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Approximated European Union greenhouse gas inventory:

Proxy GHG emission estimates for 2015

European Environment Agency

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Abbreviations

AD	Activity data
AR	Activity rate
AR4	IPCC Fourth Assessment Report: Climate Change 2007
BP	British Petroleum
CH_4	Methane
EUTL	European Union Transaction Log
CO_2	Carbon dioxide
CO_2eq	Carbon dioxide equivalent
CRF	Common reporting format
EC	European Commission
EEA	European Environment Agency
ESD	Effort Sharing Decision
ETC/ACM	European Topic Centre on Air Pollution and Climate Change Mitigation
ETS	Emissions Trading System
EU	European Union
EU-28	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom
EU plus Iceland	'EU plus Iceland' refers to the EU plus Iceland. In figures and tables this may be abbreviated to EU + IS. The attribution 'EU-28' is used in contexts where Iceland is not included.
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
LULUCF	Land use, land-use change and forestry
Mt	Megatons (million tons)
N_2O	Nitrous oxide
NF_3	Nitrogen triflouride
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	IE	Ireland
BE	Belgium	IT	Italy
BG	Bulgaria	IS	Iceland
CH	Switzerland	LT	Lithuania
CY	Cyprus	LU	Luxembourg
CZ	Czech Republic	LV	Latvia
DE	Germany	MT	Malta
DK	Denmark	NL	Netherlands
EE	Estonia	PL	Poland
ES	Spain	PT	Portugal
FI	Finland	RO	Romania
FR	France	SE	Sweden
GR	Greece	SI	Slovenia
HR	Croatia	SK	Slovakia
HU	Hungary	UK	United Kingdom

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Executive Summary

Objective of the report

This report provides estimates of greenhouse gas (GHG) emissions in the European Union (EU) and its Member States for 2015, covering the full GHG inventory (all sectors, except land use, land-use change and forestry (LULUCF), and all gases). These estimates are also referred to as approximated ('proxy') estimates or inventories in this report as they cover the year for which no official GHG inventories have been prepared yet. The proxy inventories in this report are based on GHG emission estimates reported by Member States to the European Commission under existing EU legislation[1] and on calculations made by the European Environment Agency's (EEA) European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM) using activity and/or emission data at country level. The official submission of 2015 inventories to the United Nations Framework Convention on Climate Change (UNFCCC) will take place in 2017. The proxy estimates greatly improve the timeliness of information on GHG emissions and are used for analysis of emission trends and progress towards EU climate targets.

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]. For this reason, the aggregates in this report will refer to the EU-28 and Iceland to the extent possible. The Doha Amendment's entry into force is subject to acceptance by at least three quarters of the Parties to the Kyoto Protocol.

The executive summary and Chapter 2 of this report are based on proxy estimates reported by Member States as well as EEA estimates when Member States did not report proxy estimates by 31 July 2016[3]. The GHG inventory data for 1990-2014 used in this report are taken from the countries' inventory submissions to the EEA by 25 May 2016. The estimates in this report are based on

1 Regulation (EU) 525/2013 of the European Parliament and of the Council on a mechanism for monitoring and reporting greenhouse gas emissions (EU MMR).

2 Submission by Denmark and the European Commission on behalf of the European Union and its Member States (19 April 2012). Available at:
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

3 In some cases, the EEA allocates emissions reported by Member States in gases and sectors using the methodologies used in section 4.1.3. This is to ensure that the provision of the EU proxy inventory and the explanation of the EU trends is performed at the appropriate level of detail, while safeguarding full consistency with the estimates provided by the Member States.

the International Panel on Climate Change (IPCC) 2006 Reporting Guidelines and global warming potentials (GWPs) from the IPCC Fourth Assessment Report (AR4). Unless otherwise stated, total GHG emissions are considered to include indirect CO_2 and exclude LULUCF and international transport.

Proxy GHG emission estimates for 2015 at EU level

The estimates for 2015 indicate that emissions increased for the first time since 2010. Compared with 2014 emissions, the increase in emissions between 2014 and 2015 is estimated to be 28.8 million tonnes of CO_2-equivalents (Mt CO_2-eq.) or 0.7 % for the EU plus Iceland[4] (total GHG emissions without LULUCF and including indirect CO_2)[5]. For EU plus Iceland, total GHG emissions in 2015 are estimated to be 23.9 % below 1990 emissions (22.4 % if international aviation is included).

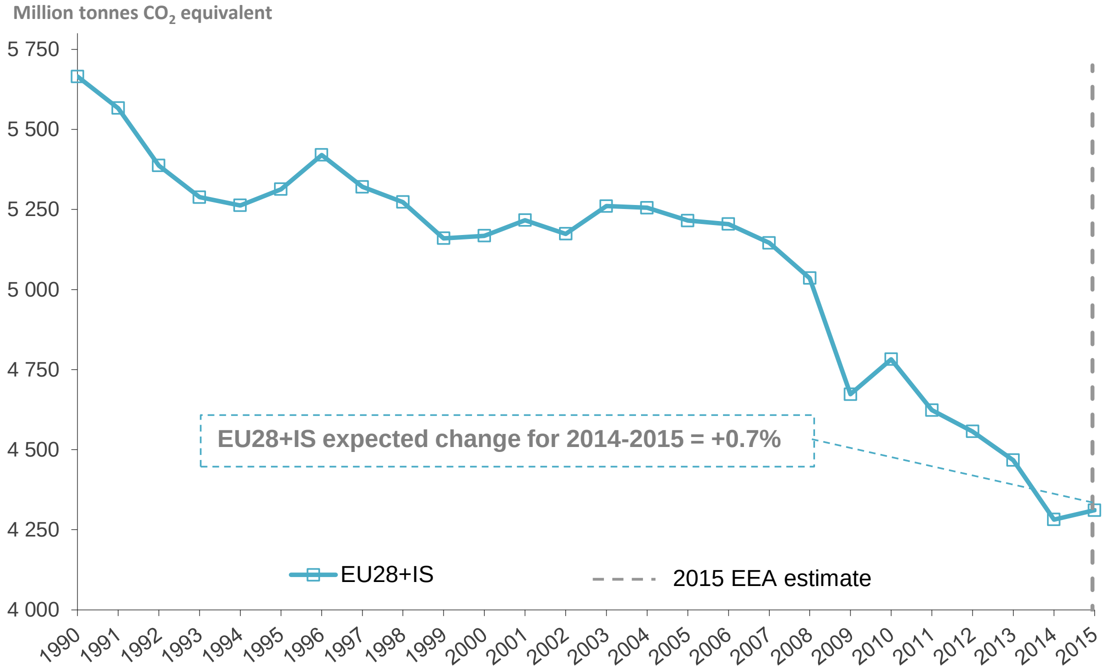
Figure ES.1 shows the emission trend for total GHG emissions in the EU and Iceland in the period 1990–2015 ([6]).

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

5 According to the UNFCCC reporting guidelines, Annex I Parties may report indirect CO_2 from the atmospheric oxidation of methane (CH_4), carbon monoxide (CO) and non-methane volatile organic compounds (NMVOCs). For Parties that decide to report indirect CO_2, the national totals shall be presented with and without indirect CO_2. The EU proxy estimates are based on national totals excluding LULUCF and including indirect CO_2 if reported by Member States.

6 This is not equivalent to the difference from base year emissions because of accounting rules such as the selection of the base year (which varies from country to country) for fluorinated gases (F-gases) and the continuing recalculations of GHG inventories.

Figure ES.1 Trends in total GHG emissions, 1990-2015



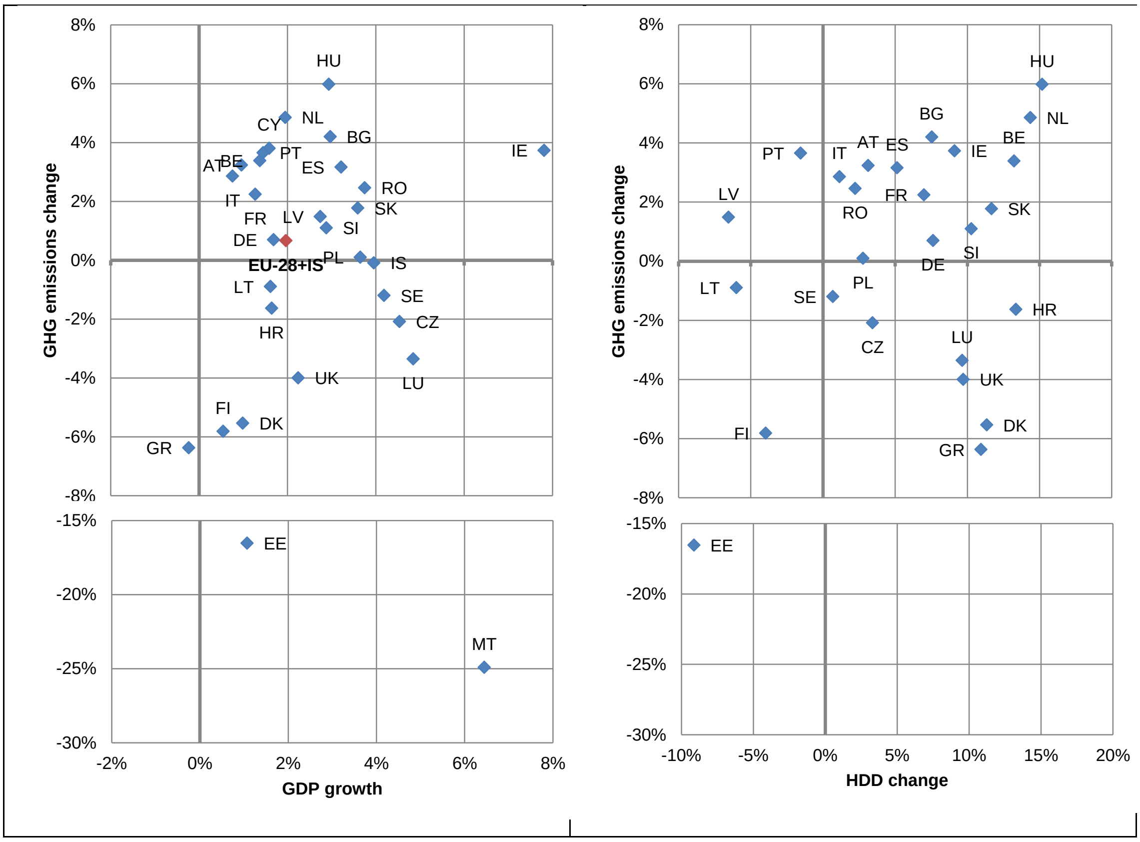
Note: Total GHG emissions without LULUCF including indirect CO_2.

Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to the UNFCCC for 1990-2014 and proxy estimates for 2015.

Compared with 2014, the 0.7 % emission increase for the EU plus Iceland in 2015 is considerably lower than the 2.0 % average growth in gross domestic product (GDP) over the same period. As in 2014, notwithstanding economic developments in specific sectors and countries, there was no common pattern between GDP and GHG emissions for all EU Member States in 2015. The economic situation in the EU improved during 2015 compared to 2014. Eleven Member States achieved emission reductions in 2015 while also recording positive economic growth (see figure ES.2).

Analysis of emission trends needs to include climatic factors, which can affect behaviour and energy demand. The years 2014 and 2015 were the warmest years on record in Europe (KNMI, 2016). However, winter in Europe in 2015 was generally colder than it was in 2014. Lower winter temperatures especially in west and central Europe led to higher heating demand and higher emissions from the residential and commercial sectors, which partly explain the emission changes in figure ES.2. A regional distribution of GHG-emission changes is presented in figure ES.3.

Figure ES.2 GHG emissions, GDP growth and heating degree days in the EU, changes 2014-2015



Note: As GHG emission changes in Estonia and Malta are much greater than in all other Member States, these two are shown using different scales. Heating Degree Days (HDDs) are an indication of heat demand based on outdoor temperatures. HDD change was not available for Cyprus, Malta and Iceland.

Source: The EEA's ETC/ACM, based on GDP from Eurostat (Gross domestic product at market prices, Chain linked volumes (2010), million Euro). HDDs are produced by the EEA.

On a sectoral basis, the largest absolute emission increase between 2014 and 2015 in the EU occurred in the energy sector (i.e. all combustion activities and fugitive emissions). GHG emissions grew by 39.5 Mt CO_2-eq. (1.2 %) across the EU plus Iceland. This increase in emissions in the energy sector reflects the increase of gross inland energy consumption in the EU plus Iceland in 2015. Within the energy sector, emissions mostly grew in residential and commercial (+30.6 Mt CO_2-eq.) and transport (+20.3 Mt CO_2-eq.) while it fell in energy industries (−5.5 Mt CO_2-eq.) and manufacturing industries and construction (−2.8 Mt CO_2-eq.).

After decreasing between 2010 and 2014, primary energy consumption in the EU-28 increased by 1.6 % in 2015. Both fossil and renewable fuels increased their contribution to the energy mix while nuclear decreased its share slightly (BP 2016).

Based on Eurostat monthly consumption data for solid, liquid and gaseous fuels (Eurostat, 2016), total fuel consumption in the EU-28 increased by 4 %, with different trends for the different fossil fuel types. Consumption of natural gas increased by 4.3 % and consumption of liquid fuels grew by 1.2 %. Solid fossil fuel consumption (excluding peat) fell by 3.9 % and peat consumption dropped by 9.1 %.

Natural gas consumption rose in 19 EU Member States between 2014 and 2015 and four Member States experienced increases in natural gas consumption of more than 10 %: Bulgaria (10.4 %), Croatia (11.9 %), Portugal (11.1 %) and Slovakia (21.1 %). In seven Member States, natural gas consumption fell with the largest decreases being observed in Estonia (10.4 %) and Finland (11.4 %).

Also liquid fossil-fuel consumption grew in 19 EU Member States, with the largest increase in Slovakia (12.3 %) followed by Hungary (8.9 %) and Poland (7.3 %). A decrease in liquid fuel consumption was observed in nine EU Member States; in three consumption decreased by more than 10 %: Estonia (14.9 %), Malta (26.9 %) and Sweden (15.6 %).

Sixteen Member States showed decreasing solid fossil fuel consumption (excluding peat), most notably Denmark (33.6 %), followed by Latvia (29.9 %), the United Kingdom (20.0 %) and Lithuania (19.9 %). On the other hand, solid fossil fuel consumption (excluding peat) increased in eleven Member States, most notably in Cyprus (50.0 %)[7], Ireland (17.0 %), the Netherlands (24.2 %) and Portugal (21.7 %). These changes in fossil fuel consumption are not only related to heating degree day (HDD) effects, as described before, but are also strongly connected to the trends in electricity generation. Peat consumption decreased in all seven Member States that report peat consumption to Eurostat. Most pronounced were the decreases in Estonia (88 %), Latvia (67 %) and Lithuania (56 %).

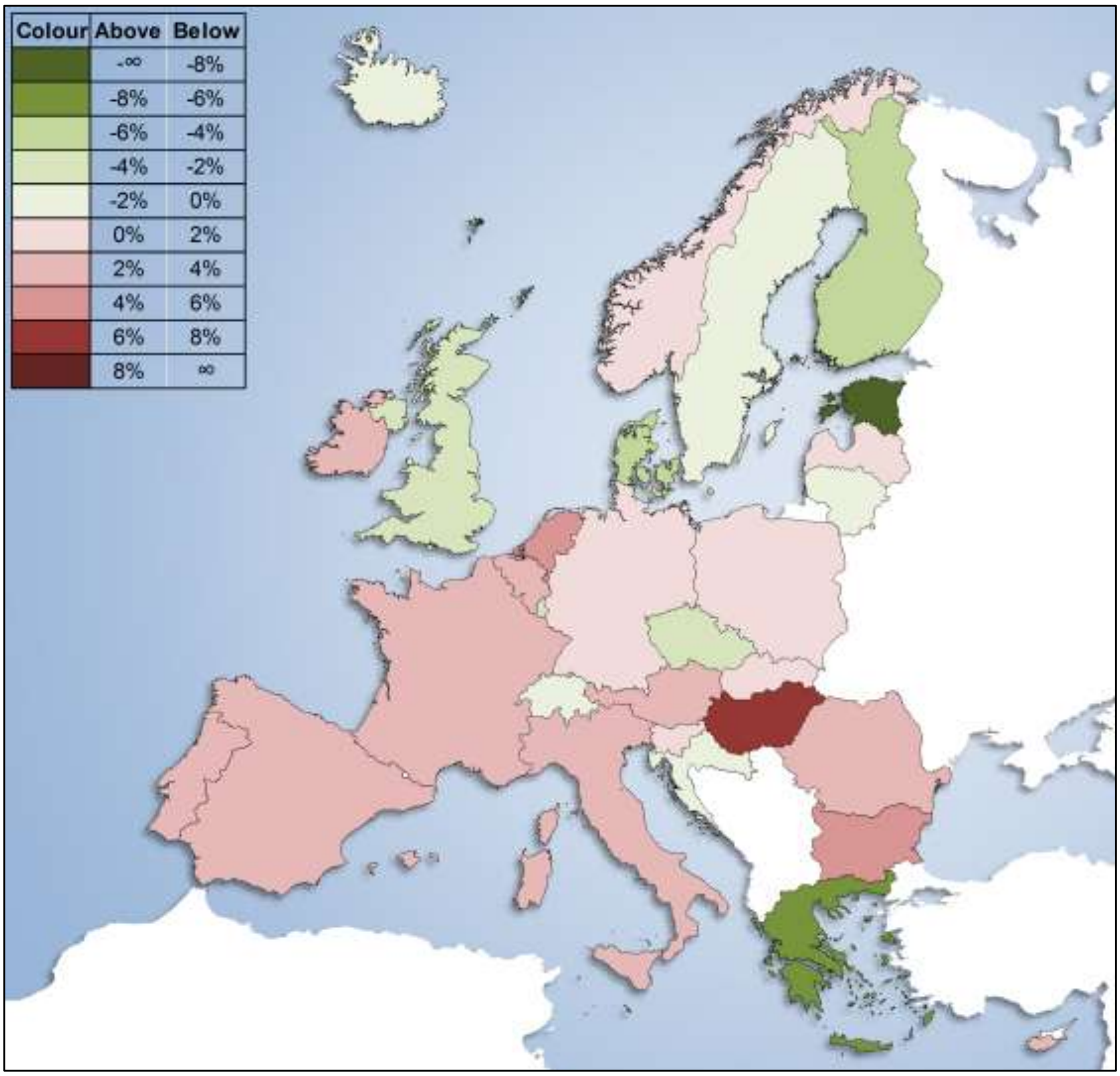
Hydroelectric generation decreased by 9 % in the EU-28 with strong regional differences. Most parts of central and southern Europe experienced disadvantageous conditions for hydro-electricity production because of lower rainfall (KNMI, 2016). In Portugal, renewable gross hydro generation fell by 45 % compared to the previous year, followed by Slovenia (36 %), Croatia (28 %), Spain (26 %), Italy and Hungary (23 %) each and the Netherlands (22 %). Hydro production decreased further in ten Member States. Northern Europe faced the opposite conditions with higher gross hydro generation, in particular in Finland (25 %), Ireland and Denmark (20 %) and Sweden (16 %). Good hydro conditions also occurred in the very south-eastern part of Europe with increasing hydro production in Greece (24 %) and Bulgaria (17 %).

In the EU plus Iceland, GHG emissions from industrial processes decreased by 1.1 % in 2015 compared with 2014. The largest emission decrease was observed for product uses of F-gases as substitutes for ozone-depleting substances (ODS), which decreased by 3.5 %. Emissions from mineral products decreased by 0.4 % and emissions from metal production fell by 1.4 % across the EU plus Iceland. Emissions from the chemical industry remained relatively stable in the EU plus Iceland, falling by only 0.1 % between 2014 and 2015.

Agriculture emissions increased by just 0.2 %, mainly due to emission increases from enteric fermentation. The trend in emissions from waste (−3.4 %) continues the decrease seen in previous years with the largest reduction in emissions coming from solid waste disposal.

[7] As the solid fuel consumption in Cyprus is very small, this very high relative increase corresponds to a small absolute increase of only 2 kilotonnes.

Figure ES.3 Regional trends in total GHG emissions, change 2014-2015 (displayed as ranges)



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

Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to the UNFCCC for 1990-2014 and proxy estimates for 2015.

Change in GHG emissions over 1990–2015

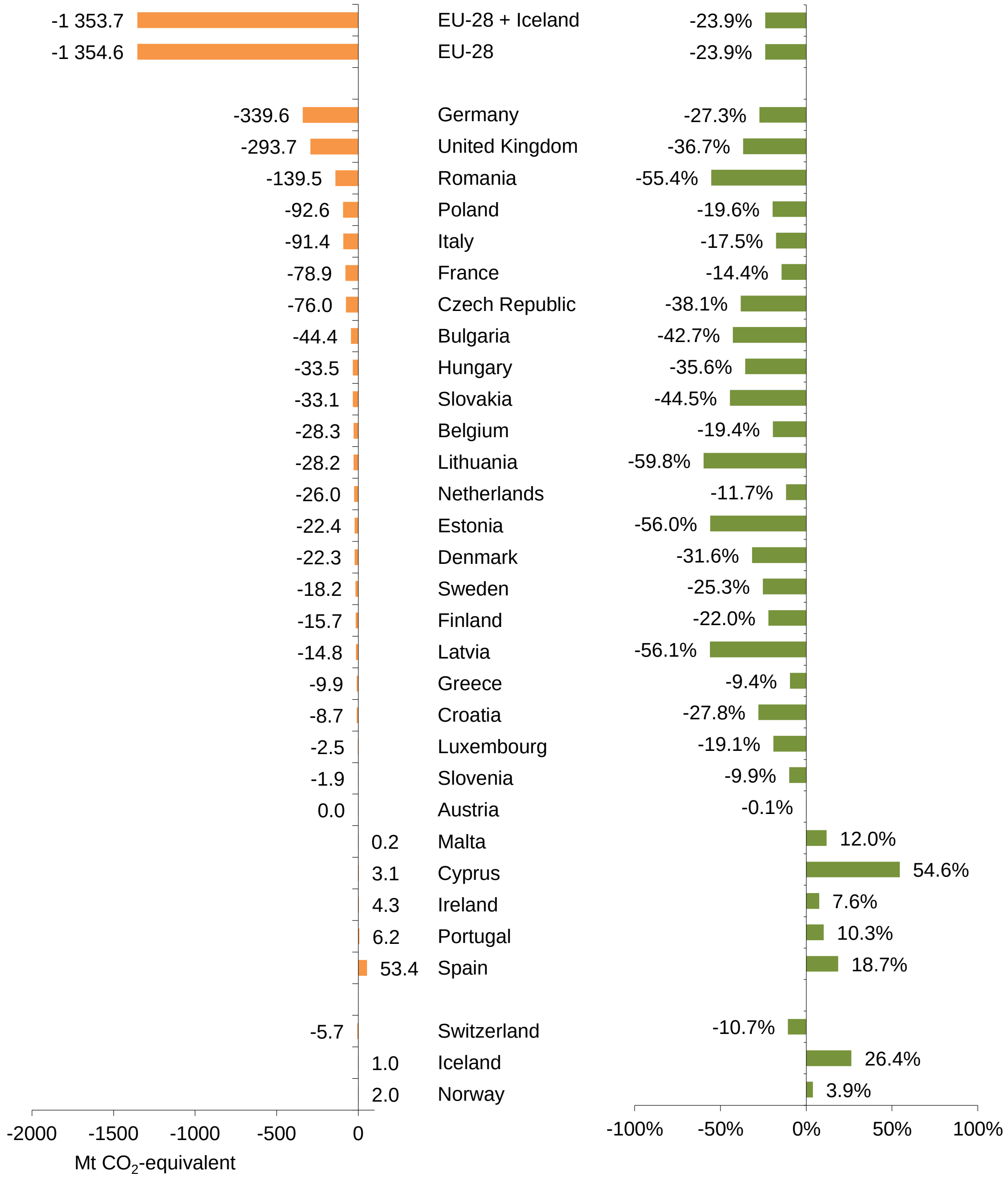
Figure ES.4 presents the estimated change in GHG emissions for each Member State between 1990 and 2015[8]. Based on these 2015 estimates, total EU plus Iceland emissions (excluding LULUCF and including indirect CO_2) in 2015 were 23.9 % below 1990 levels.

The reduction in greenhouse gas emissions over this period was due to a variety of factors, including the growing share in the use of renewables, the use of less carbon intensive fuels and improvements in energy efficiency, as well as to structural changes in the economy and the economic recession. Demand for energy to heat households has also been lower, as Europe on average has experienced milder winters since 1990, which has also helped reduce emissions[9]. The effects of the Montreal Protocol in reducing emissions of ozone-depleting substances have also indirectly contributed to very significant reductions in emissions of some potent GHGs such as chlorofluorocarbons. Specific polices to reduce F-gases have also slowed growth in the consumption of fluorinated gases with high global-warming potential. Other EU policies such as the Nitrates Directive, the Common Agriculture Policy (CAP) and the Landfill Waste Directive have also been successful in indirectly reducing GHG emissions from non-CO_2 gases such as methane and nitrous oxide. Further implementation of the EU's Climate and Energy Package should lead to additional reductions in emissions.

[8] The percentage change cannot be directly compared to the emission reduction obligations under the Kyoto Protocol since the fixed base-year emissions are not identical to the latest recalculation of 1990 emissions. Furthermore, Member State use of flexible mechanisms and LULUCF activities also contribute to compliance with the Kyoto targets.

[9] See EEA (2016c), 'Analysis of key categories and drivers in greenhouse gas emissions in the EU between 1990 and 2014', http://www.eea.europa.eu/publications/analysis-of-key-trends-ghg

Figure ES.4 Member States' emissions, change 1990-2015



Note: Total GHG emissions without LULUCF including indirect CO_2.

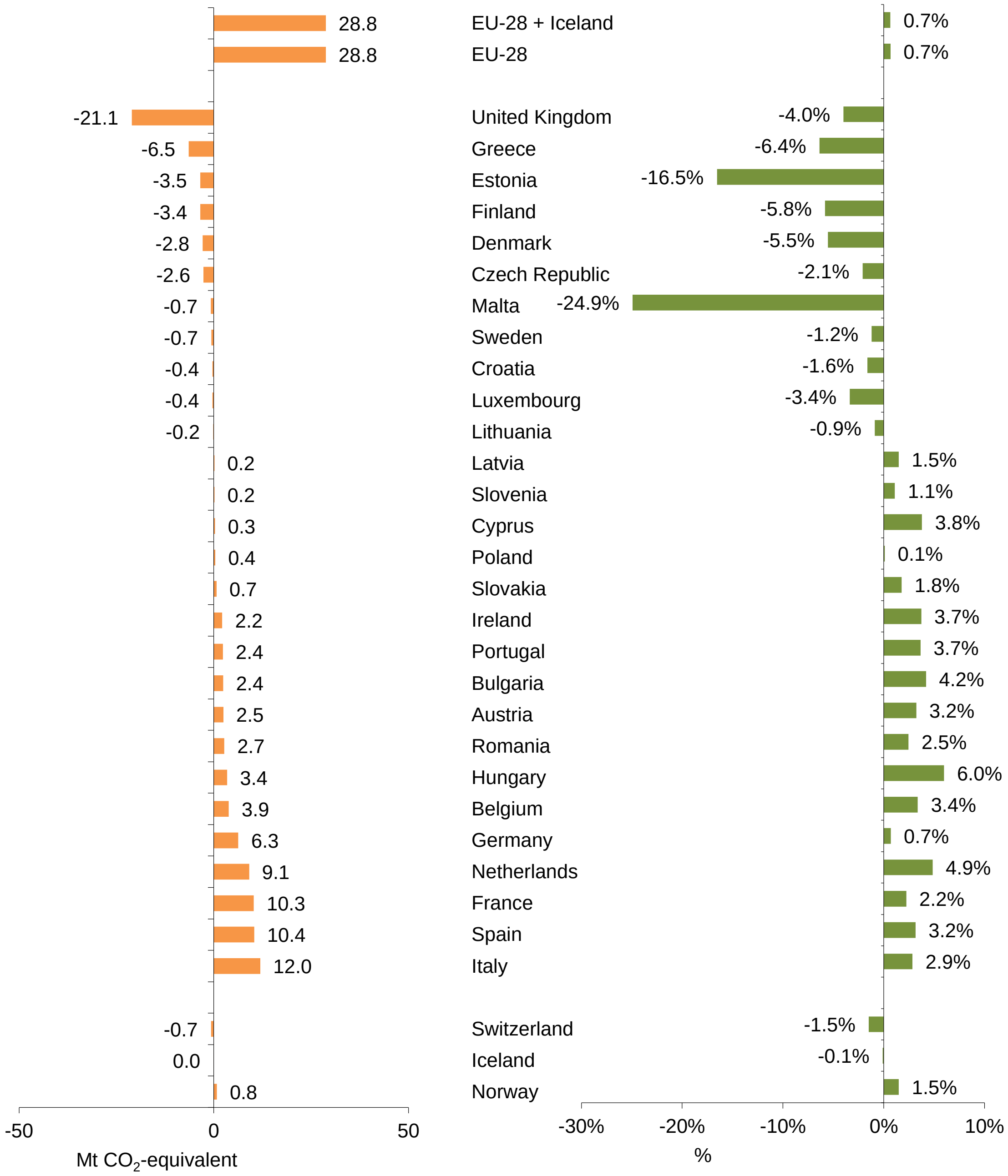
Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to the UNFCCC for 1990-2014 and proxy estimates for 2015.

Change in GHG emissions at Member State level over 2014–2015

As explained above, total GHG emissions in the EU plus Iceland increased by 0.7 % in 2015 alongside an improved economic situation, with GDP increasing by 2.0% compared with 2014. The main reasons for the increase in emissions were the higher heat demand by households due to a colder winter and the higher energy demand in transport. Liquid fuel and natural gas consumption grew in most Member States while consumption of solid fuels declined for the EU as a whole. Renewables continued to increase in 2015, which slowed down the overall growth of GHG emissions.

As Figure ES.5 illustrates, GHG emissions increased in 17 EU Member States (Austria, Belgium, Bulgaria, Cyprus, France, Germany, Hungary, Italy, Ireland, Latvia, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia and Spain). The largest absolute increase in emissions occurred in Italy (12.0 Mt CO_2-eq. compared to 2014), followed by Spain (10.4 Mt CO_2-eq.) and France (10.3 Mt CO_2-eq.). The largest relative growth in emissions compared to the previous year took place in Hungary (6.0 %), followed by the Netherlands (4.9 %) and Bulgaria +4.2 %). Compared to 2014 the largest absolute fall of emissions occurred in the United Kingdom (21.1 Mt CO_2-eq.), followed by Greece (6.5 Mt CO_2-eq.), while the largest relative decrease occurred in Malta (24.9 %) and Estonia (16.5 %). Chapter 2 of the main report includes explanations for some of the changes in emissions by Member State. In the non-EU, EEA member countries, GHG emissions increased in Norway (0.8 Mt CO_2-eq. (1.5 %)), decreased in Switzerland (0.7 Mt CO_2-eq. (1.5 %)) and were almost constant in Iceland (-0.004 Mt CO_2-eq. (-0.1%)).

Figure ES.5 Member States' emissions, change 2014-2015



Note: Total GHG emissions without LULUCF including indirect CO_2.

Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to the UNFCCC for 1990-2014 and proxy estimates for 2015.

A total of 22 EU Member States submitted preliminary 2015 GHG data to the European Commission and the EEA by 31 July 2016[10][11]. Austria, Belgium, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and the United Kingdom all submitted emissions in the form of largely complete common reporting format Summary2 tables.

Luxembourg submitted preliminary GHG data on 5 August 2016 and Malta on 16 August 2016. As these submissions were made after the official submission deadline, they were not included in the totals for European Union plus Iceland and approximated GHG emissions calculated centrally by EEA and its ETC/ACM were used for these countries[12].

Other countries for which the EEA and its ETC/ACM calculated centrally approximated GHG emissions are Bulgaria, Cyprus, Lithuania and Romania because they did not submit preliminary GHG inventories by 31 July 2016 (see section 4.1.2).

10 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.

11 Hungary submitted preliminary GHG data on 1 August, which was only one day after the official deadline and the EEA and its ETC/ACM were therefore still able to include these data in the EU-28 and EU plus Iceland totals.

12 For reasons of transparency, the proxy inventories reported by Luxembourg and Malta are presented in Annex I of this report.

Rationale for proxy GHG emission estimates

The EU, as a Party to the UNFCCC, reports annually on GHG emissions within the area covered by its Member States (i.e. emissions occurring within its territory). National GHG inventories for EU Member States are only available with a delay of one and a half years. Inventories submitted on 15 April of the year *t*, therefore, include data up to the year *t*–2. For example, the data submitted on 15 April 2016 included data covering all of 2014, but not 2015. Thus, the timeliness of the data does not always allow for timely analysis of emission trends and progress towards targets.

