%	0.4%
IE	60 744	16 897	43 829	60 906	15 515	45 372	162	-1 381	1 543	0.3%	-8.2%	3.5%	3.5%
IT	427 708	155 332	270 132	423 478	146 481	274 753	-4 230	-8 850	4 621	-1.0%	-5.7%	1.7%	1.7%
LT	20 417	6 283	14 132	20 093	5 953	14 139	-324	-330	6	-1.6%	-5.3%	0.0%	0.0%
LU	10 236	1 492	8 743	10 561	1 469	9 091	325	-23	348	3.2%	-1.6%	4.0%	4.0%
LV	11 325	2 050	9 271	11 800	2 613	9 183	475	563	-88	4.2%	27.5%	-0.9%	-0.9%
MT	2 152	724	1 427	2 171	698	1 472	19	-26	45	0.9%	-3.6%	3.2%	3.2%
NL	193 713	91 390	102 290	189 244	87 414	101 797	-4 469	-3 976	-493	-2.3%	-4.4%	-0.5%	-0.5%
PL	413 781	202 167	211 482	418 088	199 973	217 982	4 306	-2 194	6 500	1.0%	-1.1%	3.1%	3.1%
PT	70 737	30 076	40 159	67 505	26 252	40 752	-3 231	-3 824	593	-4.6%	-12.7%	1.5%	1.5%
RO	113 796	40 617	73 031	114 038	39 624	74 266	242	-994	1 235	0.2%	-2.4%	1.7%	1.7%
SE	52 660	19 648	32 468	53 084	19 847	32 693	424	199	225	0.8%	1.0%	0.7%	0.7%
SI	17 453	6 570	10 882	17 473	6 492	10 980	20	-78	98	0.1%	-1.2%	0.9%	0.9%
SK	43 316	22 063	21 250	44 121	22 193	21 924	805	130	675	1.9%	0.6%	3.2%	3.2%
UK	470 509	136 877	332 021	459 856	128 845	329 400	-10 653	-8 033	-2 620	-2.3%	-5.9%	-0.8%	-0.8%
EU28	**4 324 868**	1 727 358	**2 581 547**	**4 233 085**	1 655 042	**2 562 081**	**-91 783**	**-72 316**	**-19 466**	**-2.1%**	**-4.2%**	**-0.7%**	**-0.8%**

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

Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017, proxy estimates for 2018 totals. ETS data is from EUTL (verified emissions for 2017 and 2018, not from the Member States proxies).

In total, emissions changed by -2.1 % within the EU between 2017 and 2018. They decreased in the ETS sector and in the ESD sector but the decrease in the ESD sector (-0.8 %) is less significant than in the ETS sector (-4.2 %). Figure 11 illustrates all emission trend changes.

In absolute terms, the total emission decrease in the EU was -91.8 Mt CO2 eq. Of this decrease -19.5 Mt CO2 eq. occurred in the ESD sector and -72.3 Mt CO2 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 five Member States (Belgium, Finland, Latvia, Sweden, and Slovakia). By absolute amounts the largest increase occurred in Finland (+1.1 Mt CO2 eq.) followed by Latvia (0.6 Mt CO2 eq.). The largest relative increase of ETS emissions was in Latvia (+27.5 %) followed by Finland (+4.3 %).

In 23 EU Member States ETS emissions decreased. The largest absolute decrease was experienced in Germany (−15.4 Mt CO2 eq.) followed by France (−9.6 Mt CO2 eq.), Spain (−8.9 Mt CO2 eq.) and Italy and the United Kingdom (−8.8 Mt CO2 eq. and 8.0 Mt CO2 eq.). Portugal saw the highest relative ETS emission decrease (−12.7 %).

Also ESD emissions increased in eighteen Member States (Belgium, Bulgaria, Croatia, Czechia, Estonia, Hungary, Lithuania, Italy, Ireland, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden). The largest absolute increase can be observed in Poland (+6.5 Mt CO2 eq.) and Italy (+4.6 Mt CO2 eq.). The largest relative increase was in Luxembourg (+4.0 %), the second largest was in Ireland (+3.5 %) and Croatia (+3.6 %).

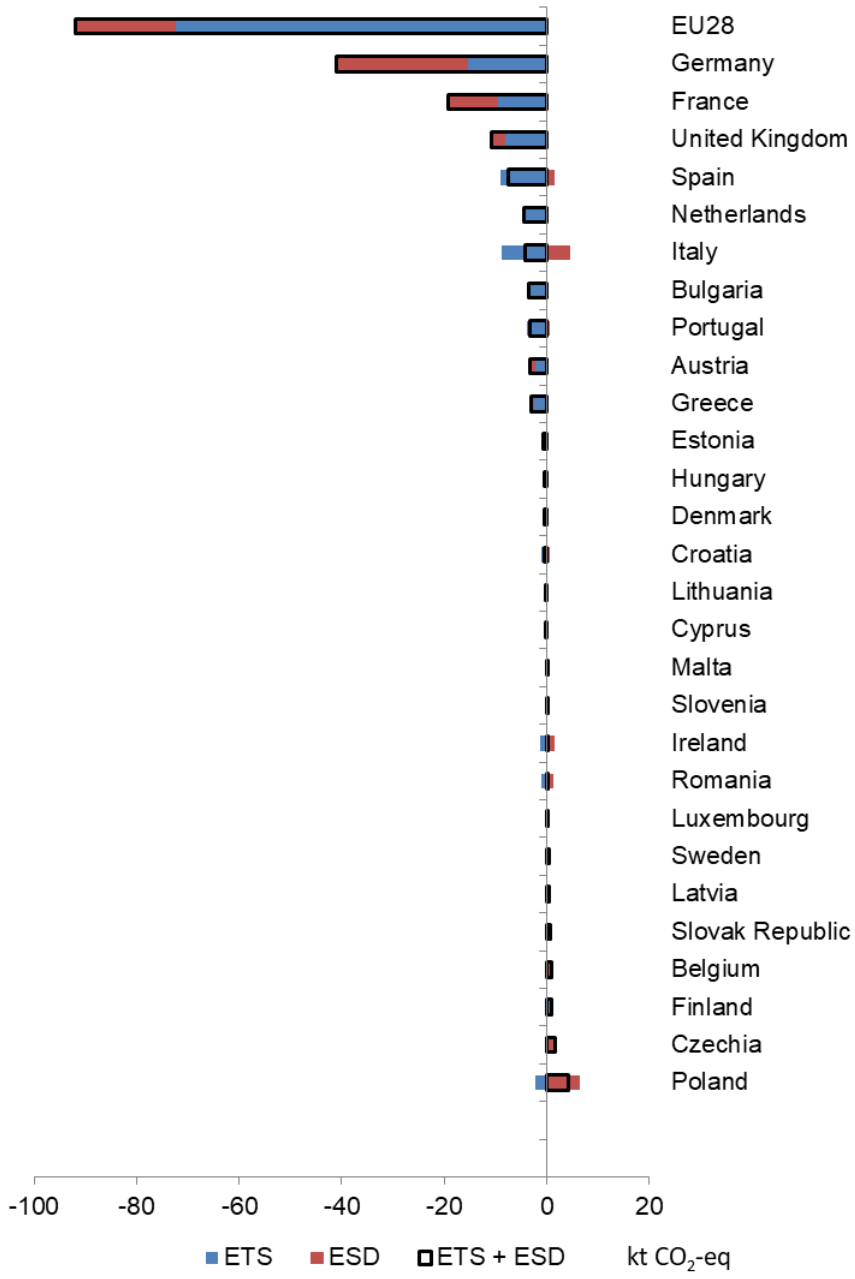
Ten Member States saw decreases in ESD emissions. The largest absolute ESD emission declines were in Germany (−25.7 Mt CO2 eq.) followed by the United Kingdom (−2.6 Mt CO2 eq.) and France (−9.7 Mt CO2 eq.). The largest relative decrease of ESD emissions was in Germany (−5.5 %) followed by Cyprus (-4.0 %).

Increases of both ETS and ESD emissions can hence be seen for Belgium, Sweden and Slovakia. On the other hand, there are eight Member States which had decreases in both ETS and ESD emissions: Austria, Cyprus, Germany, Denmark, France, Greece, Netherlands and the United Kingdom.

In Bulgaria, Czechia, Estonia, Spain, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania and Slovenia emissions in the ETS sector decreased while emissions in the ESD sector increased. A contrasting development can be observed only by two Member States: Finland, Latvia, 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 0. Especially the strong increase of the ESD emissions is consistent with the strong emission increase in the transport sector.

Figure 11 ETS and ESD emissions, change 2017-2018



Source: EEA, based on the 2019 Member States' GHG inventories submitted to UNFCCC for the years 1990-2017, proxy estimates for 2018 totals. ETS data is from EUTL (verified emissions for 2017 and 2018, not from the Member States proxies).

3. Robustness of the EU proxy inventory

The approximated EU GHG inventory for the year 2017, published in 2018, underestimated the final EU GHG emissions by 8.2 Mt CO2 eq. or 0.2 %.

The effect of Member States' recalculations of GHG estimates and methodological improvements dominate the differences of the 2017 proxy emission estimates compared to 2017 emissions officially reported in 2019. After taking these recalculations into account difference between the proxy GHG inventory for 2016 and final GHG inventory submission was only 0.1 % for total emissions (including indirect CO_2, excluding LULUCF) for the EU.

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 Guidelines (IPCC, 2006) 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.

3.1 Difference between MS proxy and final GHG inventories

The proxy submissions by Member States closely mirrored the slight increase 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/CME 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 2017 between proxy and final GHG inventories

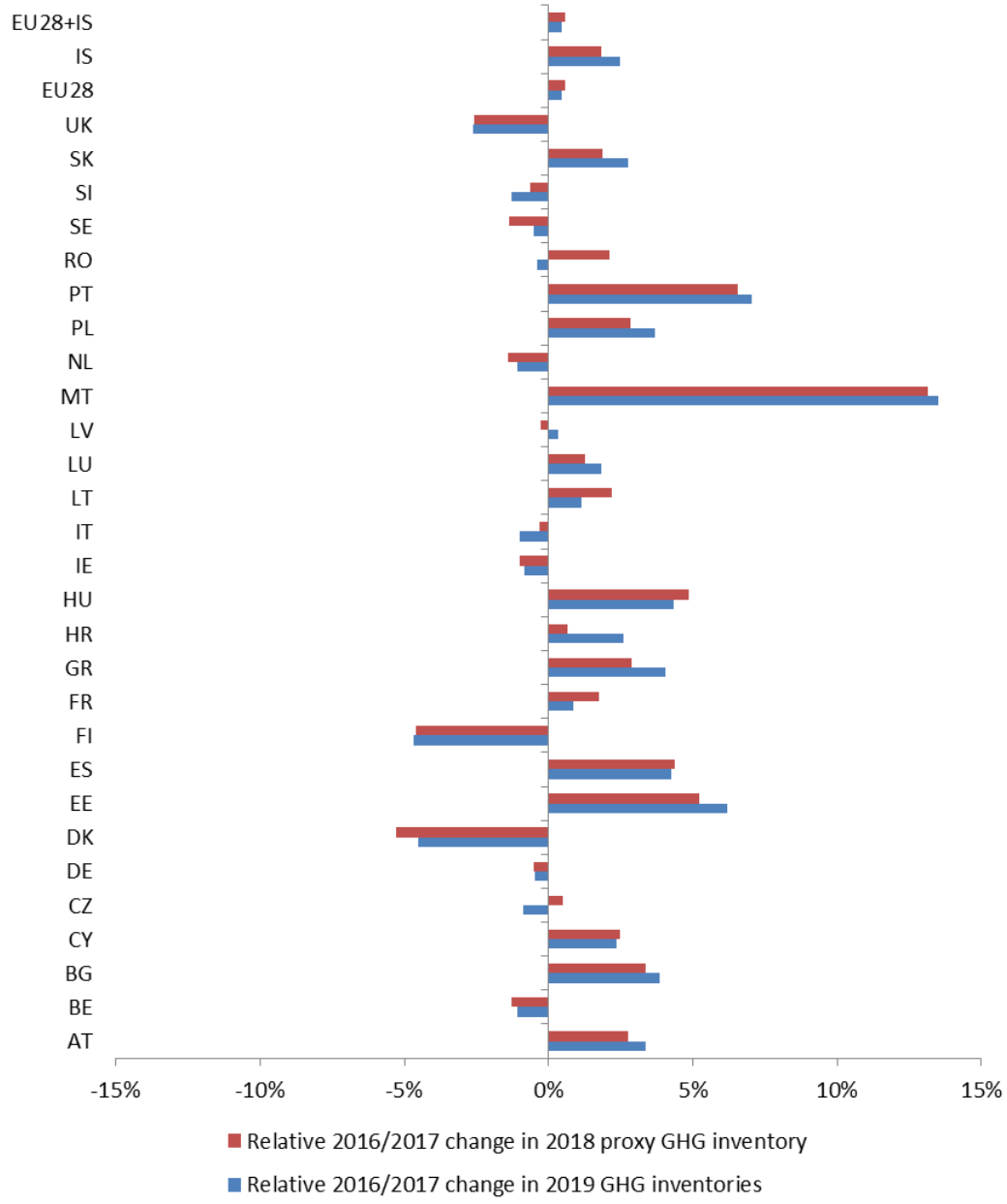
MS	Inventory 2017 (Submission 2019)	Proxy 2017 (Submission 2018)	Deviation 2017		Recalcu-lations	Deviation 2017 cleared of impact of recalculations	Proxy calculated by
	kt CO2eq			%			
AT	82 261	81 884	-378	-0.5%	-0.1%	-0.6%	MS
BE	114 540	116 210	1 670	1.5%	-1.7%	-0.2%	MS
BG	61 367	61 049	-318	-0.5%	0.0%	-0.5%	ETC/CME
CY	8 945	8 990	45	0.5%	-0.4%	0.1%	ETC/CME
CZ	129 384	130 968	1 584	1.2%	0.1%	1.3%	MS
DE	906 611	904 745	-1 867	-0.2%	0.2%	0.0%	MS
DK	47 892	47 812	-81	-0.2%	-0.6%	-0.8%	MS
EE	20 880	20 649	-231	-1.1%	0.2%	-0.9%	MS
ES	340 231	338 860	-1 371	-0.4%	0.5%	0.1%	MS
FI	55 387	56 078	691	1.2%	-1.2%	0.1%	MS
FR	464 593	466 164	1 571	0.3%	0.5%	0.9%	MS
GR	95 421	94 233	-1 187	-1.2%	0.1%	-1.1%	MS
HR	25 020	24 459	-561	-2.2%	0.3%	-1.9%	MS
HU	63 788	64 438	651	1.0%	-0.5%	0.5%	MS
IE	60 744	60 937	193	0.3%	-0.4%	-0.1%	MS
IT	427 708	426 436	-1 272	-0.3%	1.0%	0.7%	MS
LT	20 417	20 524	106	0.5%	0.5%	1.0%	MS
LU	10 236	10 156	-80	-0.8%	0.2%	-0.5%	MS
LV	11 325	11 275	-50	-0.4%	-0.2%	-0.6%	MS
MT	2 152	2 161	9	0.4%	-0.7%	-0.3%	MS
NL	193 713	192 475	-1 238	-0.6%	0.3%	-0.3%	MS
PL	413 781	407 036	-6 746	-1.6%	0.8%	-0.8%	MS
PT	70 737	72 211	1 474	2.1%	-2.5%	-0.4%	MS
RO	113 796	114 897	1 101	1.0%	1.5%	2.5%	ETC/CME
SE	52 660	52 170	-490	-0.9%	0.1%	-0.8%	MS
SI	17 453	17 605	152	0.9%	-0.2%	0.7%	MS
SK	43 316	41 807	-1 509	-3.5%	2.7%	-0.8%	MS
UK	470 509	470 432	-77	0.0%	0.1%	0.1%	MS
EU28	4 324 868	4 316 659	-8 209	-0.2%	0.3%	0.1%	ETC/CME
IS	4 755	4 755	0	0.0%	-0.6%	-0.6%	MS
EU28+IS	4 329 623	4 321 414	-8 209	-0.2%	0.3%	0.1%	ETC/CME

Source: Member States submissions to UNFCCC and proxy estimates for 2017.

The largest deviations in relative terms occurred for Slovakia (proxy 3.5 % lower), followed by Croatia (proxy 2.2 % lower), and Portugal (proxy 2.1 % higher). In absolute terms the deviations were highest for Poland (underestimate by proxy of 6.7 Mt CO2 eq.), Slovakia (underestimate by 1.5 Mt CO2 eq.), Belgium (overestimate of proxy by 1.6 Mt CO2 eq.), Germany (underestimate by proxy of 1.8 Mt CO2 eq.) and France (overestimate by proxy of 1.6 Mt CO2 eq.). By comparing the percentage changes in emission levels 2016/2017 as derived from the 2018 proxy GHG inventory on the one hand and from the 2019 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 Romania, Latvia and Czechia. Both Czechia and Romania had emission increases estimated in their proxies while the emissions decreased in the final inventories. For Latvia both the emission changes in the proxy and in the final inventory were quite small. Iceland estimated emissions to stay constant in its proxy while emissions increased in the final inventory.

After taking into account recalculations, the relative differences were largest for Romania (+2.5 %), Croatia (-2.0 %) and Czechia (+1.3 %).

Figure 12 Relative difference between proxy and submitted inventories by Member State 2016/2017



Source: Member States submissions to UNFCCC and proxy estimates for 2017.

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' (+13.1 Mt CO2 eq.) and '1.A.2 Manufacturing industries and construction' (−17 Mt CO2 eq.). The next largest differences were in '1.A.4 Other sectors' (+7.6 Mt CO2 eq.), sector 5.A Solid waste disposal (−3.5 Mt CO2 eq.), 3.D Agricultural soils (-3.8 Mt CO2 eq.) and 2.F Product uses as ODS substitutes (+3.6 Mt CO2 eq.). After accounting for recalculation effects, the differences for most of these sectors are significantly smaller. Sectors with highest relative deviation after allowing for recalculation

effects were 2.H Other [IPPU] (+76.9 %), 3.F Field burning of agricultural residues (+20.6 %), 1.A.5 Other [Energy] (-16.3 %) and 5.E Other [Waste] (-12 %), 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 2017 between proxy and final GHG inventories

Sector	Inventory 2017 (Submission 2019)	Proxy 2017 (Submission 2018)	Deviation 2017		Recalcu-lations	Deviation 2017 cleared of impact of recalculations
	kt CO2eq			%		
Total incl. indirect CO2 excl. LULUCF	4 329 623	4 321 414	-8 209	-0.2%	0.3%	0.1%
1 Energy	3 369 732	3 370 147	415	0.0%	0.2%	0.2%
1.A Fuel combustion	3 283 347	3 286 109	2 763	0.1%	0.2%	0.2%
1.A.1 Energy industries	1 179 306	1 192 453	13 148	1.1%	0.2%	1.3%
1.A.2 Manufacturing industries	500 017	483 059	-16 958	-3.4%	2.0%	-1.3%
1.A.3 Transport	946 902	946 849	-52	0.0%	0.1%	0.1%
1.A.4 Other sectors	650 358	657 939	7 581	1.2%	-1.2%	-0.1%
1.A.5 Other	6 765	5 809	-956	-14.1%	-2.2%	-16.3%
1.B Fugitive emissions	86 385	84 037	-2 348	-2.7%	1.6%	-1.2%
2 Industrial processes & product use	379 518	381 171	1 653	0.4%	-0.2%	0.2%
2.A Mineral products	110 752	110 512	-239	-0.2%	-0.1%	-0.3%
2.B Chemical industry	66 153	64 558	-1 595	-2.4%	1.3%	-1.1%
2.C Metal production	74 188	74 484	296	0.4%	1.9%	2.3%
2.D Non-energy products	10 122	10 183	62	0.6%	-2.8%	-2.2%
2.E Electronic Industry	649	803	154	23.7%	-20.4%	3.3%
2.F Product uses as ODS substitutes	105 522	109 162	3 640	3.4%	-2.5%	1.0%
2.G Other product manufacture and use	11 138	11 138	0	0.0%	-1.9%	-1.9%
2.H Other	995	331	-664	-66.8%	143.7%	76.9%
3 Agriculture	439 572	432 325	-7 247	-1.6%	1.1%	-0.5%
3.A Enteric fermentation	195 231	191 837	-3 394	-1.7%	1.9%	0.1%
3.B Manure management	64 493	64 329	-164	-0.3%	-0.2%	-0.5%
3.C Rice cultivation	2 671	2 578	-94	-3.5%	4.2%	0.7%
3.D Agricultural soils	164 482	160 598	-3 884	-2.4%	0.8%	-1.6%
3.F Field burning of agricultural residues	700	863	163	23.2%	-2.6%	20.6%
3.G Liming	5 538	5 534	-4	-0.1%	-0.3%	-0.4%
3.H Urea application	4 515	4 670	155	3.4%	0.2%	3.7%
3.I Other carbon-containing fertilizers	318	318	0	0.1%	0.0%	0.1%
3.J Other	1 625	1 598	-27	-1.6%	-1.5%	-3.1%
5 Waste	139 096	136 283	-2 813	-2.0%	1.2%	-0.9%
5.A Solid waste disposal	100 907	97 332	-3 575	-3.5%	2.3%	-1.3%
5.B Biological treatment of solid waste	7 490	7 511	22	0.3%	0.7%	1.0%
5.C Incineration & open burning of waste	3 595	4 250	655	18.2%	-17.7%	0.5%
5.D Waste water treatment & discharge	27 013	27 094	81	0.3%	0.3%	0.6%
5.E Other	92	96	4	4.3%	-16.3%	-12.0%
Indirect CO2	1 705	1 488	-217	-12.7%	15.2%	2.5%

Source: Member States submissions to UNFCCC and proxy estimates for 2017.