The latest official EU GHG inventory data available (1990–2014), covering all countries, sectors and gases, were released in June 2016 with the annual submission of the EU GHG inventory to the UNFCCC (EEA, 2016a). The inventory data include GHG emissions not regulated by the Montreal Protocol, both from sectors covered by the ETS and from non-trading sectors. However, whereas UNFCCC emissions run on a year *t*–2 basis, Kyoto registries and EU ETS information are available on a year *t*–1 basis. Verified EU ETS emissions are therefore already available for 2015 (EEA, 2016b).

There are clear advantages in generating proxy GHG estimates for all sectors. When Member States set national emission caps for installations under the ETS for the period 2013–2020, they allocated part of their Kyoto emission budget (Kyoto Assigned Amounts) to the EU ETS and fixed the overall contribution of the ETS sectors towards reaching Kyoto national targets. ETS information runs on a year *t*–1 timeline but success in reducing emissions from sectors not covered by the EU ETS (running on a year *t*–2 timeline) will determine whether governments need to use Kyoto flexible mechanisms to achieve their targets.

Starting in 2014, the legal basis for the proxy GHG emission estimates is Regulation (EU) 525/2013 on a mechanism for monitoring and reporting GHG emissions (EU MMR). Article 8 requires Member States to submit to the Commission, where possible, approximated GHG inventories for the year *t*–1 by 31 July every year. These estimates are used to assess progress towards GHG emission targets.

Publishing a proxy GHG emissions report also fulfils the goals of the 'Beyond GDP' process (European Commission, 2014), which encourages authorities to produce data on the environment with the same frequency and timeliness as they produce data on the economy.

Methodology for proxy GHG emission estimates

This report presents the estimated GHG emissions for 2015 based on emissions estimates submitted to the EEA by 31 July 2016. The aggregated EU plus Iceland proxy 2015 GHG emission estimates are based on these submissions. 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 addition, the EEA may allocate the Member States’ reported emissions in gases and sectors using the methodologies used in section 4.1.3, to ensure that the provision of the EU proxy inventory and the explanation of the EU trends is performed at the appropriate level of detail. In such cases, the detailed proxy estimates are fully consistent with the estimates provided by the Member States.

Member States are responsible for the methodological choice regarding their own estimates. For gap-filling, the EEA uses the latest activity data available at country level to estimate the emissions. For emission sources for which no appropriate datasets exist, emissions are extrapolated from past trends or emissions from the previous year are kept constant if historic data do not show a clear linear trend. The emission 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. On this basis, a detailed bottom-up approach has been developed covering the full scope of emissions included in a GHG inventory submission. The estimates cover total GHG emissions as reported under the Kyoto Protocol and the UNFCCC excluding the LULUCF sector but including indirect CO_2 emissions.

For the most important source categories, publicly available data sets at the national, European and international levels with updated activity or emissions data for the year *t*- 1 that were published prior to the end of July 2016 were identified and used to calculate emissions. For source categories for which no international datasets with updated activity data exist or which are too complex for such an approach, emissions were extrapolated from past trends (linear extrapolation), or emissions from the previous year were kept constant or the average of three preceding years was used if historic data did not show a clear trend.

The EEA has used the proxy estimates of 2015 GHG emissions produced by Member States to assess progress towards GHG emission targets in its annual *Trends and projections* report (to be published later in the autumn). In that report, the EEA's proxy estimates for 2015 were only used for countries that lack their own estimates to track progress towards national and EU targets.

The report is structured as follows: Chapter 2 shows the complete dataset of EU proxy GHG emission estimates, based on the submissions made by Member States and the EEA's gap-filling of the remaining Member States that did not submit, where applicable. Chapter 2.1 shows trends and general results while Chapter 2.2 shows detailed results per sector. Chapter 3 presents the performance of last year’s EU proxy. An introduction to the applied methodologies for gap-filling is given in Chapter 4. Further details on the methods and data sources developed by the EEA and its ETC/ACM are described in Annex II (chapter 6.2). The detailed results for each Member State are shown in Annex I (chapter 6.1) of this report in order to ensure complete transparency regarding the available GHG estimates.

1. Background and objective

The approximated GHG inventory is an early estimate for the GHG emissions for the year preceding the current year and is available by 30 September each year. The legal basis for the Proxy 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 Proxy inventory, where possible, as any other EU Member State. Then, the European Environment Agency (EEA) assists the Commission in the compilation of the Union approximated greenhouse gas inventory. When Member States do not provide their own proxy emission estimates, the EEA produces gap-filled estimates in order to have a complete approximated GHG inventory for the European Union. Non-EU member states of the European Environment Agency are invited to submit their proxy estimates on a voluntarily basis.

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

Member States are responsible for the methodological choice regarding their own estimates. For gap-filling, the EEA uses the latest activity data available at country level to estimate the emissions. For emission sources for which no appropriate datasets exist, emissions are extrapolated from past trends, or emissions from the previous year are kept constant if historic data do not show a clear trend. The emission estimates assume no change in emission factors or methodologies as compared to the latest official inventory submissions to UNFCCC for the year *t*-2. On this basis, a detailed bottom-up approach was developed covering the full scope of emissions included in a GHG inventory submission. The EEA proxy estimates are used both for gap-filling purposes, when Member States do not provide their own proxy estimates, and as verification of the estimates provided by Member States.

This report provides approximated estimates of greenhouse gas (GHG) emissions in the EU, its Member States and Iceland for the year 2015. They are also referred to as 'proxy' estimates in this report, and they are based on GHG emission estimates reported by Member States and on calculations made by the EEA using activity and/or emissions data at country level. The official submission of 2015 data to the United Nations Framework Convention on Climate Change (UNFCCC) will take place in 2017.[13]

[13] For two Member States – Denmark and the UK – GHG inventories submitted to the UNFCCC are different to the inventories submitted under the EU Monitoring Mechanism Decision, as their Kyoto inventories include non-EU territories. The comparison in this report refers to the scope of the EU GHG inventory consistent with the inventory submitted by these countries under the EU Monitoring Mechanism Regulation.

There are clear advantages in generating proxy GHG estimates for all sectors. For the second commitment period of the Kyoto Protocol (2013–2020) that was established in Doha in 2012 (COP 18/CMP8), the 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 and Iceland agreed to a joint QELRC, corresponding to a 20 % reduction compared to the base year and they declared that they intended to fulfil this commitment jointly, under Article 4 of the Kyoto Protocol.[14] The Doha Amendments' entry into force is subject to acceptance by at least three quarters of the Parties to the Kyoto Protocol.

When Member States set national emission caps for installations under the ETS for the period 2013–2020, they allocated part of their Kyoto emission budget (Kyoto Assigned Amounts) to the EU ETS and fixed the overall contribution of the ETS sectors towards reaching Kyoto national targets. ETS information is available on a year *t*-1 timeline but success in reducing emissions from sectors not covered by the EU ETS (running on a year *t*-2 timeline) will determine whether governments need to use Kyoto flexible mechanisms to achieve their targets. Therefore, a proxy estimate of the previous year's emissions has improved tracking and analysis of progress towards Kyoto targets, as it has been done in the annual EEA report on greenhouse gas emission trends and projections in Europe.

Starting from 2014, the legal basis for the proxy GHG emission estimates is Regulation (EU) 525/2013 on a mechanism for monitoring and reporting GHG emissions (EU MMR). Article 8 requires Member States to submit to the Commission, where possible, approximated GHG inventories for the year *t*–1 by 31 July every year. These estimates are used to assess progress towards GHG emission targets.

Publishing a proxy GHG emissions report also fulfils the goals of the 'Beyond GDP' process (European Commission, 2014), which encourages authorities to produce data on the environment with the same frequency and timeliness as they produce data on the economy.

In addition, the 2009 EU's Climate and Energy Package encourages trading and non-trading sectors to run on similar timelines. The Package represents the EU's response to limiting the rise in global average temperature to no more than 2°C above pre-industrial levels. To achieve this Member States agreed to reduce total EU GHG emissions by 20% compared to 1990 by 2020. Both ETS and non-ETS sectors will contribute to the 20% objective. Minimising overall reduction costs to reach the 20 % objective implies a 21% reduction in emissions from EU ETS compared to 2005 by 2020 and a reduction of approximately 10% compared to 2005 by 2020 for non-trading sectors. Since 2013, there is an EU-wide cap on emissions from ETS installations (instead of national allocation plans as under the Kyoto Protocol) and national targets for the non-trading sectors. As

[14] Submission by Denmark and the European Commission on behalf of the European Union and its Member States (19 April 2012). Available at:
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

with Kyoto, meeting the 2020 national targets will by and large be determined by how countries reduce emissions in the non-trading sectors. Proxy GHG estimates can therefore help tracking progress to towards EU and national targets for 2020. The EEA has also used the proxy estimates of 2015 GHG emissions produced by EEA member countries to assess progress towards GHG emission targets in its annual *Trends and Projections Report*. In that report, the EEA's own proxy estimates for 2015 were only used for countries that lack their own estimates to track progress towards national and EU targets.

The EEA and its European Topic Centre on Air Pollution and Climate Change Mitigation have developed a methodology to estimate GHG emissions using a bottom up approach — based on data or estimates for individual countries, sectors and gases — to derive EU GHG estimates in the preceding year (*t*–1). This methodological approach was used until 2013.

In accordance with the reporting of approximated greenhouse gas inventories under Article 8 of the MMR, all member states will produce their own proxy greenhouse gas estimates. Since the 2014 report the approach in the way that Member States proxies are used has changed. In previous reports the analysis and calculations took advantage of available Member States proxy emission estimates for quality assurance and quality control.

This year's proxy report makes use of the Member States proxy inventories reported under the EU MMR Missing Member States proxies have been gap filled with proxy data that has been calculated with the same bottom-up country specific methods that were used in previous years.

This report provides greenhouse gas estimates one year before the official submission of national greenhouse gas inventories to UNFCCC. The estimates are based on the proxy inventories received from the Member states with gap-filling where necessary. Table 1 shows 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-1.

Table 1 Overview of EU data sources for GHG estimates

What	Who	When	Timeliness	Geographical scope	Sectoral Scope	EU reporting obligation
EU GHG inventory to UNFCCC	EEA	15 April (draft submission) & 30 May (final submission)	*t*-2	EU and its 28 Member States	All gases and sectors (100% of emissions)	EU MMR (525/2013)
Approximated GHG inventory	EEA	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 CLIMA	Early April and May	*t*-1	EU-28, Iceland, Norway and Liechtenstein	12,000 installations (~45% of total emissions)	EU ETS Directive (2003/87/EC)
CO_2 early estimates	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
EDGAR global database	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. European GHG emissions in 2015

Twenty-one EU-28 Member States submitted preliminary 2015 GHG data to the European Commission and the EEA by 31 July 2016[15]. Austria, Belgium, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Luxembourg, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and the United Kingdom all submitted emissions in the form of largely[16] complete CRF Summary2 tables. The methodologies used for any gap-filling are described in chapter 4.1.3.

Hungary, submitted preliminary GHG data on 1 August which was only one day after the official deadline and EEA and its ETC/ACM were therefore still able to include these data into the EU-28 and EU plus Iceland totals. Luxembourg submitted preliminary GHG data on 5 August 2016 and Malta on 16 August 2016. As these submission was late after the official submission deadline these data was not be included in the totals for European Union plus Iceland and approximated GHG emissions calculated centrally by EEA and its ETC/ACM were used.

As Bulgaria, Cyprus, Lithuania and Romania did not submit preliminary GHG inventories by 31 July 2016 approximated GHG emissions calculated centrally by EEA and its ETC/ACM were also used for these countries Member States (see chapter 4.1.2).

Additionally of the non-EU member states of the EEA, three member states submitted preliminary 2015 GHG data by 31 July 2016: Iceland, Norway and Switzerland.[17]

Approximated GHG inventories in CRF Summary2 table format are presented for the EU-28 and EU plus Iceland in chapter 2.1.3. Chapter 6.1 provides the CRF Summary2 tables for each of the 28 EU Member States and also for Iceland, Norway and Switzerland.

From the 2014 reporting year the new rules for inventory calculation for the second commitment period of the Kyoto Protocol apply. These changes include implementation of IPCC Reporting Guidelines 2006 and the use of the GWPs from the IPCC Fourth Assessment Report (AR4) and therefore limit direct comparisons with previously published emissions reports and data.

15 Where LULUCF data was provided, this data was not used, as for the approximated GHG inventories for EU-28 and EU plus Iceland, emissions from LULUCF are not calculated.

16 While some Member States did not include in their CRF Summary2 sheets the full level of detail indicated in Article 17 of the Commission Implementing Regulation (EU) No 749/2014 referencing to Article 8 (1) of Regulation (EU) No 525/2013, the missing data was minor and no gap-filling was required. Belgium, Denmark, Germany, Greece, Hungary, Sweden and the United Kingdom submitted CRF Summary2 tables which included some gaps or aggregation of data at a higher level. For these seven countries, gap-filling methodologies were applied.

17 Other non-EU member states of the EEA are Liechtenstein and Turkey. As these two countries did not submit any GHG data for 2015 these countries are not considered in this report.

2.1 Trends and general results

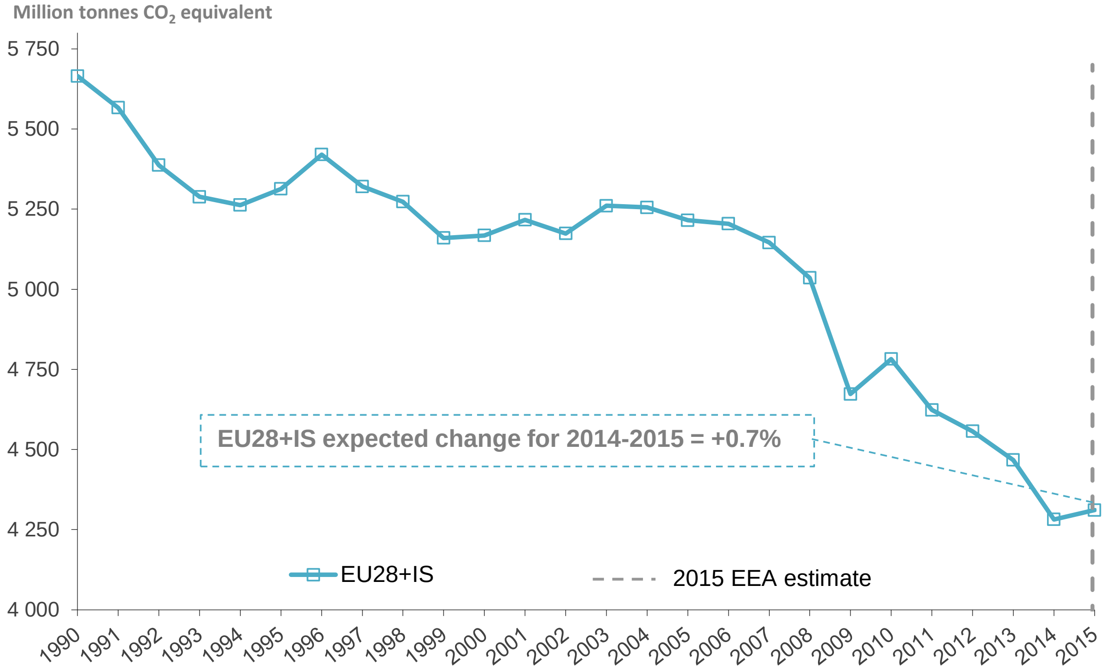
The estimates for 2015 indicate that emissions increased for the first time since 2010. The increase in emissions between 2014 and 2015 is estimated to be 29.5 million tonnes of CO2-equivalents (Mt CO2-eq) or 0.7 % for the EU plus Iceland[18] (total GHG emissions without LULUCF and including indirect CO2)[19]. For EU plus Iceland, total GHG emissions in 2015 are estimated to be -23.9 % below 1990 emissions.

The +0.7 % emission increase for EU plus Iceland is considerably lower than the +2.0 % growth of gross domestic product (GDP) on average in 2015 compared to 2014. As in 2014, notwithstanding economic developments in specific sectors and countries, there was no common pattern between GDP and GHG emissions for all EU Member States in 2015. The economic situation in the EU improved during 2015 compared to 2014. The GHG emission reductions in 2014 compared to 2013 were even larger than in 2013 compared to 2012 (-4.1 % and -1.8 %, respectively). Eleven Member States achieved emission reductions in 2015 while also recording positive economic growth.

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

[19] According to the UNFCCC reporting guidelines, Annex I Parties may report indirect CO2 from the atmospheric oxidation of CH_4, CO and NMVOCs. For Parties that decide to report indirect CO2 the national totals shall be presented with and without indirect CO_2. The EU proxy estimates are based on national totals excluding LULUCF and including indirect CO_2 if reported by Member States.

Figure 1 Trends in total greenhouse gas emissions, 1990-2015



Note: Total GHG emissions without LULUCF including indirect CO_2.

Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990-2014 and proxy estimates for 2015.

Analysis of emission trends needs to include climatic factors, which can affect behaviour and energy demand. 2014 and 2015 were the warmest years on record in Europe (KNMI, 2016), however the winter in Europe in 2015 was generally colder than it was in 2014. Lower winter temperatures especially in west and central Europe led to higher heating demand and higher emissions from the residential and commercial sectors. In most EU-28 Member States EEA data on heating degree days (HDD – a measure for heating demand), were higher in 2015 compared to 2014: Strongest increases of HDD occurred in Hungary (+15.2 %), the Netherlands (+14.4 %), Croatia (+13.4 %) and Belgium (+13.2 %). Further eleven Member States had HDD increases of more than +5 %. Only in Estonia (−9.1 %), Finland (−4.0 %), Latvia (−6.5 %), Lithuania (−6.0 %) and Portugal (−1.5 %) heating degree days decreased in 2015 compared to 2014. In all analysed[20] Member States HDD were lower in 2014 compared to the long-term average 1990–2013. In 2015 only in three analysed Member States (Greece, Ireland and Malta) experienced higher HDD than the long-term

[20] HDD data for 2014 was not available for Cyprus and Malta and HDD data for Iceland neither for 2014 nor for 2015 at the time of production of this report.

average 1990–2013. This shows that 2015– although less extreme than 2014 – was an exceptionally warm year across most parts of Europe.

On a sectoral basis, the largest absolute emission increase in the EU occurred in the energy sector (i.e. all combustion activities and fugitive emissions). GHG emissions grew by +39.5 Mt CO_2-eq (+1.2 %) across the EU plus Iceland. This increase in emissions in the energy sector reflects the increase of gross inland energy consumption in the EU plus Iceland in 2015. Within the energy sector, emissions mostly grew in the so called "other sectors" (i.e. residential and commercial) (+30.6 Mt CO_2-eq) and transport (+20.3 Mt CO_2-eq) while it fell in energy industries (−5.5 Mt CO_2-eq) and manufacturing industries and construction (−2.8 Mt CO_2-eq).

After a decreasing period between 2010 and 2014 primary energy consumption in the EU-28 increased by +1.6 % in 2015. Both fossil and renewable fuels increased their contribution to the energy mix while nuclear decreased its share slightly (BP 2016).

Based on Eurostat monthly consumption data for solid, liquid and gaseous fuels (Eurostat, 2016), total fuel consumption in the EU-28 increased by +4 %, with different trends for the different fossil fuel types. Consumption of natural gas most significantly extended by +4.3 % and consumption of liquid fuels grew by only +1.2 %. Solid fossil fuel consumption (excluding peat) fell by −3.9 % and peat consumption even dropped by −9.1 %.

Natural gas consumption extended in 19 EU-28 Member States between 2014 and 2015 and four Member States experienced increases in natural gas consumption of more than 10 %: Bulgaria by +10.4 %, Croatia by +11.9 %, Portugal by +11.1 % and Slovakia by +21.1 %. In seven Member States natural gas consumption fell with largest decrease in Estonia (−10.4 %) and Finland (−11.4 %).

Also liquid fossil consumption grew in 19 EU-28 Member States with the largest increase in Slovakia by +12.3 % followed by Hungary (+8.9 %) and Poland (+7.3 %). A decrease of liquid fuel consumption was observed in nine EU-28 Member States and in three of them consumption decreased by more than 10 %: Estonia by −14.9 %, Malta by −26.9 % and Sweden by −15.6 %.

Sixteen Member States showed decreasing solid fossil fuel consumption (excluding peat), most notably Denmark (−33.6 %), followed by Latvia with −29.9 %, the United Kingdom with −20.0 % and – Lithuania with –19.9 % (Eurostat, 2016). On the other hand, solid fossil fuel consumption (excluding peat) increased in eleven Member States, most notably in Cyprus (+50.0 %)[21], Ireland (+17.0 %), the Netherlands (+24.2 %) and Portugal (+21.7 %). These changes in fossil fuel consumption are not only related to heating degree day (HDD) effects as described before but also strongly connected to the trends in electricity generation. Peat consumption decreased in all seven Member States that report peat consumption to Eurostat. Most pronounced were the decreases in Estonia (−88 %), Latvia (−67 %) and Lithuania (−56 %).

[21] As the solid fuel consumption in Cyprus is very small this huge absolute increase corresponds to a little absolute increase of only 2 kilotons.

Hydroelectric generation decreased by −9 % in the EU-28 with strong regional differences. Most parts of central and southern Europe experienced disadvantageous conditions for hydro electricity production. In Portugal renewable gross hydro generation fell by −45 % compared to the previous year, in Slovenia by −36 %, Croatia by −28 %, in Spain by −26 %, in Italy and Hungary by −23 % each and in the Netherlands by −22 %. Hydro production decreased in further ten Member States. North Europe faced the opposite conditions with a larger gross hydro generation, in particular in Finland (+25 %), Ireland and Denmark (+20 % each) and Sweden (+16 %). Good hydro conditions also occurred in the very south eastern part with increasing hydro production in Greece (+24 %) and Bulgaria (+17 %).

Electricity production from renewable sources other than hydro increased considerably. Gross generation electricity generation from wind energy grew by +21 % in the EU-28 (EurObserv'ER, 2016a).[22] Wind generation grew in 25 Member States in 2015, some with very high growth rates: Finland (+110 %), Slovenia (+75 %), Germany (+53 %), Sweden (+47 %) and Austria (+35 %). The largest absolute contributions from wind energy were observed in Germany followed by Spain, the United Kingdom, France, Sweden, Italy and Portugal. Electricity production from photovoltaics also increased strongly: by +9 % across Europe (EurObserv'ER, 2016b), with very large relative increases in Poland (+195 %), Estonia (+100 %), Hungary (+93 %), the United Kingdom (+87 %) and Sweden (+63 %). The largest absolute generation from photovoltaics was in Germany followed by Italy, Spain, the United Kingdom and France.

Thus, the use of renewables continues to play an important role in GHG mitigation efforts by the EU and its Member States. Strong relative growth of total renewable energy consumption (without hydro) is reported for many Member States such as Romania (+47 %), United Kingdom (+31 %), Ireland (+24 %), Germany (+24 %), Lithuania (+23 %), Sweden (+23 %), France (+21 %), Belgium (+20 %), Austria (+16 %), Poland (+16 %), Bulgaria (+13 %) (BP, 2016). Only Spain (-4 %) and Portugal (-3 %) showed decreasing consumption of renewable energy according to BP data.

In 2015 nuclear electricity production across the EU-28 decreased in 2015 by −2.1 % compared to 2014 according to Eurostat monthly data. The only increases in nuclear electricity generation occurred in the United Kingdom (+10 %), Hungary (+1.2 %) and France (+0.3 %) while nuclear electricity generation decreased in twelve Member States. The largest decreases in nuclear electricity generation were in Belgium (−24 %), Sweden (−13 %), the Czech Republic (−11 %) and Germany (−6 %). Nuclear electricity generation decreased by less than -3% in all other countries.

GHG emissions from industrial processes decreased in 2015 compared to 2014, by −1.1 % in the EU plus Iceland. The largest emission decrease was observed for product uses of F-gases as substitutes for ozone-depleting substances (ODS) which decreased by −3.5 %. Emissions from mineral products decreased by −0.4 %, emissions from metal production fell by −1.4 % across the EU

[22] 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.

plus Iceland. Emissions from the chemical industry remained relatively stable in the EU plus Iceland (falling by only −0.1 % between 2014 and 2015).

Agriculture emissions increased by only +0.2 %, mainly from emission increases due to enteric fermentation. The trend in emissions from waste (−3.4 %) continues the decrease seen in previous years with largest reduction being in emissions for solid waste disposal.

2.1.1 Change in GHG emissions in the period 2014–2015 at Member State level

Figure 2 illustrates the changes in emissions in Europe from 2014 to 2015. GHG emissions increased in 17 EU Member States (Austria, Belgium, Bulgaria, Cyprus, France, Germany, Hungary, Italy, Ireland, Latvia, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia and Spain). The largest absolute increase of emissions occurred in the Italy (+12.0 Mt CO_2-eq compared to 2014), followed by Spain (+10.4 Mt CO_2-eq) and France (+10.3 Mt CO_2-eq). The largest relative growth in emissions compared to the previous year also took place in Hungary (+6.0 %), followed by the Netherlands (+4.9 %) and Bulgaria (+4.0 %). The largest absolute fall of emissions occurred in the United Kingdom (−21.1 Mt CO_2-eq) followed by Greece (−6.5 Mt CO_2-eq) and the largest relative decrease in Malta (−24.9%) and Estonia (−16.5%). Chapter 2 of the main report includes explanations for some of the change in emissions by Member State. In the non-EU member states of the EEA GHG increased in Norway (+0.8 Mt CO_2-eq / +1.5%), decreased in Switzerland (−0.7 Mt CO_2-eq /-1.5%) and were almost constant in Iceland (−0.004 Mt CO_2-eq / −0.1%).

The following section explains the emission trends for those Member States that contribute considerably to total EU emissions (Germany, United Kingdom, France, Italy, Poland and Spain)[23] as well as for those Member States (Estonia, Hungary Malta and the Netherlands) that showed pronounced positive or negative changes in emissions compared to the previous year.

Member States with increasing 2014 to 2015 emission trends

The largest absolute emission increase of all Member States was found in **Italy**: Emissions were +12.0 Mt CO_2eq or +2.9 % higher. Fossil fuel consumption showed a mixed changes according to energy statistics from Eurostat (2016): Natural gas consumption (+9.1 %) and liquid fuel consumption (+1.7 %) increased while solid fuel consumption fell (−4.3 %). The largest emission increase was in 1.A.4 Other Sectors (+6.7 Mt CO_2-eq or +9.1 %) which corresponds to an increased natural gas consumption and slightly higher heating degree days (+1.1 %). The next most significant increase was in 1.A.1 Energy Industries (+6.2 Mt CO_2-eq or +6.2 %). A large decrease in hydro generation (−23 %) was mainly compensated by an increase electricity generation from conventional power plants (+9 %). Reduced rainfall and therefore reduced generation from hydroelectric power plants was seen across most parts of south and central Europe. The decrease of emissions from 1.A.2 Manufacturing industries and construction (−2.9 Mt CO_2-eq or −5.6 %) compensated for the increase of emissions in 1.A.3 Transport (+2.9 Mt CO_2-eq or +2.8 %). The largest

[23] Comments are made for these six Member States because in combination they contribute to about 70 % of total EU plus Iceland emissions (4316 Mt CO_2-eq) and each of these Member States contributes more than 300 Mt CO_2-eq. These six MS are sorted in descending order.

emission change in the non-energy sectors was in Waste (−0.9 Mt CO_2-eq or −4.4 %) followed by Agriculture (−0.4 Mt CO_2-eq or −1.2 %) while emissions from Industrial processes and product use increased (+0.3 Mt CO_2-eq or +0.9 %).

Emissions in **Spain** also grew by a large absolute amount: +10.4 Mt CO_2eq or +3.2 %. This was the second largest absolute emission increase of all Member States. Energy consumption from both natural gas (+3.7 %) and liquid fossil fuels (+3.2 %) increases by similar amounts while solid fuel consumption declined (−2.0%). By far the largest increase in energy emissions were in 1.A.1 Energy Industries which increased by +12.4 Mt CO_2-eq or +16.5 %. According to Spain's own reported information, this increase is related to increased coal (+22 %) and natural gas (+20 %) in the electricity generation mix and increased emissions from refineries. Second largest emission increase in the energy sector was from 1.A.3 Transport (+2.7 Mt CO_2-eq or +3.4 %) which corresponds well to increased oil consumption. Also emissions in 1.A.2 Manufacturing industries and construction (+0.6 Mt CO_2-eq or +1.6 %) and 1.A.4 Other sectors (+1.0 Mt CO_2-eq or +2.6 %) increased. The strong emission increase in the energy sectors were partially compensated by strong reductions of emissions in the Industrial Processes and Product Use sector by −5.8 Mt CO_2-eq or −15.4 %. This is mainly caused by a −6.3 Mt CO_2-eq or −38 % decrease of hydrofluorocarbons (HFC) emissions from product use as ozone-depleting substances (ODS) substitutes. Second strongest emission change in IPPU was a +0.5 Mt CO2-eq (+4.1 %) increase in mineral industry. Emissions from Agriculture decreased by −0.7 Mt CO2-eq or −1.9 % and emissions from Waste were almost constant.

France is the third largest GHG emitter within the European Union and also has experienced the third largest absolute increase of all Member States: emissions were +10.2 Mt CO_2-eq or +2.2 % higher. The increase is mainly due to greater energy use in all energy sectors. Energy statistics from Eurostat (2016) reveal that natural gas consumption grew by +8.3 % and solid fuel use fell by −2.8 % while liquid fuel consumption was almost constant. Largest increases were in 1.A.4 Other sectors (which includes residential and commercial) which increased by +7.1 Mt CO_2-eq or +8.3 %. This is consistent with the strong increase of natural gas consumption and reflects the colder winter (heating degree days: +7.0 %). Second largest increases were in 1.A.1 Energy industries (which includes coal and gas fired electricity generation and district heating as well as refineries) by +2.1 Mt or +5.2 %. Emissions from 1.A.3 Transport increased by +1.2 Mt CO_2-eq (or +0.9 %) and from 1.A.2 Manufacturing industries and construction increased by +0.7 Mt CO_2-eq (or +1.1 %). Largest emissions change in the non-energy sector was the +0.6 Mt CO_2-eq (or +1.5 %) increase in Industrial processes and product use while emissions from Waste (−0.4 Mt CO_2-eq or −1.9 %) and Agriculture (−0.2 Mt Coe-eq or −0.2 %) decreased.

In the **Netherlands** emissions grew by +9.1 Mt CO_2-eq or +4.9 %. This is the second largest relative increase of all Member States. According to energy statistics from Eurostat (2016) solid fuel consumption increased by +24 % while natural gas consumption decreased by −1.1 % and liquid fuel consumption by −9 %. Emissions from 1.A.1 Energy industries increased by +4.9 Mt CO_2-eq or

+7.7 % which is consistent with the strong increase of solid fuel consumption and the commissioning of the Eemshaven 1.6 gigawatts coal power plant in 2015[24]. Second largest emission increase was in 1.A.4 Other sectors where emissions increased by +2.3 Mt-CO_2-eq (or +7.2 %) which is in line with a +14.4 % increase of heating degree days. Emission increases in 1.A.2 Manufacturing industries and construction (+2.0 %) and 1.A.3 Transport (+1.8 %) were lower and contribute to the total emission increase by +0.5 Mt CO_2-eq each. Also emissions from Industrial process and product use extended by +0.5 Mt CO_2-eq (+5.0 %), mainly in the chemical industry. Emissions from Agriculture are estimated to grow by +0.4 Mt CO_2-eq (+2.4 %) while emissions from Waste fell by −0.2 Mt CO_2-eq (−5.6 %).

In **Germany**, the largest GHG emitter in the European Union, there was an emissions increase of +6.3 Mt CO2-eq or +0.7 %. There has been a growth in the use of natural gas (+4.9 %) while total solid fuel consumption decreased by 2.0% and liquid fuels remained at the same levels with 2014. Heating degree days in 2015 were higher (+7.6 %) than in 2014. The upswing heating demand is reflected in the +4.5 Mt CO2-eq (+3.6 %) emission increase in the residential and commercial sector (CRF sectors 1.A.4 and 1.A.5). Second largest emission increase was in 1.A.3 Transport with +2.5 Mt CO2-eq (or +1.5 %). The emission increases in Transport and Other Sector are consistent with extended oil and natural gas consumption. While emissions in 1.A.2 Manufacturing industries and construction were almost constant emissions from 1.A.1 Energy industries fell by −1.8 Mt CO2-eq (or −0.5 %) which is consistent with a similar decline of electricity generation from fossil fuels. Emissions from Industrial processes and product use (+0.9 Mt CO2-eq or +1.4 %) and Agriculture (+0.8 Mt CO2-eq or +1.3 %) increased while emissions from Waste decreased (−0.6 Mt CO2-eq or −5.3 %).

The largest relative increase was in **Hungary** where emissions were +6.0 % higher. This corresponds to an absolute increase of +3.4 Mt CO_2-eq. Consumption of all fossil fuels grew in 2015: liquid fuels by +8.9 %, natural gas by +6.8 % and solid fuels by 3.1 %. Largest increase in the energy sector was in 1.A.3 Transport (+0.9 Mt CO_2-eq or +8.0 %) which is in line with the strong increase of oil consumption. Emissions from 1.A.4 Other sectors (+0.6 Mt CO_2-eq or +5.4 %) and Energy industries (+0.5 Mt CO_2 eq or +3.9 %) while emissions from 1.A.2 Manufacturing industries and construction are estimated to be constant. The increases in Other sectors and energy industries correspond to higher heating degree days (+15.5 %) and extended electricity generation in conventional power plants (+6.3 %). The largest emission increase across all sectors was in Industrial processes and product use with +1.2 Mt CO_2-eq or +20.4 %, mainly from F-gas emissions in source category Product uses as ODS substances which burst by +58 % (+0.8 Mt CO_2-eq). Emissions from Agriculture also grew (+0.1 Mt CO_2-eq or +1.8 %) while emissions from Waste fell (−0.1 Mt CO_2-eq or −1.4 %).

In **Poland** emissions increased by only +0.3 Mt CO_2-eq or +0.1 %. However there were dissimilar changes across sectors. Energy statistics from Eurostat (2016) show that consumption of liquid

[24] RWE: Eemshaven Power Plant, http://www.rwe.com/web/cms/en/1772148/rwe-generation-se/locations/netherlands/eemshaven-power-plant/, accessed 15 August 2016.

fossil fuels increased by +7.3 % and natural gas by +1.8 % while solid fuel consumption remained constant. This is in contrast to national statistics show decreasing lignite and hard coal consumption. These changes are in line with the reported increase (+3.1 Mt CO_2-eq or +7.0 %) in 1.A.3 Transport. Emissions for 1.A.4 Other sectors (+0.4 t CO_2-eq or +0.8 %) and 1.A.2 Manufacturing industries and construction (+0.2 Mt CO_2-eq or +0.5 %) increased only slightly. One reason may be that that apparent heating degree days changed only slightly (+2.8 %). Emissions from 1.A.1 Energy industries decreased significantly (−2.7 Mt CO_2-eq or −1.7 %) which is consistent with the national data on lignite and hard coal consumption. Emissions from Industrial processes and process use decreased only slightly (−0.1 Mt CO_2-eq or −0.5 %) while emissions from Agriculture decreased (−0.7 Mt CO_2-eq or −2.3 %), mainly from agricultural soils. Emissions from Waste are estimated to stay constant.

Member States with decreasing 2014 to 2015 emission trends

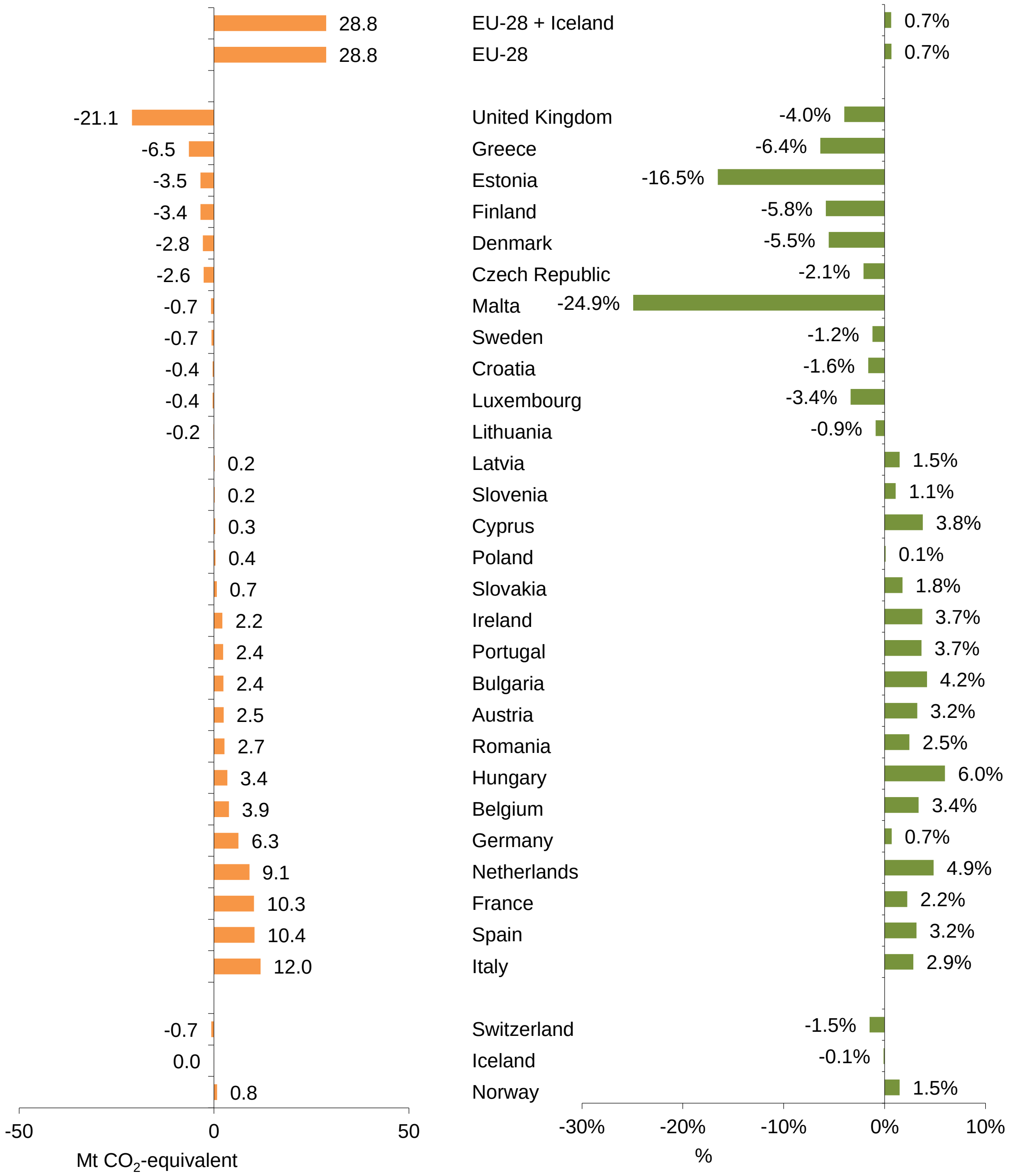
The largest absolute decrease was seen in the **United Kingdom**, the second largest GHG emitter in the European Union. Emissions decreased by −21.1 Mt CO_2-eq or −4.0 %, significantly more than in any other Member State. The decline in emissions is mainly due to reduced consumption of fossil fuels which also fell by −20 %. Against this overall reduction the consumption of liquid fossil fuels (+3.4 %) and natural gas (+2.2 %) increased moderately. The largest absolute emissions decrease was in sub-category 1.A.1 Energy Industries (−20.8 Mt CO_2-eq or −13.5 %). The emissions decrease was due to reduced lower conventional electricity generation (−7.8 % in 2015) with less use of coal, more wind generation (+11 %) and also increased net electricity imports (+13 %). The next largest emission increase reflects increased heating demand. Heating degree days were +9.7 % higher resulting in an emissions increase of +3.5 Mt CO_2-eq or +4.0 % in 1.A.4 Other Sectors which includes residential and commercial activities. Emissions of 1.A.3 Transport increased by +0.8 Mt CO_2-eq (+0.7 %) while emissions of 1.A.2 Manufacturing industries and commercial decreased by −3.0 Mt CO_2-eq (−5.1 %). Emissions of Industrial processes and product use declined by −0.9 Mt CO_2-eq (−2.4 %) and of Waste by −2.3 Mt CO_2-eq (−12.2 %) while emissions from Agriculture increased by +1.3 Mt CO_2-eq (+2.8 %).

Estonia had the second largest relative emission increase of all Member States: −3.4 Mt CO_2-eq or −16.5 %. Consumption of all fossil fuels fell strongly: solid fuels (excluding peat) and liquid fuels decreased by −15 % each. Consumption of natural gas declined by −10 % and consumption of peat by −88 %. The largest emissions decrease occurred in 1.A.1 Energy industries with −3.0 Mt CO_2-eq or −20.1 %. Conventional electricity generation dropped by −19 % which is partly due to a strong reduction of electricity net exports (−57 %) while electricity consumption decreased by 5 %. As district heating in Estonia plays an important role in heat supply for buildings, the emissions reduction in energy industries is also related to a −9.1 % decrease of heating degree days. Similarly emissions from 1.A.4 Other (which includes residential) decreased by −0.1 Mt CO_2-eq (−19.3 %). 1.A.3 Transport was the only sector with increasing emissions (+0.1 Mt CO_2-eq or +3.5 %). Emissions from 1.A.2 Manufacturing industries and construction fell by −0.3 Mt (−37.9 %) and emissions from Industrial processes and product use decreased by −0.2 Mt CO_2-eq (−27.5 %), mainly reduced operations at one clinker kiln in 2015. Emissions from Agriculture increased by +0.06 Mt CO_2-eq or +4.9 %, mainly due to recalculation effects for agricultural soils. Emissions from Waste decreased by −0.02 Mt CO_2-eq or −6.6 %.

Malta decreased its GHG emissions by −0.7 Mt CO_2-eq in 2015 compared to 2014. As Malta is the smallest GHG emitter within the European Union this corresponds to an impressive relative decrease of −24.9 %. According to Eurostat (2016) energy statistics consumption of liquid fuels decreased by 27 % with minimal consumption of other fossil fuels. Emissions of 1.A.1 Energy industries decreased by −0.75 Mt CO_2-eq or −46.6 %. In 2015 a subsea electricity interconnector between Malta and Sicily (Italy) was commissioned.[25] Electricity imports from Italy partly displaced electricity generation in Malta's oil-fired power plants (production −45 %). Second largest emission change was a −0.045 Mt CO_2-eq (−6.9 %) reduction in 1.A.3 Transport. Increasing emissions were estimated in 1.A.4 Other sectors (+0.015 Mt CO_2-eq or +7.3 %) and in 1.A.2 Manufacturing industries and construction (+0.003 Mt CO_2-eq or +8.6 %). Emissions from non-energy sectors increased in Industrial processes and product use (+0.017 Mt CO_2-eq or +7.0 %) and Waste (+0.015 Mt CO_2-eq or +9.7 %) with decreases in Agriculture (−0.003 Mt CO_2-eq or −3.8 %).

[25] Enemalta: Malta-Italy interconnector, http://www.enemalta.com.mt/index.aspx?cat=2&art=247&jse=0, accessed 15 August 2016.

Figure 2 Member States emissions, change 2014-2015

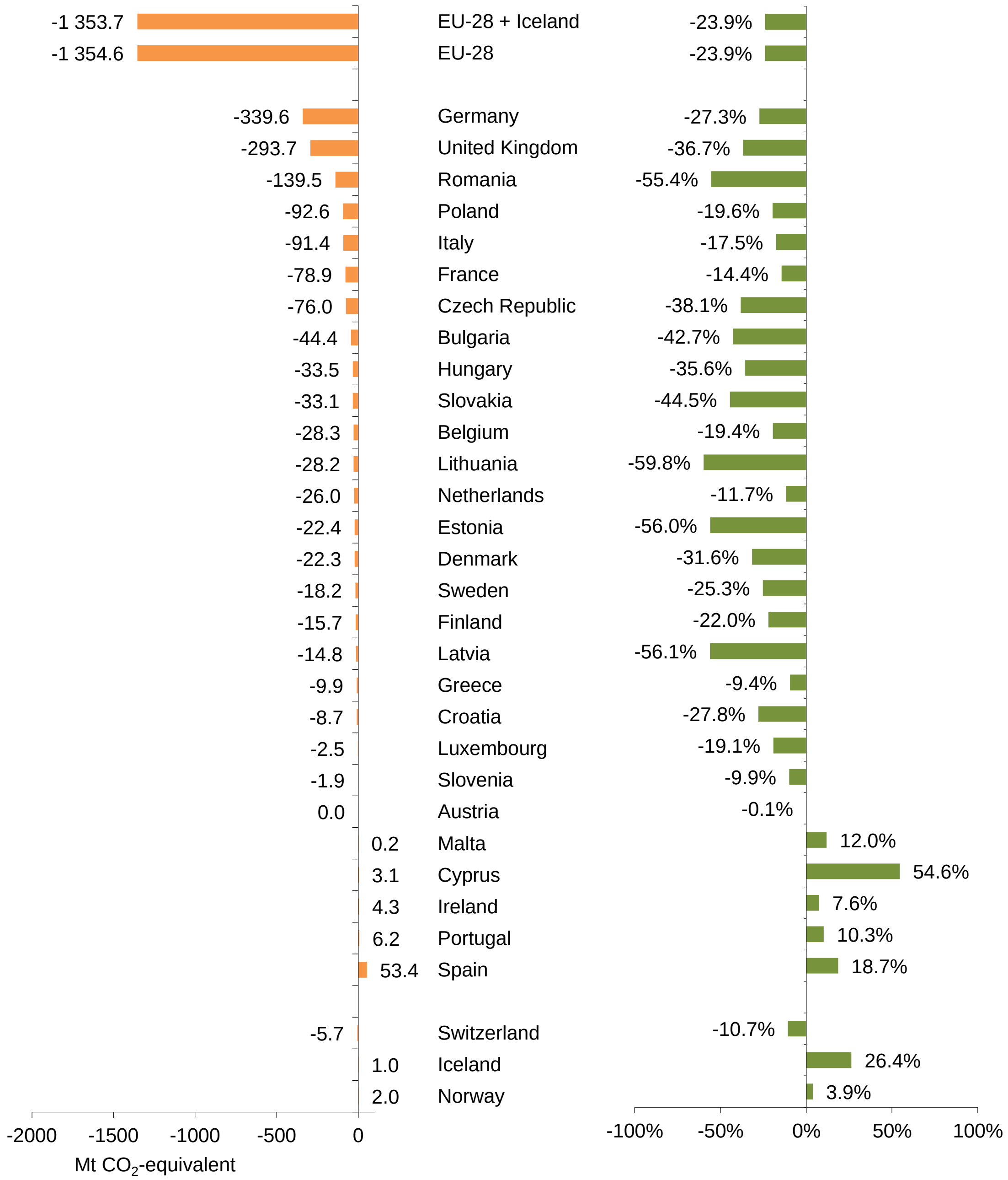


Note: Total GHG emissions without LULUCF including indirect CO_2.

Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990- 2014 and proxy estimates for 2015.

2.1.2 Change in GHG emissions in the period 1990–2015 at Member State level

Figure 3 Member States emissions, change 1990-2015



Note: Total GHG emissions without LULUCF including indirect CO_2.

Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990-2014 and proxy estimates for 2015.

Figure 3 shows the trend for total GHG emissions without LULUCF and including indirect CO_2 between the years 1990 and 2015. For EU plus Iceland, total GHG emissions in 2015 are estimated to be −23.9 % or below 1990 emissions.

Emissions of 22 EU-28 Member States were lower compared to 1990 while emissions in six of the other EU-28 Member States were higher. The largest absolute decrease was in Germany, followed by the United Kingdom and Romania which all reduced their GHG emissions by more than 100 Mt CO_2-eq. The largest absolute increases experienced Spain with 53.4 Mt CO_2-eq. Absolute emission increases in the remaining five Member States are by an order of magnitude lower.

The largest relative emission decreases were in Lithuania, Latvia, Estonia and Romania which all reduced their emissions by more than 50 % compared to 1990. The relative emission decreases of further nine Member States are stronger than the EU plus Iceland average. By far the largest relative emission increase was in Cyprus (+54.6 %) while the changes in other EU Member States with increased emissions compared to 1990 are all below +20 %.

Of the three non-EU Member States of the EEA considered in this report only Switzerland had in 2015 lower GHG emissions compared to 1990 level. Iceland has second largest relative emission increase of all EEA Member States. Norway's absolute emission increase is larger than Iceland's but the relative emission increase is considerably lower.

2.1.3 Detailed results for EU-28 and EU plus Iceland

Table 2 and Table 3 show the detailed results for the EU-28 and the EU plus Iceland. Annex 6.1 includes summary tables for 2015 for each Member State as submitted by the Member States or by EEA for Member States which did not submit their own approximated emissions report.

Table 2 Summary table of approximated GHG emissions for 2015 for EU-28 (total emissions without LULUCF including indirect CO_2)

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

Inventory 2015
Submission 2016 v Proxy 1.0
EUROPEAN UNION (28)

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)]	**3 289 095**	**454 442**	**243 084**	**107 890**	**3 686**	**5 818**	**783**	**77**	**4 104 876**		
1. Energy	**3 251 324**	**82 659**	**29 481**						**3 363 464**		
A. Fuel combustion (sectoral approach)	3 224 848	23 660	29 378						3 277 885		
1. Energy industries	1 228 176	4 021	7 945						1 240 143		
2. Manufacturing industries and construction	483 641	1 685	4 346						489 672		
3. Transport	898 607	1 346	9 353						909 306		
4. Other sectors	609 302	16 582	7 655						633 539		
5. Other	5 122	25	78						5 225		
B. Fugitive emissions from fuels	26 476	58 999	103						85 579		
1. Solid fuels	3 659	23 485	0						27 144		
2. Oil and natural gas	22 817	35 514	70						58 401		
C. CO_2 transport and storage	0								0		
2. Industrial processes and product use	**237 704**	**2 198**	**11 008**	**107 890**	**3 686**	**5 818**	**783**	**77**	**369 165**		
A. Mineral industry	108 687								108 687		
B. Chemical industry	47 821	1 418	7 446	467	1 881	97	0	0	59 130		
C. Metal industry	68 231	687	26	60	456	181	52	0	69 693		
D. Non-energy products from fuels and solvent use	12 063	2	5						12 070		
E. Electronic Industry				57	535	162	5	77	835		
F. Product uses as ODS substitutes				107 294	222	0	0	0	107 515		
G. Other product manufacture and use	707	77	3 438	11	590	5 354	414	0	10 591		
H. Other	195	15	93	2	3	23	0	0	331		
3. Agriculture	**10 073**	**239 450**	**186 222**						**435 745**		
A. Enteric fermentation		189 049	0						189 049		
B. Manure management		44 853	21 870						66 723		
C. Rice cultivation		2 738	0						2 738		
D. Agricultural soils		0	163 662						163 662		
E. Prescribed burning of savannas		0	0						0		
F. Field burning of agricultural residues		1 257	320						1 577		
G. Liming	6 007								6 007		
H. Urea application	3 985								3 985		
I. Other carbon-containing fertilizers	82								82		
J. Other	0	1 554	370						1 924		
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	3 558	126 570	10 629						140 757		
A. Solid waste disposal	0	102 447							102 447		
B. Biological treatment of solid waste		4 013	3 072						7 085		
C. Incineration and open burning of waste	3 536	97	200						3 834		
D. Waste water treatment and discharge		20 005	7 284						27 289		
E. Other	21	8	74						102		
6. Other *(as specified in summary 1.A)*	0	0	0	0	0	0	0	0	0		

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
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)]	4 105										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**4 309 131**	**1 771 637**	**2 536 845**
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	**4 310 868**	**1 771 637**	**2 539 027**
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.

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

Table 3 Summary table of approximated GHG emissions for 2015 for EU plus Iceland (total emissions without LULUCF including indirect CO_2)

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

Inventory 2015
Submission 2016 v Proxy 1.0
EU28+Iceland

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)]	**3 298 615**	**457 288**	**243 549**	**108 055**	**3 790**	**5 820**	**783**	**77**	**4 117 977**		
1. Energy	**3 252 887**	**82 666**	**29 525**						**3 365 079**		
A. Fuel combustion (sectoral approach)	3 226 251	23 663	29 422						3 279 335		
1. Energy industries	1 228 178	4 021	7 945						1 240 145		
2. Manufacturing industries and construction	483 666	1 685	4 346						489 697		
3. Transport	899 438	1 348	9 382						910 168		
4. Other sectors	609 847	16 583	7 671						634 100		
5. Other	5 122	25	78						5 225		
B. Fugitive emissions from fuels	26 636	59 004	103						85 744		
1. Solid fuels	3 659	23 485	0						27 144		
2. Oil and natural gas	22 978	35 519	70						58 566		
C. CO_2 transport and storage	0								0		
2. Industrial processes and product use	**239 405**	**2 199**	**11 011**	**108 055**	**3 790**	**5 820**	**783**	**77**	**371 140**		
A. Mineral industry	108 688								108 688		
B. Chemical industry	47 821	1 418	7 446	467	1 881	97	0	0	59 130		
C. Metal industry	69 931	688	26	60	560	181	52	0	71 498		
D. Non-energy products from fuels and solvent use	12 063	2	5						12 070		
E. Electronic Industry				57	535	162	5	77	835		
F. Product uses as ODS substitutes				107 458	222	0	0	0	107 680		
G. Other product manufacture and use	707	77	3 441	11	590	5 356	414	0	10 596		
H. Other	195	15	93	2	3	23	0	0	331		
3. Agriculture	**10 074**	**239 794**	**186 625**						**436 493**		
A. Enteric fermentation		189 343							189 343		
B. Manure management		44 903	21 913						66 815		
C. Rice cultivation		2 738							2 738		
D. Agricultural soils		0	164 023						164 023		
E. Prescribed burning of savannas		0	0						0		
F. Field burning of agricultural residues		1 257	320						1 577		
G. Liming	6 007								6 007		
H. Urea application	3 985								3 985		
I. Other carbon-containing fertilizers	82								82		
J. Other	0	1 554	370						1 924		
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	3 565	126 809	10 638						141 012		
A. Solid waste disposal	0	102 679							102 679		
B. Biological treatment of solid waste		4 015	3 074						7 089		
C. Incineration and open burning of waste	3 544	97	201						3 842		
D. Waste water treatment and discharge		20 010	7 290						27 300		
E. Other	21	8	74						102		
6. Other *(as specified in summary 1.A)*	0	0	0	0	0	0	0	0	0		

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)]	4 105										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**4 313 724**	**1 773 449**	**2 539 626**
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	**4 315 461**	**1 773 449**	**2 541 808**
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.

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

2.2 Sectoral results

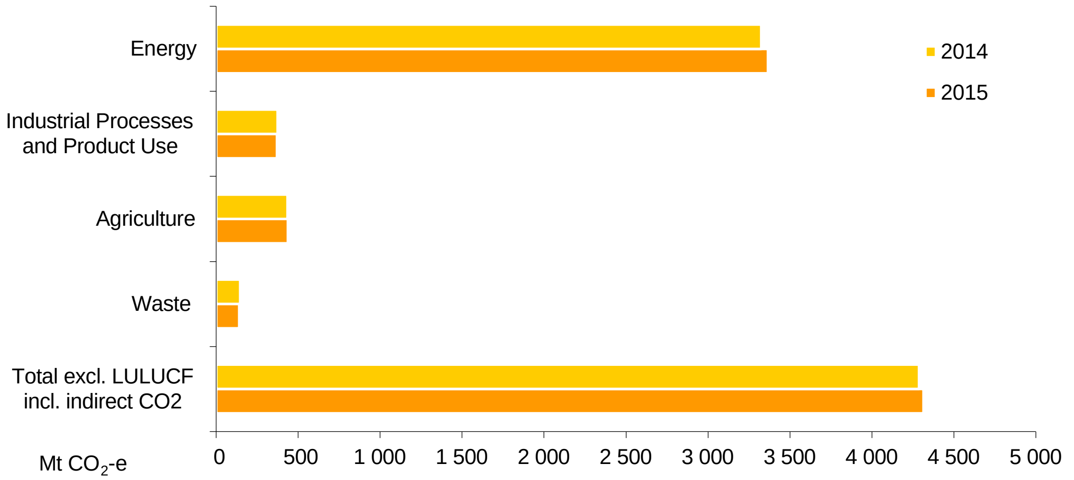
Table 4 and Figure 4 show the changes between 2014 and 2015 at sectoral level for the EU plus Iceland.

Table 4 Emissions by sector, change 2014-2015

Change 2014 / 2015	EU plus Iceland	
	Mt CO_2eq	%
Energy	39.5	1.2%
Industrial Processes and Product Use	-4.2	-1.1%
Agriculture	0.8	0.2%
Waste	-4.9	-3.4%
Total excl. LULUCF incl. indirect CO_2	28.8	0.7%

Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990-2014 and proxy estimates for 2015.

Figure 4 Emissions by sector, EU plus Iceland, 2014-2015



Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990-2014 and proxy estimates for 2015.

On a sectoral basis, the largest absolute emission change occurred in the Energy sector (i.e. all combustion activities and fugitive emissions from energy). GHG emissions grew by +39.5 Mt CO_2eq (+1.2 %) across the EU plus Iceland. More detailed explanations for the trends in the energy sector are provided in section 2.2.1 Energy.

The greenhouse gas emissions from Industrial Processes and Product Use decreased by −4.2 Mt CO_2eq (−1.1%). The agricultural sector saw an increase of +0.8 Mt CO_2-eq (+0.2 %), the waste sector emissions had a reduction of −4.9 Mt CO_2eq (−3.4%).

2.2.1 Energy

Emissions from the energy sector contributed about 78 % of total EU plus Iceland emissions in 2015. Emissions from fuel combustion saw an increase of +41.2 Mt CO_2eq or +1.3 % since 2014.

Table 5 shows that the largest increase in fuel combustion emissions occurred in 1.A.4 Other sectors (+30.6 Mt CO_2eq) and 1.A.3 Transport (+20.2 Mt CO_2eq). "Other sectors" mainly consists of residential and commercial activities. The relative increase in 1.A.4 Other sectors (+5.1 %) was significantly larger than that of 1.A.3 Transport (+2.3 %). Emissions in 1.A.1 Energy industries (−0.4 %) and 1.A.2 Manufacturing industries and construction (−0.6 %) decreased by similar relative amounts but absolute emissions change was larger in 1.A.1 Energy Industries (−5.5 Mt CO_2eq) than in 1.A.2 Manufacturing industries and construction (−2.8 Mt CO_2eq). The change of 1.A.5 is mainly an artefact.[26] 1.B Fugitive emissions from fuels decreased by −1.8 Mt CO_2eq (−2.0 %).

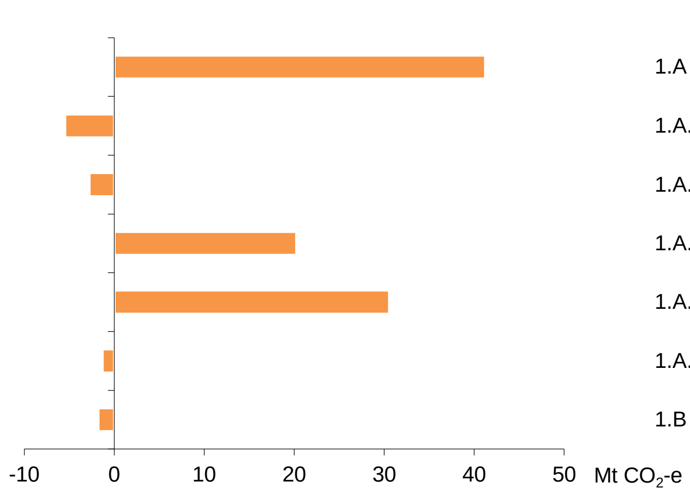
Table 5 Energy sector emissions, change 2014-2015

Change 2014 / 2015	**EU plus Iceland**	
	Mt CO_2eq	**%**
1.A Fuel Combustion (Sectoral Approach)	41.2	1.3%
1.A.1 Energy Industries	-5.5	-0.4%
1.A.2 Manufacturing Industries and Construction	-2.8	-0.6%
1.A.3 Transport	20.3	2.3%
1.A.4 Other sectors	30.6	5.1%
1.A.5 Other	-1.3	-20.1%
1.B. Fugitive Emissions from Fuels	-1.8	-2.0%

Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990-2014 and proxy estimates for 2015.

[26] In its 2016 GHG inventory submission, Germany reported 1.0 Mt CO2eq emissions in source category 1.A.5 for year 2014. In the 2015 proxy these emissions were reported under 1.A.4 Other sectors. EEA and its ETC/ACM did not re-allocate these emissions.

Figure 5 Energy sector emissions, EU plus Iceland, change 2014-2015



Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990-2014 and proxy estimates for 2015.

The largest emissions increase for 1.A Fuel Combustion on Member States level was in Spain (+16.8 Mt CO_2-eq) followed by Italy (+12.8 Mt CO_2-eq), France (+11.0 Mt CO_2-eq) and the Netherlands (+8.3 Mt CO_2-eq). Largest emission decrease was in the United Kingdom (−19.6 Mt CO_2-eq) followed by Greece (−5.5 Mt CO_2-eq). Emissions from Fuel Combustion increased in 18 Member States and decreased in 11 Member States.

Going to more detail, in the sub category 1.A.1 Energy Industries, largest reduction was in the United Kingdom (−20.8 Mt CO_2-eq), followed by Greece (−4.4 Mt CO_2-eq), Finland (−3.3 Mt CO_2-eq) and Estonia (−3.0 Mt CO_2-eq). Largest increases were in Spain (+12.5 Mt CO_2-eq) followed by Italy (+6.2 Mt CO_2-eq), the Netherlands (+4.9 Mt CO_2-eq) and Portugal (+3.2 Mt CO_2-eq).

Emissions changes in the sector 1.A.2 Manufacturing Industries and Construction were significantly smaller. The largest decrease was in the United Kingdom (−3.0 Mt CO_2-eq) and the largest increase in Belgium (+2.0 Mt CO_2-eq).

Emissions from 1.A.3 Transport increased in 22 Member States. The largest increases were in Poland (+3.1 Mt CO_2-eq), Italy (+3.0 Mt CO_2-eq) and Spain (+2.7 Mt CO_2-eq), while largest decreases was in Greece (−0.3 Mt CO_2-eq).

In 1.A.4 Other Sectors (which include residential and commercial) emissions increased in 20 Member States. The largest increases occurred in France (+7.1 Mt CO_2-eq), Italy (−6.7 Mt CO_2-eq), Germ (+5.6 Mt CO_2-eq) and the United Kingdom (+3.5 Mt CO_2-eq). The largest decrease was in Finland (−0.3 Mt CO_2-eq).

Emission changes in the sector 1.A.5 Other in all Member States are less than ±0.2 Mt CO_2-eq.[27]

[27] For Germany see footnote 26.

1.B Fugitive Emissions from fuels decreased in most Member States. The largest increase was in the United Kingdom (+0.4 Mt CO_2-eq) and the largest decrease in the Czech Republic (−0.4 Mt CO_2-eq).

2.2.2 Industrial Processes and Product Use

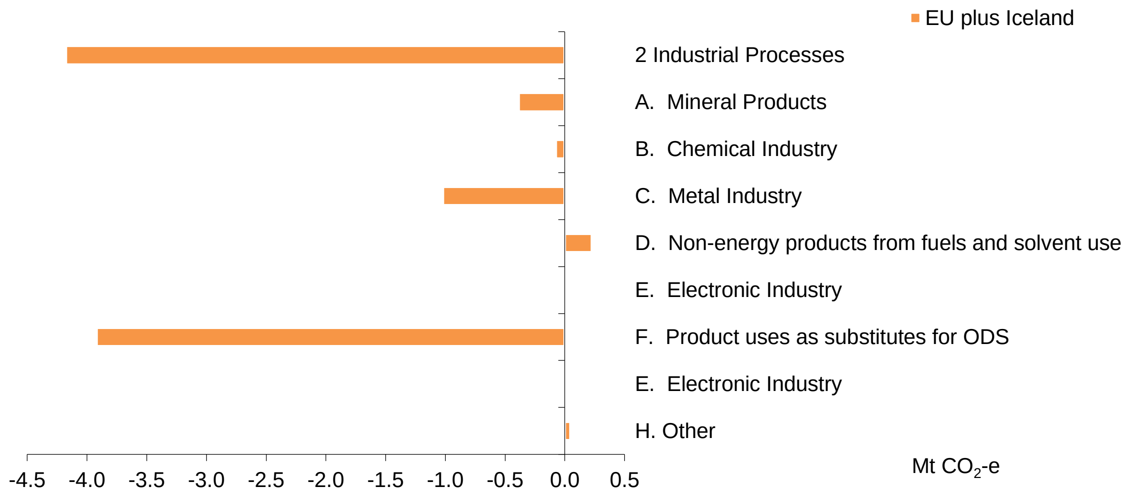
Industrial Processes and Product Use (IPPU) contribute to about 9 % of total EU plus Iceland emissions and are the third most important source after energy and agriculture. Emissions from Industrial Processes decreased by −4.2 Mt CO_2eq for the EU plus Iceland (−1.1%). Table 6 and Figure 6 show the sub-sector contribution to this trend in emissions. The decrease is dominated by the subsector 2.F Product uses as substitutes for ODS.