In the Energy sector, deviations after recalculation are very small. They are highest for 1.A.5 Other (-16.3 %) and within ±1 % for all other energy combustion sectors. For 1.B Fugitive emissions deviations after recalculations are -1.2 %.

In Sector 2 (Industrial processes & product use) there were considerable recalculations for some subsectors. The largest relative deviations occurred in 2.H Other (-66.8 %). This is also the subsector with the largest recalculation effect. The largest absolute difference was in subsector 2.F Product use as ODS substitutes (+3.6 Mt CO2 eq. or +3.4 %) followed by 2.B Chemical industry (−1.5 Mt CO2 eq. resp. −2.3 %). 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 (−0.5 %) after allowing for recalculations. The largest absolute deviations were in 3.D Agricultural soils (-3.8 Mt CO2 eq. resp. -2.4 %) and 3.A Enteric fermentation (-3.4 Mt CO2 eq. resp. -1.7 %). After considering

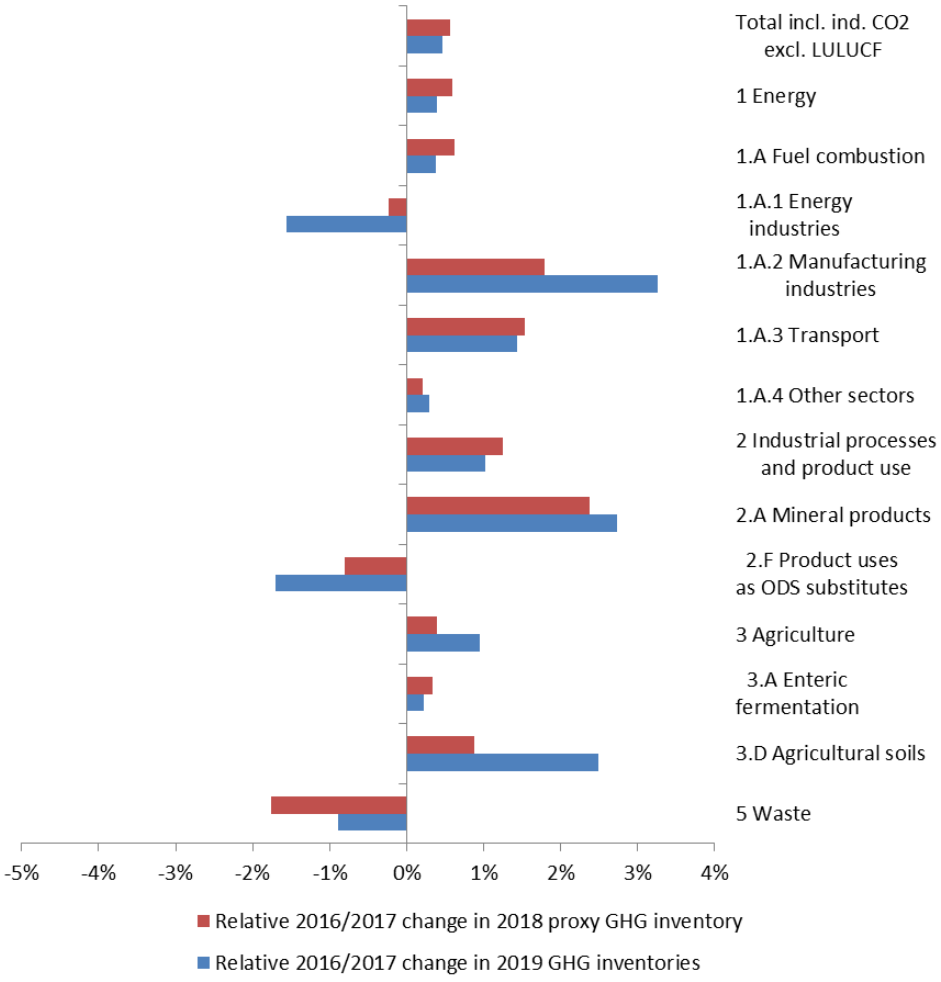
recalculation effects the deviation for subsector 3.A Enteric fermentation was reduced to only 0.1 % and 3.D Agricultural soils to -1.6 %.

The waste sector has the largest deviations even after taking recalculations effects into account: Emissions in the waste sector were still underestimated by 0.9 %. The largest absolute deviation was found in subsector 5.A Solid waste disposal (-3.6 Mt CO2 eq. or -3.5 %). The emission of these sector dominate the total waste sector emissions and even after considering recalculations the deviation of 5.A emissions were still underestimated (-1.3 %). The deviations of all other waste subsectors are less than 0.7 Mt CO2 eq.

The differences for estimates for indirect CO_2 are significant (-12.7 % before and 2.5 % after considering recalculation effects). However the absolute amounts of indirect CO_2 emissions have only a very small share in total EU emissions.

By comparing the percentage changes in emission levels 2016/2017 as derived from the 2017 proxy GHG inventory on the one hand and from the 2019 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 CO2 eq., see Figure 13. Also the direction of the emission trend (increasing or decreasing) was estimated correctly.

Figure 13 Relative difference between proxy and submitted inventories by sector 2016/2017



Note: Only sectors with GHG emissions of more than 100 Mt CO2 eq. in 2017 are shown.

Source: Member States submissions to UNFCCC and proxy estimates for 2017

4. Methodologies and data sources at Member State level

4.1 Description of different approaches

This report presents the estimated GHG emissions for 2018 based on Member State emissions estimates, submitted to EEA by 31 July. The aggregated EU 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 the whole EU. Therefore these were gap-filled this year by ETC/CME 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 0.

4.2 MS proxies submitted under the EEA MMR

Member States are responsible for the methodological choice regarding their own estimates. The MS 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/CME 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[8];
- The percentage change in CO_2 emissions in energy use between 2018 and 2017 in the EU from Eurostat newsrelease 81/2019, 8 May 2019.

Early estimates of CO_2 emissions from energy use are computed by Eurostat based on monthly energy statistics and using a harmonised methodology. These data may slightly differ from those published nationally. (Eurostat newsrelease, 2019)

Based on these data sources, 2019 emission estimates for year 2018 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
  - 1.B Fugitive emissions from fuels
    - 1. Solid fuels
    - 2. Oil and natural gas
- 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 04 July 2019 was used
Eurostat newsrelease 81/2019	early May
GHG inventory data from CRF files (via UNFCCC)	early June

Source: EEA's ETC/ACM, ETC/CME

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

8 European Union Emissions Trading System data viewer, 04 July 2019 https://www.eea.europa.eu/data-and-maps/dashboards/emissions-trading-viewer-1

improvement to inventory estimates. Through the quantification of uncertainty 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 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/CME, as the 2019 estimates for the 2018 proxy inventory were based on the national methodologies used for 2019 inventory submissions (covering emissions until 2017). Thus, revised methodologies and parameters at Member States level can result in differences between the final inventory and the proxy inventory.

4.3.1 CO2 Energy emissions from 1.Energy subsectors

For the proxy year estimation, the previous year CO_2 value from each 1.Energy subsector from summarytable2 was multiplied by the percentage change of CO_2 emissions from energy use between the proxy year and the previous year.

$$E_{1,GHG}^{Y-1} = E_{1,GHG}^{Y-2} \cdot \left(\frac{E_{1,GHG}^{Y-1}}{E_{1,GHG}^{Y-2}}\%\right)$$

With:

$E_{1,GHG}^{Y-1}$	Emission of CO_2 in source category 1. sub sector in the proxy year
$E_{1,GHG}^{Y-2}$	Emission of CO_2 in source category 1. sub sector in the previous year
$\left(\frac{E_{1,GHG}^{Y-1}}{E_{1,GHG}^{Y-2}}\%\right)$	Change in energy use between the previous year and the proxy year. The value is from Eurostat. (Eurostat newsrelease, 2019)

Source: EEA's ETC/ACM, ETC/CME

4.3.2 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 2

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

With:

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

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 14 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, ETC/CME

4.3.3 Other emissions

For the source categories not mentioned before the emission values from previous year (2017) were used as proxy estimates for the year 2018. 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 CO_2 eq., including indirect CO_2, 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[9]) can appear in the following source categories of industrial processes and product use:

9 F-gas emissions include emission of the following gases or groups of gases: hydrofluorocarbons = HFCs; perfluorocarbons = PFCs; sulphur hexafluoride = SF6; nitrogen triflouride =NF3.

- 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 2018 contains GHG estimates for source category 1.A (Fuel Combustion), but not sub sector totals, which were added by summing CO_2, CH4 and N2O. There are no LULUCF emissions reported.

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 for the individual gases. 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 at sector level, 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 2017 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.

4.4.6 United Kingdom

In United Kingdom's Summary2 proxy for 2018 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 2018 was split into the subcategories using shares based on the subsector to sector ratios of UK's 2017 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 2017 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. List of 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
ETC/CME	European Topic Centre for Climate change Mitigation and Energy
ETS	Emissions Trading System
EU	European Union
EU-28	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, 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 + IS	The EU plus Iceland. 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	Million tonnes
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
BE	Belgium
BG	Bulgaria
CH	Switzerland
CY	Cyprus
CZ	Czechia
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GR	Greece
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
IS	Iceland
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
NO	Norway
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
UK	United Kingdom

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- Monthly data on gross inland deliveries (calculated) of solid fuels (data set nrg_101m, indicator code B_100500);
- 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);
- Monthly data on electricity (data set nrg_105m)
- Cooling and heating degree days by country - annual data [nrg_chdd_a]

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Annex I. Detailed results at national level

Country	Compiled by	Submission date
Austria	Member State	25 July 2019
Belgium	Member State	31 July 2019
Bulgaria	EEA, ETC/CME	
Croatia	Member State	30 July 2019
Cyprus	EEA, ETC/CME	
Czechia	Member State	22 July 2019
Denmark	Member State	05 July 2019
Estonia	Member State	31 July 2019
Finland	Member State	06 June 2019
France	Member State	20 July 2019
Germany	Member State	29 July 2019
Greece	Member State	25 July 2019
Hungary	Member State	31 July 2019
Iceland	Country	26 July 2019
Ireland	Member State	5 July 2019
Italy	Member State	24 July 2019
Latvia	Member State	25 July 2019
Lithuania	Member State	31 July 2019
Luxembourg	Member State	23 July 2019
Malta	Member State	24 July 2019
Netherlands	Member State	11 July 2019
Norway	Country	23 August 2019
Poland	Member State	24 July 2019
Portugal	Member State	31 July 2019
Romania	EEA, ETC/CME	
Slovakia	Member State	15 July 2019
Slovenia	Member State	15 July 2019
Spain	Member State	14 June 2019
Sweden	Member State	31 July 2019
Switzerland	Country	11 July 2019
United Kingdom	Member State	30 July 2019

Source: EEA's ETC/CME

6.1 Austria (national submission)

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

Year 2018
Submission 2019
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]	67 237.29	6 498.22	3 436.42	1 485.33	45.38	390.07	NO,NA	10.41	79 103.12		
1. Energy	53 679.63	624.25	588.02						54 891.90	**15 144.84**	**39 747.06**
A. Fuel combustion (sectoral approach)	53 541.38	335.42	588.02						54 464.82	15 144.84	**39 319.98**
1. Energy industries	10 400.81	26.09	103.30						10 530.20	8 419.86	**2 110.34**
2. Manufacturing industries and construction	10 596.65	22.16	130.11						10 748.92	6 138.35	**4 610.57**
3. Transport	24 192.42	10.56	210.94						24 413.92	586.64	**23 827.28**
4. Other sectors	8 301.27	276.57	142.69						8 720.54		**8 720.54**
5. Other	50.23	0.04	0.98						51.25		**51.25**
B. Fugitive emissions from fuels	138.25	288.83	0.00						427.08		**427.08**
1. Solid fuels	NO,IE,NA	NO,IE,NA	NO,IE,NA						0.00		**0.00**
2. Oil and natural gas	138.25	288.83	NO,IE,NA						427.08		**427.08**
C. CO_2 transport and storage	NO								0.00		**0.00**
2. Industrial processes and product use	13 440.72	46.51	169.95	1 485.33	45.38	390.07	NA	10.41	15 588.37	**13 257.19**	**2 331.19**
A. Mineral industry	2 921.80								2 921.80	2 921.80	**0.00**
B. Chemical industry	568.67	46.51	38.57	NA	NA	NA	NA	NA	653.74	557.94	**95.81**
C. Metal industry	9 802.04	NO,IE,NA	NO		0.00	4.46	NA		9 806.51	9 777.44	**29.06**
D. Non-energy products from fuels and solvent use	148.21	NA	NA						148.21		**148.21**
E. Electronic Industry				4.09	45.38	35.25	NA	10.41	95.13		**95.13**
F. Product uses as ODS substitutes				1 481.24	NO,IE		NO		1 481.24		**1 481.24**
G. Other product manufacture and use	NO,NA	NO,NA	131.38	NO	NO	350.36	NO		481.74		**481.74**
H. Other	NA	NA	NA				NO		NA		**0.00**
3. Agriculture	114.88	4 678.50	2 413.86						7 207.24		
A. Enteric fermentation		4 124.99							4 124.99		
B. Manure management		552.97	450.90						1 003.86		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NA	1 962.87						1 962.87		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		0.54	0.10						0.64		
G. Liming	83.78								83.78		
H. Urea application	31.10								31.10		
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		
H. Other	NE	NE	NE						NE		
5. Waste	2.06	1 148.96	264.58						1 415.60		
A. Solid waste disposal	NO,NA	1 045.27							1 045.27		
B. Biological treatment of solid waste		79.80	97.61						177.41		
C. Incineration and open burning of waste	2.06	0.00	0.01						2.07		
D. Waste water treatment and discharge		23.89	166.97						190.85		
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	2 486.49	0.40	22.86						2 509.75		
Aviation	2 428.48	0.37	18.42						2 447.27		
Navigation	58.01	0.03	4.44						62.48		
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											
Indirect N_2O											
Indirect CO_2[3]											
Total CO_2 equivalent emissions without land use, land-use change and forestry									79 103.12	28 402.03	50 701.09
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									79 103.12		
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
[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 2017-2018 in fuel consumption by type of fuel are:** Sales of transport diesel increased by 0.7% and gasoline by 2.4% (approx. +0.25 Mt of CO2 from diesel and gasoline). Sales of gasoil decreased by -10% (approx. -0.4 Mt of CO2) and residuel fuel oil consumption decreased by -21% (approx. -0.1 Mt of CO2) (https://www.wko.at/branchen/industrie/mineraloelindustrie/verbrauchsstatistik.html) Natural gas consumption (other than non energy use) decreased by 5% (approx. -0.9 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) decreased by -13% (approx -1.6 Mt CO2) due to an decrease in crude steel production (-15%). (https://www.worldsteel.org/steel-by-topic/statistics.html) **Agriculture:** Fertilizer Use: two-year mean value decreased by -1.9% (https://www.ama.at/Marktinformationen/Getreide-und-Olsaaten/Dungemittel) Animals numbers: total cattle decreased by -1.6% and milk cows decreased by -1.9 % while milk yield increased by +2.9%; swine number decreased by -1.5% (https://www.ama.at/Marktinformationen/Vieh-und-Fleisch/Produktion) **F-Gases:** 2018 emissions decrease due to new EU F-Gas Regulation

6.2 Belgium (national submission)

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS									Year		Proxy 2018	
(Sheet 1 of 1)									Submission		July 2019	
									Country		Belgium	
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)	**98286.68**	**7973.50**	**5983.07**	**2805.39**	**167.66**	**92.03**	**0.00**	**0.63**	**115308.95**			
1. Energy	**82351.30**	**1049.08**	**641.86**						**84042.25**		**27770.11**	**56272.14**
A. Fuel combustion (sectoral approach)	82230.05	492.49	641.86						83364.41		27649.35	55715.06
1. Energy industries	19898.30	30.19	169.53						20098.02		17723.71	2374.31
2. Manufacturing industries and construction	13603.73	40.40	84.83						13728.96		9759.26	3969.69
3. Transport	26 142.03	16.08	277.22						26435.33		85.30	26350.03
4. Other sectors	22479.64	405.66	109.19						22994.49		81.07	22913.42
5. Other	106.36	0.16	1.09						107.60			107.60
B. Fugitive emissions from fuels	121.25	556.60	0.00						677.84		120.76	557.08
1. Solid fuels	NO	42.03	NO,NA						42.03			42.03
2. Oil and natural gas and other emissions from energy production	121.25	514.57	NO,IE,NA						635.82		120.76	515.05
C. CO2 transport and storage	NO											
2. Industrial processes and product use	**15917.94005**	**23.10427**	**948.17**	**2 805.39**	**167.66**	**92.03**	**NO,NA**	**0.63**	**19954.91690**		**16069.25**	**3885.67**
A. Mineral industry	4437.43147								4437.43147		4436.82	0.61
B. Chemical industry	7109.56421	8.98	881.59799	0.02	155.21	NO,NA	NA	NA	8 155.37		7360.70	794.67
C. Metal industry	4232.77943	14.13	NO						4 246.91		4238.82	8.09
D. Non-energy products from fuels and solvent use	105.25395	NO,NA	NO,NA						105.25			105.25
E. Electronic Industry				1.28	10.83	5.61	NO	0.63	18.35			18.35
F. Product uses as ODS substitutes				2 804.09	1.62				2805.71			2805.71
G. Other product manufacture and use	NO	NO	66.57	NO	NO	86.42	NO	NO	152.99			152.99
H. Other	32.91100	NO,NA	NO,NA	NO	NO	NO	NO	NO	32.91100		32.91	0.00
3. Agriculture	**176.89**	**5 838.34**	**4 091.21**						**10106.44**			**10106.44**
A. Enteric fermentation		4 588.49							4588.49			4588.49
B. Manure management		1 249.85	671.02						1920.87			1920.87
C. Rice cultivation		NO							NO			NO
D. Agricultural soils		NA	3 420.19						3420.19			3420.19
E. Prescribed burning of savannahs		NO	NO						NO			NO
F. Field burning of agricultural residues		NO	NO						NO			NO
G. Liming	126.51								126.51			126.51
H. Urea application	50.38								50.38			50.38
I. Other carbon-containing fertilizers	NO								NO			NO
J. Other	NO	NO	NO						NO			NO
4. Land use, land-use change and forestry(1)	**-422.31**	**NO,NA**	**162.89**						**-259.42**			
A. Forest land	-1 538.97	NO	0.05						-1538.92			
B. Cropland	1 266.09	NO	107.51						1373.60			
C. Grassland	-663.52	NO	4.21						-659.31			
D. Wetlands	-9.66	NO,NA	0.07						-9.59			
E. Settlements	749.45	NO	51.06						800.51			
F. Other land	NO	NO	NO						NO			
G. Harvested wood products	-225.70								-225.70			
H. Other	NO	NO	NO						NO			
5. Waste	**262.85**	**1 062.97**	**138.94**						**1464.76**			
A. Solid waste disposal	NO,NA	857.24774							857.24774			857.25
B. Biological treatment of solid waste		23.96	36.55						60.51			60.51
C. Incineration and open burning of waste	262.84841	0.00	0.09						262.93959		243.32	19.62
D. Waste water treatment and discharge		181.77	102.29						284.06			
E. Other	NO	NO	NO						NO			
6. Other (as specified in summary 1.A)	**NO**	**NO**	**NO**						**NO**			
Memo items:(2)												
International bunkers	28361.04	4.08	194.94						28560.06			
Aviation	4802.97	0.81	38.97						4842.74			
Navigation	23558.08	3.27	155.97						23717.32			
Multilateral operations	NO	NO	NO						NO			
CO2 emissions from biomass	12797.36								12797.36			
CO2 captured									NO			
Long-term storage of C in waste disposal sites									NA			
Indirect N2O												
Indirect CO2 (3)												
Total CO2 equivalent emissions without land use, land-use change and forestry									**115 568.36**			
Total CO2 equivalent emissions with land use, land-use change and forestry									**115 308.95**			
Total CO2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry									**115 568.36**			
Total CO2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry									**115 308.95**			

(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.

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 2018 in Belgium shows an increase of emissions of 1028 kt CO2eq or +0.90% compared to 2017 emissions (i.e. excl. LULUCF). This increase is mainly due to road transportation (55%) and to ETS industrial emissions. Road transport is estimated at national level following "MINIOIL 2018" provided to Eurostat. The definitive emission figures for the entire timeseries from 1990 onwards will be available against the reporting to the EU of 15/01/2020.

First estimates in the Flemish region show very small differences (+120 kt CO2eq) in greenhouse gas emissions in 2018 compared to 2017.

First estimates of the emissions in the Brussels Capital region show no major changes between 2018 and 2017.

First estimate of the total greenhouse gas emissions in 2018 in Wallonia shows an increase of 343 kt CO2eq or +1% compared to 2017 emissions (i.e. excl. LULUCF). This increase is mainly due the ETS emissions in the industry, partially offset by a decrease in the residential and commercial sector due to a warmer year.

6.3 Bulgaria (EEA calculations)

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

Proxy inventory 2018
EEA calculations 2019v1
BULGARIA

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]	35290.71	6795.32	5900.65	1817.89	0.02	17.51	NO,NA	NO,NA	49822.10		
1. Energy	39408.50	1420.43	308.09						41137.01		
A. Fuel combustion (sectoral approach)	38669.45	357.12	307.26						39333.83		
1. Energy industries	25322.67	8.34	109.06						25440.07		
2. Manufacturing industries and construction	3276.64	12.25	26.19						3315.08		
3. Transport	8592.76	23.08	86.79						8702.63		
4. Other sectors	1477.39	313.45	85.23						1876.06		
5. Other	NO	NO	NO						NO		
B. Fugitive emissions from fuels	739.05	1063.31	0.83						1803.18		
1. Solid fuels	NO	844.50	NO						844.50		
2. Oil and natural gas	739.05	218.81	0.83						958.68		
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	4431.77	0.00	105.51	1817.89	0.02	17.51	NO,NA	NO,NA	6372.71		
A. Mineral industry	2459.22								2459.22		
B. Chemical industry	1652.74	NO,NA	93.48	NA	NA	NA	NA	NA	1746.22		
C. Metal industry	203.80	0.00	NA	NA	NA	NA	NA	NA	203.80		
D. Non-energy products from fuels and solvent use	86.58	NO,NA	NO,NA						86.58		
E. Electronic Industry				NO	NO	NO	NO	NO	NO		
F. Product uses as ODS substitutes				1817.89	0.02	NO	NO	NO	1817.91		
G. Other product manufacture and use	24.05	NO	12.04		NO	17.51			53.60		
H. Other	5.38	NA	NA						5.38		
3. Agriculture	33.42	1754.09	4772.93						6560.44		
A. Enteric fermentation		1512.39							1512.39		
B. Manure management		120.47	481.27						601.73		
C. Rice cultivation		93.97							93.97		
D. Agricultural soils		NO	4284.10						4284.10		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		27.26	7.56						34.82		
G. Liming	NO								NO		
H. Urea application	33.42								33.42		
I. Other carbon-containing fertilizers	NO								NO		
J. Other											
4. Land use, land-use change and forestry[1]	-8597.70	10.63	555.23						-8031.84		
A. Forest land	-7268.70	10.63	87.39						-7170.68		
B. Cropland	743.28	NO	75.59						818.88		
C. Grassland	-1687.29	NO	NO						-1687.29		
D. Wetlands	259.72	NO	21.90						281.62		
E. Settlements	788.09	NO	67.12						855.21		
F. Other land	-592.14	NO	190.42						-401.72		
G. Harvested wood products	-840.65								-840.65		
H. Other											
5. Waste	14.72	3610.17	158.89						3783.78		
A. Solid waste disposal	NO	2832.50							2832.50		
B. Biological treatment of solid waste		23.80	17.02						40.82		
C. Incineration and open burning of waste	14.72	0.00	1.15						15.87		
D. Waste water treatment and discharge		753.87	140.72						894.59		
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	962.60	0.71	7.93						971.23		
Aviation	712.36	0.12	5.94						718.43		
Navigation	250.23	0.58	1.99						252.80		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	5818.39								5818.39		
CO_2 captured	NO,IE								NO,IE		
Long-term storage of C in waste disposal sites	NE								NE		
Indirect N_2O			1103.60								
Indirect CO_2 [3]	NO										
Total CO_2 equivalent emissions without land use, land-use change and forestry									57853.94	34908.095	22945.84
Total CO_2 equivalent emissions with land use, land-use change and forestry									49822.10		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									57853.94		
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

6.4 Croatia (national submission)

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

Year 2018
Submission 2019
Country CROATIA

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]	**18 328.39**	**4 277.18**	**1 584.10**	**494.19**	**NA,NO**	**0.00**	**NA,NO**	**NA,NO**	**24 683.86**		
1. Energy	**16 215.50**	**597.56**	**218.04**						**17 031.11**	**5 527.44**	**11 468.69**
A. Fuel combustion (sectoral approach)	16 036.13	391.39	217.82						16 645.34	5 527.44	11 082.92
1. Energy industries	4 151.62	6.42	20.04						4 178.08	3 735.90	415.72
2. Manufacturing industries and construction	2 100.48	3.06	5.45						2 108.99	1 791.54	308.94
3. Transport	6 832.80	11.05	66.74						6 910.59	NO	6 910.59
4. Other sectors	2 951.24	370.86	125.58						3 447.68	NO	3 447.68
5. Other	NO	NO	NO						NO	NO	NO
B. Fugitive emissions from fuels	179.37	206.18	0.22						385.77	0.00	385.77
1. Solid fuels	NO	NO	NO						NO	NO	NO
2. Oil and natural gas and other emissions from energy production	179.37	206.18	0.22						385.77	NO	385.77
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	**2 032.82**	**NO,NE,IE**	**50.33**	**494.19**	**NA,NO**	**0.00**	**NA,NO**	**NA,NO**	**2 581.86**	**1 917.18**	**664.68**
A. Mineral industry	1 372.46								1 372.46	1 358.35	14.12
B. Chemical industry	581.31	NO,NE,IE	50.11	NO	NO	NO	NO	NO	631.42	545.06	86.36
C. Metal industry	13.77	NO,NA	NO	NO	NO	NO	NO	NO	13.77	13.77	0.00
D. Non-energy products from fuels and solvent use	69.79	NA	NA						69.79	NO	69.79
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				494.19	NO	NO	NO	NO	494.19	NO	494.19
G. Other product manufacture and use	NO	NO	0.22	NO	NO	0.00	NO	NO	0.22	NO	0.22
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NO	NO	NO
3. Agriculture	**80.06**	**1 572.10**	**1 223.20**						**2 875.35**	**NO**	**2 875.35**
A. Enteric fermentation		1 137.27							1 137.27	NO	1 137.27
B. Manure management		434.82	157.38						592.21	NO	592.21
C. Rice cultivation		NO							NO	NO	NO
D. Agricultural soils		NA	1 065.81						1 065.81	NO	1 065.81
E. Prescribed burning of savannahs		NO	NO						NO	NO	NO
F. Field burning of agricultural residues		NO	NO						NO	NO	NO
G. Liming	9.06								9.06	NO	9.06
H. Urea application	71.00								71.00	NO	71.00
I. Other carbon-containing fertilizers	NA								NA	NO	NA
J. Other	NO	NO	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	NE						NE		
H. Other	NE	NE	NE						NE		
5. Waste	**NO**	**2 107.52**	**92.54**						**2 200.06**	**NO**	**2 200.06**
A. Solid waste disposal	NA	1 833.64	NA						1 833.64	NO	1 833.64
B. Biological treatment of solid waste		4.33	3.10						7.43	NO	7.43
C. Incineration and open burning of waste	NO	NA	NA						NO	NO	NO
D. Waste water treatment and discharge		269.55	89.44						358.99	NO	358.99
E. Other	NO	NO	NO						NO	NO	NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO						NO	NO	NO

Memo items:[2]											
International bunkers	469.17	0.12	3.85						473.14		
Aviation	449.06	0.08	3.69						452.82		
Navigation	20.11	0.05	0.16						20.32		
Multilateral operations	C	C	C						C		
CO_2 emissions from biomass	5 906.62								5 906.62		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	4 486.55								4 486.55		
Indirect N_2O			NO,NA								
Indirect CO_2 [3]	NO,NA										
Total CO_2 equivalent emissions without land use, land-use change and forestry									**24 688.38**	**7 444.62**	**17 208.78**
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 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.
1. Energy
1A1 - 90% of total CO2 emissisons is from ETS, according to 2017. It is assumed that the distribution stayed the same in 2018. For CH4 and N2O emissions is assumed that ratio CH4/CO2 and N2O/CO2 in 2018 is the same as for 2017. 1A2 -106.1% of total CO2 emissisons is from ETS, according to data for 2017. It is assumed that the distribution stayed the same in 2018. For CH4 and N2O emissions is assumed that ratio CH4/CO2 and N2O/CO2 in 2018 is the same as for 2017 1A3 - Transport, 1A4. Other Sectors, 1B2. Oil and Natural Gas all GHG were extrapolated based on emissions from 2014-2017 1B2 - all GHG are extrapolated based on emissions from 2014-2017
2. Industrial processes and product use
2.A - ETS: CO2 emission from 2.A.1; 2.A.2-lime factories; 2.A.3; 2.A.4.a and 2.A.4.d; 2.A - non-ETS: CO2 emission from 2.A.4.b and 2.A.2-sugar factories. Non-ETS emission is extrapolated based on emissions from 2013-2017 2.B.1 - non-ETS. It should be noted that ammonia production plant is covered by the EU ETS. However, ETS emission reporting methodology is different from the one specified in the IPCC 2006 Guidelines for inventory purposes. Thus, CO2 emission was extrapolated based on emissions from 2013-2017. 2.B.2 - ETS: Verified N2O emission (CO2-eq) 2.B.8 - NO in 2018 2.C.1 - ETS: Verified CO2 emission is included. Emission has increased due to significantly increased steel production in 2018. 2.D.1; 2.D.2; 2.D.3 - non-ETS. CO2 emission extrapolated based on emissions from 2013-2017 2.E - Activities do not exist in Croatia. 2.F - non-ETS: Emissions extrapolated based on emissions from 2013-2017 2.G.1 - non-ETS: SF6 emission extrapolated based on emissions from 2013-2017 2.G.3 - non-ETS: N2O emission extrapolated based on emissions from 2013-2017 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 2013 to 2017
5. Waste
5.A.1; 5.A.2 - non-ETS: CH4 emissions are assessed by extrapolation, according to emissions trend from 2013 to 2017, due to the lack of the information. 5.B - non-ETS: CH4 and N2O emissions are assessed by extrapolation, according to emissions trend from 2013 to 2017, due to the lack of the information. 5.C.1 - non-ETS: CO2 emissions are assessed according to data for 2017 as NO, due to the lack of the information.There was no incineration of clinical waste without energy recovery in 2017. 5.D.1- non-ETS: CH4 emission is assessed by extrapolation, according to emissions trend from 2013 to 2017, due to the lack of the information. 5.D.1 - non-ETS: N2O emission is assessed by extrapolation, according to emissions trend from 2013 to 2017, due to the lack of the information. 5.D.2 - non-ETS: CH4 emission is assessed by extrapolation, according to emissions trend from 2013 to 2017, due to the lack of the information.

6.5 Cyprus (EEA calculations)

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

Proxy inventory 2018
EEA calculations 2019v2
Cyprus

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]	6831.61	864.37	293.19	249.56	NO	0.17	NO	NO	8238.90		
1. Energy	6526.47	14.76	25.48						6566.72		
A. Fuel combustion (sectoral approach)	6526.41	14.61	25.48						6566.51		
1. Energy industries	3261.53	3.32	7.80						3272.65		
2. Manufacturing industries and construction	649.49	1.82	3.24						654.55		
3. Transport	2060.80	4.05	13.00						2077.86		
4. Other sectors	531.81	5.34	1.38						538.54		
5. Other	22.78	0.08	0.06						22.91		
B. Fugitive emissions from fuels	0.06	0.15	NO						0.21		
1. Solid fuels	NO	NO	NO						NO		
2. Oil and natural gas	0.06	0.15	NO						0.21		
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	839.24	NO,NE,NA	60.82	249.56	NO	0.17	NO	NO	1149.79		
A. Mineral industry	839.24								839.24		
B. Chemical industry	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	23.97	NE,NA	NE,NA						23.97		
E. Electronic Industry				NO	NO	NO	NO	NO	NO		
F. Product uses as ODS substitutes				249.56	NO	NO	NO	NO	249.56		
G. Other product manufacture and use	0.01	NE	60.82		NO	0.17			61.00		
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO		
3. Agriculture	0.42	306.53	187.78						494.73		
A. Enteric fermentation		255.44							255.44		
B. Manure management		50.84	67.53						118.37		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NE	120.17						120.17		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		0.25	0.08						0.33		
G. Liming	NO								NO		
H. Urea application	0.42								0.42		
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	-534.52	0.38	0.13						-534.01		
A. Forest land	-294.82	0.38	0.13						-294.31		
B. Cropland	-156.17	NO,NE	NE						-156.17		
C. Grassland	-124.59	NO,NE	NE						-124.59		
D. Wetlands	-9.88	NE	NO,NE						-9.88		
E. Settlements	20.09	NE	NO,NE						20.09		
F. Other land	6.51	NO,NE	NO,NE						6.51		
G. Harvested wood products	24.34								24.34		
H. Other	NO	NO	NO						NO		
5. Waste	NO,NA	542.69	18.97						561.66		
A. Solid waste disposal	NO,NA	476.06							476.06		
B. Biological treatment of solid waste		3.31	2.37						5.68		
C. Incineration and open burning of waste	NO	NO	NO						NO		
D. Waste water treatment and discharge		63.32	16.60						79.92		
E. Other	NO	NO	NO						NO		
6. Other *(as specified in summary 1.A)*											

Memo items:[2]											
International bunkers	1802.99	1.69	17.10						1821.78		
Aviation	998.33	0.17	8.32						1006.82		
Navigation	804.67	1.51	8.77						814.95		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	240.21								240.21		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	NE								NE		
Indirect N_2O			NE								
Indirect CO_2[3]	NE										
Total CO_2 equivalent emissions without land use, land-use change and forestry									8687.30	4585.57	4101.73
Total CO_2 equivalent emissions with land use, land-use change and forestry									8238.90		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									8687.30		
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

6.6 Czechia (national submission)

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

Year 2018
Submission 2019
Country Czech Republi
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]	113927.05	12694.27	6108.06	3819.91	1.21	73.23	NO,NE	3.07	136626.80		
1. Energy	95589.00	3997.04	678.82						100264.86	**52 958**	**47 307**
A. Fuel combustion (sectoral approach)	95468.76	1001.42	678.80						97148.99	52 958	**44 191**
1. Energy industries	51650.50	35.66	238.96						51925.12	IE	IE
2. Manufacturing industries and construction	9940.37	38.09	61.11						10039.56	IE	IE
3. Transport	20838.48	24.73	225.77						21088.98	IE	IE
4. Other sectors	12560.15	901.32	136.81						13598.28	IE	IE
5. Other	479.27	1.63	16.15						497.04	IE	IE
B. Fugitive emissions from fuels	120.24	2995.61	0.02						3115.87	NO	**3 116**
1. Solid fuels	116.26	2398.84	NO,NA						2515.10	NO	**2 515**
2. Oil and natural gas	3.98	596.78	0.02						600.77	NO	**601**
C. CO_2 transport and storage	NO								NO	NO	**NO**
2. Industrial processes and product use	11699.69	52.36	406.85	3819.91	1.21	73.23	NO	3.07	16056.32	9983	**6 074**
A. Mineral industry	3001.68								3001.68	3 002	**0**
B. Chemical industry	1888.82	37.06	183.35	NO	NO	NO	NO	NO	2109.23	1 067	1 042
C. Metal industry	6662.98	15.30	NA	NO	NO	NO	NO	NO	6678.28	5 914	764
D. Non-energy products from fuels and solvent use	146.21	NO	NO,NA						146.21	0	146
E. Electronic Industry				NO	0.56	4.18	NO, NE	3.07	7.81	0	**8**
F. Product uses as ODS substitutes				3819.91	0.65	NO	NO	NO	3820.56	0	**3 821**
G. Other product manufacture and use	NO	NO	223.50	NO	NO	69.05	NO	NO	292.55	0	**293**
H. Other	NO	NO	NO	0.05	NO	NO	NO	NO	0.05	0	**0**
3. Agriculture	283.32	3485.67	4699.35						8468.34		
A. Enteric fermentation		2964.01							2964.01		
B. Manure management		521.66	587.63						1109.29		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NO	4111.72						4111.72		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	159.04								159.04		
H. Urea application	124.28								124.28		
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	6236.28	55.45	40.94						6332.67		
A. Forest land	6757.61	55.45	36.56						6849.62		
B. Cropland	31.27	NO	4.38						35.66		
C. Grassland	-378.79	NO	NO,NA						-378.79		
D. Wetlands	20.89	NO	NO						20.89		
E. Settlements	583.80	NO,NA	NO						583.80		
F. Other land	NO,NA	NO,NA	NO,NA						NO,NA		
G. Harvested wood products	-778.50								-778.50		
H. Other	NO	NO	NO						NO		
5. Waste	118.76	5103.76	282.10						5504.61		
A. Solid waste disposal	0.00	3496.85							3496.85		
B. Biological treatment of solid waste		697.43	75.99						773.42		
C. Incineration and open burning of waste	118.76	0.00	2.30						121.06		
D. Waste water treatment and discharge		909.48	203.81						1113.29		
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	1237.64	0.22	10.43						1248.29		
Aviation	1237.64	0.22	10.43						1248.29		
Navigation	NO	NO	NO						NO		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	15797.44								15797.44		
CO_2 captured	NO,NE								NO,NE		
Long-term storage of C in waste disposal sites	40998.00								40998.00		
Indirect N_2O			253.07								
Indirect CO_2[3]	741.56										
Total CO_2 equivalent emissions without land use, land-use change and forestry									130294.13	62 941	53 381
Total CO_2 equivalent emissions with land use, land-use change and forestry									136626.80		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									131288.75		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									137621.42		

(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 2018. Linear regression was applied on the lowest levels of sectors and subsectors. This way a better accuracy was reached.
No significant change of the total emission from Energy is expected in comparison with the previous years.

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 2010-2017). 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 (Category 2.H contains HFO1234yf emission estimates related to category 2.F.1.e).

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 2017 (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 methodology: only 4A1 category partially updated in the absence of AD for other categories. 4A1 also includes updated emissions from burning and wildfiers (CO_2, CH_4, N_2O).

LULUCF key drivers and interpretation: 4A1 is the most important kategory for entire sector. The extreme rise in emissions is due to the record-high wood harvest in 2018.
This is due to the current dieback of coniferous stands, initiated by elevated tempertatures during the recent years (since 2015), drought and follow-up unprecedented insect outbreak.
Source of harvest data: Czech Statistical Office (www.czso.cz)

6.7 Denmark (national submission)

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

Year
Submission
Country Denmark

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]	**34 385,30**	**6 883,57**	**5 447,60**	**452,02**	**0,00**	**76,03**	**0,00**	**0,00**	**47244,51**		
1. Energy	**32 678,49**	**372,42**	**399,21**						**33450,12**	**13451,29**	**19998,83**
A. Fuel combustion (sectoral approach)	32 430,48	272,93	355,82						33059,23	13219,31	19839,92
1. Energy industries	11 253,55	100,98	85,26								
2. Manufacturing industries and construction	3 917,72	17,92	42,98								
3. Transport	12 905,91	10,81	138,53								
4. Other sectors	4 054,98	142,93	85,65								
5. Other	298,33	0,28	3,40								
B. Fugitive emissions from fuels	248,01	99,48	43,39						390,88	231,98	158,91
1. Solid fuels	NA,NO	NA,NO	NA,NO						NA,NO		
2. Oil and natural gas and other emissions from energy production	248,01	99,48	43,39						390,88	231,98	158,91
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	**1 471,99**	**2,29**	**19,37**	**452,02**	**0,00**	**76,03**	**0,00**	**0,00**	**2021,70**	**1265,16**	**756,54**
A. Mineral industry	1 298,55								1298,55	1265,16	33,40
B. Chemical industry	1,37	NA,NO	NA,NO	NA	NA	NA	NA	NA	1,37	0	1,37
C. Metal industry	0,17	NO	NO		NO	NO			0,17	0	0,17
D. Non-energy products from fuels and solvent use	171,72	0,48	0,19						172,38	0	172,38
E. Electronic Industry				NO	NO	NO	NO	NO	0,00	0	0,00
F. Product uses as ODS substitutes				452,02	0,00	NA	NA	NA	452,02	0	452,02
G. Other product manufacture and use	0,18	1,81	19,18	NA	NA	76,03	NA	NA	97,20	0	97,20
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA		
3. Agriculture	**219,12**	**5 545,89**	**4 876,69**						**10641,70**	**0,00**	**10641,70**
A. Enteric fermentation		3 730,69							3730,69	0	3730,69
B. Manure management		1 812,26	715,70						2527,95	0	2527,95
C. Rice cultivation		NO							NO		
D. Agricultural soils		NE	4 160,09						4160,09	0	4160,09
E. Prescribed burning of savannahs		NO	NO						NO		
F. Field burning of agricultural residues		2,94	0,91						3,85	0	3,85
G. Liming	214,40								214,40	0	214,40
H. Urea application	1,54								1,54	0	1,54
I. Other carbon-containing fertilizers	3,18								3,18	0	3,18
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	**15,70**	**962,98**	**152,33**						**1131,01**	**0,00**	**1131,01**
A. Solid waste disposal	NO,NA	592,65							592,65	0	592,65
B. Biological treatment of solid waste		317,46	85,64						403,09	0	403,09
C. Incineration and open burning of waste	NA,NO	0,02	0,27						0,29	0	0,29
D. Waste water treatment and discharge		51,14	66,42						117,57	0	117,57
E. Other	15,70	1,72	NA						17,41	0	17,41
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]	280,84										

Total CO_2 equivalent emissions without land use, land-use change and forestry	**47 244,51**	**14 716,45**	**32 528,07**
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	**47 525,35**		
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 2018, there was not a big change in electricity import/export compared to 2017 nor did the production of renewable energy increased significantly. As a result the coal consumption in the Danish power plants remained almost at the same level as in 2017. The consumption of natural gas decreased albeit to a small extent as a decrease of about 5 % is observed. The consumption of oil products (mainly related to transport and mobile sources) increased by less than 1 %. The overall result is that emissions from fuel combustion are at the same level as in 2017. More information on the preliminary energy statistics is available from the Danish Energy Agency (https://ens.dk/sites/ens.dk/files/Statistik/preliminary_energy_statistics_2018.xlsx).