Table 6 Industrial Processes and Product Use emissions, change 2014-2015

Change 2014 / 2015	**EU plus Iceland**	
	Mt CO_2eq	**%**
2 Industrial Processes	-4.2	-1.1%
A. Mineral Products	-0.4	-0.4%
B. Chemical Industry	-0.1	-0.1%
C. Metal Industry	-1.0	-1.4%
D. Non-energy products from fuels and solvent use	0.2	1.9%
E. Electronic Industry	0.0	0.2%
F. Product uses as substitutes for ODS	-3.9	-3.5%
G. Other Product Manufacture and Use	0.6	6.4%
H. Other	0.0	16.9%

Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990-2014 and proxy estimates for 2015.

Figure 6 Industrial Processes and Product Use emissions, EU plus Iceland, change 2014-2015



Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990-2014 and proxy estimates for 2015.

The largest decrease of emissions from Industrial Processes and Product Use was in Estonia (−5.8 Mt CO_2-eq) followed by Belgium (−1.6 Mt CO_2-eq), the United Kingdom (−0.9 Mt CO_2-eq) and Greece (−0.8 Mt CO_2-eq) while the largest increases were in Hungary (+1.2 Mt CO_2-eq) followed by Germany (+0.9 Mt CO_2-eq), France (+0.6 Mt CO_2-eq) and the Netherlands (+0.6 Mt CO_2-eq).

The decrease of emissions from 2.A Mineral Products (−0.4 Mt CO_2-eq or −0.4 %) on the EU plus Iceland level) was smaller than individual Member State changes. Largest decrease was in Greece (−0.4 Mt CO_2-eq) and largest increase in Germany (+0.7 Mt CO_2-eq).

Emissions from 2.B Chemical Products were almost constant on the EU plus Iceland level (−0.1 Mt CO_2-eq or −0.1 %). The largest decrease was in Belgium (−1.4 Mt CO_2-eq) while the largest increase was in the Netherlands (+0.4 Mt CO_2-eq).

Emissions from 2.C Metal Industry decreased for whole the EU plus Iceland (−1.0 Mt CO_2-eq or −1.4 %) with the largest decrease in the United Kingdom (−0.6 Mt CO_2-eq) and largest increase in Hungary (−0.3 kt CO_2-eq).

2.D Non-energy Products from Fuels and Solvent Use is the only source category in IPPU with notable increases of emissions for the EU plus Iceland (+0.2 Mt CO_2-eq or +1.9%). This is mainly due to an increase of +0.4 Mt CO_2-eq in France. The largest decrease was in Poland −0.1 Mt CO_2-eq.

2.E Electronic Industry were almost constant for whole EU plus Iceland (+0.002 Mt CO_2-eq or +0.2%) while emission changes for individual Member States were within than ±0.006 Mt CO_2-eq.

The decrease of emissions from 2.F Product uses as substances for ODS (−3.9 Mt CO_2-eq or −3.5 %) on the EU plus Iceland level) dominates the trend of the total IPPU emissions. In 18 Member States emissions increased in this source category, but the very large emission decrease in Spain (−6.3 Mt CO_2-eq) contrasted these increases as the largest growth was rise of emissions was in Hungary (+0.8 Mt CO_2-eq) and the increases of all other below were below +0.3 Mt CO_2-eq.

Emissions from 2.G Other Product Manufacture and Use increased for whole EU plus Iceland (+0.6 Mt CO_2-eq or 6.4 %) which is mainly caused by a +0.6 Mt CO_2-eq increase in Poland.

Emissions from 2.H Other increased only slightly for whole EU plus Iceland (+0.05 Mt CO_2-eq or +16.9 %). Largest change was in Belgium (+0.14 Mt CO_2-eq).

2.2.3 Agriculture

Agriculture (excluding LULUCF) contributes to about 10 % of European emissions. Emissions increased with a small overall rise of 0.8Mt CO_2eq. or 0.2%. 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 43 % and 38 % of the of the sector's emissions respectively. As shown in Table 7 and Figure 7 the small increase in agriculture sector emissions is due to higher emissions from enteric fermentation which was only partially offset by lower emissions from soils. Manure management, which contributes to about 15 % of agricultural emissions, also saw a small reduction.

Table 7 and Figure 7 show the sub-sector change 2014-2015, with CH_4 and N_2O emissions shown as CO_2 equivalents (Mt CO_2eq).

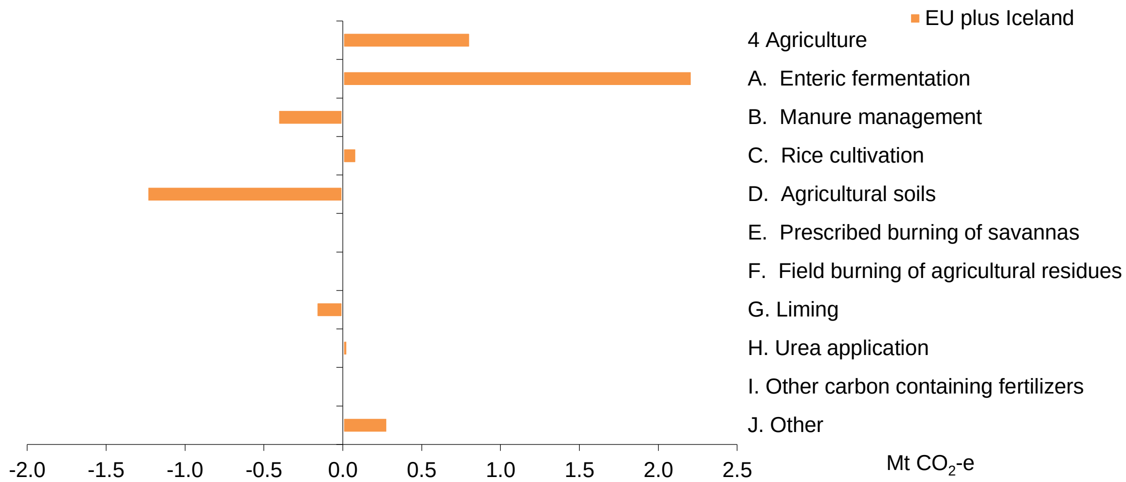
Table 7 Agriculture sector emissions, change 2014-2015

Change 2014 / 2015	**EU plus Iceland**	
	Mt CO_2eq	**%**
4 Agriculture	0.8	0.2%
A. Enteric fermentation	2.2	1.2%
B. Manure management	-0.4	-0.6%
C. Rice cultivation	0.1	3.3%
D. Agricultural soils	-1.2	-0.8%
E. Prescribed burning of savannas	-	-
F. Field burning of agricultural residues	0.0	0.4%
G. Liming	-0.2	-2.7%
H. Urea application	0.0	0.8%
I. Other carbon-containing fertilizers	0.0	9.6%
J. Other	0.3	17.4%

Source: The EEA's ETC/ACM, based on 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990-2014 and proxy estimates for 2015.

Total emissions from agriculture increased due to higher emissions from enteric fermentation.

Figure 7 Agriculture sector emissions, EU plus Iceland, change 2014-2015



Note: Although sub-sectors C. Rice cultivation, F. Field burning of agricultural residues, G. Liming, H. Urea application, I. Other carbon containing fertilizers and J. Other are shown in Table 7, they contribute to less than 4% of EU Agricultural emissions and have barely changed since 2013 so they are not shown in Figure 7.

Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990-2014 and proxy estimates for 2015.

Emissions from Enteric Fermentation increased with a small overall rise of 2.2Mt CO_2-eq or 1.2 %. The largest absolute and relative increases were in the United Kingdom (1.1Mt CO_2-eq or 5%) and Spain (0.4Mt CO_2-eq or 4%).

While CH_4 and N_2O from manure management contribute to about 15 % of agriculture sector emissions they have changed very little since 2014 (-411 kt CO_2-eq, -0.61 %), with decreases outweighing increases. The largest decrease was in Portugal (-571 kt CO_2-eq, -42 %). The largest increase was in Spain (+283 kt CO_2-eq, +3 %).

Agricultural soils contribute to about 38 % of the emissions from agriculture and have decreased by -1.2 Mt CO_2-eq or -0.75%) since 2014. The greatest decreases were for Spain (-1.3 Mt CO_2-eq, -10 %), and Poland (-0.6Mt CO_2-eq, -4 %). The greatest increases were for Germany (+0.7Mt CO_2-eq, +3 %).

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 (73 % 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.

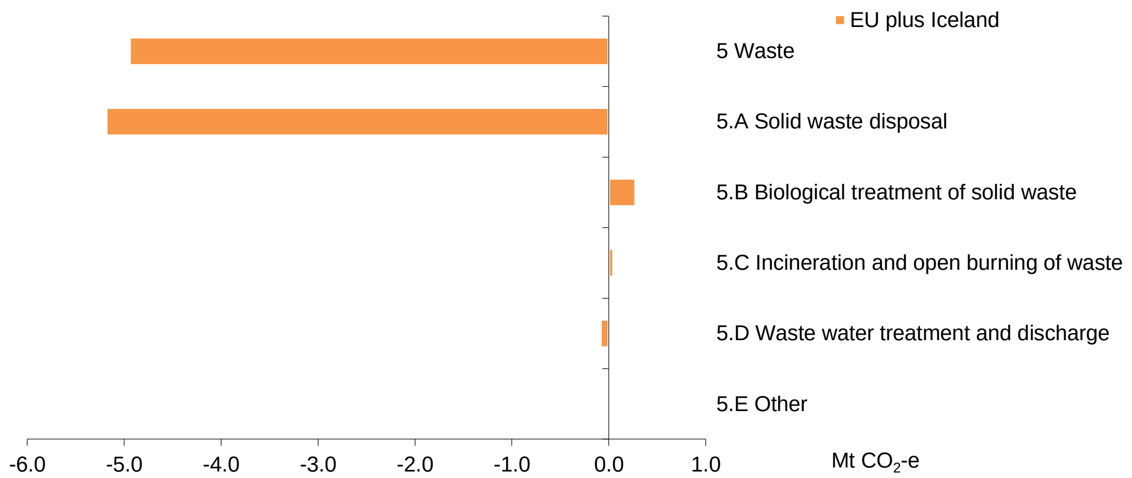
Emissions from the Waste sector decreased by −4.9 Mt CO_2eq. compared to 2014. Table 8 and Figure 8 show the sub-sector contributions to this trend in emissions.

Table 8 Waste sector emissions, change 2014-2015

Change 2014 / 2015	**EU plus Iceland**	
	Mt CO_2eq.	**%**
5 Waste	-4.9	-3.4%
5.A Solid Waste Disposal	-5.2	-4.8%
5.B Biological Treatment of Solid Waste	0.3	4.4%
5.C Incineration and Open burning of Waste	0.1	1.4%
5.D Waste Water Treatment and Discharge	-0.1	-0.3%
5.E Other	0.0	0.0%

Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990-2014 and proxy estimates for 2015.

Figure 8 Waste sector emissions, EU plus Iceland, change 2014-2015



Source: The EEA's ETC/ACM, based on the 2016 Member States' GHG inventories submitted to UNFCCC for the years 1990-2014, proxy estimates for 2015 and ETS data (2014 from EUTL verified emissions and 2015 from MS proxy estimates or EUTL verified emissions).

The largest decrease of waste emissions occurred in the United Kingdom (−2.3 Mt CO_2-eq), followed by Italy (−0.8 Mt CO_2-eq) and Germany (−0.6 Mt CO_2-eq) while the largest increases were in Ireland (+0.05 Mt CO_2-eq), followed by Spain (+0.04 Mt CO_2-eq). The trends of 5.A Solid Waste emissions dominated the waste sector. Eighteen Member States decreased emissions from solid waste (largest decrease in the United Kingdom with −2.6 Mt CO_2-eq) while only seven Member States had increasing emissions (largest Romania with +0.07 kt CO_2-eq). 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 non-ETS sector is regulated by the Effort Sharing Decision (ESD). Please refer to Chapter 2 of EEA report No 24/2016 'Trends and projections in Europe 2016 – Tracking progress towards Europe's climate and energy targets', to be published alongside the current report. The Trends and Projections report presents a detailed analysis of emission trends in the EU ETS and under the Effort Sharing Decision (ESD). The report includes 2015 data on ETS emissions and ESD emissions. 2015 ETS (verified) emissions are based on the European Union Transaction Log (EUTL) (data extracted on 13 September 2016). 2015 ESD emissions for EU Member States are calculated on the basis of approximated total GHG emissions in 2015 as reported by Member States and presented in the present report (including indirect CO_2 emissions), from which are subtracted 2015 ETS emissions, CO_2 emissions from domestic aviation (source category 1.A.3.a) and NF_3 emissions. For the latter (CO_2 emissions from domestic aviation (source category 1.A.3.a) and NF_3 emissions), 2014 data are used as proxies for 2015, as these are not available from GHG proxy inventories.

3. Performance of last year's EU proxy

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

In this section the differences between the previous proxy estimates and the subsequent official inventory submissions are assessed.

For 2014 the approximated GHG inventory had overestimated the GHG emissions for EU plus Iceland by 0.4 %. It has to be taken into account that recent national improvements of GHG reporting methodologies could not be considered for the calculation of the approximated GHG inventory, as the 2015 estimates for the 2014 proxy inventory were based on the national methodologies used for 2015 inventory submissions (covering emissions until 2013). This is especially the case for those emission estimates performed by EEA and its ETC/ACM for gap-filling missing or partially incomplete Member State submissions of proxy GHG inventories. Both Member States and ETC/ACM estimates rely in some categories on trend extrapolations or simply use previous year emissions as proxy estimates. This is in particular for the source categories some subcategories in the sectors Industrial processes and product use, Agriculture and Waste where short-term activity data is lacking. Thus, revised methodologies and parameters at Member States level will always result in deviations between the final inventory and the proxy inventory.

Member States' recalculations of GHG estimates and methodological improvements played an important role for the differences of the 2014 proxy emission estimates compared to 2014 emissions officially reported in 2016. After taking these recalculations into account deviation between the proxy GHG inventory for 2014 and final GHG inventory submission was only 0.01 % for total emissions (including indirect CO_2, excluding LULUCF) for EU plus Iceland.

3.1 Performance at Member State level

The proxy submissions by Member States mirrored rather well the decreasing trend in official emissions as reported to the UNFCCC this year. The deviations per Member State given in Table 9 arise from several factors: different methodologies and data with varying precision used across the Member States (resp. ETC/ACM for gap-filling); the lack of updated (t-1) activity data for some key emission sources; and, from Member States' own recalculations of GHG estimates and methodological improvements which mainly cannot be reflected in the approximated data where usually constant methodologies and emission factors are assumed.

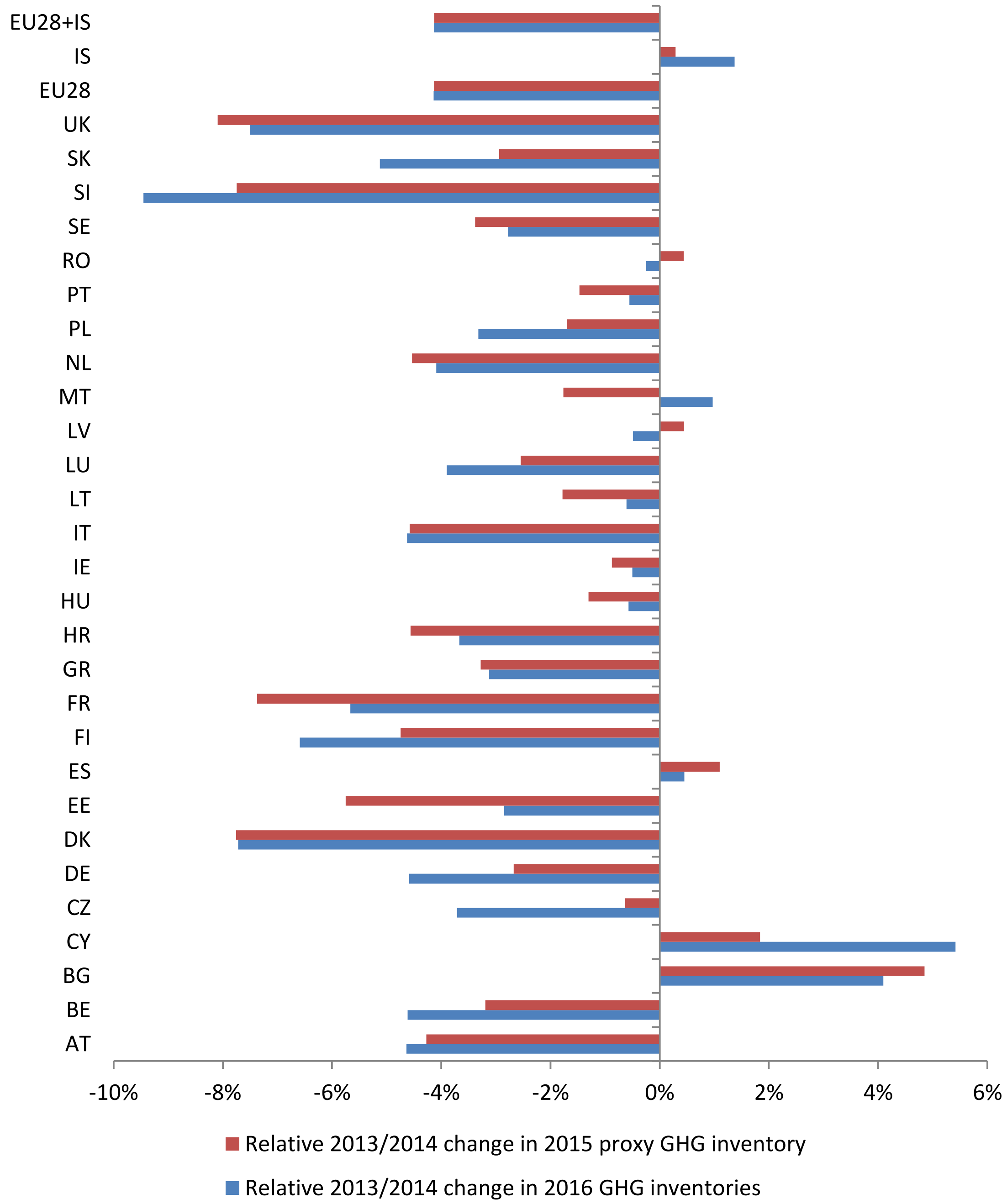
Table 9 Difference per Member State for year 2014 between proxy and final GHG inventories

MS	Inventory 2014 (Submission 2016)	Proxy 2014 (Submission 2015)	Deviation 2014		Recalcu-lations	Deviation 2014 cleared of impact of recalculations	Proxy calculated by
	kt CO2eq			%			
AT	76 333	76 196	-137	-0.2%	0.6%	0.4%	MS
BE	113 867	115 553	1 686	1.5%	0.0%	1.5%	MS
BG	57 197	58 613	1 416	2.5%	-1.7%	0.8%	ETC/ACM
CY	8 394	8 476	82	1.0%	-4.3%	-3.4%	ETC/ACM
CZ	125 885	128 698	2 813	2.2%	0.9%	3.2%	MS
DE	900 202	910 000	9 798	1.1%	0.9%	2.0%	MS
DK	51 169	50 891	-278	-0.5%	0.5%	0.0%	MS
EE	21 059	20 507	-552	-2.6%	-0.4%	-3.0%	MS
ES	328 926	325 549	-3 377	-1.0%	1.7%	0.7%	MS
FI	59 105	60 085	980	1.7%	0.3%	2.0%	MS
FR	458 899	454 975	-3 924	-0.9%	-1.0%	-1.8%	MS
GR	101 403	101 656	252	0.2%	-0.4%	-0.2%	MS
HR	22 899	24 738	1 839	8.0%	-8.3%	-0.3%	MS
HU	57 225	56 097	-1 128	-2.0%	1.3%	-0.7%	MS
IE	58 254	58 305	51	0.1%	-0.5%	-0.4%	MS
IT	418 587	417 255	-1 332	-0.3%	0.4%	0.1%	MS
LT	19 139	19 342	203	1.1%	-2.2%	-1.2%	ETC/ACM
LU	10 771	11 085	314	2.9%	-1.5%	1.5%	MS
LV	11 374	11 075	-298	-2.6%	3.7%	1.0%	MS
MT	2 983	2 735	-247	-8.3%	6.1%	-2.2%	MS
NL	187 057	187 042	-15	0.0%	-0.5%	-0.5%	MS
PL	380 038	388 172	8 134	2.1%	-0.5%	1.7%	MS
PT	64 523	63 734	-788	-1.2%	0.3%	-0.9%	ETC/ACM
RO	109 760	110 011	252	0.2%	0.5%	0.7%	ETC/ACM
SE	54 383	53 888	-495	-0.9%	0.3%	-0.6%	MS
SI	16 582	16 758	176	1.1%	0.8%	1.9%	MS
SK	40 658	42 394	1 736	4.3%	-1.9%	2.4%	MS
UK	523 739	525 768	2 029	0.4%	-1.0%	-0.6%	MS
EU28	4 282 096	4 299 598	17 502	0.4%	-0.4%	0.0%	ETC/ACM
IS	4 597	4 451	-145	-3.2%	2.2%	-1.0%	ETC/ACM
EU28+IS	4 286 693	4 304 050	17 357	0.4%	-0.4%	0.0%	ETC/ACM

Source: Member States submissions to UNFCCC and proxy estimates for 2014

The largest deviations in relative terms occurred for Malta (proxy 8.3% lower), followed by Croatia (proxy 8.0 % lower), Slovakia (proxy 4.3 % higher), Iceland (proxy 3.2 % lower) and Luxembourg. In absolute terms the deviations were highest for Germany (overestimate by proxy of 9.8 Mt CO_2eq), Poland (overestimate by proxy of 8.1 Mt CO_2eq), France (underestimate by proxy of 3.9 Mt CO_2eq), Spain (underestimate by proxy of 3.4 Mt CO_2eq) and the Czech Republic (overestimate by proxy of 2.8 Mt CO_2eq). By comparing the percentage changes in emission levels 2013/2014 as derived from the 2015 proxy GHG inventory on the one hand and from the 2016 official GHG inventory submissions to UNFCCC on the other, the deviations are in almost all cases in the same order of magnitude, see Figure 9. Also the direction of the emission trend (increasing or decreasing) was estimated correctly except for Latvia, Malta and Romania which had only comparatively small 2013/2014 emission changes.

Figure 9 Differences between approximated and submitted inventories for relative 2013/2014 emission changes by Member State



Source: Member States submissions to UNFCCC and proxy estimates for 2014

In the following sections country-specific deviations are further explained for some Member States with high deviations in absolute terms (Germany, Poland and France) and/or in relative terms (Malta, Croatia and Slovakia) (see also Table 9):

- Germany: 2014 GHG emissions were overestimated by the 2014 proxy inventory by 9.8 Mt CO_2eq (1.1 %). These overestimations occurred mainly in the energy sector and within this sector mainly in the subsector Manufacturing industries and construction (1.A.2) with an overestimation of 5.3 Mt CO_2eq. Furthermore, there was also quite a high overestimation for the sector Chemical industry (2.B) with over 36 % (2.8 Mt CO_2eq). However, when taking the recalculations into consideration, the overestimation is considerably lower with 2.6 Mt CO_2eq (0.3 %). The sector with the highest absolute overestimation after recalculation is Transport (1.A.3) where proxy emissions were 3.1 Mt CO_2eq or 1.9 % higher than emissions in the inventory.

- Poland: 2014 GHG emissions were overestimated by the 2014 proxy inventory by 8.1 Mt CO_2eq (2.1 %). This overestimation resulted to a large extent from the subsector Energy industries (1.A.1) and Other sectors (1.A.4). On the other hand, there was also an underestimation of nearly 20 % (1.7 Mt CO_2eq) for the subsector Product uses as ODS substitutes (2.F). This underestimation increased to 36% (3.2 Mt CO_2eq) by recalculations and hence reduced the general overestimation to 6.3 Mt CO_2eq (1.7 %).
- France: 2014 GHG emissions were underestimated by the 2014 proxy inventory by 3.9 Mt CO_2eq (0.9 %). About 1 Mt CO_2eq resulted from indirect CO_2 which was not reported by France in this year's inventory. The underestimations occurred mainly for Agriculture (2.0 Mt CO_2eq) and for the Energy subsector Other sectors (1.A.4) (1.5 Mt CO_2eq). The underestimations were furthermore increased by 4.7 Mt CO_2eq by recalculations by France. Underestimations increased again especially in the sectors Agriculture and Energy. The subsector with the highest absolute deviation after recalculation is Agricultural soils (3.D).
- Malta: 2014 GHG emissions were underestimated by the 2014 proxy inventory by 0.2 Mt CO_2eq (8.3 %). After recalculations, this underestimation was reduced to 2.2 % (0.07 Mt CO_2eq), however. Deviations occurred especially for the subsectors Other sectors (1.A.4) and Solid waste disposal (5.A).
- Croatia: 2014 GHG emissions were overestimated by the 2014 proxy inventory by 1.8 Mt CO_2eq (8.0 %). This was, however, more than compensated by the Croatian recalculations. When comparing the recalculated inventory to the proxy results, there is a small underestimation by 0.3 % (0.3 Mt CO_2eq).
- Slovakia: 2014 GHG emissions were overestimated by the 2014 proxy inventory by 1.7 Mt CO_2eq (4.3 %) but were about halved when the recalculations are taken into account (0.9 Mt CO_2eq or 2.4 %). After recalculation the largest deviation in absolute terms was for Other sectors (1.A.4).

After taking into account recalculations, relative deviation were largest for Cyprus (-3.4 %), Czech Republic (+3.2 %) and Estonia (-3.0 %).

3.2 Performance at sectoral level

At the sectoral level, the highest deviation in absolute terms was by far from Other sectors (1.A.4) (+17.0 Mt CO_2eq) because these are very hard to predict since they depend on heating needs and therefore are highly dependent on winter temperatures. However it was also the sector with the largest absolute emission change. Other sectors was followed by sector 2.F Product uses as ODS substitutes (-8.7 Mt CO_2eq) and sector 3.D Agricultural soils (8.0 Mt CO_2eq). After recalculations, the deviations were reduced for all three sectors, for 3.D the overestimation resulted in a (smaller) underestimation. Sectors with highest relative deviation after recalculation were 3.F Field burning of agricultural residues (18.4 %) and 2.G Other product manufacture and use (12.6 %), see Table 10.

Table 10 Difference per sector for year 2014 between proxy and final GHG inventories

Sector	Inventory 2014 (Submission 2016)	Proxy 2014 (Submission 2015)	Deviation 2014		Recalcu-lations	Deviation 2014 cleared of impact of recalculations
	kt CO2eq			%		
Total incl. indirect CO2 excl. LULUCF	4 282 096	4 304 050	21 953	0.5%	-0.5%	0.0%
1 Energy	3 325 615	3 345 855	20 240	0.6%	-0.3%	0.3%
1.A Fuel combustion	3 238 100	3 255 767	17 667	0.5%	-0.2%	0.3%
1.A.1 Energy industries	1 245 629	1 246 728	1 099	0.1%	0.3%	0.4%
1.A.2 Manufacturing industries	492 475	490 781	-1 694	-0.3%	-0.4%	-0.7%
1.A.3 Transport	889 927	891 178	1 252	0.1%	-0.2%	-0.1%
1.A.4 Other sectors	603 532	620 541	17 008	2.8%	-1.3%	1.5%
1.A.5 Other	6 537	6 755	219	3.3%	3.1%	6.4%
1.B Fugitive emissions	87 515	89 988	2 473	2.8%	-2.7%	0.1%
2 Industrial processes & product use	375 318	366 055	-9 263	-2.5%	2.2%	-0.3%
2.A Mineral products	109 074	108 787	-287	-0.3%	0.4%	0.1%
2.B Chemical industry	59 206	62 004	2 798	4.7%	-0.8%	4.0%
2.C Metal production	72 518	69 178	-3 340	-4.6%	1.0%	-3.6%
2.D Non-energy products	11 843	11 458	-386	-3.3%	5.1%	1.8%
2.E Electronic Industry	833	785	-48	-5.8%	-0.1%	-5.9%
2.F Product uses as ODS substitutes	111 600	102 912	-8 688	-7.8%	6.0%	-1.8%
2.G Other product manufacture and use	9 960	10 427	467	4.7%	7.9%	12.6%
2.H Other	283	358	74	26.3%	-34.5%	-8.2%
3 Agriculture	435 685	440 392	4 707	1.1%	-3.1%	-2.0%
3.A Enteric fermentation	187 130	184 549	-2 581	-1.4%	0.1%	-1.3%
3.B Manure management	67 226	67 655	428	0.6%	-2.7%	-2.1%
3.C Rice cultivation	2 651	3 013	362	13.7%	-10.1%	3.6%
3.D Agricultural soils	165 263	173 264	8 001	4.8%	-7.4%	-2.5%
3.E Prescribed burning of savannas	NO	0	NA	NA	NA	NA
3.F Field burning of agricultural residues	1 570	1 395	-176	-11.2%	29.6%	18.4%
3.G Liming	6 176	5 606	-570	-9.2%	8.1%	-1.1%
3.H Urea application	3 955	3 193	-762	-19.3%	21.2%	1.9%
3.I Other carbon-containing fertilizers	75	75	0	0.0%	0.0%	0.0%
3.J Other	1 639	1 673	34	2.1%	-9.8%	-7.7%
5 Waste	145 957	149 277	3 321	2.3%	-0.9%	1.4%
5.A Solid waste disposal	107 865	110 544	2 679	2.5%	-0.1%	2.4%
5.B Biological treatment of solid waste	6 811	6 897	86	1.3%	-3.5%	-2.2%
5.C Incineration & open burning of waste	3 792	3 711	-81	-2.1%	1.5%	-0.7%
5.D Waste water treatment & discharge	27 386	28 349	964	3.5%	-3.8%	-0.3%
5.E Other	102	149	46	45.0%	-36.3%	8.7%
6 Other	14	0	-14	-100.0%	10.6%	-89.4%
Indirect CO2	4 105	2 726	-1 379	-33.6%	-0.9%	-34.4%

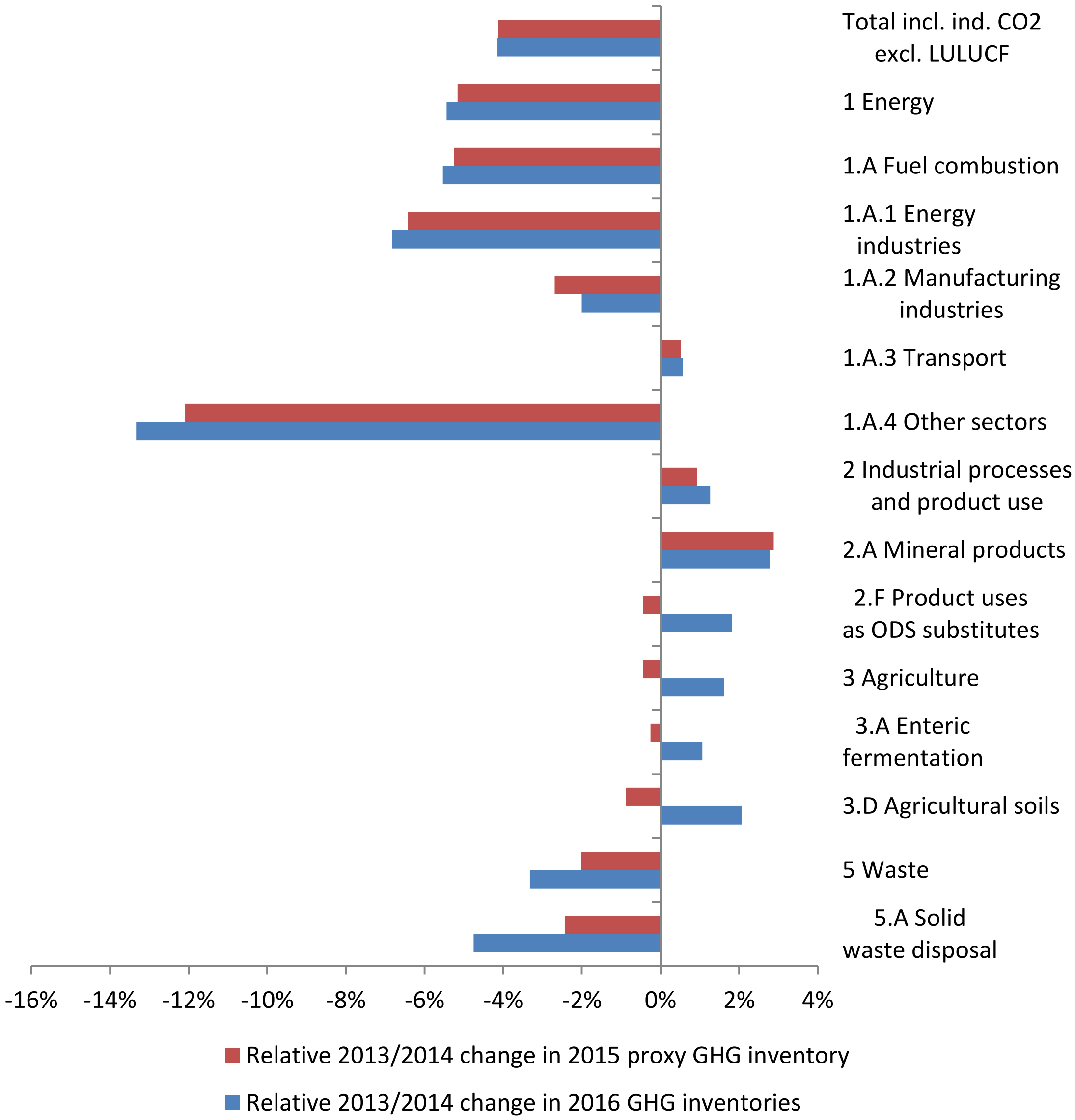
Source: Member States submissions to UNFCCC and proxy estimates for 2014

In the Energy sector, deviations after recalculation are very small. They are highest for 1.A.5 Other (6.4 %) where recalculations increased the deviation. In Sector 2 (Industrial processes & product use) there were considerable recalculations for some subsectors that partly result in a change from overestimation to underestimation or vice versa. This can mainly be observed for 2.H with almost 35 % of recalculation which reduced the high overestimation of 26 % to an underestimation of 8 %. In general, proxy results match pretty well to inventory results after recalculation for sector 2 (-0.3 %). The agricultural sector is the superior sector with highest relative deviation (2 %) after recalculation. There were also quite considerable recalculations in the subsectors, especially for 3.F (Field burning of agricultural residues) where the underestimation was turned into an even larger overestimation of more than 18 %. On the other hand, the recalculation for 3.H (Urea application) reduced the deviation from 19 % underestimation to just about 2 % overestimation.

Due to the large recalculation in sector 3.J (Other) the relative deviation is quite high with nearly 8 %. In the waste sector recalculations reduced the deviation except for 5.B (Biological treatment of solid waste). The highest relative deviation by far of all subsectors for 5.E (Other) was considerably reduced by the recalculation (-36 %) to about 9 %. The total deviation in the waste sector is 1.4 % after recalculation.

By comparing the percentage changes in emission levels 2013/2014 as derived from the 2015 proxy GHG inventory on the one hand and from the 2016 official GHG inventory submissions to UNFCCC on the other by sectors, the deviations are in the same order of magnitude in almost all cases, see Figure 10. Also the direction of the emission trend (increasing or decreasing) was estimated correctly except for 2.F (Product uses as ODS substitutes), Agriculture in general and the two subsectors 3.A (Enteric fermentation) and 3.D (Agricultural soils) which had only comparatively small 2013/2014 emission changes.

Figure 10 Differences between approximated and submitted inventories for relative 2013/2014 emission changes by sectors



Note: Only sectors with GHG emissions of more than 100 Mt CO_2-eq in 2014 are shown.

Source: Member States submissions to UNFCCC and proxy estimates for 2014

4. Methodologies and data sources at Member State level

4.1 Description of different approaches

This report presents the estimated GHG emissions for 2015 based on emissions estimates, submitted to EEA by 31 July 2016. The aggregated EU plus Iceland proxy 2015 GHG emission estimates are based on these submissions and gap filling where necessary.

Under the recently adopted Regulation (EU) 525/2013 on a mechanism for monitoring and reporting GHG emissions (EU MMR) and its implementing provisions, Member States are to submit, where possible, to the European Commission approximated GHG inventories by 31 July every year for the preceding year *t*–1 (in this case 2015). 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.

For gap-filling, the EEA uses the latest activity data available at country level to estimate the emissions. For emission sources for which no appropriate datasets exist, emissions are extrapolated from past trends, or emissions from the previous year are kept constant if historic data do not show a clear linear trend. The emission estimates assume no change in emission factors or methodologies as compared to the latest official inventory submissions to UNFCCC for the year *t*–2.

In recent years, a methodology to estimate GHG emissions using a 'bottom-up' approach has been developed (see Annex II). It uses data sources (or estimates) that were published prior to the end of July 2016 for individual countries, sectors and gases to derive GHG estimates for the preceding year (*t*–1). The estimates cover total GHG emissions as reported under the Kyoto Protocol and the UNFCCC excluding the LULUCF sector but including indirect CO_2 emissions.

Approximated greenhouse gas inventories were missing for Bulgaria, Cyprus, Lithuania, Luxembourg, Malta and Romania.[28] Therefore for missing Member States submissions proxy emissions were gap-filled with estimates calculated by ETC/ACM for EEA with the same or improved bottom-up country specific methods that were used in previous years.

In some cases emissions have been allocated to sector/gases by the ETC/ACM to allow for the aggregation and explanation of trends at EU level. This has been implemented in the case of Belgium, Denmark, Germany, Greece, Hungary, Sweden and the United Kingdom.

4.1.1 MS proxies by MMR

Member States are responsible for the methodological choice regarding their own estimates. The MS proxies shall submit approximated GHG inventories for the preceding year (*t*–1) in accordance with the "summary 2" table of the Common Reporting Format (CRF). The implementing

[28] Luxembourg and Malta submitted approximated GHG inventories on 5 August 2016 resp. 16 August 2016. However these two submissions were too late to be considered in this report.

regulation of the EU MMR demands 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 summary 2 tables with their proxy estimates.

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

4.1.2 Gap-filling MS without MS proxies

Estimates by the EEA and ETC/ACM are made for all major source categories in all sectors. For the most important source categories, 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 datasets with updated activity data exist or which are too complex for such an approach, emissions were extrapolated from past trends (linear extrapolation), or emissions from the previous year were kept constant or the average of three preceding years was used if historic data did not show a clear trend. On this basis, a detailed bottom-up approach was developed covering the full scope of emissions included in a GHG inventory submission.

The EEA estimates are based on publicly available datasets at the national, European and international levels. These datasets are disaggregated by major source categories in all sectors reported under the UNFCCC and the Kyoto Protocol. For the estimation of approximated emissions, the following data sources for emissions or activities were used:

- BP's Statistical Review of World Energy 2016[29];
- verified emissions reported under the EU-ETS and recorded in the EUTL[30];
- Eurostat Monthly Oil and Gas Questionnaires and Monthly Coal Questionnaires
- Eurostat monthly data on crude oil production (data set nrg_102m, indicator code 100100, product code 3100);
- Eurostat monthly total consumption data for natural gas (data set nrg_103m, indicator code 100900, product code 4100);
- Eurostat production data for natural gas (data set nrg_103m, indicator code 100100, product code 4100);
- Eurostat monthly gross inland deliveries observed data for total fuel oil, heating and other gas oil (data set nrg_102m, indicator code 100520, product codes 3270A and 3266);

29 BP, 2016, BP Statistical Review of World Energy 2016 (http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html) accessed by 14 July 2016.

30 EEA 2016b: www.eea.europa.eu/data-and-maps/data/data-viewers/emissions-trading-viewer

- Eurostat monthly data for the internal market deliveries of motor spirit, automotive diesel oil and kerosene/jet fuels (data set nrg_102m, indicator code 100520, product codes 3234, 3234A, 3260, 3260A, 3247A, 5546O, 5547O, 5549O);
- Eurostat monthly data on hard coal and lignite production (data set 101m, indicator code 100100, product codes 2111 and 2210);
- Eurostat monthly data on supply of electricity (data set nrg_105m, indicator code 16_107104));
- Eurostat annual data on GDP and main components (output, expenditure and income) [nama_10_gdp] (Gross domestic product at market prices, Chain linked volumes (2010), million euro)
- Eurostat annual data on livestock population for cattle, sheep and swine [apro_mt_lscatl, apro_mt_lssheep,_apro_mt_lspig].
- Heating degree days for 1990–2015 calculated by EEA.
- Monthly production data for crude steel production and blast furnace iron production of the World Steel Association (previously IISI International Iron and Steel Institute)[31]; this data source has only data for some of the EU Member States[32];
- National preliminary energy balance data or energy statistics:
  - Austria, 2016, Provisional energy balance 2015, http://www.statistik.at/web_de/statistiken/energie_und_umwelt/energie/energiebilanzen/, accessed 14 July 2016.
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  - Croatia, 2016, Short term indicators of energy statistics, http://www.dzs.hr/default_e.htm, accessed 19 July 2016.
  - Cyprus, 2016, Monthly statistics Petroleum products sales and stock changes, http://www.cystat.gov.cy/mof/cystat/statistics.nsf/energy_environment_81main_en/energy_environment_81main_en?OpenForm&sub=1&sel=1, accessed 19 July 2016.
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31 Available at http://www.worldsteel.org, accessed by 20 June 2016

32 Pig iron/Blast furnace iron production: AT, BE, CZ, DE, ES, FR, HU, IT, NL, PL, SK and UK. Crude steel production: AT, BE, BG, CZ, DE, ES, FI, FR, GR, HR, HU, IT, LU, NL, PL, SI, SE, SK and UK.

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Based on these data sources, 2015 emission estimates 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.B Fugitive Emissions
        - 1.B.1 Solid Fuels
        - 1.B.2.a Oil
        - 1.B.2.b Natural Gas
        - 1.B.2.c Venting and Flaring
- 2. Industrial Processes and Product Use
    - 2.A Mineral Industry
        - 2.A.1 Cement Production
        - 2.A.2 Lime Production
        - 2.A.3 Glass Production
    - 2.B Chemical Industry
        - 2.B.1 Ammonia Production
        - 2.B.2 Nitric Acid Production
        - 2.B.7 Soda Ash Production
    - 2.C Metal Production

    - 2.C.1 Iron and Steel Production
- 3. Agriculture
  - 3.A Enteric fermentation
  - 3.B Manure management
  - 3.D Agricultural soils

The alternative sources for activity data and emissions listed above were only used if the resulting emissions matched well with real inventories for past years. If large discrepancies occurred for individual Member States, different approaches (trend extrapolation, constant values from previous year) were used.

Values for Energy 1.A.5 were filled by using previous year emissions. For the waste sector and all other inventory source categories not listed above, no 2015 activity data was available that could be combined with IEFs from GHG inventories. Values these were extrapolated from GHG inventories, either by trend extrapolation or by taking the constant values of the year 2015 or by taking the average of 2013 to 2015 emissions and by following the gap filing rules in accordance with the implementing provisions under Council Decision 280/2004/EC. Constant values or averages were used when past trends were inconsistent and strongly fluctuating; trend extrapolation was used when historic time series showed good correlations with a linear trend.

Annex II provides a detailed overview of methods and data sources used for each source category and Member State.

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 11. The latest data source on energy consumption that became available in 2016 was the BP statistical review of World Energy which is annually published in mid-June. Member States' national energy statistics are released at different point in times and the national websites do not always indicate the publication data and whether the publication is regularly made available at the same date.

Table 11 Time of availability of data used for the proxy inventory

Data source	Availability
EUTL verified emissions	Data as of 6 May 2016was used for EEA proxy.
BP Statistical Review of World Energy	8 June 2016
Eurostat monthly production data for hard coal and lignite	3 month after reporting period
Eurostat monthly production data on crude oil input to refineries	3 month after reporting period
Eurostat monthly production data for crude oil	3 month after reporting period
Eurostat monthly production data for natural gas	3 month after reporting period
World Steel Association monthly production data for crude steel production	two months after reporting
World Steel Association monthly production data for blast furnace iron production	two months after reporting
Eurostat annual statistics on livestock population for live bovine animals, swine and sheep	April-May after reporting period
GHG inventory data from EEA GHG MMR locator	25 June 2016
Member States' national energy balances and national energy statistics	different publication dates
Member States' own preliminary inventories	31 July 2016

Source: EEA's ETC/ACM

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

It has to be taken into account that any recent national improvements of GHG reporting methodologies could not be considered for approximated GHG inventories calculated centrally by EEA and its ETC/ACM, as the 2015 estimates for the 2014 proxy inventory were based on the national methodologies used for 2015 inventory submissions (covering emissions until 2014). This is especially the case for those source categories for which linear trend extrapolation was performed. Thus, revised methodologies and parameters at Member States level will always result in deviations between the final inventory and the proxy inventory.

4.1.3 Methodologies and data sources for gap-filling MS with incomplete MS proxies

The approximated GHG emissions data are submitted by Member States in form of CRF Summary2 tables. However, these tables were not always submitted with a complete dataset. Where disaggregated emission data needed to be estimated the following gap-filling methodologies were applied per case:

4.1.3.1 *Total CO2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry in ETS and non-ETS*

Austria, Croatia, the Czech Republic, Denmark, Estonia, Germany, France, Greece, Hungary, Ireland, Italy, Latvia, the Netherlands, Poland, Portugal, Slovenia, Slovakia, Spain, the United Kingdom and Iceland did not report *Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry* split into ETS and non-ETS emissions in their submissions of proxy inventories. This was caused by a fault in the reporting template. This was gap-filled using ETS and non-ETS emission for *Total CO_2 equivalent emissions, without land use, land-use change and forestry* and – if reported – adding indirect CO_2 emissions to non-ETS emissions.

4.1.3.2 *F-gases*

In general emissions from fluorinated greenhouse gases (F-gases[33]) can turn up in the following source categories of industrial processes and product use:

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

Germany and the United Kingdom reported F-gas emissions but did not prove details in which source categories these emissions occurred. To distribute the total F-gas emissions into emissions of individual source categories split factors were derived using the respective shares of F-gas emissions per source categories of the year 2014 in the latest available GHG inventories.

Sweden submitted only IPPU emissions without any further information on source categories or gases. Therefore additional gap-filling described in chapter 4.1.3.7 was combined with the F-gas gap-filing method.

As the gap-filling method for Bulgaria, Cyprus, Lithuania, Luxembourg, Malta and Romania using linear trend extrapolations described in chapter 6.2.2.4 of the Annex II for F-gas emissions only produces proxy estimates for whole industrial processes and product use but not detailed data at source category level also for these Member States the F-gas emissions were distributed in the same way like for Germany and the United Kingdom using split factors derived from 2014 data.

[33] F-gas emissions include emission of the following gases or groups of gases: hydroflourocarbons = HFCs; perflourocarbons = PFCs; sulphur hexafluoride = SF6; nitrogen triflouride =NF_3.

4.1.3.3 *Belgium*

Belgium included ETS emissions per sector but did not provide a total of ETS emissions. This was gap-filled with the sum of the sectoral ETS emissions. Also no ETS / non-ETS split was reported for source category 5.D Waste water treatment and discharge. For gap-filling it was assumed that none of these emissions are within the scope of the ETS.

4.1.3.4 *Denmark*

The Danish CRF Summary2 table with approximated GHG inventory data for 2015 contains GHG estimates for source category 1.A (Fuel Combustion), but not disaggregated into subcategories. To gap-fill these subcategories 1.A emission estimate for 2015 split factors were needed. These split factors were derived from the proxy estimates calculated centrally by EEA and its ETC/ACM and are the shares from the individual source categories given in Table 12.

Table 12 Shares of 1.A Fuel Combustion Emissions in Denmark in year 2015

Source category	**CO2**	**CH4**	**N2O**
1.A Fuel Combustion	100.0%	100.0%	100.0%
1.A.1 Energy Industries	37.2%	56.2%	29.9%
1.A2 Manufacturing Industries and Construction	13.2%	3.8%	15.8%
1.A.3 Transport	37.2%	5.0%	42.0%
1.A.4 Other Sectors	11.7%	34.9%	11.6%
1.A.5 Other	0.7%	0.1%	0.8%

Source: Proxy estimates calculated centrally by EEA and its ETC/ACM

Denmark did report ETS and non-ETS emissions with its approximated GHG inventory data for 2015 for energy and industrial processes and product use but neither for agriculture nor for waste. These gaps were filled assuming all agriculture and waste emissions are non-ETS emissions. Finally total ETS and non-ETS emissions were gap-filled by summation of all ETS respectively non-ETS emissions across all sectors.

4.1.3.5 *Greece*

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

4.1.3.6 *Hungary*

Hungary did not provide data on total net emissions. This was gap-filled by summation of emissions from Energy, Industrial processes and product use, Agriculture and Waste.

4.1.3.7 Sweden

The Swedish CRF Summary2 table with approximated GHG inventory data for 2015 contains only total GHG estimates but emission estimates are not disaggregated into individual greenhouse gases. Additionally Sweden reported for source categories 1.B (Fugitive emissions from fuels), 2 (Industrial Processes and Product Use), 3 (Agriculture) and 5 (Waste) no details on subcategories. To gap-fill these subcategories 1.A emission estimate for 2015 split factors were needed. These split factors were derived from the proxy estimates calculated centrally by EEA and its ETC/ACM and are the shares from the individual source categories given in the following tables.[34]

Table 13 Shares of Fuel combustion emissions in Sweden in year 2015

Source category	CO_2	CH_4	N_2O	Total
1.A.1 Energy Industries	94.9%	1.1%	4.0%	100.0%
1.A.2 Manufacturing Industries and Construction	97.3%	0.7%	2.0%	100.0%
1.A.3 Transport	98.9%	0.2%	0.9%	100.0%
1.A.4 Other Sectors	89.3%	8.3%	2.4%	100.0%
1.A.5 Other	98.6%	>0.0%	1.4%	100.0%

Source: Proxy estimates calculated centrally by EEA and its ETC/ACM

Table 14 Shares of Fugitive emissions from fuels in Sweden in year 2015

Source category	CO_2	CH_4	N_2O	Total
1.B Fugitive emissions from fuels	91.7%	8.3%	0.1%	100.0%
1.B.1 Solid fuels	0.7%	0.0%	IE	
1.B.2 Oil and natural gas	90.9%	8.3%	IE	

Note: Interpretation of ">0.0%": A number greater than zero but too small to appear with one decimal.

Source: Proxy estimates calculated centrally by EEA and its ETC/ACM

Table 15 Industrial processes and product use emissions in Sweden in year 2015

Source category	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
2 Industrial processes and product use	80.7%	0.2%	3.5%	13.6%	1.4%	0.6%	100.0%
2.A Mineral industry	33.2%						33.2%
2.B Chemical industry	2.3%	>0.0%	0.8%	NA	NA	NA	3.2%
2.C Metal industry	35.9%	>0.0%	0.0%	NA	1.4%	0.2%	37.5%
2.D Non-energy products from fuels and solvent use	9.1%	NA	NA				9.1%
2.E Electronic Industry				NO	NO	NO	0.0%
2.F Product uses as ODS substitutes				13.6%	0.0%	0.0%	13.6%

[34] The described gap-filling was combined with the sub-sectoral gap-filling method from chapter 4.1.3.2.

2.G Other product manufacture and use	NE,NA	NA	1.3%	0.0%	NO	0.4%	1.7%
2H Other	0.2%	0.1%	1.4%	0.0%	0.0%	0.0%	1.7%

Note: Interpretation of ">0.0%": A number greater than zero but too small to appear with one decimal. No split factors for: Unspecified mix of HFCs and PFCs, as these gases are not relevant in Sweden.

Source: Proxy estimates calculated centrally by EEA and its ETC/ACM

Table 16 Shares of Agriculture emissions in Sweden in year 2015

Source category	CO_2	CH_4	N_2O	Total
3 Agriculture	1.7%	46.3%	52.0%	100.0%
3.A Enteric fermentation		42.7%		42.7%
3.B Manure management		3.6%	4.6%	8.2%
3.C Rice cultivation		NO		0.0%
3.D Agricultural soils		NE	47.4%	47.4%
3.E Prescribed burning of savannahs		NE	NE	NE
3.F Field burning of agricultural residues		NO	NO	0.0%
3.G Liming	1.7%			1.7%
3.H Urea application	0.0%			0.0%
3.I Other carbon-containing fertilizers	NO			0.0%
3.J Other	0.0%			0.0%

Note: Interpretation of ">0.0%": A number greater than zero but too small to appear with one decimal.

Source: Proxy estimates calculated centrally by EEA and its ETC/ACM

Table 17 Shares of Waste emissions in Sweden in year 2015

Source category	CO_2	CH_4	N_2O	Total
5 Waste	4.0%	77.9%	18.1%	100.0%
5.A Solid waste disposal	NA,NO	69.6%	0.0%	69.6%
5.B Biological treatment of solid waste		6.3%	3.0%	9.3%
5.C Incineration and open burning of waste	4.0%	0.0%	0.4%	4.4%
5.D Waste water treatment and discharge		2.0%	14.7%	16.7%
5.E Other	0.0%	0.0%	0.0%	0.0%
5.F Waste	4.0%	77.9%	18.1%	69.6%

Note: Interpretation of ">0.0%": A number greater than zero but too small to appear with one decimal.

Source: Proxy estimates calculated centrally by EEA and its ETC/ACM

Sweden reported ETS emissions with its approximated GHG inventory data for 2015. This was gap-filled with data from the 'EU Emissions Trading System (ETS) data viewer' (EEA, 2016b).

4.1.3.8 United Kingdom

In United Kingdom's CRF Summary2 table of approximated GHG inventory data for 2015 only for CO_2 emissions are given as 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 source categories total CH_4 and N_2O emission estimate for 2015 was split into the subcategories using shares from 2015 proxy estimates calculated centrally by EEA and its ETC/ACM. These split factors for the respective subsectors are shown in Table 18.

Table 18 Estimated shares of CH_4 and N_2O emissions in United Kingdom in year 2015

Source category	**CH_4**	**N_2O**
Total (net emissions)	100.0%	100.0%
1. Energy	16.9%	15.9%
1.A Fuel Combustion	2.4%	15.8%
1.A.1 Energy Industries	0.4%	4.8%
1.A.2 Manufacturing Industries and Construction	0.2%	3.8%
1.A.3 Transport	0.2%	5.1%
1.A.4 Other Sectors	1.6%	1.9%
1.A.5 Other	>0.0%	0.1%
1.B Fugitive Emissions Form Fuels	14.5%	0.1%
1.B.1 Solid Fuels	3.7%	IE
1.B.2 Oil and natural gas	10.7%	IE
2. Industrial Processes and Product Use	0.3%	4.1%
2.B Chemical Industry	0.2%	0.2%
2.C Metal Industry	>0.0%	0.1%
2.D Non-energy Products from Fuels and Solvent Use	>0.0%	>0.0%
2.G Other Product Manufacture and Use	NO	3.9%
2.H Other	0.0%	NO
3. Agriculture	53.9%	75.2%
3.A Enteric Fermentation	46.7%	NO
3.B Manure Management	6.8%	6.5%
3.D Agricultural Soils	NE	68.3%
4. Land use, land-use change and forestry	0.1%	2.6%
5. Waste	29.0%	4.8%
5.A Solid Waste Disposal	20.8%	NO
5.B Biological Treatment of Solid Waste	1.6%	2.7%
5.C Incineration and Open Burning of Waste	>0.0%	0.3%
5.D Waste Water Treatment and Discharge	6.6%	1.9%

Note: Interpretation of ">0.0%": A number greater than zero but too small to appear with one decimal.

Source: Proxy estimates calculated centrally by EEA and its ETC/ACM

The total F-gas emissions of UK were allocated to individual source subcategories of Industrial Processes and Product Use as described in chapter 4.1.3.2.

UK did not fill *Total CO_2 equivalent emissions without land use, land-use change and forestry* in the designated field of the template. As UK mentioned in the description box below the MS 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 gap-filled by subtracting 2014 LULUCF CH_4 and N_2O emissions.

Also UK included ETS emissions per sector but did not provide a total of ETS emissions. This was gap-filled with the sum of the sectoral ETS emissions.

4.1.3.9 Norway and Switzerland

Norway submitted a proxy GHG inventory which does not 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. As neither Norway nor Switzerland is included in EU-28 total emissions or EU plus Iceland total emissions no gap-filling was performed for these two countries.

4.2 Comparison of emission estimates between Member States and EEA calculations

Preliminary data estimated by Member States were compared with the approximated EU inventory calculated by EEA and its ETC/ACM. In general, the preliminary estimates from both sources matched well with differences smaller than ± 2 %, except for Croatia (difference 3.6 %), Czech Republic (2.3 %), Spain (2.5 %) and Iceland (4.8 %) for total emissions. Especially the estimates for four Member States with highest emissions are pretty close: 0.1 % difference for Germany and the United Kingdom, 0.3 % difference for Italy and 0.4 % difference for France.

For Belgium, Croatia, Czech Republic, Finland, France, Germany, Greece, Ireland, Poland, Portugal, Slovakia, Spain, United Kingdom and Iceland the Member States own emissions estimates are below the EEA estimates. For Austria, Denmark, Estonia, Hungary, Italy, Latvia, Luxembourg, Netherlands, Slovenia and Sweden the proxy estimates by EEA and its ETC/ACM are lower. Member States' own estimates for Croatia, Czech Republic and Iceland show a decrease of emissions in 2015 compared to 2014. In contrast, EEA estimates show an increase of emissions for these Member States. Differences in absolute values are 0.9 Mt CO2eq for Croatia, 2.9 Mt CO2eq for Czech Republic and 0.2 Mt CO2eq for Iceland.

Bulgaria, Cyprus, Lithuania, Malta and Romania did not submit proxy estimates and EEA and its ETC/ACM did not calculate proxy estimates for these Norway and Switzerland; thus a comparison of national and EEA & ETC/ACM proxy data is not possible for these countries.

Table 19 Comparison of EEA and Member States proxies (total without LULUCF)

MS	Sector	2015 estimate		Deviation		Comment
		EEA	MS	absolute	relative	
Austria	**Total incl. indirect CO2 excl. LULUCF**	**77 912**	**78 802**	**890**	**1.1%**	
	Energy	53 360	53 750	390	0.7%	
	Industrial processes and process use	15 939	16 320	381	2.4%	
	Agriculture	6 954	7 076	123	1.8%	
	Waste	1 659	1 655	-4	-0.2%	
Belgium	**Total incl. indirect CO2 excl. LULUCF**	**118 459**	**117 725**	**-734**	**-0.6%**	
	Energy	86 922	87 744	822	0.9%	
	Industrial processes and process use	20 165	18 255	-1 911	-9.5%	
	Agriculture	9 814	9 942	127	1.3%	
	Waste	1 557	1 784	228	14.6%	
Bulgaria	**Total incl. indirect CO2 excl. LULUCF**	**59 599**				Member States proxy not received by 01/08/2016. EEA proxy used for all values.
	Energy	45 186				
	Industrial processes and process use	5 178				
	Agriculture	5 047				
	Waste	4 188				
Croatia	**Total incl. indirect CO2 excl. LULUCF**	**23 379**	**22 527**	**-852**	**-3.6%**	
	Energy	16 718	15 794	-924	-5.5%	
	Industrial processes and process use	2 867	2 911	44	1.5%	
	Agriculture	2 187	2 302	116	5.3%	

MS	Sector	2015 estimate		Deviation		Comment
		EEA	MS	absolute	relative	
	Waste	1 608	1 519	-88	-5.5%	
Cyprus	**Total incl. indirect CO2 excl. LULUCF**	**8 714**				Member States proxy not received by 01/08/2016. EEA proxy used for all values.
	Energy	5 968				
	Industrial processes and process use	1 678				
	Agriculture	561				
	Waste	508				
Czech Republic	**Total incl. indirect CO2 excl. LULUCF**	**126 168**	**123 262**	**-2 906**	**-2.3%**	
	Energy	95 080	94 068	-1 012	-1.1%	
	Industrial processes and process use	15 316	15 145	-171	-1.1%	
	Agriculture	8 200	7 784	-416	-5.1%	
	Waste	5 337	5 028	-309	-5.8%	
	Indirect CO2	2 234	1 237	-998	-44.7%	
Denmark	**Total incl. indirect CO2 excl. LULUCF**	**47 770**	**48 336**	**566**	**1.2%**	
	Energy	33 334	34 376	1 042	3.1%	
	Industrial processes and process use	2 052	2 068	16	0.8%	
	Agriculture	10 682	10 570	-113	-1.1%	
	Waste	1 281	1 322	41	3.2%	
	Indirect CO2	421	0	-421	-100.0%	
Estonia	**Total incl. indirect CO2 excl. LULUCF**	**17 357**	**17 576**	**219**	**1.3%**	
	Energy	15 051	15 367	317	2.1%	
	Industrial processes and process use	716	513	-203	-28.4%	
	Agriculture	1 285	1 382	97	7.6%	
	Waste	305	315	9	3.0%	
	Other	0	NO			
	Indirect CO2	0	NE, NO, IE			
Finland	**Total incl. indirect CO2 excl. LULUCF**	**55 825**	**55 671**	**-154**	**-0.3%**	
	Energy	40 962	40 966	4	0.0%	
	Industrial processes and process use	6 196	6 015	-181	-2.9%	
	Agriculture	6 513	6 491	-21	-0.3%	
	Waste	2 078	2 122	44	2.1%	
	Indirect CO2	76	76	0	0.0%	
France	**Total incl. indirect CO2 excl. LULUCF**	**471 171**	**469 184**	**-1 987**	**-0.4%**	
	Energy	332 050	330 844	-1 206	-0.4%	
	Industrial processes and process use	40 276	40 541	264	0.7%	
	Agriculture	78 847	78 676	-171	-0.2%	
	Waste	19 048	19 123	75	0.4%	
	Indirect CO2	949	IE (4)			
Germany	**Total incl. indirect CO2 excl. LULUCF**	**907 194**	**906 499**	**-696**	**-0.1%**	
	Energy	768 475	767 517	-958	-0.1%	
	Industrial processes and process use	61 918	61 835	-83	-0.1%	
	Agriculture	66 630	66 918	288	0.4%	
	Waste	10 158	10 230	72	0.7%	

MS	Sector	2015 estimate		Deviation		Comment
		EEA	MS	absolute	relative	
	Other	14	NO			
Greece	**Total incl. indirect CO2 excl. LULUCF**	**97 821**	**94 945**	**-2 876**	**-2.9%**	
	Energy	71 587	69 713	-1 874	-2.6%	
	Industrial processes and process use	12 769	11 556	-1 213	-9.5%	
	Agriculture	8 311	8 729	418	5.0%	
	Waste	5 154	4 947	-207	-4.0%	
Hungary	**Total incl. indirect CO2 excl. LULUCF**	**59 711**	**60 647**	**936**	**1.6%**	
	Energy	42 225	42 395	169	0.4%	
	Industrial processes and process use	6 546	7 377	831	12.7%	
	Agriculture	6 723	6 652	-71	-1.1%	
	Waste	4 218	4 224	6	0.2%	
Ireland	**Total incl. indirect CO2 excl. LULUCF**	**60 485**	**60 429**	**-55**	**-0.1%**	
	Energy	36 530	36 553	23	0.1%	
	Industrial processes and process use	3 062	3 128	66	2.2%	
	Agriculture	19 205	19 137	-69	-0.4%	
	Waste	1 623	1 547	-76	-4.7%	
	Indirect CO2	65	65	0	0.0%	
Italy	**Total incl. indirect CO2 excl. LULUCF**	**429 358**	**430 558**	**1 200**	**0.3%**	
	Energy	351 364	352 660	1 296	0.4%	
	Industrial processes and process use	30 379	30 523	144	0.5%	
	Agriculture	29 805	29 987	181	0.6%	
	Waste	17 810	17 389	-422	-2.4%	
Latvia	**Total incl. indirect CO2 excl. LULUCF**	**11 515**	**11 543**	**28**	**0.2%**	
	Energy	7 087	7 112	26	0.4%	
	Industrial processes and process use	816	753	-63	-7.7%	
	Agriculture	2 750	2 821	71	2.6%	
	Waste	842	836	-5	-0.6%	
	Indirect CO2	20	20	0	0.0%	
Lithuania	**Total incl. indirect CO2 excl. LULUCF**	**18 968**				Member States proxy not received by 01/08/2016. EEA proxy used for all values.
	Energy	10 943				
	Industrial processes and process use	3 105				
	Agriculture	3 869				
	Waste	1 050				
	Other	0				
	Indirect CO2	NE,NO,IE				
Luxembourg	**Total incl. indirect CO2 excl. LULUCF**	**10 410**	**10 458**	**48**	**0.5%**	Member States proxy not received by 01/08/2016. EEA proxy used for all values.
	Energy	9 032	9 069	36	0.4%	
	Industrial processes and process use	651	650	-1	-0.1%	
	Agriculture	680	689	9	1.3%	
	Waste	47	50	4	8.0%	
Malta	**Total incl. indirect CO2 excl. LULUCF**	**2 240**	**2 272**	**32**	**1.4%**	
	Energy	1 727	1 736	9	0.5%	