A split between fuel combustion activities have been made by scaling the 2017 emissions based on the difference between total CO2 estimated for 2017 compared to the proxy for 2018.

For industrial processes, most emissions of CO2, CH4 and N2O have been assumed constant at 2017 levels. However, 2017 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 2017 levels for the purpose of this proxy.

6.8 Estonia (national submission)

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

Year 2018
Submission 2019
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]	17969.97	1070.11	920.88	230.78	NO	2.55	NO	NO	20194.28		
1. Energy	17563.32	169.12	127.01						17859.46	**13 493.49**	**4 365.97**
A. Fuel combustion (sectoral approach)	17563.29	151.34	127.01						17841.64	13 493.49	4 348.16
1. Energy industries	13869.11	21.65	42.88						13933.64	13 154.72	778.93
2. Manufacturing industries and construction	489.54	2.15	3.56						495.25	331.69	163.56
3. Transport	2560.94	3.60	22.60						2587.13	2.33	2 584.81
4. Other sectors	587.96	123.88	57.06						768.90	4.76	764.14
5. Other	55.73	0.07	0.91						56.72	NO	56.72
B. Fugitive emissions from fuels	0.03	17.78	NO						17.81	NO	17.81
1. Solid fuels	NO	NO	NO						NO	NO	NO
2. Oil and natural gas	0.03	17.78	NO						17.81	NA	17.81
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	386.25	NO	2.39	230.78	NO	2.55	NO	NO	621.97	**363.01**	**258.95**
A. Mineral industry	363.04								363.04	363.01	0.02
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal industry	2.45	NO	NO	NO	NO	NO	NO	NO	2.45	NO	2.45
D. Non-energy products from fuels and solvent use	20.76	NO	NO						20.76	NA	20.76
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				230.78	NO	NO	NO	NO	230.78	NA	230.78
G. Other product manufacture and use	NO	NO	2.39	NO	NO	2.55	NO	NO	4.94	NA	4.94
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
3. Agriculture	19.38	617.87	746.99						1384.23	**NA**	**1384.23**
A. Enteric fermentation		539.73							539.73	NA	539.73
B. Manure management		78.14	54.57						132.71	NA	132.71
C. Rice cultivation		NO							NO	NA	NO
D. Agricultural soils		NO	692.41						692.41	NA	692.41
E. Prescribed burning of savannas		NO	NO						NO	NA	NO
F. Field burning of agricultural residues		NO	NO						NO	NA	NO
G. Liming	19.27								19.27	NA	19.27
H. Urea application	0.10								0.10	NA	0.10
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								
A. Forest land	NE	NE	NE								
B. Cropland	NE	NE	NE								
C. Grassland	NE	NE	NE								
D. Wetlands	NE	NE	NE								
E. Settlements	NE	NE	NE								
F. Other land	NE	NE	NE								
G. Harvested wood products	NE										
H. Other	NE	NE	NE								
5. Waste	1.02	283.12	44.50						328.63	**NA**	**328.63**
A. Solid waste disposal	NO	211.05							211.05	NA	211.05
B. Biological treatment of solid waste		16.88	12.07						28.96	NA	28.96
C. Incineration and open burning of waste	1.02	0.47	0.09						1.58	NA	1.58
D. Waste water treatment and discharge		54.71	32.33						87.04	NA	87.04
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	1132.89	2.33	9.27						1144.49		
Aviation	179.34	0.05	1.49						180.87		
Navigation	953.55	2.28	7.78						963.61		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	4812.97								4812.97		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites									NO		
Indirect N_2O			NE								
Indirect CO_2[3]	IE										
Total CO_2 equivalent emissions without land use, land-use change and forestry									20194.28	13 856.50	6 337.79
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									20194.28		
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 2018 decreased 3.3% compared to 2017 mainly due to decreased emissions in Energy sector. ETS emission have decreased by 5.6% in 2018 compared to 2017. According to the Proxy estimates ESD emissions have increased by 2.1% compared to 2017. The drivers underpinning the total GHG emission decrease are elaborated below. **Energy:** Total GHG emissions have decreased 3.6% compared to year 2017 due to a decrease in emissions from Energy industries and the Manufacturing industries, which decreased 5.3% and 21.5%, respectively. The larger decrease in Manufacturing Industries is due to decreased waste fuel consumption. Emissions increased in the Transportation sector almost by 6% due to increase in diesel fuel demand. **IPPU:** GHG emissions have decreased by 2.7% in comparison to 2018 year´s inventory submission. This decrease is caused by slightly reduced emissions from Mineral industry sector (2.A) and Refrigeration and air conditioning subsector (2.F.1). **Agriculture:** Total GHG emissions have increased 0.4% compared to the year 2017, mainly due to an increased use of lime fertilizers and at lesser extent due to an increase of the numbers of swine and non-dairy cattle. The emissions from Liming in 2018 increased 29.6% compared to the previous year. The emissions from liming have grown due to the increase in the amounts of lime fertilizers used and its applied areas. The increase is also contributed by the yearly variations in the use of different type of lime fertilizers, in 2018 especially the use of dolomite has increased. Moreover, yearly fluctuations in the use of lime fertilizers have been common in Estonia throughout the time series of the GHG inventory. The emissions from Enteric Fermentation and Manure Management increased 0.2% and 0.5%, **Waste:** The preliminary data for 2020 submission for calculating waste sector proxy emissions is under inspection by the invenotry compiler and therefore the activity data from 2019 submission is used.

6.9 Finland (national submission)

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

Inventory 2018
Submission 2019 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]	28883.46	5368.05	6659.43	1258.39	5.84	50.23	NO	NO	42225.39		
1. Energy	41518.59	296.18	577.59						42392.35	**22 003**	**20 199**
A. Fuel combustion (sectoral approach)	41428.00	266.00	576.00						42270.00		
1. Energy industries	18210.00	30.00	264.00						18504.00		
2. Manufacturing industries and construction	6750.00	22.00	151.00						6923.00		
3. Transport	11554.00	15.00	86.00						11655.00		
4. Other sectors	3760.00	196.00	67.00						4023.00		
5. Other	1154.00	3.00	8.00						1165.00		
B. Fugitive emissions from fuels	90.59	30.18	1.59						122.35		
1. Solid fuels	NO	NO	NO						NO		
2. Oil and natural gas	90.59	30.18	1.59						122.35		
C. CO_2 transport and storage	NO,NA								NA,NO		
2. Industrial processes and product use	4372.39	0.15	221.84	1258.39	5.84	50.23	NO	NO	5908.84	**4 220**	**1 689**
A. Mineral industry	1048.44								1048.44		
B. Chemical industry	1096.76	NA,NO	195.16	NO	NO	NO	NO	NO	1291.92		
C. Metal industry	2084.63	0.00	NO			NA,NO			2084.63		
D. Non-energy products from fuels and solvent use	142.56	0.15	0.87						143.57		
E. Electronic Industry				NO,IE	NO,IE	NO,IE	NO	NO	NO,IE		
F. Product uses as ODS substitutes				1256.47	0.90				1257.36		
G. Other product manufacture and use	NO	NO	25.81	NO	NO	12.35	NO	NO	38.16		
H. Other	NO	NO	NO	1.92	4.94	37.89			44.75		
3. Agriculture	198.49	2501.70	3634.45						6334.63	**0**	**6 335**
A. Enteric fermentation		2051.49							2051.49		
B. Manure management		448.60	277.62						726.22		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NE,NO	3356.34						3356.34		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		1.61	0.50						2.10		
G. Liming	196.65								196.65		
H. Urea application	1.83								1.83		
I. Other carbon-containing fertilizers	NA								NA		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	-17206.01	919.94	2103.61						-14182.46		
A. Forest land	-23645.63	845.54	1977.10						-20823.00		
B. Cropland	7270.44	IE,NA	7.27						7277.71		
C. Grassland	630.48	0.03	0.69						631.20		
D. Wetlands	1842.56	74.37	95.33						2012.26		
E. Settlements	686.57	NE,NA	21.46						708.03		
F. Other land	NO,NA	NA	NA						NO,NA		
G. Harvested wood products	-3990.42								-3990.42		
H. Other	NA	NA	NA						NA		
5. Waste	NE,NO,IE	1650.08	121.94						1772.02	**0**	**1 772**
A. Solid waste disposal	NO	1416.81							1416.81		
B. Biological treatment of solid waste		64.63	39.30						103.93		
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		168.65	82.64						251.29		
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	3426.24	2.59	26.68						3455.51		
Aviation	2373.24	0.33	19.32						2392.89		
Navigation	1053.00	2.26	7.36						1062.62		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	41640.09								41640.09		
CO_2 captured	127.10								127.10		
Long-term storage of C in waste disposal sites	54730.04								54730.04		
Indirect N_2O			175.57								
Indirect CO_2 [3]	53.11										
Total CO_2 equivalent emissions without land use, land-use change and forestry									56407.85	**26 223**	**29 994**
Total CO_2 equivalent emissions with land use, land-use change and forestry									42225.39		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									56460.96	**26 223**	**30 047**
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									42278.50		

[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 2018 corresponded with 56.5 million tonnes of carbon dioxide (CO2 eq.). Emissions

According to Statistics Finland's instant preliminary data, the total emissions of greenhouse gases in 2018 corresponded with 56.5 million tonnes of carbon dioxide (CO2 eq.). Emissions grew by two per cent from the previous year. The growth in emissions was most influenced by increased consumption of natural gas and peat. Emissions not included in the EU Emissions Trading System remained at last year's level but exceeded the annual emission allocations set by the EU by 0.4 million tonnes of CO2 equivalent. In the instant preliminary data, the emissions and removals of the latest year are produced at a less detailed level than data for previous years.

According to the instant preliminary data, total emissions (excl. LULUCF) increased by two per cent in 2018 (1.1 million tonnes of CO2 eq.) compared to the previous year. In the energy sector, emissions grew by three per cent (1.4 tonnes of CO2 eq.) and the emissions from industrial processes and product use remained almost unchanged. In the energy sector, the growth in emissions was most affected by increased consumption of peat and natural gas. Emissions from agriculture fell by three per cent (0.2 million tonnes of CO2 eq.) and emissions in the waste sector by six per cent (0.1 million tonnes of CO2 eq.) from 2017 to 2018. According to instant preliminary data, the net sink of the LULUCF sector was -14.2 million tonnes of CO2 eq. in 2018, or 30 per cent lower than in the year before. The emissions and removals of this sector are usually not included in total emissions.

Emissions not included in the EU ETS are calculated as the difference between the total emissions and verified emissions of the sectors in the EU ETS, excluding CO2 emissions from domestic civil aviation as they are estimated in the inventory. The data on the verified emissions of the sectors in the EU ETS 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 not included in the ETS. The emissions in question were below the target path in 2013 to 2015 and in 2017. The 2016 emissions and the 2018 emissions based on instant preliminary data exceeded the target path, but these could be compensated for with the emission allocations not used in previous years.

http://tilastokeskus.fi/til/khki/2018/khki_2018_2019-05-23_tie_001_en.html

http://tilastokeskus.fi/til/ehk/2018/04/ehk_2018_04_2019-03-28_tie_001_en.html (Energy statistics, Preliminary data)

https://energiavirasto.fi/tiedote/-/asset_publisher/suomen-paastokauppasektorin-paastot-kasvoivat-1-1-miljoonaa-tonnia-vuonna-2018 (Energy authority, EU Emissions trading Scheme, The data on the verified emissions of the emissions trading sector in Finland in 2018, in Finnish only)

6.10 France (national submission)

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

Year proxy 2018
Submission July 2019
Country FRANCE (KP)
Geographical scope[4] UE perimeter of FR

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)	291525.28	56961.36	44969.08	18711.33	707.68	460.21	0.00	7.64	413343		
1. Energy	301874.77	2665.02	3703.01						308243	**76 795**	**231 448**
A. Fuel combustion (sectoral approach)	299082.26	1558.81	3690.66						304332	74 066	**230 266**
1. Energy industries	41182.56	33.75	275.00						41491	33 391	**8 101**
2. Manufacturing industries and construction	48475.42	137.89	560.72						49174	40 054	**9 120**
3. Transport	130833.91	141.97	1543.97						132520	345	**132 175**
4. Other sectors	78590.37	1245.21	1310.96						81147	276	**80 871**
5. Other	0.00	0.00	0.00						0	0	**0**
B. Fugitive emissions from fuels	2792.51	1106.22	12.35						3911	2 729	**1 182**
1. Solid fuels	0.00	16.73	0.00						17	0	**17**
2. Oil and natural gas	2792.51	1089.49	12.35						3894	2 729	**1 165**
C. CO2 transport and storage	0.00								0	0	**0**
2. Industrial processes and product use	22352.60	52.36	1658.65	18711.33	707.68	460.21	0.00	7.64	43950	**20 685**	**23 266**
A. Mineral industry	9441.30								9441	9 390	**52**
B. Chemical industry	6710.81	43.50	1523.05	300.36	3.10	0.00	0.00	0.00	8581	6 646	**1 935**
C. Metal industry	4529.12	8.68	0.00	0.00	41.16	53.77	0.00	0.00	4633	4 584	**48**
D. Non-energy products from fuels and solvent use	1198.50	0.18	2.53						1201	47	**1 154**
E. Electronic Industry				7.59	111.85	3.88	0.00	7.64	131	0	**131**
F. Product uses as ODS substitutes				18402.70	0.00	0.00	0.00	0.00	18403	0	**18 403**
G. Other product manufacture and use	472.82	0.00	133.07	0.69	551.56	402.56	0.00	0.00	1561	17	**1 544**
H. Other	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	**0**
3. Agriculture	1943.20	38543.95	35721.38						76209		**76 209**
A. Enteric fermentation		34727.83							34728		**34 728**
B. Manure management		3686.15	2512.30						6198		**6 198**
C. Rice cultivation		81.43							81		**81**
D. Agricultural soils		0.00	33194.08						33194		**33 194**
E. Prescribed burning of savannas		0.00	0.00						0		**0**
F. Field burning of agricultural residues		48.55	15.00						64		**64**
G. Liming	645.06								645		**645**
H. Urea application	1298.14								1298		**1 298**
I. Other carbon-containing fertilizers	0.00								0		**0**
J. Other	0.00	0.00	0.00						0		**0**
4. Land use, land-use change and forestry(1)	-36212.68	1198.10	3083.60						-31931		**-31 931**
A. Forest land	-54151.11	622.08	353.25						-53176		**-53 176**
B. Cropland	16053.49	116.96	1857.87						18028		**18 028**
C. Grassland	-8536.52	169.22	110.89						-8256		**-8 256**
D. Wetlands	518.85	9.45	0.77						529		**529**
E. Settlements	11037.51	61.19	760.82						11860		**11 860**
F. Other land	0.16	0.00	0.00						0		**0**
G. Harvested wood products	-1195.10								-1195		**-1 195**
H. Other	60.03	219.20	0.00						279		**279**
5. Waste	1567.40	14501.93	802.43						16872		**16 872**
A. Solid waste disposal	0.00	11966.15							11966		**11 966**
B. Biological treatment of solid waste		253.62	354.87						608		**608**
C. Incineration and open burning of waste	1567.40	23.59	48.11						1639		**1 639**
D. Waste water treatment and discharge		2258.56	399.45						2658		**2 658**
E. Other	0.00	0.00	0.00						0		**0**
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		0

Memo items:(2)											
International bunkers	22826.91	15.37	186.21						23028		
Aviation	17246.69	1.96	143.58						17392		
Navigation	5580.22	13.41	42.63						5636		
Multilateral operations	1.35	NE	NE						1		
CO2 emissions from biomass	64439.31								64439		
CO2 captured	NO,NE,NA								NO,NE,NA		
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									445274	97 479	347 794
Total CO2 equivalent emissions with land use, land-use change and forestry									413343		
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 (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
(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
(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.

6.11 Germany (national submission)

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

Year 2018 (proxy)
Submission 10.07.2019
Country GERMANY
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)									CO_2 equivalent (Gg)	
Total (net emissions)[1]	**743 072**	**54 667**	**36 472**	**11 112**	**259**	**4 800**	**IE**	**IE**	**850 381**		
1. Energy	**710 146**	**12 115**	**5 357**						**727 618**	**381 561**	**346 057**
A. Fuel combustion (sectoral approach)	707 742	4 620	5 357						717 719	381 561	**336 158**
1. Energy industries	293 879	3 008	2 446						299 333	280 798	**18 535**
2. Manufacturing industries and construction	130 577	302	842						131 721	99 275	**32 446**
3. Transport	161 286	140	1 623						163 049	1 201	**161 848**
4. Other sectors	122 000	1 170	446						123 616	288	**123 328**
5. Other	IE	IE	IE						IE	IE	**IE**
B. Fugitive emissions from fuels	2 404	7 495	0						9 899	IE	**9 899**
1. Solid fuels	693	2 484	NO						3 178	IE	**3 178**
2. Oil and natural gas	1 711	5 011	0						6 721	IE	**6 721**
C. CO_2 transport and storage	NO								NO	NO	**NO**
2. Industrial processes and product use	46 926	532	1 093	11 112	259	4 800	IE	IE	64 722	**40 671**	**24 051**
A. Mineral industry	20 347								20 347	14 280	**6 067**
B. Chemical industry	5 554	492	753	IE	IE	IE	IE	IE	6 799	11 562	**-4 763**
C. Metal industry	18 946	7	15	IE	IE	IE	IE	IE	18 968	14 829	**4 139**
D. Non-energy products from fuels and solvent use	2 080	NA	1						2 081	NO	**NO**
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	NA	33	323	IE	IE	IE	IE	IE	357	0	**357**
H. Other	NA	NA	NA	IE	IE	IE	IE	IE	IE	IE	**NA**
3. Agriculture	2 914	32 345	28 323						63 582		
A. Enteric fermentation		24 916							24 916		
B. Manure management		6 103	3 168						9 271		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NO	24 895						24 895		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	2 140								2 140		
H. Urea application	570								570		
I. Other carbon-containing fertilizers	204								204		
J. Other	NO,NA	1 326	260						1 586		
4. Land use, land-use change and forestry[1]	-16 914	865	864						-15 185		
A. Forest land	-57 760	19	150						-57 591		
B. Cropland	14 506	249	360						15 115		
C. Grassland	21 935	507	106						22 548		
D. Wetlands	3 969	44	23						4 035		
E. Settlements	3 472	45	226						3 744		
F. Other land	NO	NO	NO						NO		
G. Harvested wood products	-3 037								-3 037		
H. Other		NA	IE						0		
5. Waste	NA, NO	8 810	835						9 645		
A. Solid waste disposal	NA	7 575							7 575		
B. Biological treatment of solid waste		709	310						1 019		
C. Incineration and open burning of waste	NO	NO	NO						NO		
D. Waste water treatment and discharge		522	455						977		
E. Other		4	69						73		
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO		

Memo items:[2]											
International bunkers	35 594	4	358						35 956		
Aviation	29 119	2	273						29 395		
Navigation	6 475	1	84						6 561		
Multilateral operations	NE	NE	NE						NE		
CO_2 emissions from biomass	108 593								108 593		
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									**865 567**	**422 233**	**443 334**
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.