MS	Sector	2015 estimate		Deviation		Comment
		EEA	MS	absolute	relative	
	Industrial processes and process use	255	282	26	10.3%	Member States proxy not received by 01/08/2016. EEA proxy used for all values.
	Agriculture	85	85	-1	-0.6%	
	Waste	171	169	-2	-1.4%	
Netherlands	**Total incl. indirect CO2 excl. LULUCF**	**192 404**	**196 139**	**3 736**	**1.9%**	
	Energy	158 120	162 077	3 957	2.5%	
	Industrial processes and process use	11 720	11 637	-82	-0.7%	
	Agriculture	18 993	18 834	-159	-0.8%	
	Waste	3 359	3 379	20	0.6%	
	Indirect CO2	211	211	0	0.0%	
Poland	**Total incl. indirect CO2 excl. LULUCF**	**385 104**	**380 412**	**-4 692**	**-1.2%**	
	Energy	314 077	310 057	-4 020	-1.3%	
	Industrial processes and process use	30 388	29 878	-510	-1.7%	
	Agriculture	30 183	29 712	-471	-1.6%	
	Waste	10 455	10 765	310	3.0%	
Portugal	**Total incl. indirect CO2 excl. LULUCF**	**68 076**	**66 880**	**-1 196**	**-1.8%**	
	Energy	47 579	47 369	-210	-0.4%	
	Industrial processes and process use	6 065	5 946	-119	-2.0%	
	Agriculture	7 442	6 742	-700	-9.4%	
	Waste	6 862	6 694	-168	-2.4%	
	Indirect CO2	128	128	1	0.5%	
Romania	**Total incl. indirect CO2 excl. LULUCF**	**112 462**				Member States proxy not received by 01/08/2016. EEA proxy used for all values.
	Energy	78 790				
	Industrial processes and process use	10 985				
	Agriculture	16 909				
	Waste	5 778				
Slovakia	**Total incl. indirect CO2 excl. LULUCF**	**41 685**	**41 378**	**-307**	**-0.7%**	
	Energy	28 049	27 509	-541	-1.9%	
	Industrial processes and process use	8 906	9 127	221	2.5%	
	Agriculture	3 142	3 156	14	0.4%	
	Waste	1 587	1 586	-2	-0.1%	
Slovenia	**Total incl. indirect CO2 excl. LULUCF**	**16 508**	**16 765**	**256**	**1.6%**	
	Energy	13 170	13 388	218	1.7%	
	Industrial processes and process use	1 141	1 168	27	2.4%	
	Agriculture	1 726	1 729	3	0.2%	
	Waste	472	480	8	1.7%	
Spain	**Total incl. indirect CO2 excl. LULUCF**	**348 178**	**339 326**	**-8 852**	**-2.5%**	
	Energy	256 672	254 956	-1 716	-0.7%	
	Industrial processes and process use	36 962	31 943	-5 019	-13.6%	
	Agriculture	39 104	36 695	-2 409	-6.2%	
	Waste	15 440	15 731	291	1.9%	

MS	Sector	2015 estimate		Deviation		Comment
		EEA	MS	absolute	relative	
Sweden	**Total incl. indirect CO2 excl. LULUCF**	**53 457**	**53 733**	**276**	**0.5%**	
	Energy	39 062	38 603	-459	-1.2%	
	Industrial processes and process use	5 705	6 464	760	13.3%	
	Agriculture	7 282	7 143	-139	-1.9%	
	Waste	1 407	1 522	114	8.1%	
United Kingdom	**Total incl. indirect CO2 excl. LULUCF**	**507 611**	**506 900**	**-711**	**-0.1%**	GHG emissions per sector in MS proxy not available. MS total includes LULUCF CH_4 and N_2O emissions.
	Energy	411 299				
	Industrial processes and process use	34 560				
	Agriculture	45 410				
	Waste	16 342				
European Union (EU28)	**Total incl. indirect CO2 excl. LULUCF**	**4 329 539**				
	Energy	3 370 419				
	Industrial processes and process use	376 318				
	Agriculture	438 341				
	Waste	140 343				
	Other	14				
	Indirect CO2	4 105				
Iceland	**Total incl. indirect CO2 excl. LULUCF**	**4 826**	**4 593**	**-233**	**-4.8%**	
	Energy	1 847	1 615	-232	-12.6%	
	Industrial processes and process use	1 975	1 975	0	0.0%	
	Agriculture	729	748	18	2.5%	
	Waste	275	255	-19	-7.0%	
European Union (EU28) plus Iceland	**Total incl. indirect CO2 excl. LULUCF**	**4 334 366**				
	Energy	3 372 266				
	Industrial processes and process use	378 293				
	Agriculture	439 070				
	Waste	140 618				
	Other	14				
	Indirect CO2	4 105				
Norway	**Total incl. indirect CO2 excl. LULUCF**		**53 900**			No EEA proxy available, MS proxy not in CRF compatible format.
	Energy					
	Industrial processes and process use					
	Agriculture					
	Waste					
Switzerland	**Total incl. indirect CO2 excl. LULUCF**		**48 007**			No EEA proxy available.
	Energy		37 044			
	Industrial processes and process use		3 898			
	Agriculture		6 091			
	Waste		840			
	Other		14			

MS	Sector	2015 estimate		Deviation		Comment
		EEA	MS	absolute	relative	
	Indirect CO2		121			

Source: Member States' preliminary data provided to EEA for the purposes of this report, own calculations

Note: Negative values indicate that Member State's own proxy estimates are lower than EEA and ETC/ACM's estimates; positive values indicate that the MS proxy estimates are higher. Lines for "Other" and "indirect CO_2" are only shown if relevant

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http://ec.europa.eu/eurostat/data/database accessed in June-August 2016, including:

- Monthly Oil and Gas Consumption
  - Monthly data on crude oil production (data set nrg_102m, indicator code 100100, product code 3100);
  - Monthly total consumption data for natural gas (data set nrg_103m, indicator code 100900, product code 4100);
  - Production data for natural gas (data set nrg_103m, indicator code 100100, product code 4100);
  - Monthly data for the internal market deliveries of motor spirit, automotive diesel oil and kerosene/jet fuels (data set nrg_102m, indicator code 100520, product codes 3234, 3234A, 3260, 3260A, 3247A, 5546O, 5547O, 5549O);
  - Monthly data for gross inland deliveries observed for total fuel oil, heating and other gas oil (data set nrg_102m, indicator code 100520, product codes 3270A and 3266);
- Eurostat monthly data on hard coal and lignite production (data set 101m, indicator code 100100, product codes 2111 and 2210);
- Eurostat monthly data on net electricity generation from conventional thermal power plants (data set nrg_105m, indicator code 16_107104);
- Annual statistics on livestock population for cattle, sheep and swine [apro_mt_lscatl, apro_mt_lssheep,_apro_mt_lspig];
- Annual data on GDP and main components (output, expenditure and income) [na-ma_10_gdp] (Gross domestic product at market prices, Chain linked volumes (2010), million euro);

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6. Annexes

6.1 Annex I. Detailed results for each Member State

Country	Compiled by?	Submission date
Austria	Member State	21 July 2016
Belgium	Member State	29 July 2016
Bulgaria	EEA & ETC/ACM	
Croatia	Member State	26 July 2016
Cyprus	EEA & ETC/ACM	
Czech Republic	Member State	21 July 2016
Denmark	Member State	26 July 2016
Estonia	Member State	26 July 2016
Finland	Member State	15 June 2016
France	Member State	28 July 2016
Germany	Member State	25 July 2016
Greece	Member State	29 July 2016
Hungary	Member State	01 August 2016[35]
Ireland	Member State	29 July 2016
Italy	Member State	29 July 2016
Latvia	Member State	28 July 2016
Lithuania	EEA & ETC/ACM	
Luxembourg	Member State	05 August 2016[36]
Malta	Member State	16 August 2016[36]
Netherlands	Member State	18 July 2016
Poland	Member State	13 July 2016
Portugal	Member State	29 July 2016
Romania	EEA & ETC/ACM	
Slovakia	Member State	15 July 2016
Slovenia	Member State	08 July 2016
Spain	Member State	22 July 2016
Sweden	Member State	04 July 2016
United Kingdom	Member State	29 July 2016
European Union	EEA & ETC/ACM	
Iceland	Member State	20 July 2016
European Union and Iceland	EEA & ETC/ACM	
Switzerland	Member State	15 July 2016
Norway	Member State	30 June 2016

35 Late submission after 31 July 2016 deadline but EEA & ETC/ACM was still able to include the proxy GHG inventory submitted by Hungary in the approximated GHG inventory for EU plus Iceland.

36 Late submission after 31 July 2016 deadline and EEA & ETC/ACM was not able any more to include the proxy GHG inventory submitted by Luxembourg and Malta in the approximated GHG inventory for EU plus Iceland.

Source: EEA's ETC/ACM

6.1.1 Austria (submitted by MS)

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

Year Proxy 2015
Submission 2016
Country Austria

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)]	**66.604,76**	**6.510,75**	**3.436,57**	**1.872,86**	**53,30**	**311,77**	**NA,NO**	**11,62**	**78.801,65**		
1. Energy	**52.651,08**	**510,65**	**588,56**						**53.750,29**	**15.822,70**	**37.927,59**
A. Fuel combustion (sectoral approach)	52.429,83	241,19	588,56						53.259,57	15.822,70	37.436,87
1. Energy industries	10.685,38	12,83	92,51						10.790,72	8.753,10	2.037,61
2. Manufacturing industries and construction	10.756,98	14,00	127,98						10.898,96	6.486,77	4.412,19
3. Transport	22.434,39	9,38	199,22						22.642,99	582,82	22.060,17
4. Other sectors	8.504,55	204,94	167,89						8.877,38	0,00	8.877,38
5. Other	48,52	0,04	0,96						49,51	0,00	49,51
B. Fugitive emissions from fuels	221,25	269,47	0,00						490,72	0,00	490,72
1. Solid fuels	NA,NO	NA,NO	NA,NO						0,00	0,00	0,00
2. Oil and natural gas and other emissions from energy production	221,25	269,47	NA,NO,IE						490,72	0,00	490,72
C. CO_2 transport and storage	NO								0,00	0,00	0,00
2. Industrial processes and product use	**13.840,34**	**46,78**	**183,68**	**1.872,86**	**53,30**	**311,77**	**NA**	11,62	**16.320,37**	**13.669,34**	**2.651,02**
A. Mineral industry	2.740,00								2.740,00	2.728,87	11,13
B. Chemical industry	607,85	46,78	47,68	NA	NA	NA	NA	NA	702,31	654,71	47,60
C. Metal industry	10.285,77	NA,NO,IE	NA	0,00	0,00	15,66	NA	0,00	10.301,42	10.285,77	15,66
D. Non-energy products from fuels and solvent use	181,98	NA	NA						181,98	0,00	181,98
E. Electronic Industry				2,01	53,30	31,34	NA	11,62	98,28	0,00	98,28
F. Product uses as ODS substitutes				1.870,85	NO	0,00	NO	0,00	1.870,85	0,00	1.870,85
G. Other product manufacture and use	24,74	NA,NO	136,01	NO	NO	264,77	NO	0,00	425,52	0,00	425,52
H. Other	NA	NA	NA	0,00	0,00	0,00	NO	0,00	NA	0,00	0,00
3. Agriculture	**111,31**	**4.555,58**	**2.409,34**						**7.076,23**	**0,00**	**7.076,23**
A. Enteric fermentation		4.117,80							4.117,80	0,00	4.117,80
B. Manure management		437,18	433,62						870,80	0,00	870,80
C. Rice cultivation		NO							NO	0,00	0,00
D. Agricultural soils		NA	1.975,61						1.975,61	0,00	1.975,61
E. Prescribed burning of savannahs		NO	NO						NO	0,00	0,00
F. Field burning of agricultural residues		0,60	0,11						0,70	0,00	0,70
G. Liming	85,87								85,87	0,00	85,87
H. Urea application	25,44								25,44	0,00	25,44
I. Other carbon-containing fertilizers	NA								NO	0,00	0,00
J. Other	NA	NA	NA						NA	0,00	0,00
4. Land use, land-use change and forestry[(1)]	NE	NE	NE						**NE**		
A. Forest land	NE	NE	NE						NE		
B. Cropland	NE	NE	NE						NE		
C. Grassland	NE	NE	NE						NE		
D. Wetlands	NE	NE	NE						NE		
E. Settlements	NE	NE	NE						NE		
F. Other land	NE	NE	NE						NE		
G. Harvested wood products	NE	NE	NE						NE		
H. Other	NE	NE	NE						NE		
5. Waste	2,03	1.397,74	254,98						**1.654,76**	**0,00**	**1.654,76**
A. Solid waste disposal	NA,NO	1.293,93	0,00						1.293,93	0,00	1.293,93
B. Biological treatment of solid waste		78,44	93,31						171,75	0,00	171,75
C. Incineration and open burning of waste	2,03	0,00	0,01						2,04	0,00	2,04
D. Waste water treatment and discharge		25,38	161,67						187,04	0,00	187,04
E. Other	NO	NO	NO						NA	NA	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	2.188,03	1,14	25,08						2.214,26		
Aviation	2.124,10	1,10	19,77						2.144,97		
Navigation	63,94	0,04	5,31						69,29		
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	**32.254,71**								**32.254,71**		
Indirect N_2O			NE,NO,IE								
Indirect CO_2 [(3)]	NE,NA,NO,IE										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**78.801,65**	**29.492,04**	**49.309,60**
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	**78.801,65**		
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.
The trend of 1.A fuel combustion widely follows the trend in preliminary energy statistics (http://www.statistik.at/web_de/statistiken/energie_und_umwelt/energie/energiebilanzen/) **The most significant trends 2014-2015 in fuel consumption by type of fuel are:** Sales of transport diesel and gasoline increased by 1.8% (approx. +0.4 Mt of CO_2). Sales of gasoil increased by 3% (+0.1 Mt CO_2). Residual fuel oil consumption of power plants increased (+0.1 Mt CO_2). (https://www.wko.at/Content.Node/branchen/oe/Mineraloelindustrie/Verbrauchsstatistik.html) Natural gas consumption (other than non energy use) increased by 7% (approx. +1.1 Mt of CO_2) (http://www.e-control.at/de/statistik/gas) CO_2 emissions from iron and steel industries (1.A.2.a and 2.C.1) increased by approx +0.2 Mt CO_2. **Fertilizer Use:** two-year mean value increased by 9.4% (https://www.ama.at/getattachment/f3f479f8-6bc9-42e3-be83-d8fd4112a937/281_Dungemittel_Reinnahrstoffabsatz.pdf) **Animals numbers:** total cattle decreased by 0,2%, whereas milk cows increased by 0.2 % (and milk yield increased by 1.1%); swine number decreased by 0.8% (https://www.ama.at/getattachment/211986b7-3699-4bde-bb99-9e6104f54e81/230_vz_rinder.pdf) (https://www.ama.at/getattachment/73c7b521-82be-4f9f-9f84-6c9e14d3a2e0/240_vz_schweine.pdf)

6.1.2 Belgium (submitted by MS)

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

Year	Proxy 2015
Submission	July 2016
Country	Belgium

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions) [(1)]	**96323.98**	**7950.67**	**6215.93**	**2811.80**	**306.96**	**95.22**	**0.00**	**0.69**	**113705.25**		
1. Energy	**86117.24**	**1001.82**	**625.17**						**87744.23**	**30130.02**	**57614.21**
A. Fuel combustion (sectoral approach)	86028.97	463.74	625.17						87117.88	30130.02	56987.86
1. Energy industries	21071.07	46.08	157.02						21274.17	18950.56	2323.61
2. Manufacturing industries and construction	15152.94	26.95	112.42						15292.32	11019.40	4272.92
3. Transport	25 634.86	17.47	265.42						25917.76	86.25	25831.51
4. Other sectors	24135.57	373.14	89.90						24598.62	73.81	24524.81
5. Other	34.52009	0.09	0.40						35.02		35.02
B. Fugitive emissions from fuels	88.27	538.09	0.00						626.35	0.00	626.35
1. Solid fuels	NA,NO	1.49	NA,NO						1.49		1.49
2. Oil and natural gas and other emissions from energy production	88.27	536.60	NA,NO,IE						624.86	0.00	624.86
C. CO_2 transport and storage	NO										
2. Industrial processes and product use	**13947.69901**	**22.04351**	**1070.12**	**2 811.80**	**306.96**	**95.22**	**NA,NO**	**0.69**	**18254.53025**	**14310.59**	**3943.94**
A. Mineral industry	4378.94770								4378.94770	4360.95	18.00
B. Chemical industry	5519.68233	6.92433	977.63823	0.27	299.34	NA,NO	NA	NA	6 803.85	5991.02	812.83
C. Metal industry	3794.57758	15.11918	NO						3 809.70	3794.54	15.16
D. Non-energy products from fuels and solvent use	90.41373	NA,NO	NA,NO						90.41		90.41
E. Electronic Industry				1.99	5.72	3.45	0.00	0.69	11.85		11.85
F. Product uses as ODS substitutes				2 809.54	1.90	0.00	0.00	0.00	2811.44		2811.44
G. Other product manufacture and use	NO	NO	92.48	NO	NO	91.77	NO	NO	184.25		184.25
H. Other	164.07766	NA,NO	NA,NO	NO	NO	NO	NO	NO	164.07766	164.08	0.00
3. Agriculture	**132.50**	**5 723.00**	**4 086.26**						**9941.76**		**9941.76**
A. Enteric fermentation		4 466.24							4466.24		4466.24
B. Manure management		1 256.75	732.58						1989.34		1989.34
C. Rice cultivation		NO							NO		NO
D. Agricultural soils		NA	3 353.68						3353.68		3353.68
E. Prescribed burning of savannahs		NO	NO						NO		NO
F. Field burning of agricultural residues		NO	NO						NO		NO
G. Liming	132.50								132.50		132.50
H. Urea application	NE								NE		NE
I. Other carbon-containing fertilizers	NO								NO		NO
J. Other	NO	NO	NO						NO		NO
4. Land use, land-use change and forestry [(1)]	**-4 146.76**	**NO**	**127.14**						**-4019.62**		
A. Forest land	-4 205.77	NO	0.03						-4205.74		
B. Cropland	-182.04	NO	63.58						-118.46		
C. Grassland	-624.12	NO	5.14						-618.98		
D. Wetlands	-13.92	NO	0.09						-13.84		
E. Settlements	542.78	NO	58.30						601.08		
F. Other land	NO	NO	NO						NO		
G. Harvested wood products	336.31	0.00	0.00						336.31		
H. Other	NO	NO	NO						NO		
5. Waste	**273.31**	**1 203.80**	**307.24**						**1784.35**		
A. Solid waste disposal	NA,NO	972.20940	0.00						972.20940		972.21
B. Biological treatment of solid waste		24.51	37.39						61.90		61.90
C. Incineration and open burning of waste	273.30750	NA,NO,IE	0.09						273.39354	273.31	0.09
D. Waste water treatment and discharge		207.09	269.76						476.85		
E. Other	NO	NO	NO						NO		
6. Other ***(as specified in summary 1.A)***	**NO**	**NO**	**NO**						**NO**		
Memo items: [(2)]											
International bunkers	21 771.48	2.21	19.05						21 792.74		
Aviation	4 052.52	1.56	12.53						4 066.61		
Navigation	17 718.95	0.65	6.52						17 726.12		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	11 002.63								11 002.63		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	NE								NE		
Indirect N_2O			NE,NO								
Indirect CO_2 [(3)]	NE,NO										

Total CO_2 equivalent emissions without land use, land-use change and forestry	**117 724.87**		
Total CO_2 equivalent emissions with land use, land-use change and forestry	**113 705.25**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**117 724.87**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**113 705.25**		

(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.

In general energetic emissions in Flanders are increasing in almost all sectors: 1/ emissions in the category 1A4 increase compared to 2014 mainly due to a colder winter, 2/ emissions in the sector of energy industries/electricity production (category 1A1a) where the energy consumption is increasing (for liquid fuels and gaseous fuels) due to a higher production and 3/ finally also the energetic emissions in the industrial sectors (category 1A2) are increasing as a result of higher energy consumption.

In Wallonia, emissions in the ETS (combustion in the industrial sector) show a slight decrease compared to 2014 (-191 kt CO_2eq)
Emissions in the residential sector increased due to a colder winter in 2015 (+486 kt CO2eq). For Brussels, the emissions in the residential and tertiary sectors increased (+387 kt CO_2eq) due to a colder winter in 2015

<u>Road Transportation according reference approach in tons (annual balance from MOS transmitted to IEA and Eurostat - April 2016) recalculated for offroads consumption (gasoline)</u>

Gasoline (excluding offroads)	1 271 769
Diesel	6 611 000
LPG	43 000
Bioethanol (excluding offroads)	58 411
Biodiesel	456 000

6.1.3 Bulgaria (calculated centrally by EEA and its ETC/ACM)

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

Inventory 2015
Submission 2016 v Proxy 1.0
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)	**47.321**	**7.351**	**3.756**	**1.155**	**0**	**16**	**0**	**0**	**59.599**		
1. Energy	**43.410**	**1.467**	**309**						**45.186**		
A. Fuel combustion (sectoral approach)	43.396	342	309						44.047		
1. Energy industries	30.292	9	119						30.420		
2. Manufacturing industries and construction	2.762	11	23						2.796		
3. Transport	9.180	31	81						9.292		
4. Other sectors	1.159	291	85						1.535		
5. Other	3	0	0						3		
B. Fugitive emissions from fuels	14	1.125	0						1.139		
1. Solid fuels	NO	914	IE						914		
2. Oil and natural gas	14	211	IE						225		
C. CO_2 transport and storage	NO								0		
2. Industrial processes and product use	**3.869**	**0**	**138**	**1.155**	**0**	**16**	**NO**	**NO**	**5.178**		
A. Mineral industry	2.098								2.098		
B. Chemical industry	1.670	0	138	IE	IE	IE	IE	IE	1.808		
C. Metal industry	42	0	0	IE	IE	IE	IE	IE	42		
D. Non-energy products from fuels and solvent use	31	NA,NO,IE	NA,NO,IE						31		
E. Electronic Industry				IE	IE	IE	IE	IE	IE		
F. Product uses as ODS substitutes				IE	IE	IE	IE	IE	IE		
G. Other product manufacture and use	22	NO	0	IE	IE	IE	IE	IE	22		
H. Other	5	NA,IE	NA,IE	IE	IE	IE	IE	IE	5		
3. Agriculture	**31**	**1.856**	**3.160**						**5.047**		
A. Enteric fermentation		1.445	0						1.445		
B. Manure management		276	414						690		
C. Rice cultivation		104	0						104		
D. Agricultural soils		NO	2.737						2.737		
E. Prescribed burning of savannas		NE	NE						NE		
F. Field burning of agricultural residues		31	9						40		
G. Liming	NO								0		
H. Urea application	31								31		
I. Other carbon-containing fertilizers	NO								0		
J. Other	0	0	0						0		
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	11	4.028	149						4.188		
A. Solid waste disposal	NO	3.045							3.045		
B. Biological treatment of solid waste		6	4						10		
C. Incineration and open burning of waste	11	0	1						12		
D. Waste water treatment and discharge		977	144						1.121		
E. Other	NO	NO	NO						0		
6. Other *(as specified in summary 1.A)*									0		

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
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	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**59.599**	**36.261**	**23.338**
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	**59.599**	**36.261**	**23.338**
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

(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.

The estimates at the level of sub-sector and gas in this table have been compiled according to the methodology described in Annex chapter 6.2. The EEA proxy estimates are based on a bottom up approach (by sector, gas and country). The uncertainty in the numbers increases at finer levels of detail, particularly for non-CO_2 emissions. The uncertainty is lowest for CO_2 emissions from fuel combustion.

6.1.4 Croatia (submitted by MS)

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

Year 2015
Submission 2016 v1.0
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)]	**17.183,05**	**3.080,87**	**1.666,65**	**587,93**	**0,06**	**7,98**	**NA,NO**	**NA,NO**	**22.526,54**		
1. Energy	**15.137,03**	**524,87**	**132,13**						15.794,04	**5.547,66**	**10.246,38**
A. Fuel combustion (sectoral approach)	14.679,86	355,79	131,97						15.167,62	5.547,66	9.619,96
1. Energy industries	4.730,38	16,15	18,36						4.764,89	4.396,35	368,55
2. Manufacturing industries and construction	2.141,94	3,54	6,26						2.151,74	1.151,31	1.000,43
3. Transport	5.528,10	11,60	54,16						5.593,86	NO	5.593,86
4. Other sectors	2.279,44	324,50	53,19						2.657,13	NO	2.657,13
5. Other	NO	NO	NO						NO	NO	NO
B. Fugitive emissions from fuels	457,18	169,09	0,16						626,43	NO	626,43
1. Solid fuels	NO	NO	NO						NO	NO	NO
2. Oil and natural gas and other emissions from energy production	457,18	169,09	0,16						626,43	NO	626,43
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	**1.968,23**	**0,19**	**346,38**	**587,93**	**0,06**	**7,98**	**NA,NO**	**NA,NO**	**2.910,75**	**2.838,56**	**72,20**
A. Mineral industry	1.311,51								1.311,51	1.306,39	5,12
B. Chemical industry	587,57	0,19	311,57	NA	NA	NA	NA	NA	899,33	1.518,62	-619,29
C. Metal industry	13,55	NA	NA	NA	NA	NA	NA	NA	13,55	13,55	NO
D. Non-energy products from fuels and solvent use	55,60	NA	NA						55,60	NO	55,60
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				587,93	0,06	NA	NA	NA	587,99	NO	587,99
G. Other product manufacture and use	NA	NA	34,81	NA	NA	7,98	NA	NA	42,79	NO	42,79
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NO	NA
3. Agriculture	**77,75**	**1.121,60**	**1.103,01**						**2.302,35**	NO	**2.302,35**
A. Enteric fermentation		951,37							951,37	NO	951,37
B. Manure management		170,23	129,98						300,21	NO	300,21
C. Rice cultivation		NO							NO	NO	NO
D. Agricultural soils		NA	973,03						973,03	NO	973,03
E. Prescribed burning of savannahs		NO	NO						NO	NO	NO
F. Field burning of agricultural residues		NO	NO						NO	NO	NO
G. Liming	18,39								18,39	NO	18,39
H. Urea application	59,36								59,36	NO	59,36
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	**0,04**	**1.434,21**	**85,13**						**1.519,39**	NO	**1.519,39**
A. Solid waste disposal	NA	1.223,91	NA						1.223,91	NO	1.223,91
B. Biological treatment of solid waste		3,73	2,05						5,77	NO	5,77
C. Incineration and open burning of waste	0,04	NA	0,00						0,04	NO	0,04
D. Waste water treatment and discharge		206,57	83,09						289,66	NO	289,66
E. Other	NO	NO	NO						NO	NO	NO
6. Other *(as specified in summary 1.A)*										NO	NO

According to 2006 IPCC Guidelines, CO2 recovered for downstream use from ammonia production is subtracted from total CO2 emissions that is included in national inventory report. Estimated value for recovered CO2 in 2015 is about 400 kt. According to ETS methodology, total amount of CO2 is included in ETS (recovery is not accounted).

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
Memo items:[(2)]											
International bunkers	368,10	0,71	0,91						369,73		
Aviation	368,10	0,71	0,91						369,73		
Navigation	NO	NO	NO						NO		
Multilateral operations	C	C	C						C		
CO_2 emissions from biomass	5.249,83								5.249,83		
CO_2 captured	NO								NE		
Long-term storage of C in waste disposal sites	NE								NO		
Indirect N_2O			NO,NA								
Indirect CO_2 [(3)]	NO,NA										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**22.526,54**	**8.386,21**	**14.140,32**
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	**22.526,54**		
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.
1. Energy
1A1 - 92.9% of total CO2 emissisons is from ETS, according to 2014. It is assumed that the distribution stayed the same in 2015. For CH4 and N2O emissions is assumed that ratio CH4/CO2 and N2O/CO2 in 2015 is the same as for 2014. 1A2 - 53.8% of total CO2 emissisons is from ETS, according to data for 2014. It is assumed that the distribution stayed the same in 2015. For CH4 and N2O emissions is assumed that ratio CH4/CO2 and N2O/CO2 in 2015 is the same as for 2014. 1A2 - All ETS emissions from petrochemical industry (including petrochemical heating plant) are included into 2.B.1. sector 1A3 - Transport, 1A4. Other Sectors, 1B2. Oil and Natural Gas all GHG were extrapolated based on emissions from 2011-2014 1B2 - all GHG are extrapolated based on emissions from 2011-2014
2. Industrial processes and product use
2.A - ETS: CO2 emissions from 2.A.1; 2.A.2; 2.A.3; 2.A.4a; non-ETS: CO2 emission from 2.A.4b. Verified ETS emissions for 2.A.1; 2.A.2; 2.A.3; 2.A.4a are provided by Croatian Agency for the Environment and Nature. Emission for 2.A.4b is assessed according to data for 2014 due to the lack of the information. 2.B.1 - ETS: natural gas consumption as fuel and feedstock in ammonia production is included, CO2 recovered is subtracted according to 2006 IPCC Guidelines. CO2 emission is assessed according to emissions trend from 2013 to 2014 due to the lack of information (emissions are included into cell J21). According to ETS Guidelines, CO2 recovered is not subtracted (emissions are included into cell L21). All ETS emissions from petrochemical industry (including industrial heating plants) are included into cell L21. Non-ETS: CH4 and N2O emissions from combustion of natural gas as fuels are assessed according to emissions trend from 2013 to 2014 due to the lack of information. 2.B.2 - ETS: The methodology used to determine N2O emission is based on the measurement. Catalytic decomposition is implemented as a measure for N2O emission reduction in nitric acid production. Verified N2O emission is provided by Croatian Agency for the Environment and Nature. 2.B.8 - non-ETS: CO2 and CH4 emissions are assessed according to data for 2014 due to the lack of the information. 2.C.1 - ETS: Verified CO2 emission from steel production is included. Data are provided by Croatian Agency for the Environment and Nature. 2.D.1; 2.D.2; 2.D.3 - non-ETS: CO2 emission is assessed by extrapolation due to the lack of the information. Extrapolation is based on emissions trend from 2013 to 2014. 2.E - Activities do not exist within a country. 2.F - non-ETS: HFC and PFC emissions are assessed by extrapolation due to the lack of the information. Extrapolation is based on emissions trend from 2013 to 2014. 2.G.1 - non-ETS: SF6 emission is assessed by extrapolation due to the lack of the information. Extrapolation is based on emissions trend from 2013 to 2014. 2.G.3 - non-ETS: N2O emission is assessed according to data for 2014 due to the lack of the information. 2.H.1; 2.H.2; 2.H.3 - non-ETS: Only information on CO2 emission of non-biogenic origin should be reported.
3. Agriculture
3.A-3.H. linear extrapolation is based on trend from 2010 to 2014
5. Waste
5.A.1; 5.A.2 - non-ETS: CH4 emissions are assessed by extrapolation due to the lack of the information. Extrapolation is based on emissions trend from 2013 to 2014. 5.B - non-ETS: CH4 and N2O emissions are assessed according to data for 2014 due to the lack of the information. 5.C.1 - non-ETS: CO2 and N2O emissions are assessed according to data for 2014 due to the lack of the information. 5.D.1- non-ETS: CH4 emission is assessed by extrapolation due to the lack of the information. Extrapolation is based on emissions trend from 2013 to 2014. 5.D.1 - non-ETS: N2O emission is assessed according to data for 2014 due to the lack of the information. 5.D.2 - non-ETS: CH4 emission is assessed according to data for 2014 due to the lack of the information. 5.D.3 - non-ETS: N2O emission is assessed according to data for 2013 due to the lack of the information.

6.1.5 Cyprus (calculated centrally by EEA and its ETC/ACM)

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

Inventory 2015
Submission 2016 v Proxy 1.0
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]	**6.877**	**883**	**320**	**320**	**0**	**0**	**313**	**0**	**8.714**		
1. Energy	**5.891**	**18**	**58**						**5.968**		
A. Fuel combustion (sectoral approach)	5.891	18	58						5.968		
1. Energy industries	3.023	3	7						3.033		
2. Manufacturing industries and construction	555	1	2						558		
3. Transport	1.772	10	48						1.830		
4. Other sectors	506	4	1						512		
5. Other	35	0	0						35		
B. Fugitive emissions from fuels	0	0	NE,NO						0		
1. Solid fuels	NO	NO	IE						0		
2. Oil and natural gas	0	0	IE						0		
C. CO_2 transport and storage	NO								0		
2. Industrial processes and product use	**986**	**0**	**59**	**320**	**0**	**0**	**313**	**0**	**1.678**		
A. Mineral industry	978								978		
B. Chemical industry	NO	NO	NO	IE	IE	IE	IE	IE	0		
C. Metal industry	NO	NO	0	IE	IE	IE	IE	IE	0		
D. Non-energy products from fuels and solvent use	7	NE,IE	NE						7		
E. Electronic Industry				IE	IE	IE	IE	IE	IE		
F. Product uses as ODS substitutes				IE	IE	IE	IE	IE	IE		
G. Other product manufacture and use	0	NE	59	IE	IE	IE	IE	IE	59		
H. Other	0	0	0	IE	IE	IE	IE	IE	0		
3. Agriculture	**0**	**379**	**182**						**561**		
A. Enteric fermentation		231	0						231		
B. Manure management		148	67						215		
C. Rice cultivation		NO	0						0		
D. Agricultural soils		NE	114						114		
E. Prescribed burning of savannas		NE	NE						NE		
F. Field burning of agricultural residues		0	0						0		
G. Liming	NO								0		
H. Urea application	0								0		
I. Other carbon-containing fertilizers	NO								0		
J. Other	0	0	0						0		
4. Land use, land-use change and forestry[1]	**NE**	**NE**	**NE**						**NE**		
A. Forest land	NE	NE	NE						NE		
B. Cropland	NE	NE	NE						NE		
C. Grassland	NE	NE	NE						NE		
D. Wetlands	NE	NE	NE						NE		
E. Settlements	NE	NE	NE						NE		
F. Other land	NE	NE	NE						NE		
G. Harvested wood products	NE								NE		
H. Other	NE	NE	NE						NE		
5. Waste	0	486	22						508		
A. Solid waste disposal	NE,NA	469							469		
B. Biological treatment of solid waste		6	6						12		
C. Incineration and open burning of waste	NO	NO	NO						0		
D. Waste water treatment and discharge		10	16						26		
E. Other	NO	NO	NO						0		
6. Other *(as specified in summary 1.A)*									0		

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
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]	NE,NO										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**8.714**	**4.369**	**4.344**
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	**8.714**	**4.369**	**4.344**
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

(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.

The estimates at the level of sub-sector and gas in this table have been compiled according to the methodology described in Annex chapter 6.2. The EEA proxy estimates are based on a bottom up approach (by sector, gas and country). The uncertainty in the numbers increases at finer levels of detail, particularly for non-CO_2 emissions. The uncertainty is lowest for CO_2 emissions from fuel combustion.

6.1.6 Czech Republic (submitted by MS)

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

Year 2015
Submission
Country

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 (1)	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)(1)	**92.532,18**	**13.010,44**	**5.526,35**	**3.053,12**	**3,78**	**102,33**	**0,00**	**4,51**	**114.232,71**		
1. Energy	**89.207,57**	**4.091,23**	**769,21**						**94.068,02**	**53.279**	**40.789**
A. Fuel combustion (sectoral approach)	89.024,12	680,27	769,19						90.473,58	53.279	37.194
1. Energy industries	51.174,00	27,77	231,37						51.433,14	IE	IE
2. Manufacturing industries and construction	9.633,60	33,90	52,40						9.719,91	IE	IE
3. Transport	18.156,90	26,09	378,18						18.561,16	IE	IE
4. Other sectors	9.748,15	591,75	98,21						10.438,11	IE	IE
5. Other	311,47	0,76	9,03						321,26	IE	IE
B. Fugitive emissions from fuels	183,45	3.410,96	0,0261						3.594,44	NO	3.594,44
1. Solid fuels	177,53	2.881,00							3.058,53	NO	3.058,53
2. Oil and natural gas and other emissions from energy production	5,93	529,96	0,0261						535,91	NO	535,91
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	**10861,96**	**590,05**	**529,55**	**3053,12**	**3,78**	**102,33**		**4,51**	15.145,30	**9.334,15**	**5.811,15**
A. Mineral industry	2299,95								2.299,95	2215,44	84,51
B. Chemical industry	1895,35	49,30	306,05						2.250,69	1281,303	969,39
C. Metal industry	6552,57	540,75							7.093,32	5837,409	1.255,91
D. Non-energy products from fuels and solvent use	114,10								114,10	NO	114,10
E. Electronic Industry						21,89		4,51	26,39	NO	26,39
F. Product uses as ODS substitutes				3053,12	3,78				3.056,91	NO	3.056,91
G. Other product manufacture and use			223,50			80,44			303,94	NO	303,94
H. Other									NO	NO	NO
3. Agriculture	**207,00**	**3613,35**	**3963,62**						**7.783,96**	**NO**	**7783,96**
A. Enteric fermentation		2841,99							2841,99	NO	2.841,99
B. Manure management		771,36	952,80						1724,16	NO	1.724,16
C. Rice cultivation		NO							NO	NO	NO
D. Agricultural soils			3010,82						3010,82	NO	3.010,82
E. Prescribed burning of savannahs		NO	NO						NO	NO	NO
F. Field burning of agricultural residues		NO	NO						NO	NO	NO
G. Liming	150,00								150,00	NO	150,00
H. Urea application	57,00								57,00	NO	57,00
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)	-7.878,16	73,31	12,17						**-7792,68**		
A. Forest land	-7.389,95	73,31	6,01						-7310,63		
B. Cropland	12,10	NO	5,03						17,14		
C. Grassland	-569,10	NO	NO						-569,10		
D. Wetlands	26,76	NO	NO						26,76		
E. Settlements	127,60	NO	NO						127,60		
F. Other land	8,55	NO	NO						8,55		
G. Harvested wood products	-94,13	NO	NO						-94,13		
H. Other	NO	NO	1,13						1,13		
5. Waste	133,80	4.642,50	251,81						5.028,11	**NO**	**5028,11**
A. Solid waste disposal	NE, NO	3.270,00							3.270,00	NO	3.270,00
B. Biological treatment of solid waste		646,25	44,70						690,95	NO	690,95
C. Incineration and open burning of waste	133,80	0,00	2,38						136,18	NO	136,18
D. Waste water treatment and discharge		726,25	204,73						930,98	NO	930,98
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	887,50	0,16	7,48						895,14		
Aviation	887,50	0,16	7,48						895,14		
Navigation	NO	NO	NO						NO		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	11.793,45								11.793,45		
CO_2 captured	**NO**								NO		
Long-term storage of C in waste disposal sites	**10.978,20**								**10.978,20**		
Indirect N_2O			1330,72								

Indirect CO_2 (3)	1236,64										

Total CO_2 equivalent emissions without land use, land-use change and forestry	**122.025,39**	**62.613,39**	**59.412,00**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**114.232,71**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**123.262,03**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**115.469,35**		

(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.
Approximated GHG inventory was created using linear regression for the last 5 years (in some cases for 1990 - 2014) and further extrapolation for year 2015. For more accurate estimations outliers from the activity data were removed. In sectors, where preliminary data was available, the approximation was calculated from it. Linear regression was applied on the lowest levels of sectors and subsectors. This way a better accuracy was reached. Agriculture: The increase in GHG emissions in 2015 (proxy) compared to 2014 submission is caused by increase of activity data (animal population, crop production). Animal and crop production data are provided in the official statistics (Czech Statistical Office). Other data and parameters are expert estimates based on time-series consistency or data reported in last inventory submission. The emissions from LULUCF correspond to CRF data in 2016 submission. The trend in LULUCF sector is negligible within the time step of one year. ETS and non-ETS data: The ETS data for IPPU sector is based on expert judgement since not all verified data were available at the time of processing the proxy inventory Following the recommendations, received during the EU ESD review, indirect emissions of CO2 from sector Energy were recalculated and the new values are used for this inventory. The values are lower compared to the previous year due to abolishment of double counting found by the TERT. The difference is apparent from the cell B 67.

6.1.7 Denmark (submitted by MS)

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

Year
Submission
Country

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions) [(1)]	**35.183,78**	**7.321,59**	**5.055,42**	**649,23**	**7,61**	**118,19**	**0,00**	**0,00**	**48335,82**		
1. Energy	**33.650,65**	**362,80**	**362,39**						**34375,84**	**14784,86**	**19590,98**
A. Fuel combustion (sectoral approach)	33.390,47	255,51	322,37						33968,36	14539,19	19429,17
1. Energy industries											
2. Manufacturing industries and construction											
3. Transport											
4. Other sectors											
5. Other											
B. Fugitive emissions from fuels	260,18	107,28	40,02						407,48	245,67	161,81
1. Solid fuels	NA,NO	NA,NO	NA,NO						NA,NO		
2. Oil and natural gas and other emissions from energy production	260,18	107,28	40,02						407,48	245,67	161,81
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	**1.271,61**	**2,87**	**18,45**	**649,23**	**7,61**	**118,19**	**0,00**	**0,00**	**2067,96**	**1011,08**	**1056,88**
A. Mineral industry	1.085,30								1085,30	1011,08	74,22
B. Chemical industry	1,48	NA,NO	NA,NO	NA	NA	NA	NA	NA	1,48	0	1,48
C. Metal industry	0,18	NO	NO		NO	NO			0,18	0	0,18
D. Non-energy products from fuels and solvent use	184,51	0,51	0,22						185,23	0	185,23
E. Electronic Industry				NA	2,65	NA	NA	NA	2,65	0	2,65
F. Product uses as ODS substitutes				649,23	4,96	NA	NA	NA	654,19	0	654,19
G. Other product manufacture and use	0,16	2,36	18,23	NA	NA	118,19	NA	NA	138,94	0	138,94
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA		
3. Agriculture	**240,24**	**5.838,93**	**4.490,71**						**10569,88**		
A. Enteric fermentation		3.636,25							3636,25		
B. Manure management		2.199,66	747,27						2946,94		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NE	3.742,50						3742,50		
E. Prescribed burning of savannahs		NO	NO						NO		
F. Field burning of agricultural residues		3,01	0,93						3,95		
G. Liming	237,72								237,72		
H. Urea application	0,51								0,51		
I. Other carbon-containing fertilizers	2,01								2,01		
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	**21,27**	**1.116,99**	**183,87**						1322,14		
A. Solid waste disposal	NA,NO	825,57							825,57		
B. Biological treatment of solid waste		179,53	123,31						302,84		
C. Incineration and open burning of waste	NA,NO	0,02	0,26						0,28		
D. Waste water treatment and discharge		109,44	60,30						169,74		
E. Other	21,27	2,44	NA						23,72		
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)]											

Total CO_2 equivalent emissions without land use, land-use change and forestry			
Total CO_2 equivalent emissions with land use, land-use change and forestry			
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry			
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry			

(1) For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions 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 2015, Denmark imported more electricity compared to 2014 and also the production of renewable energy increased. This caused an decrease in coal consumption in the Danish power plants by 31 %. The consumption of natural gas and oil products increased, but only by 3.5 and 1.4 % respectively. The overall result is a decrease in the CO2 emission from fuel combustion. More information on the preliminary energy statistics is available from the Danish Energy Agency (http://www.ens.dk/en/info/news-danish-energy-agency/2015-denmark-hits-lowest-energy-consumption-more-40-years & http://www.ens.dk/en/info/facts-figures/energy-statistics-indicators-energy-efficiency/annual-energy-statistics).

For industrial processes, most emissions of CO2, CH4 and N2O have been assumed constant at 2014 levels. However, 2015 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 for the purpose of this proxy.

6.1.8 Estonia (submitted by MS)

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

Year 2015
Submission 2016
Country Estonia

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)]	**15.430,50**	**1.045,95**	**870,08**	**227,79**	**NO**	**2,17**	**NO**	**NO**	**17.576,49**		
1. Energy	**15.136,57**	**156,19**	**74,34**						**15.367,10**	**11.640,09**	**3.727,01**
A. Fuel combustion (sectoral approach)	15.136,54	138,40	74,34						15.349,28	11.640,09	3.709,19
1. Energy industries	11.894,93	15,66	31,51						11.942,10	11.357,69	584,42
2. Manufacturing industries and construction	432,60	1,40	2,36						436,36	272,79	163,57
3. Transport	2.321,04	3,95	20,70						2.345,69	2,84	2.342,85
4. Other sectors	455,35	117,34	19,25						591,94	6,78	585,16
5. Other	32,62	0,04	0,53						33,19	0,00	33,19
B. Fugitive emissions from fuels	0,03	17,79	NO						17,82	0,00	17,82
1. Solid fuels	NO	NO	NO						NO	0,00	0,00
2. Oil and natural gas and other emissions from energy production	0,03	17,79	NO						17,82	0,00	17,82
C. CO_2 transport and storage	NO								NO	0,00	0,00
2. Industrial processes and product use	**278,92**	**NO**	**3,74**	**227,79**	**NO**	**2,17**	**NO**	**NO**	**512,62**	**257,57**	**255,05**
A. Mineral industry	257,80								257,80	257,57	0,23
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00	0,00
C. Metal industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00	0,00
D. Non-energy products from fuels and solvent use	21,12	NO	NO						21,12	0,00	21,12
E. Electronic Industry				NO	NO	NO	NO	NO	NO	0,00	0,00
F. Product uses as ODS substitutes				227,79	NO	NO	NO	NO	227,79	0,00	227,79
G. Other product manufacture and use	NO	NO	3,74	NO	NO	2,17	NO	NO	5,91	0,00	5,91
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	0,00	0,00
3. Agriculture	**14,02**	**617,70**	**750,54**						**1.382,26**	**0,00**	**1.382,26**
A. Enteric fermentation		542,03							542,03	0,00	542,03
B. Manure management		75,67	63,94						139,60	0,00	139,60
C. Rice cultivation		NO							NO	0,00	0,00
D. Agricultural soils		NO	686,61						686,61	0,00	686,61
E. Prescribed burning of savannahs		NO	NO						NO	0,00	0,00
F. Field burning of agricultural residues		NO	NO						NO	0,00	0,00
G. Liming	14,02								14,00	0,00	14,00
H. Urea application	NO								NO	0,00	0,00
I. Other carbon-containing fertilizers	NO								NO	0,00	0,00
J. Other	NO	NO	NO						NO	0,00	0,00
4. Land use, land-use change and forestry[(1)]											
A. Forest land											
B. Cropland											
C. Grassland											
D. Wetlands											
E. Settlements											
F. Other land											
G. Harvested wood products											
H. Other											
5. Waste	**0,99**	**272,06**	**41,45**						**314,50**	**0,00**	**314,50**
A. Solid waste disposal	NO	192,85	NO						192,85	0,00	192,85
B. Biological treatment of solid waste		15,75	11,26						27,01	0,00	27,01
C. Incineration and open burning of waste	0,99	0,45	0,09						1,53	0,00	1,53
D. Waste water treatment and discharge		63,01	30,10						93,11	0,00	93,11
E. Other	NO	NO	NO						NO	0,00	0,00
6. Other *(as specified in summary 1.A)*	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**0,00**	**0,00**
Memo items:[(2)]											
International bunkers	1.104,83	2,28	10,12						1.117,23		
Aviation	125,13	0,03	1,18						126,34		
Navigation	979,70	2,25	8,94						990,89		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	3.503,40								3.503,40		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	3.739,00								3.739,00		
Indirect N_2O			NE, NO								
Indirect CO_2 [(3)]	NE, NO, IE										

Estonia:
Includes CO2 emissions from domestic aviation.

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**17.576,49**	**11.897,66**	**5.678,83**
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	**17.576,49**		
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.
Energy: The total GHG emissions have decreased by 3 331 kt CO2 eq compared to year 2014 due to a decrease in emissions from Energy industries, Manufacturing industries and construction and Other sectors. The decrease was mainly caused by a decrease of electricity production in Estonia's oil shale power plants and increased electricity imports (electricity import increased 46% compared to 2014). **IPPU:** Decrease of CO2 eq emissions from IPPU sector by ca 194 kt was caused by halting production at one of clinker kilns in 2015. **Agriculture:** The emissions from Enteric fermentation and Manure management have decreased due to a fall in the numbers of dairy cattle and swine. The dairy industry has suffered a decline in production due to economic sanctions imposed by Russia on EU from August 2014. Consequently the number of dairy cattle in 2015 dropped 5.2% in comparison with 2014. The number of swine has fallen 16% in Estonia as a result of the outbreak of African swine fever in the region in 2015. The emissions from Agricultural soils have risen 14% compared to the previous year because of the recalculations performed under the crop residues sub-category. Sources:https://valitsus.ee/en/news/prime-minister-roivas-swine-fever-can-only-be-tackled-cooperation-between-pig-farmers-and-state; http://russia-insider.com/en/politics/european-dairy-industry-crisis-due-russian-food-embargo/ri9181 **Waste:** Total CO2 eq emissions have slightly decreased from 337 kt CO2 eq in 2014 to 315 kt CO2 eq in 2015. The preliminary data used for calculating the proxy emissions is under inspection by the Estonian Environment Agency. CO2 eq emission from sub-category '5.A Solid waste disposal' decreased from 219 kt CO2 eq in 2014 to 193 kt CO2 eq in 2015, which is caused by the decrease of biodegradable waste going to landfills. CO2 eq emission from sub-categor '5.B Biological Treatment of Solid Waste' increased from 25 kt CO2 eq in 2014 to 27 kt CO2 eq in 2015, which is caused by the increase of solid waste treated biologically. CO2 eq emission from sub-categor '5.C Incineration and Open Burning of Waste' increased from 1.52 kt CO2 eq in 2014 to 1.53 kt CO2 eq in 2015. CO2 eq emission from sub-categor '5.D Wastewater Treatment and Discharge' increased from 92 CO2 kt eq in 2014 to 93 kt CO2 eq in 2015, which is influenced by the industry production and the number of people living in the low density settlements.

6.1.9 Finland (submitted by MS)

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

Year 2015
Submission v1
Country 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)	**19.244**	**5.863**	**5.847**	**1.560**	**91**	**34**	**NO**	**NO**	**32.640**		
1. Energy	**40.060**	**383**	**524**						**40.966**	**21.900**	**18.861**
A. Fuel combustion (sectoral approach)	39.976	350	523						40.849		
1. Energy industries	15.860	21	227						16.108		
2. Manufacturing industries and construction	8.540	22	134						8.696		
3. Transport	11.030	21	79						11.130		
4. Other sectors	3.510	283	75						3.868		
5. Other	1.036	3	8						1.047		
B. Fugitive emissions from fuels	84	33	1						117		
1. Solid fuels	NO	NO	NO						NO		
2. Oil and natural gas	84	33	1						117		
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	**4.090**	**0,01**	**240**	**1.560**	**91**	**34**	**NO**	**NO**	**6.015**	**3.600**	**2.415**
A. Mineral industry	987								987		
B. Chemical industry	890	NA,NO	213	NO	NO	NO	NO	NO	1.103		
C. Metal industry	2.124	0,002	NO	NO	NO	C	NO	NO	2.124		
D. Non-energy products from fuels and solvent use	89	0,003	0,002						89		
E. Electronic Industry				C	C	C	NO	NO	C, NO		
F. Product uses as ODS substitutes				1.558	88	NO	NO	NO	1.647		
G. Other product manufacture and use	NO	NO	27	NO	NO	11	NO	NO	38		
H. Other	NO	NO	NO	2	3	23	NO	NO	28		
3. Agriculture	**222**	**2.568**	**3.701**						**6.491**	**0**	**6.491**
A. Enteric fermentation		2.106							2.106		
B. Manure management		460	282						742		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NE,NO	3.418						3.418		
E. Prescribed burning of savannahs		NO	NO						NO		
F. Field burning of agricultural residues		2	1						3		
G. Liming	222								222		
H. Urea application	0,3								0		
I. Other carbon-containing fertilizers	NA								NA		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry(1)	**-25.128**	**922**	**1.251**						**-22.955**		
A. Forest land	-31.874	847	1.125						-29.902		
B. Cropland	6.954	NE,NA,NO,IE	10						6.964		
C. Grassland	612	NE,NA,NO	1						613		
D. Wetlands	2.128	74	97						2.300		
E. Settlements	1.217	IE	18						1.235		
F. Other land	NA,NO	NA	NA						NA,NO		
G. Harvested wood products	-4.165								-4.165		
H. Other	NA	NA	NA						NA		
5. Waste	**NO**	**1.991**	**131**						**2.122**	**0**	**2.122**
A. Solid waste disposal	NO	1.744							1.744		
B. Biological treatment of solid waste		75	55						130		
C. Incineration and open burning of waste	NO,NE,IE	IE,NE,NO	IE,NE,NO						IE, NE, NO		
D. Waste water treatment and discharge		172	76						248		
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	2.859	3	30						2.893		
Aviation	1.963	1,0	24						1.988		
Navigation	896	1,9	6						904		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	38.532								38.532		
CO_2 captured	134								134		
Long-term storage of C in waste disposal sites	NE								NE		
Indirect N_2O			197								
Indirect CO_2 (3)	76										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**55.595**	**25.500**	**29.890**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**32.640**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**55.671**	**25.500**	**29.966**
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**32.716**		

(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.

According to Statistics Finland's instant preliminary data, the total emissions of greenhouse gases in 2015 corresponded with 55.7 million tonnes of carbon dioxide (CO2 eq.). Emissions fell by around six per cent compared with the previous year and were 22 per cent lower than in 1990. The consumption of natural gas and coal declined in the energy sector. Emissions from the non-emissions trading sector went down by half a per cent and were below the annual emission allocations set by the EU by 0.8 million tonnes of CO2 equivalent.

Emissions in the energy sector fell by close on eight per cent year-on-year. The biggest reason was the decrease in the consumption of coal and natural gas. Preliminary data on total energy consumption in 2015 released by Statistics Finland has been used in the calculation of the energy sector. In the industrial processes and product use sector, emissions rose by one per cent year-on-year, the growth was most affected by emissions from the chemical industry that increased by 12 per cent. Emissions from agriculture remained at the same level as in 2014. Emissions from waste management decreased by around four per cent. The carbon sink of the LULUCF sector grew by 11 per cent.

http://www.tilastokeskus.fi/til/khki/2015/khki_2015_2016-05-25_tie_001_en.html
http://tilastokeskus.fi/til/ehk/2015/04/ehk_2015_04_2016-03-23_tie_001_en.html (Energy statistics, preliminary data)
https://www.energiavirasto.fi/-/paastokauppasektorin-paastot-pienenivat-3-3-miljoonaa-tonnia?redirect=https%3A%2F%2Fwww.energiavirasto.fi%2Fhome%3Fp_p_id%3D101_INSTANCE_o19kFDvrgZ2J%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-8%26p_p_col_count%3D2 (Energy authority, EU Emissions trading Scheme, The data on the verified emissions of the emissions trading sector in Finland in 2015)

6.1.10 France (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS | Year 2015
(Sheet 1 of 1) | Submission July 2016
Country France Kyoto (with M

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 (1)	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecifie(	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)(1)	292809.2742	60177.2034	45136.1325	19339.70646	595.2568	0	469.94146	10.6296	418538.144	99673.47	318864.7
1. Energy	324292.4944	2755.19262	3796.14405						330843.831	83722.53	247121.3
A. Fuel combustion (sectoral approach)	321110.1128	1801.93691	3780.72104						326692.771	80793.64	245899.1
1. Energy industries	41156.03611	26.9793915	258.416622						41441.4321	31947.07	9494.361
2. Manufacturing industries and construction	60178.54108	111.075036	357.958815						60647.5749	48257.86	12389.71
3. Transport	130389.536	161.761201	1611.75946						132163.057	400.3053	131762.8
4. Other sectors	89385.99962	1502.12128	1552.58614						92440.707	188.4077	92252.3
5. Other	0	0	0						0	0	0
B. Fugitive emissions from fuels	3182.381594	953.255716	15.423011						4151.06032	2928.886	1222.175
1. Solid fuels	0	14.2805451	0						14.2805451	0	14.28055
2. Oil and natural gas	3182.381594	938.97517	15.423011						4136.77977	2928.886	1207.894
C. CO2 transport and storage	0								0	0	0
2. Industrial processes and product use	18903.01485	48.7668188	1173.57521	19339.70646	595.2568	0	469.94146	10.6296	40540.8912	15950.94	24589.95
A. Mineral industry	10581.46204								10581.462	9218.988	1362.474
B. Chemical industry	3064.393835	47.6902267	1039.04994	148.8267242	2.68257	0	0	0	4302.64329	3423.877	878.7664
C. Metal industry	3248.508277	0.8742455	0	0	83.30083	0	51.513381	0	3384.19673	3276.637	107.56
D. Non-energy products from fuels and solvent use	1449.115239	0.2023466	2.63030029						1451.94789	31.43944	1420.508
E. Electronic Industry				6.4232	78.5817	0	4.5144	10.6296	100.1489	0	100.1489
F. Product uses as ODS substitutes				19184.35079	0	0	0	0	19184.3508	0	19184.35
G. Other product manufacture and use	559.5354549	0	131.894977	0.10575211	430.6917	0	413.91368	0	1536.14156	0	1536.142
H. Other	0	0	0	0	0	0	0	0	0	0	0
3. Agriculture	1934.591358	39915.7782	36825.8342						78676.2038	0	78676.2
A. Enteric fermentation		33737.6929							33737.6929	0	33737.69
B. Manure management		5990.04843	2330.77315						8320.82157	0	8320.822
C. Rice cultivation		140.11682							140.11682	0	140.1168
D. Agricultural soils		0	34480.252						34480.252	0	34480.25
E. Prescribed burning of savannas		0	0						0	0	0
F. Field burning of agricultural residues		47.9199949	14.8090532						62.7290481	0	62.72905
G. Liming	848.2309648								848.230965	0	848.231
H. Urea application	1086.360393								1086.36039	0	1086.36
I. Other carbon-containing fertilizers	0								0	0	0
J. Other	0	0	0						0	0	0
4. Land use, land-use change and forestry(1)	-54037.6395	1064.95556	2327.27734						-50645.407	0	-50645.4
A. Forest land	-70330.0389	556.053157	289.072259						-69484.914	0	-69484.9
B. Cropland	19453.78253	112.773954	1978.80558						21545.3621	0	21545.36
C. Grassland	-10480.4127	107.565658	55.5825793						-10317.264	0	-10317.3
D. Wetlands	-2040.63318	9.20816051	0.75460875						-2030.6704	0	-2030.67
E. Settlements	11518.58884	57.3546286	3.06231241						11579.0058	0	11579.01
F. Other land	0.162209143	0	0						0.16220914	0	0.162209
G. Harvested wood products	-2249.58168								-2249.5817	0	-2249.58
H. Other	90.49333333	222	0						312.493333	0	312.4933
5. Waste	1716.813128	16392.5102	1013.30161						19122.625	0	19122.62
A. Solid waste disposal	0	13914.1672							13914.1672	0	13914.17
B. Biological treatment of solid waste		274.257241	515.017316						789.274556	0	789.2746
C. Incineration and open burning of waste	1716.813128	28.4734184	35.3525665						1780.63911	0	1780.639
D. Waste water treatment and discharge		2175.61242	462.93173						2638.54415	0	2638.544
E. Other	0	0	0						0	0	0
6. Other (as specified in summary 1.A)	0	0	0	0	0	0	0	0	0	0	0
Memo items:(2)											
International bunkers											
Aviation											
Navigation											
Multilateral operations											
CO_2 emissions from biomass											
CO_2 captured											
Long-term storage of C in waste disposal sites											
Indirect N_2O											
Indirect CO_2 (3)	IE (4)										
Total CO_2 equivalent emissions without land use, land-use change and forestry									469183.551	99673.47	369510.1
Total CO_2 equivalent emissions with land use, land-use change and forestry									418538.144		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									469183.551		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									418538.144		

(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 negati

(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) Note : for the proxy inventory the CRF Reporter is not used, but a more simple reporting tool where indirect CO2 are allocated directly in the related source sector 2D and 2G

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 a
The main factors are an increase of emissions for energy and residiential/tertiary sectors due to more rigorous climate conditions and an increase of fossil fuels consumption.

Note: This table was received in this unformatted state because the Excel file appeared to be damaged or corrupted.

6.1.11 Germany (submitted by MS)

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

Year: 2015 (proxy)
Submission: 24.07.2016
Country: GERMANY

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 (1)	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)(1)	**781.918**	**55.269**	**39.585**	**11.000**	**230**	**3.500**	**IE**	**20**	**891.522**		
1. Energy	**750.201**	**11.901**	**5.414**						**767.517**	**414.547**	**352.970**
A. Fuel combustion (sectoral approach)	747.572	4.019	5.414						757.005	414.547	**342.458**
1. Energy industries	339.304	2.508	2.652						344.464	305.468	**38.995**
2. Manufacturing industries and construction	118.683	258	783						119.724	107.466	**12.259**
3. Transport	161.912	146	1.534						163.591	1.279	**162.312**
4. Other sectors	127.673	1.107	445						129.226	334	**128.892**
5. Other	IE	IE	IE						IE	IE	**IE**
B. Fugitive emissions from fuels	2.629	7.882	0						10.512	NA	**10.512**
1. Solid fuels	707	2.802	NO						3.509	NA	**3.509**
2. Oil and natural gas and other emissions from energy production	1.922	5.081	0						7.003	NA	**7.003**
C. CO_2 transport and storage	NO								NO	NO	**NO**
2. Industrial processes and product use	**45.473**	**519**	**1.092**	**11.000**	**230**	**3.500**	**IE**	20	**61.835**	**40.913**	**20.922**
A. Mineral industry	19.720								19.720	16.888	**2.831**
B. Chemical industry	6.244	481	749						7.474	11.393	**-3.919**
C. Metal industry	17.149	5	14	IE	IE	IE	IE	IE	17.168	12.627	**4.541**
D. Non-energy products from fuels and solvent use	2.361	NO	1						2.362	5	**2.357**
E. Electronic Industry				IE	IE	IE	IE	IE	IE	NA	**IE**
F. Product uses as ODS substitutes				IE	IE	IE	IE	IE	IE	NA	**IE**
G. Other product manufacture and use	NO	33	328	IE	IE	IE	IE	IE	360	NA	**360**
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	IE	**NA**
3. Agriculture	**2.933**	**32.579**	**31.406**						**66.918**		
A. Enteric fermentation		24.970							24.970		
B. Manure management		6.258	3.896						10.155		
C. Rice cultivation		NO							NO		
D. Agricultural soils		NO	27.222						27.222		
E. Prescribed burning of savannahs		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	2.197								2.197		
H. Urea application	736								736		
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	1.351	288						1.639		
4. Land use, land-use change and forestry(1)	-16.689	865	847						**-14.977**		
A. Forest land	-58.005	17	147						-57.841		
B. Cropland	14.202	247	287						14.735		
C. Grassland	22.232	517	102						22.850		
D. Wetlands	3.884	43	22						3.949		
E. Settlements	3.299	41	190						3.530		
F. Other land	NO	NO	NO						NO		
G. Harvested wood products	-2.300								-2.300		
H. Other		NA	100						100		
5. Waste	NA, NO	9.404	825						**10.230**		
A. Solid waste disposal	NA	8.625							8.625		
B. Biological treatment of solid waste		712	311						1.023		
C. Incineration and open burning of waste	NO	NO	NO						NO		
D. Waste water treatment and discharge		63	441						504		
E. Other		4	73						78		
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO		
Memo items:(2)											
International bunkers	31.911	5	311						32.227		
Aviation	25.276	2	228						25.506		
Navigation	6.635	2	84						6.721		
Multilateral operations	**NE**	**NE**	**NE**						**NE**		
CO_2 emissions from biomass	**103.199**								**103.199**		
CO_2 captured	**NO**								**NO**		
Long-term storage of C in waste disposal sites	**NO**								**NO**		
Indirect N_2O			NO								
Indirect CO_2 (3)											

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**906.499**	**455.460**	**451.039**
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.

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.

Inventory data (column B-I) are based on an approximation published in March 2015:
http://www.umweltbundesamt.de/en/press/pressinformation/uba-emissions-data-for-2015-indicate-urgent-need

ETS data (column L) are based on work to the Emissions Trading Directive 2003/87/EC (Article 21):

please regard the high degree of uncertainty for the inventory data..