please regard:
https://www.umweltbundesamt.de/en/press/pressinformation/climate-footprint-2018-45-percent-decrease-in

for graphs and tables (only in German available)
https://www.umweltbundesamt.de/galerie/grafiken-tabellen-zur-klimabilanz-2018

6.12 Greece (national submission)

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

Year 2018
Submission 2019
Country Greece

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]									**89 168**		
1. Energy									**68 136**		
A. Fuel combustion (sectoral approach)									67 296		
1. Energy industries	38 568.81	12.35	116.56						38 698	38 162	536
2. Manufacturing industries and construction	4 806.91	6.89	62.69						4 876	3 697	1 180
3. Transport	17 000.00	80.00	260.00						17 340		17 340
4. Other sectors	6 000.00	120.00	60.00						6 180		6 180
5. Other	200.00	0.04	1.50						202		202
B. Fugitive emissions from fuels									840		
1. Solid fuels	NO	700	NA,NO						700		700
2. Oil and natural gas and other emissions from energy production	10	130	0						140		140
C. CO_2 transport and storage	NO										
2. Industrial processes and product use									**11 846**		
A. Mineral industry	3 994								3 994	3 979	15
B. Chemical industry	212		22						234	234	
C. Metal industry	1 109	0	NO		98.91296138				1 208	1 034	174
D. Non-energy products from fuels and solvent use	35	NA,NO	NA,NO						35		35
E. Electronic Industry				NO	NO	NO	NO	NO	NO		
F. Product uses as ODS substitutes				6100	45				6 145		6 145
G. Other product manufacture and use	85	NA	140		NO	5			230		230
H. Other	NA	NA	NA								
3. Agriculture									**7 745**		
A. Enteric fermentation		3 600							3 600		3 600
B. Manure management		600	300						900		900
C. Rice cultivation		170							170		170
D. Agricultural soils		NE	3 000						3 000		3 000
E. Prescribed burning of savannahs		NO	NO								
F. Field burning of agricultural residues		30	10						40		40
G. Liming	NO										
H. Urea application	35								35		35
I. Other carbon-containing fertilizers	NO										
J. Other											
4. Land use, land-use change and forestry[1]	-3 263	21	17						**-3 225**		
A. Forest land	-2 157	8	1						-2 148		
B. Cropland	109	NO	1						110		
C. Grassland	-1 491	12	1						-1 477		
D. Wetlands	1	NO	0						1		
E. Settlements	125	NO	7						131		
F. Other land	89	NO	7						95		
G. Harvested wood products	62	NA	NA						62		
H. Other	NO	NO	NO						NO		
5. Waste									**4 666**		
A. Solid waste disposal	NO,NA	3 200							3 200		3 200
B. Biological treatment of solid waste		25	15						40		40
C. Incineration and open burning of waste	5	0	1						6		6
D. Waste water treatment and discharge		1 100	320						1 420		1 420
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	10 500.00	15.60	200.00						10 715.60		
Aviation	3 500.00	0.60	30.00						3 530.60		
Navigation	7 000.00	15.00	170.00						7 185.00		
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	**92 393.00**	**47 105.46**	**45 287.55**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**89 167.82**		
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 (national submission)

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

Year 2018
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	**44 314.11**	**1 469.34**	**336.30**						**46119.75**	**15 367.66**	**30 752.09**
A. Fuel combustion (sectoral approach)	44 184.00	638.72	336.04						45158.76	15 000.92	30 157.84
1. Energy industries	12 887.02	23.72	56.42						12967.17	12 378.59	588.58
2. Manufacturing industries and construction	5 427.18	11.84	26.98						5466.00	2 463.56	3 002.44
3. Transport	13 788.41	25.17	149.07						13962.65	148.72	13 813.94
4. Other sectors	12 056.61	577.98	103.36						12737.94	10.04	12 727.90
5. Other	24.78	0.00	0.21						24.99	0.00	24.99
B. Fugitive emissions from fuels	130.11	830.62	0.26						960.99	366.74	594.25
1. Solid fuels	NA	51.34	NA						51.34	0.00	51.34
2. Oil and natural gas and other emissions from energy production	130.11	779.28	0.26						909.65	366.74	542.91
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	**5087.50**	**51.46**	**207.13**	**1417.99**	**0.74**	**96.51**	**NO**	**NO**	**6861.32**	**4 686.64**	**2 174.68**
A. Mineral industry	1360.23								1360.23	1 358.17	2.05
B. Chemical industry	2518.06	46.12	37.98	NO	NO	NO	NO	NO	2602.16	2 300.04	302.13
C. Metal industry	1053.82	5.34	NO	NO	NO	NO	NO	NO	1059.16	1 028.44	30.72
D. Non-energy products from fuels and solvent use	155.39	NO,NA	NO,NA						155.39	0.00	155.39
E. Electronic Industry				NO	NO	NO	NO	NO	NO	0.00	0.00
F. Product uses as ODS substitutes				1417.99	0.74	NO	NO	NO	1418.73	0.00	1 418.73
G. Other product manufacture and use	NO	NO	169.15	NO	NO	96.51	NO	NO	265.65	0.00	265.65
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
3. Agriculture	**212.07**	**2 772.01**	**4 075.85**						**7059.93**	**NA**	**7059.93**
A. Enteric fermentation		2101.22							2101.22	NA	2101.22
B. Manure management		651.00	474.52						1125.52	NA	1125.52
C. Rice cultivation		19.79							19.79	NA	19.79
D. Agricultural soils		NA	3601.33						3601.33	NA	3601.33
E. Prescribed burning of savannahs		NO	NO						NO	NA	NO
F. Field burning of agricultural residues		NO	NO						NO	NA	NO
G. Liming	11.06								11.06	NA	11.06
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	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	**36.38**	**3 189.85**	**120.67**						**3346.90**	**NA**	**3346.90**
A. Solid waste disposal	NO,NA	2 797.78							2797.78	NA	2797.78
B. Biological treatment of solid waste		108.90	40.45						149.36	NA	149.36
C. Incineration and open burning of waste	36.38	0.10	0.44						36.92	NA	36.92
D. Waste water treatment and discharge		283.07	79.77						362.85	NA	362.85
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	NA	NO
Memo items:[2]											
International bunkers	**847.37**	**0.15**	**7.06**						**854.58**		
Aviation	847.37	0.15	7.06						854.58		
Navigation	NO,NE	NO,NE	NO,NE						NO,NE		
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			NE								
Indirect CO_2 [3]	NE										
Total CO_2 equivalent emissions without land use, land-use change and forestry									**63 387.90**	**20 054.30**	**43 333.60**
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.
Total emissions did not change significantly. Compared to 2017, a slight decrease of 0.6% is expected for 2018. ETS emissions decreased by 2.8%.
ENERGY (-0.1%)
Electricity production decreased by 2.9%. At the same time, classic fossil fuel consumption of large power plants decreased by 9%;
Natural gas consumption of the residential sector decreased by 7% due to lower heating demand (HDD decreased by 10%!);
In contrast, motor gasoline and diesel oil sales increased by 6 to 7 per cent which led to increased emissions in the transport sector;
We also expect increased emission level in manufacturing industry and construction;
Lower natural gas consumption led to decreased fugitive emissions from natural gas.
IPPU (-5%)
The largest company has made major investments: modernization of blast furnaces, preparation for stricter environmental regulations after 2020. This development decreased the energy demand and also the emission of this sector.
Emission of fluorinated gases descreased due to lower of consumption (import-export) of refrigerants in the 2F1 subcategory (-21%).
AGRICULTURE (+0.1%)
Agricultural emissions remained at the last year's level.
Synthetic fertilizer use seems to be stabilised. Slightly increasing emissions from livestock, especially cattle.
WASTE (-1%)
The decreasing trend is expected to continue.

6.14 Iceland (national submission)

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

Year 2018
Submission 2020
Country Iceland
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]	9254.15	4269.13	350.63	204.91	68.85	2.31	NO	NO	14149.98		
1. Energy	1844.88	7.56	56.31						1908.76		
A. Fuel combustion (sectoral approach)	1698.41	4.24	56.31						1758.95		
1. Energy industries	1.78	0.00	0.00						1.78		
2. Manufacturing industries and construction	168.08	0.21	13.19						181.47	12.18	169.30
3. Transport	988.42	2.75	38.89						1030.06		
4. Other sectors	540.13	1.27	4.23						545.63		
5. Other	NO	NO	NO						NO		
B. Fugitive emissions from fuels	146.48	3.33	0.00						149.81		
1. Solid fuels	NO	NO	NO						NO		
2. Oil and natural gas	146.48	3.33	NO,NA						149.81		
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	1779.76	3.19	2.08	204.91	68.85	2.31	0.00	0.00	2061.10		
A. Mineral industry	0.90								0.90		
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO		
C. Metal industry	1773.68	3.16	NO	NO	68.79	NO	NO	NO	1845.63	1842.51	3.13
D. Non-energy products from fuels and solvent use	5.15	NO,NE,NA	NO,NE,NA						5.15		
E. Electronic Industry				NO	NO	NO	NO	NO	NO		
F. Product uses as ODS substitutes				204.91	0.06	NO	NO	NO	204.96		
G. Other product manufacture and use	0.03	0.03	2.08		NO	2.31			4.45		
H. Other	NA	NA	NA						NA		
3. Agriculture	4.85	366.64	281.85						653.34		
A. Enteric fermentation		305.60							305.60		
B. Manure management		61.04	20.56						81.60		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NA,NE,NO	261.29						261.29		
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	0.83								0.83		
I. Other carbon-containing fertilizers	1.72								1.72		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	5617.58	3640.85	1.32						9259.74		
A. Forest land	-346.59	0.70	0.82						-345.07		
B. Cropland	1605.94	80.96	NO,NA						1686.90		
C. Grassland	5518.13	432.45	0.48						5951.05		
D. Wetlands	-1165.63	3126.73	0.01						1961.11		
E. Settlements	5.83	NE	0.01						5.84		
F. Other land	NE,NA	0.00	0.00						NE,NA		
G. Harvested wood products	-0.09								-0.09		
H. Other	IE	IE	IE						IE		
5. Waste	7.08	250.89	9.07						267.04		
A. Solid waste disposal	NO	205.39							205.39		
B. Biological treatment of solid waste		2.17	1.55						3.72		
C. Incineration and open burning of waste	7.08	0.36	0.36						7.80		
D. Waste water treatment and discharge		42.98	7.16						50.13		
E. Other	NA	NO	NO						NO,NA		
6. Other ***(as specified in summary 1.A)***											

Memo items:[2]											
International bunkers	1339.56	0.65	11.08						1351.29		
Aviation	1146.71	0.20	9.56						1156.47		
Navigation	192.85	0.45	1.52						194.82		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	53.50								53.50		
CO_2 captured	NO,NA								NO,NA		
Long-term storage of C in waste disposal sites	NO								NO		
Indirect N_2O			NO								
Indirect CO_2 [3]	NO										
Total CO_2 equivalent emissions without land use, land-use change and forestry									4890.23	1854.68	172.42
Total CO_2 equivalent emissions with land use, land-use change and forestry									14149.98		
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.

There are three key drivers causing the increase of proxy emission data for 2018 compared to 2017:

1) Emissions from 2C Metal Industry included in ETS have increased
2) Emissions from Agriculture have increased due to revised estimates and a technical correction from Stage 2 review
3) Emissions from 5D Waste water treatment and discharge have increased due to revised estimate from Stage 2 review

6.15 Ireland (national submission)

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

Year 2018
Submission 2020
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)]	38728.07	14002.77	6958.51	1124.39	49.86	40.92	NO	1.32	60905.84		
1. Energy	35935.91	270.96	362.36						36569.23	13420.43	23148.80
A. Fuel combustion (sectoral approach)	35935.61	175.07	362.35						36473.04	13420.43	23052.62
1. Energy industries	10398.45	10.38	142.02						10550.84	9794.31	756.53
2. Manufacturing industries and construction	4741.60	9.69	16.27						4767.55	3524.80	1242.75
3. Transport	12071.10	11.95	127.30						12210.35	51.11	12159.24
4. Other sectors	8724.47	143.06	76.77						8944.30	50.21	8894.09
5. Other	IE	IE	IE						IE		
B. Fugitive emissions from fuels	0.29	95.89	0.00						96.19		96.19
1. Solid fuels	NO	18.65	NO						18.65		18.65
2. Oil and natural gas and other emissions from energy production	0.29	77.24	0.00						77.54		77.54
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	2267.69	NO	42.98	1124.39	49.86	40.92	NO	1.32	3527.15	2094.55	1432.60
A. Mineral industry	2094.55								2094.55	2094.55	0.00
B. Chemical industry	NO	NO	NO						NO		
C. Metal industry	NO	NO							NO		
D. Non-energy products from fuels and solvent use	173.14	NO	NO						173.14		173.14
E. Electronic Industry				1124.39	49.86	21.55		1.32	1197.12		1197.12
F. Product uses as ODS substitutes									0.00		0.00
G. Other product manufacture and use	NO	NO	42.98	NO	NO	19.36	NO	NO	62.34		62.34
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO		
3. Agriculture	500.13	12966.91	6447.46						19914.49		19914.49
A. Enteric fermentation		11543.21							11543.21		11543.21
B. Manure management		1423.70	543.88						1967.58		1967.58
C. Rice cultivation		NO							NO		
D. Agricultural soils		NE	5903.58						5903.58		5903.58
E. Prescribed burning of savannahs		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	462.00								462.00		462.00
H. Urea application	38.13								38.13		38.13
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	24.35	764.90	105.72						894.97		894.97
A. Solid waste disposal	NO	703.72							703.72		703.72
B. Biological treatment of solid waste		10.98	7.85						18.83		18.83
C. Incineration and open burning of waste	24.35	0.02	0.25						24.62		24.62
D. Waste water treatment and discharge		50.19	97.62						147.80		147.80
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	3 495.02	1.74	30.97						3 527.73		
Aviation	2 997.25	0.56	26.94						3 024.75		
Navigation	497.77	1.18	4.03						502.98		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	2 762.96								2 762.96		
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									**60 905.84**	**15 514.97**	**45 390.86**
Total CO_2 equivalent emissions with land use, land-use change and forestry									**60 905.84**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									**60 905.84**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									**60 905.84**		

(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

(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 emissions are down 10.8%; 44% reduction in coal combustion, 3% reduction in peat, 2% increase in gas, 13% increase in renewables (incl 27% ETS emissions decreased by 8.2% and non-ETS emissions increased by 3.2%
Transport: 1.7% increase; 4.6% increase in road diesel, 9.2% reduction in gasoline.
IPPU: 4.7% increase in emissions from clinker production

Agriculture: Dairy cow population increase of 1.9%, in addition to 10.7% increase in fertilizer nitrogen use

Residential, Public and Commercial services (1A4a and 1A4b) all show large increases of 7.2%, 7.4% and 6.1% respectively. In 2018 there were 7.6% more degree days

6.16 Italy (national submission)

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

Year 2018
Submission 2019
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]	319782.21	43305.15	17758.10	14875.92	1599.29	427.40	19.26	23.50	397790.84		
1. Energy	330680.01	7855.19	4083.96						342619.15	**132 679**	**209 940**
A. Fuel combustion (sectoral approach)	328196.72	3119.94	4074.71						335391.38	128 498	206 894
1. Energy industries	95408.07	83.25	373.71						95865.03	92 119	3 746
2. Manufacturing industries and construction	53996.40	282.51	942.31						55221.22	34 731	20 490
3. Transport	102534.63	197.59	899.51						103631.73	824	102 807
4. Other sectors	75825.79	2566.25	1878.78						80270.82	824	79 447
5. Other	431.83	-9.65	-19.60						402.58	0	403
B. Fugitive emissions from fuels	2483.29	4735.25	9.25						7227.78	4 182	3 046
1. Solid fuels	0.00	49.33	0.00						49.33	0	49
2. Oil and natural gas	2483.29	4685.91	9.25						7178.44	4 182	2 997
C. CO_2 transport and storage	0.00								0.00	0	0
2. Industrial processes and product use	15214.09	43.84	563.40	14875.92	1599.29	427.40	19.26	23.50	32766.70	**13 814**	**18 953**
A. Mineral industry	10919.71								10919.71	10 653	267
B. Chemical industry	1546.14	4.21	105.83	0.00	1478.00	0.00	0.00	NA	3134.18	1 546	1 589
C. Metal industry	1689.85	39.63	0.00	10.01	0.00	0.00	0.00	0.00	1739.49	1 615	124
D. Non-energy products from fuels and solvent use	1058.39	0.00	0.00						1058.39	0	1 058
E. Electronic Industry				9.02	121.29	65.95	19.26	23.50	239.03	0	239
F. Product uses as ODS substitutes				14856.89	0.00	0.00	0.00	NA	14856.89	0	14 857
G. Other product manufacture and use	NO	0.00	457.56	0.00	0.00	361.45	0.00	NA	819.01	0	819
H. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
3. Agriculture	435.92	19544.55	10660.59						30641.07		
A. Enteric fermentation		14230.42							14230.42		
B. Manure management		3746.09	2258.69						6004.78		
C. Rice cultivation		1553.04							1553.04		
D. Agricultural soils		0.00	8398.03						8398.03		
E. Prescribed burning of savannas		0.00	0.00						0.00		
F. Field burning of agricultural residues		15.00	3.87						18.87		
G. Liming	17.47								17.47		
H. Urea application	418.45								418.45		
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]	-26639.00	513.00	438.82						-25687.18		
A. Forest land	-28042.00	416.75	3.31						-27621.94		
B. Cropland	1006.00	2.75	12.86						1021.61		
C. Grassland	-4380.00	93.50	74.09						-4212.41		
D. Wetlands	87.00	NO	NO						87.00		
E. Settlements	4307.00	NO,NE	265.70						4572.70		
F. Other land	NO	NO	NO						0.00		
G. Harvested wood products	383.00								383.00		
H. Other	NA	0.00	NO						0.00		
5. Waste	91.20	15348.57	2011.33						17451.09		
A. Solid waste disposal	0.00	12699.24							12699.24		
B. Biological treatment of solid waste		149.65	646.03						795.68		
C. Incineration and open burning of waste	91.20	54.36	18.89						164.45		
D. Waste water treatment and discharge		2445.32	1346.41						3791.73		
E. Other	NO	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									20342.68		
Aviation									11583.55		
Navigation									8759.13		
Multilateral operations									0.00		
CO_2 emissions from biomass									57378.95		
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									423478.01	**146 493**	**276 985**
Total CO_2 equivalent emissions with land use, land-use change and forestry									397790.84		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									423478.01		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									397790.84		

[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 national emissions without LULUCF are expected to decrease in 2018 with respect 2017 (-1.0%) as a consequence of different trends of the main drivers; in particular emissions from energy production are reduced because an increase of hydroelectric production, as well as domestic heating and landfills management are expected to reduce, while emissions for road transport should slightly increase.

6.17 Latvia (national submission)

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

Year 2018
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)									CO_2 equivalent (kt)	
Total (net emissions)[1]	7851.06	1722.58	1950.86	246.42	NA,NO	10.11	NA,NO	NA,NO	11781.04		
1. Energy	7204.51	295.91	193.36						7693.78	2 031	5663.06
A. Fuel combustion (sectoral approach)	7204.50	171.89	193.36						7569.75	2 031	5539.02
1. Energy industries	1893.77	15.32	24.10						1933.18	1 591	341.82
2. Manufacturing industries and construction	711.35	14.99	38.14						764.48	394	370.92
3. Transport	3293.54	3.97	49.62						3347.13	NA	3347.13
4. Other sectors	1294.46	137.59	81.41						1513.47	46	1467.66
5. Other	11.38	0.02	0.09						11.49	NO	11.49
B. Fugitive emissions from fuels	0.01	124.02	NA,NO						124.03	NO	124.03
1. Solid fuels	NO	NO	NA,NO						NA,NO	NO,NA	NO,NA
2. Oil and natural gas	0.01	124.02	NO						124.03	NA	124.03
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	602.06	0.00	2.13	246.42	NA,NO	10.11	NA,NO	NA,NO	860.72	581.87	302.00
A. Mineral industry	558.72								558.72	581.87	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	43.34	NO,NA	NO,NA						43.34	NA	43.34
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				246.42	NO	NO	NO	NO	246.42	NA	246.42
G. Other product manufacture and use	NO	NO	2.13	NO	NO	10.11	NO	NO	12.24	NO	12.24
H. Other	NO,NA	NO,NA	NO,NA	NA	NA	NA	NA	NA	NA,NO	NO,NA	NO,NA
3. Agriculture	44.49	944.27	1703.78						2692.53	NA	2692.53449
A. Enteric fermentation		848.47							848.47	NA	848.469902
B. Manure management		95.80	83.18						178.98	NA	178.97632
C. Rice cultivation		NO							NO	NA	NO
D. Agricultural soils		NE	1620.60						1620.60	NA	1620.59913
E. Prescribed burning of savannas		NO	NO						NO	NA	NO
F. Field burning of agricultural residues		NO	NO						NO	NA	NO
G. Liming	34.38								34.38	NA	34.3786667
H. Urea application	10.11								10.11	NA	10.1104667
I. Other carbon-containing fertilizers	NE								NE	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	0.00	482.40	51.59						534.00	NA	534.00
A. Solid waste disposal	NA,NO	373.20							373.20	NA	373.20
B. Biological treatment of solid waste		27.70	19.81						47.51	NA	47.51
C. Incineration and open burning of waste	0.00	NA,NO	0.00						0.00	NA	0.00
D. Waste water treatment and discharge		81.50	31.78						113.28	NA	113.28
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	1151.04	1.15	85.82						1238.01		
Aviation	466.36	0.14	42.91						509.41		
Navigation	684.68	1.01	42.91						728.60		
Multilateral operations	NA	NA	NA						NA		
CO_2 emissions from biomass	90.27								90.27		
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]	19.13										
Total CO_2 equivalent emissions without land use, land-use change and forestry									11781.04	2612.60	9191.59
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									11800.17		
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 2018 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 2017 level. Compared to previous inventory (GHG inventory submission to UNFCCC on 12th of April 2019) Latvia`s total GHG emissions excluding LULUCF, including indirect CO2 have increased by 4.2% in 2018. 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% (23.17 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 2018. 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 increased by 11.5% in 2018 in comparison with 2017. In 2018 emissions in sector 1A1 Energy Industries have increased by 24.8% compared to 2017 due to increase use of natural gas in sector (25.1%) as well as increase use of liquid and solid fuels, peat and small increase in use of biomass. In sector 1A2 emissions have increased by 14.0% in comparison with 2017. Emission increase in Manufacturing Industries can be explained with overall increase activity in sectors especially Non-Metallic Minerals. In 2018 emissions in sector 1A4 have decreased by 0.1% compared to 2017.
Transport A proxy calculation indicates that total GHG emissions in a transport sector have been increased in 2018 by around 0.7% compare to 2017. The main reason for this trend is fuel consumption increasing by around 0.3% in road transport, mainly diesel oil consumption. GHG emissions have been increased in 2018 compare to 2017 in railway by around 2.2% and in road transport by around 0.4%. The road transport constitutes a convincing majority of the total GHG emissions in the transport sector. In 2018, it gave around 93.6 % of total emissions but the next largest emission source is railway – 5.6%.
IPPU Emissions from IPPU sector in 2018 have been increasing by 17.3% compared to 2017 mainly due to increase of emissions from mineral production especially cement (in 2018 CO2 emissions from Cement production increased by 25.4% in comparison to 2017). The only lime production company stopped lime production from dolomite since 2016 thus CO2 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 CO2 emissions thus CO2 and CH4 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 4.6% compared to 2017. **Solvents** Activity data for the Solvent Use sector was not available in 2018. There is a stability in trends of CO2 emissions from Solvent use sector in later 3 years either, therefore emissions in 2018 were assumed were extrapolated taking into account emission rates from these previous years (average). There are negligible changes in emissions compared with the previous year (+1,06%). For N2O from product use activity data wasn't available in 2018. There is a stability in trends of N2O emissions from N2O 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 (-5.58%).
Agriculture In 2018 GHG emissions from agricultural sector decreased by 3.2% compare to previous year. The most important key drivers of the decrease of emissions were activity data.The number of dairy cows decreased by 3.9%, the total number of cattle decreased by 2.6%. The number of pigs decreased by 4.9%. The statistical data also represented the decrease of fur-bearing animals by 48.4%, rabbits by 11.3%, goats by 4.7%, horses by 5.6% and sheep by 4.4%. The use of nitrogen with mineral fertilizers decreased by 3.7%, also the organic fertilizers application was less than in 2017. The total sown are in 2018 decreased by 0.5% compare to 2017.
Waste In 2018 GHG emissions from Waste Management sector decreased by 5.5% compare to previous year. Emissions from solid waste disposal and composting are in same level as in previous submissions. Activity data for these categories do not change significantly. Emissions from waste incineration decreased by 98.4% due to decrease of incinerated waste amount without energy recovery. Despite of main driving forces (decrease of national population, decrease of industrial waste water and increase of quality of waste water treatment, annual fluctuations in sewage sludge production was reason for small increase of emissions.

6.18 Lithuania (national submission)

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

Year 2018
Submission 2019
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]	10386.84	3053.91	2997.07	657.25	NO	6.41	NO	0.03	17101.51		
1. Energy	11025.62	503.50	139.47						11668.59	**3 241**	**8 426**
A. Fuel combustion (sectoral approach)	10771.51	204.86	139.45						11115.82	2 990	**8 124**
1. Energy industries	2387.15	22.81	36.49						2446.46	2 346	**101**
2. Manufacturing industries and construction	1274.10	4.91	13.43						1292.44	634	**658**
3. Transport	5776.82	18.73	48.12						5843.67	5	**5 837**
4. Other sectors	1307.78	158.40	41.19						1507.37	5	**1 502**
5. Other	25.66	0.00	0.21						25.88	NA	**26**
B. Fugitive emissions from fuels	254.11	298.64	0.01						552.77	251	**302**
1. Solid fuels	NO	NO	NO						NO	NA	**NO**
2. Oil and natural gas	254.11	298.64	0.01						552.77	251	**302**
C. CO_2 transport and storage	NO								NO	NO	**NO**
2. Industrial processes and product use	2420.84	NO	180.61	657.25	NO	6.41	NO	0.03	3265.13	**2 712**	**903**
A. Mineral industry	539.50								539.50	536	**3**
B. Chemical industry	1825.37	NO	175.50	NO	NO	NO	NO	NO	2000.87	2 176	**175**
C. Metal industry	1.86	NO	NO	NO	NO	NO	NO	NO	1.86	NO	**2**
D. Non-energy products from fuels and solvent use	54.11	NO	NO						54.11	NO	**54**
E. Electronic Industry				NO	NO	5.93	NO	0.03	5.96	NO	**6**
F. Product uses as ODS substitutes				657.25	NO	NO	NO	NO	657.25	NO	**657**
G. Other product manufacture and use	NO	NO	5.11	NO	NO	0.48	NO	NO	5.59	NO	**5.59**
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	**NO**
3. Agriculture	29.97	1736.41	2511.11						4277.48		
A. Enteric fermentation		1509.42							1509.42		
B. Manure management		226.99	177.59						404.58		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NA	2333.52						2333.52		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	11.45								11.45		
H. Urea application	18.51								18.51		
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	-3090.74	0.31	98.64						-2991.79		
A. Forest land	-5103.61	0.06	35.66						-5067.89		
B. Cropland	2540.43	0.00	53.63						2594.06		
C. Grassland	-905.27	0.25	0.27						-904.75		
D. Wetlands	856.45	NO,NE	5.04						861.49		
E. Settlements	831.81	NO	0.00						831.81		
F. Other land	47.44	NO,NE	4.04						51.48		
G. Harvested wood products	-1357.99								-1357.99		
H. Other	NO	NO	NO						NO		
5. Waste	1.16	813.69	67.25						882.10		
A. Solid waste disposal	NO	613.01							613.01		
B. Biological treatment of solid waste		61.95	23.96						85.91		
C. Incineration and open burning of waste	1.16	0.00	0.03						1.20		
D. Waste water treatment and discharge		138.74	43.25						181.99		
E. Other	NO	NO	NO						NO		
6. Other *(as specified in summary 1.A)*										NA	

Memo items:[2]											
International bunkers	877.26	1.32	7.04						885.61		
Aviation	330.04	0.06	2.74						332.84		
Navigation	547.22	1.26	4.29						552.77		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	5970.94								5970.94		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	3874.59								3874.59		
Indirect N_2O			NO, NE								
Indirect CO_2[3]	NE										
Total CO_2 equivalent emissions without land use, land-use change and forestry									20093.31	5952.94	
Total CO_2 equivalent emissions with land use, land-use change and forestry									17101.51		
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.	
1. Energy	compensated by a decrease in energy industries subsector in 2018. This happened mainly because the only oil refinery reduced its fuel gas and natural gas consumption. An increase of GHG emissions in manufacturing industries was influenced by increased activity level of cement production (where coal is consumed) and by increased natural gas consumption in non-ETS industries. Fugitive CO2 emissions from oil increased significantly because emissions form hydrogen production in oil refinery were included in this submission.
2. IPPU	Emissions from IPPU sector in 2018 have decreased by 10% compared to 2017. Emissions have decreased due to decrease of production in chemical industry and due to restrictions of F-gases Regulation (EU) No 517/2014.
3. Agriculture	Emissions from agriculture sector in 2018 have decreased by 3% compared to 2017. 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. The decrease of agriculture soils emissions is related mainly to the decrease of crop harvest and area harvested due to adverse weather
4. LULUCF	Reduced GHG removals in LULUCF sector are mainly determined by reduced GHG removals in forest land. Reduced GHG removals in forest land results from lower growing stock volume change compared to the previous year, which might be affected by natural/climatic factors.
5. Waste	Emissions from waste sector in 2018 have decreased by 15% compared to 2017. Emissions have decreased due to increase of the recovered gas for energy use.

6.19 Luxembourg (national submission)

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

Year 2018
Submission 2020
Country Luxembourg
Geographical scope[4] Luxembourg

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]	9572.98	591.30	321.98	64.63	NA,NO	9.85	NA,NO	NA,NO	10560.74		
1. Energy	8990.77	50.36	71.32						9112.45	**922**	**8 190**
A. Fuel combustion (sectoral approach)	8990.72	18.65	71.32						9080.70	922	**8 159**
1. Energy industries	213.62	2.86	4.50						220.97	46	**175**
2. Manufacturing industries and construction	1055.39	1.64	7.81						1064.84	876	**188**
3. Transport	6059.53	1.10	54.01						6114.65	NA	**6 115**
4. Other sectors	1662.07	13.06	4.99						1680.12	NA	**1 680**
5. Other	0.11	0.00	0.00						0.12	NA	**0**
B. Fugitive emissions from fuels	0.04	31.71	NA,NO						31.75	NA	**32**
1. Solid fuels	NO	NO	NO						NO	NO	**NO**
2. Oil and natural gas	0.04	31.71	NA,NO						31.75	NA	**32**
C. CO_2 transport and storage	NO								NO	NO	**NO**
2. Industrial processes and product use	574.83	NA,NO	4.45	64.63	NA,NO	9.85	NA,NO	NA,NO	653.76	**547**	**107**
A. Mineral industry	434.89								434.89	432	**2**
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	114	**-5**
D. Non-energy products from fuels and solvent use	30.45	NA	NA						30.45	NA	**30**
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	**NO**
F. Product uses as ODS substitutes				59.74	NO	NO	NO	NO	59.74	NA	**60**
G. Other product manufacture and use	NO	NO	4.45	4.89	NO	9.85	NO	NO	19.19	NA	**19**
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	**NO**
3. Agriculture	7.39	464.88	236.70						708.97		
A. Enteric fermentation		403.50							403.50		
B. Manure management		61.38	35.41						96.79		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NA	201.29						201.29		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	7.39								7.39		
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]	-331.84	NO	8.76						-323.08		
A. Forest land	-393.03	NO	NO						-393.03		
B. Cropland	35.17	NO	3.04						38.22		
C. Grassland	-39.61	NO	0.17						-39.44		
D. Wetlands	4.24	NO	0.38						4.63		
E. Settlements	61.23	NO	5.16						66.39		
F. Other land	0.15	NO	0.01						0.16		
G. Harvested wood products	NO	NO	NO						NO		
H. Other	NO	NO	NO						NO		
5. Waste	NA,NO	76.06	9.51						85.56		
A. Solid waste disposal	NA	51.84	NO						51.84		
B. Biological treatment of solid waste		21.32	5.14						26.46		
C. Incineration and open burning of waste	IE	IE	IE						IE		
D. Waste water treatment and discharge		2.90	4.36						7.26		
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									10560.74	1468.88302	9091.85955
Total CO_2 equivalent emissions with land use, land-use change and forestry									10237.66		
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 driver for the increase in GHG emissions in 2018 compared to 2017 is the increased liquid fuel consumption in the transportation sector(approx. + 456 Gg CO2 eq), resulting in an increase of total GHG emissions (without LULUCF) of +3% in 2018 compared to 2017.

6.20 Malta (national submission)

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

Year 2018
Submission 2019
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]	1589.72	198.35	39.69	346.13	0.00	0.90	NO	NO	2174.79		
1. Energy	**1580.26**	**3.41**	**3.01**						**1586.68**	**697.86**	**888.82**
A. Fuel combustion (sectoral approach)	1580.26	3.41	3.01						1586.68	697.86	**888.82**
1. Energy industries	697.86	0.94	2.24						701.03	697.86	**3.18**
2. Manufacturing industries and construction	36.73	0.03	0.07						36.83		**36.83**
3. Transport	600.12	1.43	0.01						601.56		**601.56**
4. Other sectors	242.28	1.00	0.68						243.95		**243.95**
5. Other	3.28	0.01	0.01						3.30		**3.30**
B. Fugitive emissions from fuels	NO	NO	NO						NO		
1. Solid fuels	NO	NO	NO						NO		
2. Oil and natural gas	NO	NO	NO						NO		
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	**5.14**	**0.00**	**0.91**	**346.13**	**0.00**	**0.90**	**NO**	**NO**	**353.08**		**353.08**
A. Mineral industry	0.31								0.31		**0.31**
B. Chemical industry	0.04	NO	NO	NO	NO	NO	NO	NO	0.04		**0.04**
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO		**NO**
D. Non-energy products from fuels and solvent use	4.79	NA	NA						4.79		**4.79**
E. Electronic Industry				0.24	NO	NO	NO	NO	0.24		**0.24**
F. Product uses as ODS substitutes				345.89	NO	NO	NO	NO	345.89		**345.89**
G. Other product manufacture and use	NO	NO	0.91	NO	0.00	0.90	NO	NO	1.81		**1.81**
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO		**NO**
3. Agriculture	**0.00**	**36.29**	**29.47**						**65.76**		65.76
A. Enteric fermentation		31.66							31.66		
B. Manure management		4.63	10.19						14.82		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NO	19.28						19.28		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	NO								NO		
H. Urea application	NE								NE		
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	**3.88**	**NO, NE**	**NO, NE, IE**						**3.88**		**3.88**
A. Forest land	NO	NO	NO						NO		
B. Cropland	2.64	NO, NE	NO, NE, IE						2.64		
C. Grassland	-0.28	NO, NE	NO, NE						-0.28		
D. Wetlands	NO, NE	NO	NO						NO, NE		
E. Settlements	0.73	NO	NO						0.73		
F. Other land	0.79	NO	NO						0.79		
G. Harvested wood products	NO								NO		
H. Other	NO	NO	NO						NO		
5. Waste	**0.44**	**158.66**	**6.30**						**165.39**		**165.39**
A. Solid waste disposal	NO, NA	154.93							154.93		
B. Biological treatment of solid waste		0.78	NO, NA						0.78		
C. Incineration and open burning of waste	0.44	0.00	0.13						0.56		
D. Waste water treatment and discharge		2.94	6.17						9.12		
E. Other	NO	NO	NO						NO		
6. Other ***(as specified in summary 1.A)***	NO	NO	NO	NO	NO	NO	NO	NO	NO	0	0

Memo items:[2]											
International bunkers	5558.20	17.96	13.33						5589.50		
Aviation	346.73	1.01	1.21						348.95		
Navigation	5211.47	16.95	12.13						5240.55		
Multilateral operations									NO		
CO_2 emissions from biomass	32.11								16.19		
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									2170.91	697.86	1 473.06
Total CO_2 equivalent emissions with land use, land-use change and forestry									2174.79		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									2170.91		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									2174.79		

[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.

Overall, approximated total national emissions for 2018 are 1% higher than emissions reported for 2017.
The main contributors to this overall increase, in terms of percentage increase in absolute emissions, are: category 1A4 (Other sectors), which represents an increase of 12% compared to 2017 emission levels; sector 2 (IPPU) with an overall increase of more than 11% compared to 2017 emissions, mainly driven by an increase in emissions for category 2F (Product uses as ODS substitutes); and, sector 5 (Waste) which shows an increase of more than 9% compared to 2017 levels, this increase driven primarily by an increase in emissions for category 5.A (Solid waste disposal). In all instances, the increases observed continue trends seen over the last years.

6.21 Netherlands (national submission)

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

Year 2018
Submission Proxy (preliminary estimate 2017)
Country NLD
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]	166085.15	17339.00	8634.54	1945.71	163.01	123.69	NO	NO,IE	194291.10		
1. Energy	153336.46	2167.68	624.57						156128.71	**81 231**	**74 898**
A. Fuel combustion (sectoral approach)	152224.57	1627.25	624.57						154476.38	**80 173**	**74 304**
1. Energy industries	60015.25	107.16	274.92						60397.34	56 175	4 223
2. Manufacturing industries and construction	28111.29	64.19	40.81						28216.28	23 267	4 950
3. Transport	31130.32	63.59	252.62						31446.53	0	31 447
4. Other sectors	32816.03	1391.98	53.89						34261.91	731	33 531
5. Other	151.68	0.32	2.32						154.32	0	154
B. Fugitive emissions from fuels	1111.90	540.43	NO,IE,NA						1652.33	1 058	594
1. Solid fuels	74.84	4.84	NO						79.68	IE	IE
2. Oil and natural gas	1037.06	535.59	NO,IE,NA						1572.65	IE	IE
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	7297.94	331.60	1436.20	1945.71	163.01	123.69	NO	NO,IE	11298.15	**6 184**	**5 114**
A. Mineral industry	1495.06								1495.06	930	565
B. Chemical industry	5422.76	287.85	1352.19	247.25	96.94	NO	NO	NO,IE	7406.98	5 211	2 196
C. Metal industry	19.43	NO,IE,NA	NO	NO	22.48	NO	NO		41.91	42	0
D. Non-energy products from fuels and solvent use	324.03	0.31	NO,NA						324.35	0	324
E. Electronic Industry				NO	43.59	NO	NO	NO,IE	43.59	0	44
F. Product uses as ODS substitutes				1698.46	NO	NO	NO	NO	1698.46	0	1 698
G. Other product manufacture and use	0.75	43.44	84.02	NO	NO	123.69			251.90	0	252
H. Other	35.90	NO	NO						35.90	0	36
3. Agriculture	46.87	12080.49	6307.85						18435.21		
A. Enteric fermentation		8260.58							8260.58		
B. Manure management		3819.91	771.07						4590.99		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NO	5536.77						5536.77		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	46.87								46.87		
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]	5403.88	0.32	96.20						5500.41		
A. Forest land	-1835.60	0.27	4.00						-1831.34		
B. Cropland	1737.36	NO,NE,IE	47.54						1784.91		
C. Grassland	3645.00	0.05	7.07						3652.13		
D. Wetlands	37.85	NO,NE,IE	2.61						40.46		
E. Settlements	1562.53	NO	26.30						1588.84		
F. Other land	167.21	NO	8.68						175.88		
G. Harvested wood products	89.53								89.53		
H. Other	IE,NE,NO	IE,NE,NO	IE,NE,NO						NO,NE,IE		
5. Waste	NO,IE,NA	2758.91	169.72						2928.63		
A. Solid waste disposal	NO,NA	2417.45							2417.45		
B. Biological treatment of solid waste		119.97	90.18						210.15		
C. Incineration and open burning of waste	NO,IE,NA	4.15	2.57						6.72		
D. Waste water treatment and discharge		217.35	76.97						294.31		
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	48028.11	83.29	378.19						48489.59		
Aviation	12158.26	2.13	101.35						12261.74		
Navigation	35869.84	81.16	276.85						36227.85		
Multilateral operations	IE	IE	IE						IE		
CO_2 emissions from biomass	13719.71								13719.71		
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]	453.05										
ent emissions without land use, land-use change and forestry									188 790.69	87 414.26	101 376.43
valent emissions with land use, land-use change and forestry									194291.10		
Total CO_2 equivalent emissions, including indirect CO_2,									189243.74		
ng indirect CO_2, with land use, land-use change and forestry									194744.14		

(1) For carbon dioxide (CO_2) from land use, land-use change and
(2) See footnote 7 to table Summary 1.A.
(3) In accordance with the UNFCCC Annex I inventory reporting
(4) Where applicable: for Member States with geographical scopes which differ between the Kyoto Protocol, the EU-

Brief description of the key drivers underpinning the increase or decrease in GHG emissions in t-1

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

Energy

Energy industries: decrease due to less coal combustion and more electricity import

Industry

Increased CO2 emissions as result of economic growth in the chemical sector

Agriculture

Enteric fermentation: decreased number of cattle and pigs

Manure management: decreased number of cattle and pigs

6.22 Norway (national submission)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS								Year	2018		
(Sheet 1 of 1)								Submission	2019		
								Country	NOR		
								Geographical scope[4]			
Total (net emissions)(1)	**43 933.79**	**5 059.43**	**2 389.36**	**1 372.95**	**136.82**	**56.50**			**52 948.86**	**26 212.48**	**26 735.93**
1. Energy	**37 053.85**	**1 341.96**	**209.13**						**38 604.94**	**19 610.44**	**18 994.04**
A. Fuel combustion (sectoral approach)	*34 690.41*	*478.92*	*206.64*						*35 375.97*	*17 472.90*	*17 914.24*
1. Energy industries	15 139.12	125.67	30.81						15 295.60	14 072.73	1 234.05
2. Manufacturing industries and construction	4 038.89	12.38	35.22						4 086.48	2 297.60	1 788.88
3. Transport	12 833.69	167.32	107.80						13 108.80	1 102.57	12 006.23
4. Other sectors	2 597.44	173.36	30.82						2 801.63		2 801.63
5. Other	81.27	0.19	1.99						83.45	-	83.45
B. Fugitive emissions from fuels	*2 352.96*	*863.04*	*2.49*						*3 218.49*	*2 137.54*	*1 069.32*
1. Solid fuels	8.82	72.65	NO,NA						81.47		81.47
2. Oil and natural gas	2 344.14	790.39	2.49						3 137.02	2 149.17	987.85
C. CO2 transport and storage	*10.49*								*10.49*		*10.49*
2. Industrial processes and product use	**6 774.24**	**18.49**	**310.58**	**1 372.95**	**136.82**	**56.50**			**8 669.58**	**6 602.04**	**2 067.54**
A. Mineral industry	1 024.54								1 024.54	1 008.51	16.03
B. Chemical industry	674.47	17.23	285.24	NO,NA	NO,NA	NO,NA			976.95	843.94	133.00
C. Metal industry	4 689.53	1.25	4.39		136.82	NO			4 832.00	4 749.58	82.42
D. Non-energy products from fuels and solvent use	271.98	-	-						271.98		271.98
E. Electronic Industry						1.01			1.01		1.01
F. Product uses as ODS substitutes				1 372.95	NO				1 372.95		1 372.95
G. Other product manufacture and use	-	NO	20.95			55.49			76.44		76.44
H. Other	113.71	NA	NA						113.71		113.71
3. Agriculture	**-**	**2 614.40**	**1 757.71**						**4 372.11**		**4 372.11**
A. Enteric fermentation		2 329.16							2 329.16		2 329.16
B. Manure management		282.34	146.77						429.11		429.11
C. Rice cultivation		NO							-		-
D. Agricultural soils		NE	1 610.06						1 610.06		1 610.06
E. Prescribed burning of savannas		NO	NO						-		-
F. Field burning of agricultural residues		2.90	0.88						3.78		3.78
G. Liming	-								-		-
H. Urea application	-								-		-
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	**105.71**	**1 084.59**	**111.93**						**1 302.23**		**1 302.23**
A. Solid waste disposal	NO	977.70							977.70		977.70
B. Biological treatment of solid waste		41.67	32.60						74.27		74.27
C. Incineration and open burning of waste	105.71	0.11	0.01						105.83		105.83
D. Waste water treatment and discharge		65.11	79.32						144.43		144.43

(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

(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

The increased net emissions of about 0,2 million tonnes from 2017 (inventory 2019) to 2018 (proxy data) is mainly a result of:
1) decreased use of biofuels in the transport sector (CRF 1A3). Statistics per July 2019 indicates that 2019 consumption will be back on 2017 level.
2) and increased use of fuels for other transport

Please note that we do not have proxy data for Memo items (row 56-65).

6.23 Poland (national submission)

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

Year **2018**
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	**319 502.33**	**23 564.97**	**2 777.04**						**345 844.33**		
A. Fuel combustion (sectoral approach)	314 901.43	3 862.55	2 776.41						321 540.39		
1. Energy industries	163 843.82	92.38	737.31						164 673.51		
2. Manufacturing industries and construction	31 023.54	125.22	206.82						31 355.58		
3. Transport	64 995.69	145.06	736.46						65 877.21		
4. Other sectors	55 038.38	3 499.90	1 095.82						59 634.09		
5. Other	NO,IE	NO,IE	NO,IE						NO,IE		
B. Fugitive emissions from fuels	4 600.90	19 702.41	0.63						24 303.94		
1. Solid fuels	2 740.38	16 867.18	NA						19 607.56		
2. Oil and natural gas	1 860.52	2 835.23	0.63						4 696.38		
C. CO_2 transport and storage											
2. Industrial processes and product use	**19 205.65**	**62.00**	**875.96**	**6 893.27**	**11.92**	**82.43**	NO,NA	NO,NA	**27 131.23**		
A. Mineral industry	11 505.66								11 505.66		
B. Chemical industry	4 633.00	48.63	743.02	NO	NO	NO	NO	NO	5 424.66		
C. Metal industry	2 342.08	13.37	NA	NA	NO,NA	4.15	NA	NA	2 359.60		
D. Non-energy products from fuels and solvent use	724.90	NO,NA	NO,NA						724.90		
E. Electronic Industry				NO	NO	NO	NO	NO	NO		
F. Product uses as ODS substitutes				6 893.27	11.92				6 905.19		
G. Other product manufacture and use	NA	NA	132.94	NA	NA	78.29	NA	NA	211.23		
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO		
3. Agriculture	**952.73**	**14 566.31**	**16 642.64**						**32 161.68**		
A. Enteric fermentation		12 992.63							12 992.63		
B. Manure management		1 550.34	2 242.54						3 792.87		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NA	14 389.81						14 389.81		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		23.34	10.30						33.64		
G. Liming	526.93								526.93		
H. Urea application	425.80								425.80		
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	**-37 439.85**	**37.53**	**3 556.18**						**-33 846.14**		
A. Forest land	-36 893.95	36.30	1.36						-36 856.30		
B. Cropland	848.95	NO,NA	2 307.77						3 156.72		
C. Grassland	-566.82	1.23	0.23						-565.36		
D. Wetlands	1 502.87	NO,NA	NO,NA						1 502.87		
E. Settlements	2 392.30	NO	1 246.82						3 639.13		
F. Other land	NO,NA	NO,NA	NO,NA						NO,NA		
G. Harvested wood products	-4 723.20								-4 723.20		
H. Other	NA	NA	NA						NA		
5. Waste	**598.39**	**11 450.26**	**901.88**						**12 950.53**		
A. Solid waste disposal	NO,NA	8 815.76							8 815.76		
B. Biological treatment of solid waste		93.87	67.13						161.00		
C. Incineration and open burning of waste	598.39	0.00	74.80						673.19		
D. Waste water treatment and discharge		2 540.63	759.95						3 300.58		
E. Other											
6. Other *(as specified in summary 1.A)*											

Memo items:[2]											
International bunkers	3 331.51	2.39	27.47						3 361.38		
Aviation	2 495.91	0.44	20.81						2 517.15		
Navigation	835.60	1.96	6.66						844.22		
Multilateral operations	NA	NA	NA						NA		
CO_2 emissions from biomass	32 342.80								32 342.80		
CO_2 captured	NO,IE,NA								NO,IE,NA		
Long-term storage of C in waste disposal sites	45 732.94								45 732.94		
Indirect N_2O			NA								
Indirect CO_2 [3]	NA										
Total CO_2 equivalent emissions without land use, land-use change and forestry									**418 087.77**	**199 973.130**	**217 982.124**
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 1.0% between 2017 and 2018 Main drivers for change in GHG emissions 2017/2018: **1. Energy - stationary fuel combustion** The main reason of increase of GHG emission from fuel combustion in stationary sources (by 0.5%) is increase in consumption of hard coal (by 2.8 %) and natural gas (by 2.6 %) **1. Energy - transport:** Increase in emissions triggered by growing fuels use: petrol by 8%, diesel by 3% and LPG by 1% **2. Industrial processes and product use:** Generally slight increase in emissions by about 0.7% is observed, mostly due to increase in production of clinker (by almost 10%) **3. Agriculture:** Increase in emissions (by about 1.3%) relates mostly to the higher livestock population (cattle by 0.9%, sheep by 5.9%, swine by 4.2%, poultry by 4.4%) as well as to increased use of inorganic fertilisers (Nitrogen fertlizers by about 2.5% and liming by 4.4%) **5. Waste** Decrease of emissions is driven by depopulation of Poland (-0.06%) **4. LULUCF and Memo items** the same as for 2017

6.24 Portugal (national submission)

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

Year **Proxy 2018**
Submission **July 2019**
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]	**42 907.60**	**9 580.21**	**3 395.21**	**3 395.05**	**18.12**	**25.25**	**NO**	**NO**	**59 321.44**		
1. Energy	**47 127.38**	**395.66**	**550.37**						**48 073.40**	**23 769**	**24 305**
A. Fuel combustion (sectoral approach)	46 006	333	547						46 887	22 663	24 224
1. Energy industries	17 472	14	150						17 636	17 304	333
2. Manufacturing industries and construction	7 412	50	91						7 553	4 824	2 729
3. Transport	17 121	24	158						17 304	535	16 768
4. Other sectors	3 957	245	147						4 350	0	4 350
5. Other	44	0	0						44	0	44
B. Fugitive emissions from fuels	1 121	63	3						1 187	1 106	81
1. Solid fuels	0	17	0						17	15	1
2. Oil and natural gas	1 121	46	3						1 170	1 090	80
C. CO_2 transport and storage	0.00	0.00	0.00						0.00	0.00	0.00
2. Industrial processes and product use	**4136.19**	**46.65**	**90.20**	**3395.05**	**18.12**	**25.25**	**0.00**	**0.00**	**7711.46**	**3 112**	**4 600**
A. Mineral industry	3165.87								3165.87	2 925	241
B. Chemical industry	682.01	27.30	50.98	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	760.29	145	615
C. Metal industry	53.48	18.21	NO	NO	NO	NO	NO	NO	71.69	41	30
D. Non-energy products from fuels and solvent use	234.84	1.14	NO						235.98	0	236
E. Electronic Industry				NE	NE	NE	NE	NO	NO,NE	0	NO,NE
F. Product uses as ODS substitutes				3395.05	18.12				3413.17	0	3 413
G. Other product manufacture and use	NO	NO	39.22	NO	NO	25.25	NO	NO	64.46	0	64
H. Other	NO	NO	NO						NO	0	NO
3. Agriculture	**63.27**	**4 628.56**	**2 233.83**						**6 925.65**	**0**	**6 926**
A. Enteric fermentation		3 716.49							3 716.49	0	3 716
B. Manure management		740.78	180.91						921.69	0	922
C. Rice cultivation		138.22							138.22	0	138
D. Agricultural soils		NO	2 033.69						2 033.69	0	2 034
E. Prescribed burning of savannas		NO	NO						NO	NO	NO
F. Field burning of agricultural residues		33.06	19.23						52.29	0	52
G. Liming	6.62								6.62	0	7
H. Urea application	56.64								56.64	0	57
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]	**-8 447.76**	**94.69**	**322.27**						**-8 030.80**		
A. Forest land	-10 766	58.37	31.73						-10 675.77		
B. Cropland	540.27	3.31	46.96						590.53		
C. Grassland	64.22	1.34	26.06						91.63		
D. Wetlands	332.04	0.00	26.31						358.34		
E. Settlements	2 320.15	0.00	170.37						2 490.51		
F. Other land	-995.92	31.67	20.84						-943.40		
G. Harvested wood products	57.35	NA	NA						57.35		
H. Other	NO	NO	NO						NO		
5. Waste	**28.52**	**4 414.66**	**198.54**						**4 641.72**	**0**	**4 642**
A. Solid waste disposal	0.00	3 560.40	0.00						3 560.40	0	3 560
B. Biological treatment of solid waste		23.47	14.26						37.73	0	38
C. Incineration and open burning of waste	28.52	0.17	0.83						29.52	0	30
D. Waste water treatment and discharge		830.62	183.45						1 014.07	0	1 014
E. Other	0.00	0.000	0.000						0.001	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]	183.23										

Total CO_2 equivalent emissions without land use, land-use change and forestry	**67 352.24**	**26 880.12**	**40 472.12**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**59 321.44**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**67 535.47**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**59 504.67**		

[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 -6.1% decrease of emissions in the Energy sector is explained with the reduction of consumption of solid and gaseous fuels, due to na increase in hydraulic electric production. Fuel/Energy consumption: http://www.dgeg.pt/ The decrease of emissions in IPPU sector is mostly due to the decrease in cement industry (2A1) emissions. There is an estimated slight increase of about 0.4% in the agriculture GHG emissions mostly due to balance of opposite tendencies of main categories: - 3A (Enteric Fermentation): related to an increase in the livestock - particularly no-dairy cattle and sheep; - 3D (Agriculture Soils): reduction in the application of synthetic fertilisers.
The LULUCF sector, estimated in 2017 as a net emitter as a result of the extreme situation with respect to the extent of forest, shrubland and agriculture burnt areas, is estimated again in 2018 as a sink
The -0.5% estimated slight decrease of emissions in the waste sector are mainly related with the waste divertion from land deposition (5A) in latest years and biogas recovery.

6.25 Romania (EEA calculations)

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

Proxy inventory 2018
EEA calculations 2019v1
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]	51714.18	28727.57	9678.18	2177.68	5.83	54.19	NO	NO	92357.63		
1. Energy	64065.75	10678.01	607.22						75350.98		
A. Fuel combustion (sectoral approach)	63542.15	1103.36	606.39						65251.89		
1. Energy industries	23745.20	12.97	86.28						23844.45		
2. Manufacturing industries and construction	11581.10	23.68	37.99						11642.76		
3. Transport	17665.88	35.29	221.31						17922.48		
4. Other sectors	9906.26	998.14	254.18						11158.58		
5. Other	643.71	33.28	6.63						683.62		
B. Fugitive emissions from fuels	523.61	9574.65	0.83						10099.08		
1. Solid fuels	NO,NA	5956.64	NO,NA						5956.64		
2. Oil and natural gas	523.61	3618.01	0.83						4142.44		
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	11039.67	9.42	253.09	2177.68	5.83	54.19	NO	NO	13539.88		
A. Mineral industry	4782.15								4782.15		
B. Chemical industry	1086.46	5.13	250.04	NO	NO	NO	NO	NO	1341.63		
C. Metal industry	3994.01	4.29	NO	NO	5.83	NO,NA	NO	NO	4004.13		
D. Non-energy products from fuels and solvent use	1177.05	NE	NE						1177.05		
E. Electronic Industry				NO	NO	NO	NO	NO	NO		
F. Product uses as ODS substitutes				2177.68	NO	NO	NO	NO	2177.68		
G. Other product manufacture and use	NO	NO	3.05	NO	NO	54.19	NO	NO	57.25		
H. Other	NO,NE	NO,NE	NO,NE	NO	NO	NO	NO	NO	NO,NE		
3. Agriculture	124.60	12718.07	6413.03						19255.69		
A. Enteric fermentation		10842.90							10842.90		
B. Manure management		1492.31	616.48						2108.79		
C. Rice cultivation		60.96							60.96		
D. Agricultural soils		NE	5679.30						5679.30		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		321.90	117.24						439.14		
G. Liming	57.36								57.36		
H. Urea application	67.24								67.24		
I. Other carbon-containing fertilizers	NA								NA		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	-23525.34	1.99	1843.32						-21680.03		
A. Forest land	-22553.89	1.99	27.44						-22524.46		
B. Cropland	-2069.94	NO,IE	425.84						-1644.10		
C. Grassland	453.54	NO	31.34						484.88		
D. Wetlands	1515.66	NO	33.00						1548.66		
E. Settlements	3682.48	NO	249.76						3932.24		
F. Other land	806.60	NO,NA	1075.94						1882.54		
G. Harvested wood products	-5359.79								-5359.79		
H. Other	NA	NA	NA						NA		
5. Waste	9.50	5320.09	561.53						5891.12		
A. Solid waste disposal	NA	3612.96							3612.96		
B. Biological treatment of solid waste		35.26	25.22						60.47		
C. Incineration and open burning of waste	9.50	0.03	1.49						11.02		
D. Waste water treatment and discharge		1671.84	534.82						2206.66		
E. Other	NA	NA	NA						NA		
6. Other *(as specified in summary 1.A)*											

Memo items:[2]											
International bunkers	1095.24	1.00	9.68						1105.93		
Aviation	1005.67	0.81	9.01						1015.49		
Navigation	89.58	0.20	0.67						90.44		
Multilateral operations	NA	NA	NA						NA		
CO_2 emissions from biomass	18028.11								18028.11		
CO_2 captured	NO,NA								NO,NA		
Long-term storage of C in waste disposal sites											
Indirect N_2O			1698.51								
Indirect CO_2 [3]	NO,NE										
Total CO_2 equivalent emissions without land use, land-use change and forestry									114037.66	40617.496	73420.16
Total CO_2 equivalent emissions with land use, land-use change and forestry									92357.63		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									114037.66		
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

6.26 Slovakia (national submission)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS									Year	2018	
(Sheet 1 of 1)									Submission	v1.1 (15-07-2019)	
									Country	Slovakia - total territo	
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]	**30 930.50**	**4 535.99**	**1 851.89**	**739.06**	**7.78**	**7.08**	**NO**	**NO**	**38 072.30**		
1. Energy	**27 773.84**	**1 879.41**	**232.26**						**29 885.50**	**13 033.34**	**16 852.17**
A. Fuel combustion (sectoral approach)	27 751.88	245.42	232.25						28 229.55	13 033.34	15 196.21
1. Energy industries	7 158.35	14.15	36.00						7 208.50	6 421.16	787.34
2. Manufacturing industries and construction	7 299.60	18.38	36.49						7 354.47	6 303.33	1 051.14
3. Transport	8 370.69	8.14	93.69						8 472.52	297.47	8 175.05
4. Other sectors	4 858.59	204.16	65.72						5 128.47	11.38	5 117.09
5. Other	64.65	0.59	0.35						65.59	NO	65.59
B. Fugitive emissions from fuels	21.96	1 633.99	0.01						1 655.96	NO	1 655.96
1. Solid fuels	20.68	266.31	0.00						286.99	NO	286.99
2. Oil and natural gas and other emissions from energy production	1.28	1 367.68	0.00						1 368.96	NO	1 368.96
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	**9 174.92**	**2.08**	**175.97**	**739.06**	**7.78**	**7.08**	**NO**	**NO**	**10 106.88**	**9 160.06**	**946.82**
A. Mineral industry	2 262.73								2 262.73	2 254.22	8.51
B. Chemical industry	1 867.38	0.63	106.29	NO	NO	NO	NO	NO	1 974.31	1 972.92	1.38
C. Metal industry	4 931.80	1.44	NO	NO	7.78	NO	NO	NO	4 941.02	4 931.74	9.28
D. Non-energy products from fuels and solvent use	113.01	NO	NO						113.01	1.18	111.83
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				739.06	NO	NO	NO	NO	739.06	NO	739.06
G. Other product manufacture and use	NO	NO	69.67	NO	NO	7.08	NO	NO	76.76	NO	76.76
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
3. Agriculture	**80.72**	**1 088.51**	**1 278.95**						**2 448.18**	**NO**	**2 448.18**
A. Enteric fermentation		960.79							960.79	NO	960.79
B. Manure management		127.72	165.48						293.19	NO	293.19
C. Rice cultivation		NO							NO	NO	NO
D. Agricultural soils		NO	1 113.47						1 113.47	NO	1 113.47
E. Prescribed burning of savannahs		NO	NO						NO	NO	NO
F. Field burning of agricultural residues		NO	NO						NO	NO	NO
G. Liming	16.73								16.73	NO	16.73
H. Urea application	64.00								64.00	NO	64.00
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]	**-6 101.97**	**20.92**	**32.04**						**-6 049.00**		
A. Forest land	-3 794.39	20.92	13.80						-3 759.68		
B. Cropland	-1 224.06	NO	8.26						-1 215.80		
C. Grassland	-115.28	NO	0.33						-114.95		
D. Wetlands	NO	NO	NO						0.00		
E. Settlements	80.71	NO	4.50						85.20		
F. Other land	137.48	NO	5.17						142.65		
G. Harvested wood products	-1 186.43	NO	NO						-1 186.43		
H. Other	NO	NO	NO						0.00		
5. Waste	**2.99**	**1 545.07**	**132.67**						**1 680.73**	**NO**	**1 680.73**
A. Solid waste disposal	NO	1 141.38							1 141.38	NO	1 141.38
B. Biological treatment of solid waste		108.48	77.60						186.08	NO	186.08
C. Incineration and open burning of waste	2.99	0.71	4.32						8.02	NO	8.02
D. Waste water treatment and discharge		294.50	50.75						345.25	NO	345.25
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	**193.20**	**0.08**	**1.56**						**194.84**		
Aviation	176.18	0.04	1.43						177.65		
Navigation	17.01	0.04	0.14						17.19		
Multilateral operations	**NO**	**NO**	**NO**						**NO**		
CO_2 emissions from biomass	**7 474.98**								**7 474.98**		
CO_2 captured	**NO,NE**								**NO,NE**		
Long-term storage of C in waste disposal sites	**2 692.04**								**2 692.04**		
Indirect N_2O			**NO,NE,IE**								
Indirect CO_2 [3]	**NO,NE,IE**										

Total CO_2 equivalent emissions without land use, land-use change and forestry	**44 121.30**	**22 193.40**	**21 927.90**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**38 072.30**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**44 121.30**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**38 072.30**		

[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: Categories 1.A.1, 1.A.2 and partly 1.A.4 are based on the EU ETS verified emissions 2018. Based on preliminary data, a CO2 decrease is expected in the category 1.A.1. The decrease is mainly caused by reduction of fuel consumption in Public Electricity and Heat Production. The consumption in Refinery Industry and in Manufacture of Solid Fuels remains practically on the same level as in previous year (2017). On the other hand, a minimal increase of CO2 emissions is expected in Manufacturing Industries (primary caused by increase in categories 1.A.2.a and 1.A.2.c). The increase of emissions in the category 1.A.2.c is consistent with increase of CO2 emissions in the IPPU sector (especially in the category 2.B). There is no EU ETS data for the most of the activities within the categories 1.A.4. and 1.A.5, therefore emissions are estimated mainly based on previous trend. In the 1.A.4 category, a slight increase of emissions is expected. Category 1.A.5 remains practically stable. **TRANSPORT:** Emissions increased in road transportation. This is caused by higher consumption of gasoline and diesel oil based on real values from the FQ directive (Article 7a). **MEMO ITEMS:** Emissions are not significant and proxy is calculated based on the real consumption od fuels in the category 1.A.3. **IPPU:** Categories 2.A, 2.B and 2.C were estimated based on the EU ETS verified GHG emissions 2018. ESD emissions in categories 2.A, 2.B, 2.C, 2.D and 2.G were extrapolated based on the 5-years average.
AGRICULTURE: The official statistics of livestock number and animal production data were implemented into the 2018 proxy estimate. Activity data for estimated proxy inventory was provided except of consumption of inorganic nitrogen fertilizers, sewage sludge, compost and urea. Missing data were extrapolated using the 5-years trend. Emissions increased in Manure Management due to the increasing number of pigs, which is a key category. The emissions from enteric fermentation decreased compared to the previous submission due to the decrease in the number of cattle, which is the key category and has an impact on total emissions from the 3.A category. The Agricultural soils category decreased due to the implementation of country-specific parameter FracLeach in the 3.D.2.2 category.
LULUCF: A. FOREST LAND: Emissions of CO2, CH4 and N2O are preliminary calculated using new input data from 2018 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 2018 and the same method as in the NIR. **C. GRASSLAND:** Emissions of CO2, CH4 and N2O are preliminary calculated using new input data from 2018 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 2018. **F. OTHER LAND:** Emissions of CO2 and N2O are preliminary calculated using new input data from 2018. **G. HWP:** The basic input data from FAO database for 2018 are not yet available. Emissions were estimated using the average input FAO data from period 1990-2017 and the harvested wood volume from 2018.
WASTE: The Waste sector contributes to about 5 % of total emissions in Slovakia. Emissions from solid waste disposal represent 68% of emissions in the Waste Sector, emissions from wastewater treatment 2,5%, biological treatment of waste 11% and non-biogenic waste incineration contributes 0,5%. The proxy estimates of emissions were prepared from analysis of 5-year data. There are no new data available, which have impact on emission estimates from waste sector as published in the last submission. Emissions from waste disposal are increasing at a rate of 0,6% per year. Recent changes in the Waste Act are aimed on increase of waste recovery may contribute to reduction of disposal. Support from Regulatory Office for Network Industries may increase the level of landfill gas use, but not significantly. Emission from wastewater treatment are decreasing at a rate of 1,3% per year. There were no changes in practice observed during the last year. Emissions from biological waste treatment are increasing at a rate 8,9% per year. This is caused by higher level of composting. No sophisticated technologies (e.g. MBT) are used or planned to be introduced. Incineration of waste is decreasing at a rate 1,3% per year. No new incineration capacities were introduced this year. In total the waste sector emissions are increasing by 0,8% per year. Considering the main drivers and natural variability of data, the best estimate of proxy emissions from waste sector are results from the latest submission.

6.27 Slovenia (national submission)

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

Year 2018
Submission 2019
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]	**14263.52**	**2080.51**	**740.52**	**357.48**	**15.59**	**15.81**	**NO**	**NO**	**17473.43**		
1. Energy	**13391.79**	**421.78**	**148.64**						**13962.22**	**5 762**	**8 201**
A. Fuel combustion (sectoral approach)	13260.90	162.45	148.64						13571.99	5 693	7 879
1. Energy industries	4778.96	2.92	22.74						4804.63	4 606	198
2. Manufacturing industries and construction	1684.51	5.55	18.05						1708.11	1 087	622
3. Transport	5544.70	6.82	59.97						5611.49	NO	5 611
4. Other sectors	1248.62	147.16	47.84						1443.63	NO	1 444
5. Other	4.10	0.00	0.03						4.14	NO	4
B. Fugitive emissions from fuels	130.89	259.33	0.00						390.22	68	322
1. Solid fuels	130.80	219.84	NO,NA						350.64	68	282
2. Oil and natural gas	0.09	39.49	0.00						39.58	NO	40
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	**825.04**	**0.00**	**28.70**	**357.48**	**15.59**	**15.81**	**0.00**	**0.00**	**1242.62**	**730**	**512**
A. Mineral industry	541.11								541.11	522	19
B. Chemical industry	52.77	NO,NA	NO	NO	NO	NO	NO	NO	52.77	NO	53
C. Metal industry	202.03	NO,NA	NO	NO	15.59	NO	NO	NO	217.62	208	9
D. Non-energy products from fuels and solvent use	29.14	NA	NA						29.14	NO	29
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				357.48	NO	NO	NO	NO	357.48	NO	357
G. Other product manufacture and use	NO	NO	28.70	NO	NO	15.81	NO	NO	44.51	NO	45
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NO	NA
3. Agriculture	**19.29**	**1179.24**	**518.45**						**1716.98**		**1716.98**
A. Enteric fermentation		926.89							926.89		926.89
B. Manure management		252.35	81.26						333.61		333.61
C. Rice cultivation		NO							NO		NO
D. Agricultural soils		NO	437.19						437.19		437.19
E. Prescribed burning of savannas		NO	NO						NO		NO
F. Field burning of agricultural residues		NO	NO						NO		NO
G. Liming	10.99								10.99		10.99
H. Urea application	8.30								8.30		8.30
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	NO	NO,IE						NE		NE
C. Grassland	NE	NO	NE						NE		NE
D. Wetlands	NE	NO	NO						NE		NE
E. Settlements	NE	NO	NE						NE		NE
F. Other land	NE	NO	NE						NE		NE
G. Harvested wood products	NE								NE		NE
H. Other	NO	NO	NO						NO		NE
5. Waste	**27.40**	**479.49**	**44.73**						**551.62**		**551.62**
A. Solid waste disposal	NO,NA	333.09							333.09		333.09
B. Biological treatment of solid waste		9.79	7.00						16.78		16.78
C. Incineration and open burning of waste	27.40	0.00	0.10						27.50		27.50
D. Waste water treatment and discharge		136.61	37.63						174.24		174.24
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	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]	NO										
Total CO_2 equivalent emissions without land use, land-use change and forestry									**17473.43**	**6 492**	**10 982**
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
[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 2018, emissions of GHG slightly increased by 0,1% (20 kt CO2 eq.) compared to 2017. **Emissions in the Energy sector decreased by 0.3% (-38 kt CO2 eq.).** The largest decrease occurred in the electricity production in thermal power plants (-2.3%) while emissions from road transport increased by 1.3% (70 kt CO2 eq.) and in manufacturing industries and construction by 1.8% (30 kt CO2 eq.). Preliminary energy statistics is available on: https://pxweb.stat.si/SiStatDb/pxweb/en/30_Okolje/30_Okolje__18_energetika__04_18180_goriva/1818002S.px/table/tableViewLayout2/ Consumption of liquid fuels increased by 2.0% (approx. +1.9 PJ) while consumption of solid fuels and natural gas decreased by -1.2% (-0.6 PJ) and -1.2% (-0.4 PJ) respectively. **Emissions from IPPU increased by 2.8% (34 kt CO2 eq.).** The largest increase was in mineral industry by 8.8% (44 kt CO2 eq.) **Emissions in agriculture sector increased by 1.7% (29 kt CO2 eq.).** The increase is a consequence of the recalculation, otherwise emissions in 2018 are similar to the revised emissions in 2017. Population data is available on: https://pxweb.stat.si/SiStatDb/pxweb/en/30_Okolje/30_Okolje__15_kmetijstvo_ribistvo__05_zivinoreja__01_15174_stevilo_zivine/?tablelist=true **Emissions from waste sector decreased by -1.0% (-5 kt CO2 eq).** The main reason for lower emissions is a decrease of emissions from SWDS by -2.4%.

6.28 Spain (national submission)

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

Year 2018
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]	**230 206.6**	**40 606.2**	**18 288.0**	**4 407.4**	**129.7**	**225.6**	**1 235.9**	**NO,NA**	**295 099.4**		
1. Energy	**247 552.3**	**2 913.9**	**1 947.7**						**252 413.9**	**112 576**	**139 838**
A. Fuel combustion (sectoral approach)	243 712.4	2 129.1	1 947.7						247 789.2	108 698	139 092
1. Energy industries	70 012.5	136.0	495.9						70 644.5	68 958	1 687
2. Manufacturing industries and construction	43 138.1	854.3	196.1						44 188.5	36 494	7 694
3. Transport	90 092.5	94.0	953.7						91 140.1	3 087	88 053
4. Other sectors	39 987.7	1 044.5	297.9						41 330.1	158	41 172
5. Other	481.6	0.2	4.1						485.9	0	486
B. Fugitive emissions from fuels	3 839.9	784.8	0.0						4 624.8	3 878	747
1. Solid fuels	10.4	71.8	NA,NE						82.2	0	82
2. Oil and natural gas	3 829.4	713.1	0.0						4 542.6	3 878	664
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	**20 324.8**	**215.3**	**745.6**	**4 407.4**	**129.7**	**225.6**	**1 235.9**	**NO,NA**	**27 284.2**	**17 886**	**9 399**
A. Mineral industry	12 663.6								12 663.6	12 534	129
B. Chemical industry	3 754.1	169.2	405.4	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	4 328.7	2 266	2 062
C. Metal industry	3 062.3	46.1	NA	NO,NA	123.5	NO,NA	NO,NA	NA	3 231.9	3 085	147
D. Non-energy products from fuels and solvent use	844.8	NA	NA						844.8	0	845
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				4 407.4	6.2	NO,NA	1 235.9	NO,NA	5 649.5	0	5 650
G. Other product manufacture and use	NO	NO	340.2	NO,NA	NO,NA	225.6	NO,NA	NO,NA	565.8	0	566
H. Other	IE,NA	IE,NA	0.0	NA	NA	NA	NA	NA	0.0	0	0
3. Agriculture	**514.1**	**25 037.8**	**13 992.0**						**39 543.9**		
A. Enteric fermentation		17 194.9							17 194.9		
B. Manure management		7 364.2	1 814.5						9 178.6		
C. Rice cultivation		469.7							469.7		
D. Agricultural soils		IE	12 174.7						12 174.7		
E. Prescribed burning of savannas		NO	NO						NO		
F. Field burning of agricultural residues		9.1	2.8						11.9		
G. Liming	41.2								41.2		
H. Urea application	472.8								472.8		
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry[1]	**-38 184.5**	**163.6**	**278.4**						**-37 742.5**		
A. Forest land	-33 979.8	150.2	137.9						-33 691.7		
B. Cropland	-3 550.7	6.9	73.9						-3 469.9		
C. Grassland	-33.1	6.5	7.8						-18.8		
D. Wetlands	54.7	0.0	0.0						54.7		
E. Settlements	1 220.8	NO	56.0						1 276.8		
F. Other land	32.6	NO	2.8						35.4		
G. Harvested wood products	-1 929.1								-1 929.1		
H. Other	NO	NO	NO						NO		
5. Waste	**NO,IE,NA**	**12 275.6**	**1 324.3**						**13 599.9**		
A. Solid waste disposal	NO,NA	10 412.4							10 412.4		
B. Biological treatment of solid waste		378.4	256.3						634.7		
C. Incineration and open burning of waste	NO,IE	50.8	98.2						148.9		
D. Waste water treatment and discharge		1 434.0	969.9						2 403.9		
E. Other	NA	0.0	NA						0.0		
6. Other *(as specified in summary 1.A)*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Memo items:[2]											
International bunkers									40 111.5		
Aviation									18 431.1		
Navigation									21 680.4		
Multilateral operations									NO		
CO_2 emissions from biomass									34 494.7		
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	332 842.0	130 461	202 381
								Total CO_2 equivalent emissions with land use, land-use change and forestry	295 099.4		
								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 drop of ETS emissions of -6,6%. http://www.eea.europa.eu/data-and-maps/data/data-viewers/emissions-trading-viewer
1A1a: increased participation of renewable energies in the mix (hydro: +85% and wind +3,5%) and reduction of coal -17% and gas -19% compared to 2017). http://www.ree.es/es/estadisticas-del-sistema-electrico-espanol/balance-diario
1A1b: increase of ETS emissions in refinery sector (+1.4%). http://www.eea.europa.eu/data-and-maps/data/data-viewers/emissions-trading-viewer
1A2: wide increase of industrial activity (+2,1% in emissions).
1A3: rise of national aviation kerosene consumption (+4.3 %); rise of road fossil fuels (+2.0 % diesel; +4.8 % gasoline). http://www.cores.es/es/estadisticas
1A4: rise of fuel consumption in RCI (+2%) and off-road machinery (+4,1%)
3A-3B: cattle rise (Non dairy: +1.6% and swine: +3.9%). http://www.magrama.gob.es/es/estadistica/temas/estadisticas-agrarias/ganaderia/encuestas-ganaderas/#para4
2F: decrease of F-gas Co2-eq emissions in refrigeration by -20,5%.

6.29 Sweden (national submission)

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

Year 2018
Submission Subm 2020 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]	**42 540**	**4 447**	**4 862**	**1 138**	**62**	**34**			**53 084**		
1. Energy	**36 412**	**264**	**652**						**37 328**		
A. Fuel combustion (sectoral approach)	35 587	204	651						36 441		
1. Energy industries	9 151	47	250						9 448		
2. Manufacturing industries and construction	7 114	26	144						7 283		
3. Transport	16 507	19	153						16 679		
4. Other sectors	2 630	112	102						2 844		
5. Other	185	0	3						188		
B. Fugitive emissions from fuels	825	60	1						886		
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	**5 943**	**9**	**197**	**1 138**	**62**	**34**			**7 384**		
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	**128**	**3 284**	**3 776**						**7 187**		
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	**58**	**891**	**237**						**1 186**		
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	**53 084**	**20 412**	**32 672**
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

Swedish greenhouse gas emissions were about 53.1 million tonnes of carbon dioxide equivalents in 2018, which is equivalent to an increase of around one percent comparing the approximated greenhouse gas inventory for 2018 with the complete reported inventory for 2017.

Domestic transportation (CRF 1A3) accounted for one third of Swedish greenhouse gas emissions. Transportation emissions were close to the same level in 2018 compared to 2017, showing a slight increase of around 0.6 percent. The estimated emissions for 2018 were based on available energy statistics.

Industrial emissions (including stationary, fugitive and process from manufacturing industries, construction, refineries and coke ovens) accounted for one third of Swedish greenhouse gas emissions. Industrial emissions were at the same level in 2018 compared to 2017. Industrial emissions are described at the aggregate level since the method for allocation of facilities' emissions to different CRF-categories is based on a model in the case of the approximated greenhouse gas inventory. Industrial emissions for 2018 were based on available energy statistics and adjusted based on information provided from the EU ETS-reporting.

Energy industries (CRF 1A1) accounted for 18 percent of Swedish greenhouse gas emissions. These emissions increased by three percent in 2018 compared to 2017. The estimated emissions for the heat and power production facilities were based on available energy statistics. Emissions from coke ovens and refineries were considered equal to 2017. Changes in emissions for these facilities were adjusted for in other sectors (CRF 1A2, 1B and 2).

Agricultural emissions (CRF 3) were assumed to be equal to the previous year due to lack of data to support an approximated estimate for 2018.

Emissions from waste (CRF 5) decreased by five percent in 2018 compared to 2017, based on an assumed annual reduction rate due to lack of data. The waste sector has been decreasing steadily since the beginning of the 1990s due of extensive legislation in the sector.

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.

Please also note that data on emissions within ETS and non-ETS sectors are preliminary and should be used with caution. The estimate for the ETS sector includes domestic aviation (CRF 1A3a).

6.30 Switzerland (national submission)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS — Year 2018

(Sheet 1 of 1) — Submission July 2019

Country Switzerland

Geographical scope[4] Switzerland

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]	36860.64	4852.77	2367.06	1501.15	24.71	159.13	NO	0.54	45766.00		
1. Energy	34676.95	268.75	220.65						35166.35	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	2116.31	2.87	33.40	1501.15	24.71	159.13	NO	0.54	3838.11	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	46.30	4060.67	1965.03						6072.00		
A. Enteric fermentation											
B. Manure management											
C. Rice cultivation											
D. Agricultural soils											
E. Prescribed burning of savannas											
F. Field burning of agricultural residues											
G. Liming											
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	9.56	519.87	147.47						676.90		
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)*	11.52	0.61	0.51	NO	NO	NO	NO	NO	12.64	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										
CO_2 captured	NO										
Long-term storage of C in waste disposal sites	NE										
Indirect N_2O			238.89								
Indirect CO_2[3]	95.59										
Total CO_2 equivalent emissions without land use, land-use change and forestry									45766.00	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									45861.59		
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 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 1.06 kt (and are included in the 95.89 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 2018 according to the Swiss Kyoto target are 45'847.90 kt.
Swiss climate reporting under the UNFCCC:
https://www.climate-reporting.ch
In the different sectors, emission changes from 2017 to 2018 were mainly caused by the following drivers:
Sector 1 'Energy'
Lower Fuel Combustion (1A) due to milder winter conditions and efficiency improvements.
Sector 2 'Industrial processes and product use'
(i) Slightly decreased CO2 emissions from cement production (based on data from cement plants).
(ii) Slightly decreased production in chemical industries (based on data from the industries)
(iii) Roughly constant F-gas emissions.
Sector 3 'Agriculture'
The approximated emission estimate considered aggregated animal numbers, updated milk production, and estimates on mineral fertilizers.
Sector 5 'Waste'
Reduced emissions of CH4 from waste disposal sites (based on model simulations, disposal of burnable solid waste is prohibited since the year 2000).

6.31 United Kingdom (national submission)

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

Year 2019
Submission 2018 provisional inventory
Country United Kingdom of Great Britain and Northe
Geographical scope[4] UK only, i.e. EU coverage excluding Gibraltar

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]	**375460**	**49949**	**19920**	**13656**	**360**	**510**	**NO**	**1**	**459856**		
1. Energy	**359900**	**IE**	**IE**							**131317**	**228583**
A. Fuel combustion (sectoral approach)	355315	IE	IE							127844	227471
1. Energy industries	93614	IE	IE							86800	6814
2. Manufacturing industries and construction	50377	IE	IE							26400	23977
3. Transport	119337	IE	IE							12917	106420
4. Other sectors	90691	IE	IE							1727	88964
5. Other	1296	IE	IE							NO	1296
B. Fugitive emissions from fuels	4585	IE	IE							3473	1112
1. Solid fuels	355	IE	IE							NO	355
2. Oil and natural gas	4231	IE	IE							3473	757
C. CO_2 transport and storage	NO									NO	NO
2. Industrial processes and product use	**14021**	**IE**	**IE**	**IE**	**IE**	**IE**	**NO**	**IE**		**12120**	**1901**
A. Mineral industry	6249									6208	41
B. Chemical industry	4897	IE	IE	IE	IE	NO	NO	NO		3776	1121
C. Metal industry	2409	IE	IE	IE	IE	IE	NO			2136	273
D. Non-energy products from fuels and solvent use	465	NO,IE	NO,NE,IE							NO	465
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	**1281**	**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	937										
H. Urea application	344										
I. Other carbon-containing fertilizers	NO										
J. Other	NA	NA	NA								
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	**258**	**IE**	**IE**								
A. Solid waste disposal	NO,NE	IE									
B. Biological treatment of solid waste		IE	IE								
C. Incineration and open burning of waste	258	IE	IE								
D. Waste water treatment and discharge		IE	IE								
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											
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
[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 2018 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-2018
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/789856/provisional-greenhouse-gas-emissions-statistics-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.
CO2 from LULUCF is excluded in accordance with Article 17 of the Implementing Regulation 749/2014
The non-CO2 emissions from LULUCF are included in the national total.
Emissions from LULUCF in 2017 for non-CO2 gases were 0.028 MtCO2e CH4 and 1.402 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.

European Environment Agency

Annual European Union approximated greenhouse gas inventory for the year 2018

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