6.1.12 Greece (submitted by MS)

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

Year 2015
Submission 2016
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)]											
1. Energy									**69 713**		
A. Fuel combustion (sectoral approach)									68 519		
1. Energy industries	41 361	13	125						41 499	40 924	575
2. Manufacturing industries and construction	4 830	7	63						4 900	3 715	1 186
3. Transport	17 000	80	170						17 250		17 250
4. Other sectors	4 700	100	70						4 870		4 870
5. Other											
B. Fugitive emissions from fuels									1 194		
1. Solid fuels	NO	1 100	NA,NO						1 100		1 100
2. Oil and natural gas and other emissions from energy production	4	90	0						94		94
C. CO_2 transport and storage	NO										
2. Industrial processes and product use									**11 556**		
A. Mineral industry	4 013								4 013	3 998	15
B. Chemical industry	213		20						233	233	
C. Metal industry	1 079	0	NO		65.90667751				1 145	1 006	139
D. Non-energy products from fuels and solvent use	30	NA,NO	NA,NO						30		30
E. Electronic Industry				NO	NO	NO	NO	NO	NO		
F. Product uses as ODS substitutes				5800	80				5 880		5 880
G. Other product manufacture and use	100	NA	149		NO	6			255		255
H. Other	NA	NA	NA								
3. Agriculture									**8 729**		
A. Enteric fermentation		4 050							4 050		4 050
B. Manure management		840	320						1 160		1 160
C. Rice cultivation		140							140		140
D. Agricultural soils			3 300						3 300		3 300
E. Prescribed burning of savannahs											
F. Field burning of agricultural residues		40	14						54		54
G. Liming	NO										
H. Urea application	25								25		25
I. Other carbon-containing fertilizers	NO										
J. Other											
4. Land use, land-use change and forestry[(1)]	-3 599	21	2						**-3 577**		
A. Forest land	-2 267	9	1						-2 257		
B. Cropland	-351	NO	0						-351		
C. Grassland	-978	12	1						-965		
D. Wetlands	2	NO	NO						2		
E. Settlements	15	NO	NO						15		
F. Other land	93	NO	NO						93		
G. Harvested wood products	-114	NA	NA						-114		
H. Other	NO	NO	NO						NO		
5. Waste									**4 947**		
A. Solid waste disposal	NA,NO	3 100							3 100		3 100
B. Biological treatment of solid waste		20	20						40		40
C. Incineration and open burning of waste	5	1	1						7		7
D. Waste water treatment and discharge		1 500	300						1 800		1 800
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	9 200.00	13.50	173.00						9 386.50		
Aviation	3 000.00	0.50	33.00						3 033.50		
Navigation	6 200.00	13.00	140.00						6 353.00		
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	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	94 945.49	49 876.08	45 069.41
Total CO_2 equivalent emissions with land use, land-use change and forestry	91 368.36		
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 of categories of sector 1 (power sector, refineries and industry) and 2 is based on ETS data. The estimation of emissions of sectors 3 and 5 is based on extrapolation of historic emissions and expert judgement. LULUCF: GHG emissions in t-1 year (proxy) were based on BAU scenario projections.

6.1.13 Hungary (submitted by MS)

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

Year 2015
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	**40 770.89**	**1 207.35**	**416.35**						**42394.59**	**15 153.39**	**27 241.20**
A. Fuel combustion (sectoral approach)	40 642.91	360.42	416.09						41419.41	15 127.95	26 291.46
1. Energy industries	13 615.83	25.41	67.12						13708.36	13 284.17	424.19
2. Manufacturing industries and construction	4 179.03	7.27	57.40						4243.70	1 774.51	2 469.20
3. Transport	11 877.37	30.23	132.75						12040.35	51.42	11 988.93
4. Other sectors	10 953.37	297.51	158.81						11409.69	17.86	11 391.83
5. Other	17.31	0.00	0.00						17.31	0.00	17.31
B. Fugitive emissions from fuels	127.98	846.92	0.26						975.17	25.44	949.74
1. Solid fuels	NA,NO,IE	244.68	NA,NO,IE						244.68	0.00	244.68
2. Oil and natural gas and other emissions from energy production	127.98	602.24	0.26						730.49	25.44	705.06
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	**4847.38**	**50.00**	**110.28**	**2263.87**	**1.15**	**104.10**	**0.00**	**0.00**	**7376.78**	**4 496.51**	**2 880.27**
A. Mineral industry	1137.31								1137.31	1 134.39	2.92
B. Chemical industry	2368.55	44.96	50.29	NO	NO	NO	NO	NO	2463.80	2 263.77	200.03
C. Metal industry	1212.21	5.04	NO	NO	NO	NO	NO	NO	1217.25	1 098.35	118.90
D. Non-energy products from fuels and solvent use	129.31	NA,NO	NA,NO						129.31	0.00	129.31
E. Electronic Industry				NO	NO	NO	NO	NO	NO	0.00	0.00
F. Product uses as ODS substitutes				2263.87	1.15	NO	NO	NO	2265.02	0.00	2 265.02
G. Other product manufacture and use	NO	NO	59.99	NO	NO	104.10	NO	NO	164.09	0.00	164.09
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00	0.00
3. Agriculture	**166.81**	**2 669.44**	**3 815.29**						**6651.54**	**NA**	**6651.54**
A. Enteric fermentation		1984.36							1984.36	NA	1984.36
B. Manure management		666.16	468.47						1134.62	NA	1134.62
C. Rice cultivation		18.92							18.92	NA	18.92
D. Agricultural soils		NA	3346.82						3346.82	NA	3346.82
E. Prescribed burning of savannahs		NO	NO						NO	NA	NO
F. Field burning of agricultural residues		NO	NO						NO	NA	NO
G. Liming	5.11								5.11	NA	5.11
H. Urea application	81.63								81.63	NA	81.63
I. Other carbon-containing fertilizers	80.06								80.06	NA	80.06
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	**198.14**	**3 765.77**	**260.20**						**4 224.11**	**NA**	**4224.11**
A. Solid waste disposal	NA,NO	3 291.52							3291.52	NA	3291.52
B. Biological treatment of solid waste		99.61	33.56						133.17	NA	133.17
C. Incineration and open burning of waste	198.14	0.37	2.26						200.76	NA	200.76
D. Waste water treatment and discharge		374.28	224.39						598.66	NA	598.66
E. Other	NO	NO	NO						NO	NA	NO
6. Other *(as specified in summary 1.A)*	NO	NO	NO						NO	NA	NO
Memo items:(2)											
International bunkers	514.11	16.00	4.29						534.39		
Aviation	514.11	16.00	4.29						534.39		
Navigation	NE,NO	NE,NO	NE,NO						NE,NO		
Multilateral operations	**NO**	**NO**	**NO**						NO		
CO_2 emissions from biomass	**7 537.78**								7 537.78		
CO_2 captured	**NO**								NO		
Long-term storage of C in waste disposal sites	**11 970.05**								11 970.05		
Indirect N_2O			NE								
Indirect CO_2 (3)	NE										

0.00

Total CO_2 equivalent emissions without land use, land-use change and forestry	**60 647.01**	**19 649.90**	**40 997.12**
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 in 2015 are expected to be higher by 6 per cent compared to 2014. ETS emissions increased by 4 per cent.
ENERGY (+5%)
Electricity production increased by 3% within which conventional thermal plants using fossil fuels had the greatest contribution;
Motor gasoline and diesel oil sales increased by 3 to 11 per cent which led to increased emissions in the transport sector;
Natural gas consumption increased generally; most probably more in the residential and in the energy industry categories;
A re-opened coal mine with high methane content led to increased fugitive emissions.
IPPU (+20%)
Amount of imported HFCs and consequently their use increased significantly;
Production of steel and pig iron increased by 145% and 156%, respectively;
Increased emissions are expected also in the mineral industry due to growing production level.
AGRICULTURE (+2%)
The increased fertilizer use resulted in a rise in N2O emissions.
The higher cattle, poultry and milk production also contributed to the higher agricultural N2O and CH4 emissions.
WASTE (-1%)
The decreasing trend is expected to continue,

6.1.14 Ireland (submitted by MS)

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

Year 2015
Submission 2017
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)]	38312.95	13818.64	7016.50	1160.09	8.81	47.00	NO	0.96	60364.95		
1. Energy	35992.59	236.37	324.27						36553.23	14998.82	21554.41
A. Fuel combustion (sectoral approach)	35992.59	193.07	324.27						36509.93	14998.82	21511.11
1. Energy industries	11631.37	6.67	122.16						11760.20	11587.86	172.35
2. Manufacturing industries and construction	4525.39	8.92	14.92						4549.22	3376.22	1173.00
3. Transport	11692.86	16.32	118.17						11827.35	9.20	11818.15
4. Other sectors	8142.97	161.15	69.03						8373.16	25.53	8347.62
5. Other	IE	IE	IE						IE		
B. Fugitive emissions from fuels	NO,IE	43.30	NO						43.30		43.30
1. Solid fuels	NO	19.54	NO						19.54		19.54
2. Oil and natural gas and other emissions from energy production	NO,IE	23.76	NO						23.76		23.76
C. CO_2 transport and storage	NO								NO		
2. Industrial processes and product use	1870.07	NO	41.44	1160.09	8.81	47.00	NO	0.96	3128.37	1830.36	1298.00
A. Mineral industry	1830.36								1830.36	1830.36	0.00
B. Chemical industry	NO	NO	NO						NO		
C. Metal industry	NO	NO							NO		
D. Non-energy products from fuels and solvent use	39.71	NO	NO						39.71		39.71
E. Electronic Industry				3.39	8.81	24.06		0.96	37.22		37.22
F. Product uses as ODS substitutes				1156.70					1156.70		1156.70
G. Other product manufacture and use	NO	NO	41.44	NO	NO	22.94	NO	NO	64.38		64.38
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO		
3. Agriculture	410.62	12206.50	6519.40						19136.52		19136.52
A. Enteric fermentation		10932.20							10932.20		10932.20
B. Manure management		1274.30	498.98						1773.28		1773.28
C. Rice cultivation		NO							NO		
D. Agricultural soils		NE	6020.42						6020.42		6020.42
E. Prescribed burning of savannahs		NO	NO						NO		
F. Field burning of agricultural residues		NO	NO						NO		
G. Liming	382.32								382.32		382.32
H. Urea application	28.31								28.31		28.31
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	39.66	1375.78	131.39						1546.83		1546.83
A. Solid waste disposal	NO	1294.93							1294.93		1294.93
B. Biological treatment of solid waste		13.25	11.85						25.10		25.10
C. Incineration and open burning of waste	39.66	0.07	0.41						40.15		40.15
D. Waste water treatment and discharge		67.52	119.13						186.65		186.65
E. Other	NO	NO	NO						NO		
6. Other *(as specified in summary 1.A)*	NO	NO	NO	NO	NO	NO	NO	NO	NO		

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
Memo items: [(2)]											
International bunkers	3 013.64	1.38	28.59						3 043.62		
Aviation	2 522.29	0.21	24.61						2 547.11		
Navigation	491.35	1.17	3.98						496.50		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	1 864.56								1 864.56		
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)]	64.52										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**60 364.95**	**16 829.18**	**43 535.77**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**60 364.95**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**60 429.47**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**60 429.47**		

(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.

6.1.15 Italy (submitted by MS)

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

Year
Submission
Country

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 (1)	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
	CO_2 equivalent (kt)									CO2 equivalent (Gg)	
Total (net emissions)(1)	**327 787.95**	**43 112.11**	**19 056.16**	**12 268.21**	**1 638.24**	**372.24**	**0.00**	**28.17**	**404 263.10**		
1. Energy	**339 061.59**	**8 855.48**	**4 742.93**						**352 660.00**	**142 798**	**209 862**
A. Fuel combustion (sectoral approach)	336 562.01	2 956.11	4 733.86						344 251.98	138 219	206 033
1. Energy industries	105 387.44	133.58	448.70						105 969.72	104 354	1 616
2. Manufacturing industries and construction	47 944.42	263.99	926.86						49 135.27	32 524	16 611
3. Transport	106 604.53	233.53	923.78						107 761.84	568	107 193
4. Other sectors	76 111.64	2 321.94	2 405.58						80 839.16	772	80 067
5. Other	513.98	3.08	28.94						545.99	0	546
B. Fugitive emissions from fuels	2 499.58	5 899.37	9.07						8 408.02	4 579	3 829
1. Solid fuels	0.04	50.88	NO						50.92	0	51
2. Oil and natural gas and other emissions from energy production	2 499.55	5 848.49	9.07						8 357.11	4 579	3 778
C. CO_2 transport and storage	NO								NO	0	0
2. Industrial processes and product use	**15 535.71**	**49.01**	**630.98**	**12 268.21**	**1 638.24**	**372.24**	**0.00**	**28.17**	**30 522.57**	**13 324**	**17 199**
A. Mineral industry	11 467.18	0.00	0.00						11 467.18	10 745	722
B. Chemical industry	1 418.46	5.58	112.33	0.00	1 478.00	0.00	0.00	0.00	3 014.37	1 550	1 464
C. Metal industry	1 311.81	43.43	NO	4.29	0.00	0.00	0.00	0.00	1 359.53	317	1 043
D. Non-energy products from fuels and solvent use	1 338.26	NO	NO						1 338.26	712	626
E. Electronic Industry				8.77	160.24	37.95	0.00	28.17	235.14	0	235
F. Product uses as ODS substitutes				12 255.15	0.00	0.00	0.00	0.00	12 255.15	0	12 255
G. Other product manufacture and use	NO	NO	518.65	0.00	0.00	334.29	0.00	0.00	852.94	0	853
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	0	0
3. Agriculture	**422.53**	**18 470.21**	**11 093.78**						**29 986.53**	**0**	**29 987**
A. Enteric fermentation		13 701.35							13 701.35	0	13 701
B. Manure management		3 079.04	2 145.10						5 224.14	0	5 224
C. Rice cultivation		1 674.16							1 674.16	0	1 674
D. Agricultural soils		NO	8 944.70						8 944.70	0	8 945
E. Prescribed burning of savannahs		NO	NO						NO		
F. Field burning of agricultural residues		15.66	3.98						19.64	0	20
G. Liming	11.54								11.54	0	12
H. Urea application	411.00								411.00	0	411
I. Other carbon-containing fertilizers	NO								NO		
J. Other	NO	NO	NO						NO		
4. Land use, land-use change and forestry(1)	**-27 439.77**	**458.45**	**686.71**						**-26 294.61**		
A. Forest land	-34 016.02	253.60	0.64						-33 761.79		
B. Cropland	3 134.90	1.11	5.46						3 141.47		
C. Grassland	-6 543.84	203.74	51.53						-6 288.57		
D. Wetlands	NO	NO	NO						0.00		
E. Settlements	9 547.45	NO	629.08						10 176.53		
F. Other land	NO	NO	NO						0.00		
G. Harvested wood products	437.75	NO	0.00						437.75		
H. Other	NO	NO	NO						0.00		
5. Waste	**207.88**	**15 278.96**	**1 901.76**						**17 388.60**	**67**	**17 322**
A. Solid waste disposal	NO	12 638.99	NO						12 638.99	0	12 639
B. Biological treatment of solid waste		79.12	512.55						591.67	0	592
C. Incineration and open burning of waste	207.88	57.95	23.25						289.08	67	222
D. Waste water treatment and discharge		2 502.89	1 365.97						3 868.86	0	3 869
E. Other	NO	NO	NO						NO		
6. Other *(as specified in summary 1.A)*											

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
Memo items:(2)											
International bunkers	**14 295.27**	**13.65**	**101.49**						14 410.41		
Aviation	9 525.60	2.98	67.58						9 596.16		
Navigation	4 769.67	10.67	33.91						4 814.25		
Multilateral operations	**NE**	**NE**	**NE**						**NE**		
CO_2 emissions from biomass	**48 965.03**								48 965.03		
CO_2 captured	**NO**								**NO**		
Long-term storage of C in waste disposal sites	**NE**								**NE**		
Indirect N_2O			3.78								
Indirect CO_2 (3)											

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**430 557.71**	**156 189**	**274 369**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**404 263.10**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**430 557.71**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**404 263.10**		

(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.
An increase of 3% of GHG emission is observed in 2015 with respect the previous year. This increase is prevalently due to meteo climatic conditions; in fact HDD were equal to 1810 in 2015 compared to 1632 in 2014 and energy production from hydroelectric reduced from 58545 GWh in 2014 to 43902 GWh in 2015. As a consequence a small increase of fuel consumption for residential and commercial heating as well as an increase of energy production with natural gas are observed resulting in emission increases respectively equal to 9.1% and 6.2% of the relevant categories. The repriese of economy explains a small increase of road transport emissions (2.8%).

6.1.16 Latvia (submitted by MS)

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

Year 2015
Submission 2016 v.1
Country LV

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 (kt)	
Total (net emissions)[(1)]	**7205.45**	**2072.68**	**2013.91**	**222.32**	**NO,NA**	**8.29**	**NO,NA**	**NO,NA**	**11522.65**		
1. Energy	**6655.84**	**308.96**	**147.43**						**7112.22**	**1813.413859**	**5298.8108**
A. Fuel combustion (sectoral approach)	6655.82	173.64	147.43						6976.89	1813.413859	5163.48074
1. Energy industries	1736.93	10.36	16.19						1763.48	1403.713747	359.768941
2. Manufacturing industries and construction	635.83	14.07	22.34						672.23	345.4849525	326.74435
3. Transport	3061.03	4.93	55.09						3121.05	NA	3121.05
4. Other sectors	1213.10	144.26	53.75						1411.11	64.21515942	1346.90
5. Other	8.93	0.02	0.07						9.02	NO	9.02
B. Fugitive emissions from fuels	0.01	135.32	0.00						135.33	NO	135.33
1. Solid fuels	NO,NA	NO,NA	NO,NA						NO,NA	NO,NA	NO,NA
2. Oil and natural gas and other emissions from energy production	0.01	135.32	NA						135.33	NA	135.33
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	**522.49**	**0.00**	**0.01**	**222.32**	NO,NA	**8.29**	NO,NA	NO,NA	**753.11**	**476.8836069**	**276.226402**
A. Mineral industry	476.16								476.16	476.1553057	NO
B. Chemical industry	NO	NO	NO	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA
C. Metal industry	0.73	0.00	NO	NO	NO	NO	NO	NO	0.73	0.728301266	NO
D. Non-energy products from fuels and solvent use	45.61	NO,NA	NO,NA						45.61	NA	45.6103221
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				222.32	NO	NO,NA	NO	NO,NA	222.32	NA	222.323341
G. Other product manufacture and use	NA	NA	0.01	NO	NO,NA	8.29	NA	NO,NA	8.29	NO	8.29273825
H. Other	NO,NA	NO,NA	NO,NA	NA	NA	NA	NA	NA	NO,NA	NO,NA	NO,NA
3. Agriculture	**26.95**	**965.87**	**1828.15**						**2820.96**	**NA**	**2820.96435**
A. Enteric fermentation		868.93							868.93	NA	868.927307
B. Manure management		96.94	102.38						199.32	NA	199.321179
C. Rice cultivation		NO							NO	NA	NO
D. Agricultural soils		NE	1725.77						1725.77	NA	1725.7707
E. Prescribed burning of savannahs		NO	NO						NO	NA	NO
F. Field burning of agricultural residues		NO	NO						NO	NA	NO
G. Liming	20.74								20.74	NA	20.735
H. Urea application	6.21								6.21	NA	6.21016
I. Other carbon-containing fertilizers	NO								NO	NA	NO
J. Other	NO	NO	NO						NO	NA	NO
4. Land use, land-use change and forestry[(1)]	**NE**	**NE**	**NE**						**NE**		
A. Forest land	NE	NE	NE						NE		
B. Cropland	NE	NE	NE						NE		
C. Grassland	NE	NE	NE						NE		
D. Wetlands	NE	NE	NE						NE		
E. Settlements	NE	NE	NE						NE		
F. Other land	NE	NE	NE						NE		
G. Harvested wood products	NE	NE	NE						NE		
H. Other	NE	NE	NE						NE		
5. Waste	**0.17**	**797.86**	**38.32**						**836.35**	**NA**	**836.349229**
A. Solid waste disposal	NO,NA	529.63							529.63	NA	529.629265
B. Biological treatment of solid waste		27.99	20.02						48.00	NA	48.0033024
C. Incineration and open burning of waste	0.17	NO,NA,NE	1.73						1.91	NA	1.90523008
D. Waste water treatment and discharge		240.24	16.57						256.81	NA	256.811431
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	972.10	1.10	31.67						1 004.87		
Aviation	326.00	0.10	0.77						326.87		
Navigation	646.10	1.00	30.90						678.00		
Multilateral operations	NA	NA	NA						NA		
CO_2 emissions from biomass	6 378.06								**6 378.06**		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	NA								NA		
Indirect N_2O			IE,NA,NO								
Indirect CO_2[(3)]	**20.20**										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**11 522.65**	**2290.30**	**9232.35**
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	**11 542.85**		
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.
General Latvia`s approximate GHG emissions for 2015 were estimated using available activity data or extrapolation in cases activity data were not available yet. In sectors where stable trend was not observed the emissions were left in 2014 levels. Compared to previous inventory (GHG inventory submitted on 15.06.2016 to UNFCCC) Latvia`s total GHG emissions excluding LULUCF have increased by 1.5% in 2015. We would like to inform that under 2A1 (Cement production) the different CO2 emission calculation approaches between ETS and 2006 IPCC Guidelines methodology are used as 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 CO_2 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 4.62% (21.6068kt) difference between ETS emissions reported under Article 21 of the ETS directive and GHG inventory calculated CO2 emissions from clinker production in 2015.
Energy In 1A1 GHG emissions have increased by 5% due to increase consumption of Natural Gas. In 1A2 7% decrease of GHG emissions can be explained with reduce usage of fossil fuels in this sector. 3% decrease of GHG emissions in 1A4 is due to decrease usage of Coal and Natural Gas. In sector 1A5 emissions were estimated using emissions trends from previous years. Due to unavailable data it was assumed that in 1B sector the emissions are the same as in 2014. **TRANSPORT** Total GHG emissions in a transport sector have been increased in 2015 by around 5,7% compare to 2014. The main reason for this increase is fuel consumption increasing by around 9.7% in road transprt, mainly diesel oil consumption. GHG emissions have been decreased in 2015 compare to 2014 in all other transport subsectors.
Industrial Processes and product use For approximated emission estimations the annual ETS GHG report for clinker, glass and ceramics production as well as available provisional national statistics from CSB were used as activity data. Emissions from IPPU sector in 2015 have been decreasing by approximate 10% mainly due to the fact that there are decreased demand of products from Mineral production industry by 15.27% due to decreasing demand of produced mineral products , especially clinker and ceramics. In approximate inventory there are used last year data for Lubricant, Paraffin wax and Urea use. Road paving with asphalt and asphalt roofing, as well as Food and beverage industry data are taken from CSB as provisional data. **F GASES (2F and 2G1)** activity data from annual F-gases reports for proxy emission calculation were not available yet, therefore emissions were calculated by either using extrapolation or previous three years average F-gases amounts filled into new manufactured products. F-gases emissions have increased by 4.3% compared to 2014. **SOLVENT USE** Activity data for SOLVENT USE sector was not available in 2015. There is a stability in trends of NMVOC emissions from Solvent use sector in later 3 years either, therefore emissions in 2015 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. For N2O from product use activity data wasn't available. There is a stability in trends of NO2 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 no changes compared with the previous year.
Agriculture According to preliminary results of GHG inventory in agriculture sector, total amount of emissions from agriculture increased by 3.5% (94.5 kt CO2 eq.) in 2015, comparing to 2014. Actually, emissions increased into three categories: agricultural soils (+6.2% or 100.2 kt CO2 eq.), liming (+5.3% or 0.1 kt CO2 eq.) and urea application (+31.3% or 0.3 kt CO2 eq.). Emissions from enteric fermentation and manure management slightly decreased. Levels of emissions are mainly affected by fluctuation of activity data. In 2015, the number of dairy cows fell by 3.5 thousand or 2.1 %. According to Central Statistical Bureau information, at the end of 2015, agricultural holdings were breeding 419.1 thousand cattle – that is a drop of 2.9 thousand over the year before. Partially because of further spread of the African swine fever, the number of pigs decreased by 15.3 thousand or 4.4 % over the year. In 2015, number of sheep and goats continued to grow – by 9.7 thousand or 10.5 % and 0.4 thousand or 3.2 %, respectively, while number of horses reduced by 0.5 thousand or 4.7 %. In 2015, output of milk comprised 978.1 thousand tons – an increase of 0.7 % over 2014. Average milk yield per dairy cow grew by 1.6 % and reached 5905 kilograms. The most important factor of increasing emissions under category of agricultural soils is the use of mineral fertilizers. In 2015, 128.8 thousand tons of mineral fertilizers (expressed as 100 % of nutrients) were used on the sown area of agricultural crops – 5.4 % more than in 2014. Use of mineral fertilizers per one hectare of sown area has increased as well – from 106 kg in 2014 to 110 kg in 2015 or by 3.8 %. Use of mineral fertilizers per one hectare of cereals has risen from 145 kg in 2014 to 149 kg in 2015 or by 2.8 %. In 2015, use of nitrogen per one ha of sown area was still increasing – from 63 kg in 2014 to 65 kg in 2015. However, in 2015 the use of organic fertilizers dropped by 67.4 thousand tons or 1.7 %, as compared to 2014. On average 3.4 tons of organic fertilizers were used per one hectare of sown area in 2015 – 2.9 % less than in the previous year. In 2015, harvested production of grain reached 3.0 million tons – 794.3 thousand tons or 35.7 % more than in 2014. The significant growth in the harvested production of grain was affected not only by increase in the cereal cropland (17.2 thousand hectares or 2.6 % more than in 2014), but also by notable rise in average yield per hectare. As a result of improved technological crop growing process, selection of highly productive and more qualitative seed sorts, and very favourable climatic conditions, average yield of cereals increased from 34.0 quintals in 2014 to 44.9 quintals in 2015, that is the highest yield recorded in the history of Latvia. In 2015, the total sown area of pulses increased 2.7 times, of which sown area of field beans – by 17.5 thousand hectares or 3.1 times. The increase was encouraged by the introduction of a new support payment for climate- and environment-friendly farming practices or agricultural greening. (Source of statistical information: AGRICULTURE IN LATVIA. Collection of Statistics. Rīga, Central Statistical
Waste Composting GHG emissions increase due to increase of industrial composted waste amounts. Small decrease in the CH4 emissions from the Waste Water Handling is due to decrease of sewage sludge production in the 2015. There are almost no changes in another categories of the subsector.

6.1.17 Lithuania (calculated centrally by EEA and its ETC/ACM)

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

Inventory 2015
Submission 2016 v Proxy 1.0
LITHUANIA

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)]	**12.800**	**3.284**	**2.531**	**346**	**0**	**6**	**0**	**0**	**18.968**		
1. Energy	**10.335**	**469**	**139**						**10.943**		
A. Fuel combustion (sectoral approach)	10.332	208	139						10.679		
1. Energy industries	2.988	14	23						3.026		
2. Manufacturing industries and construction	1.197	4	7						1.209		
3. Transport	5.055	16	76						5.147		
4. Other sectors	1.057	174	32						1.263		
5. Other	35	0	0						35		
B. Fugitive emissions from fuels	4	260	0						264		
1. Solid fuels	NO	NO	IE						0		
2. Oil and natural gas	4	260	IE						264		
C. CO_2 transport and storage	NO								0		
2. Industrial processes and product use	**2.416**	**0**	**337**	**346**	**NO**	**6**	**NO**	**0**	**3.105**		
A. Mineral industry	450								450		
B. Chemical industry	1.902	NO	332	IE	IE	IE	IE	IE	2.234		
C. Metal industry	3	NO	NO	IE	IE	IE	IE	IE	3		
D. Non-energy products from fuels and solvent use	61	NO	NO						61		
E. Electronic Industry				IE	IE	IE	IE	IE	IE		
F. Product uses as ODS substitutes				IE	IE	IE	IE	IE	IE		
G. Other product manufacture and use	NO	NO	5	IE	IE	IE	IE	IE	5		
H. Other	0	NO	NO	IE	IE	IE	IE	IE	0		
3. Agriculture	**47**	**1.825**	**1.996**						**3.869**		
A. Enteric fermentation		1.597	0						1.597		
B. Manure management		229	160						389		
C. Rice cultivation		NO	0						0		
D. Agricultural soils		NA	1.836						1.836		
E. Prescribed burning of savannas		NE	NE						NE		
F. Field burning of agricultural residues		NO	NO						0		
G. Liming	31								31		
H. Urea application	16								16		
I. Other carbon-containing fertilizers	NO								0		
J. Other	NO	NO	NO						0		
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	990	59						1.050		
A. Solid waste disposal	NA,NO	775							775		
B. Biological treatment of solid waste		25	18						43		
C. Incineration and open burning of waste	2	0	0						2		
D. Waste water treatment and discharge		190	41						231		
E. Other	NO	NO	NO						0		
6. Other *(as specified in summary 1.A)*									0		

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
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)]	NE,NO,IE										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**18.968**	**6.845**	**12.123**
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	**18.968**	**6.845**	**12.123**
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

(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.

The estimates at the level of sub-sector and gas in this table have been compiled according to the methodology described in Annex chapter 6.2. The EEA proxy estimates are based on a bottom up approach (by sector, gas and country). The uncertainty in the numbers increases at finer levels of detail, particularly for non-CO_2 emissions. The uncertainty is lowest for CO_2 emissions from fuel combustion.

6.1.18 Luxembourg (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS Proxy Inventory 2015

(Sheet 1 of 1) Submission 2016v4

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	ESD
	CO_2 equivalent (kt)									CO2 equivalent (Gg)		
Total (net emissions)(1)	**9499,54**	**585,34**	**292,66**	**71,21**	**NA,NO**	**8,84**	**NA,NO**	**NA,NO**	**10457,59**			
1. Energy	**8949,74**	**52,71**	**66,24**						**9068,69**	**1143,23**	**7925,46**	**7925,24**
A. Fuel combustion (sectoral approach)	8949,69	17,68	66,24						9033,61	1143,23	7890,38	7890,16
1. Energy industries	444,82	1,51	2,32						448,64	282,43	166,22	166,22
2. Manufacturing industries and construction	1054,08	2,22	8,94						1065,24	860,80	204,44	204,44
3. Transport	5768,47	2,08	47,91						5818,46	NA	5818,46	5818,24
4. Other sectors	1682,32	11,88	7,06						1701,26	NA	1701,26	1701,26
5. Other	NO	NO	NO						NO	NO	NO	NO
B. Fugitive emissions from fuels	0,05	35,03	NA,NO						35,08	NA	35,08	35,08
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0,05	35,03	NA,NO						35,08	NA	35,08	35,08
C. CO_2 transport and storage	NE								NO	NO	NO	NO
2. Industrial processes and product use	**543,99**	**NA,NO**	**25,74**	**71,21**	**NA,NO**	**8,84**	**NA,NO**	**NA,NO**	**649,78**	**517,38**	**132,40**	**132,40**
A. Mineral industry	394,58								394,58	394,58	0,00	0,00
B. Chemical industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal industry	122,80	NA	NA	NA	NA	NA	NA	NA	122,80	122,80	0,00	0,00
D. Non-energy products from fuels and solvent use	26,62	NA	NA						26,62	NA	26,62	26,62
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				69,22	NO	NO	NO	NO	69,22	NA	69,22	69,22
G. Other product manufacture and use	NO	NO	25,74	1,99	NO	8,84	NO	NO	36,57	NA	36,57	36,57
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
3. Agriculture	**5,81**	**493,80**	**189,04**						**688,65**	**NA**	**688,65**	**688,65**
A. Enteric fermentation		429,60							429,60	NA	429,60	429,60
B. Manure management		64,19	35,08						99,27	NA	99,27	99,27
C. Rice cultivation		NO							NO	NO	NO	NO
D. Agricultural soils		NA	153,97						153,97	NA	153,97	153,97
E. Prescribed burning of savannahs		NO	NO						NO	NO	NO	NO
F. Field burning of agricultural residues		NO	NO						NO	NO	NO	NO
G. Liming	5,81								5,81	NA	5,81	5,81
H. Urea application	NO								NO	NO	NO	NO
I. Other carbon-containing fertilizers	NO								NO	NO	NO	NO
J. Other	NO	NO	NO						NO	NO	NO	NO
4. Land use, land-use change and forestry(1)	**-411,24**	**NO**	**9,82**						**-401,42**			
A. Forest land	-479,66	NO	NO						-479,66			
B. Cropland	25,89	NO	9,82						35,71			
C. Grassland	-27,79	NO	0,00						-27,79			
D. Wetlands	5,19	NO	0,00						5,19			
E. Settlements	64,87	NO	0,00						64,87			
F. Other land	0,26	NO	0,00						0,26			
G. Harvested wood products	NO	NO	NO						NO			
H. Other	NO	NO	NO						NO			
5. Waste	**NA,NO**	**38,83**	**11,64**						**50,47**	**NA**	**50,47**	**50,47**
A. Solid waste disposal	NA	29,45	NO						29,45	NA	29,45	29,45
B. Biological treatment of solid waste		5,44	3,89						9,33	NA	9,33	9,33
C. Incineration and open burning of waste	IE	IE	IE						IE	IE	IE	IE
D. Waste water treatment and discharge		3,94	7,75						11,69	NA	11,69	11,69
E. Other	NO	NO	NO						NO	NO	NO	NO
6. Other *(as specified in summary 1.A)*	**NA**	**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									**NE**			
Long-term storage of C in waste disposal sites									**NE**			
Indirect N_2O												
Indirect CO_2 (3)												

	Total	ETS	non-ETS	ESD
Total CO_2 equivalent emissions without land use, land-use change and forestry	**10.457,59**	**1660,61**	**8796,98**	**8796,76**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**10.056,16**			
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**			
			0,00	*0,00*

(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 GHG emissions without LULUCF (and without indirect CO2 emissions) decrease by 2.91% between 2014 and 2015 according to this proxy estimate. For ETS emissions, the decrease is substantial (-13.4% - see below) wheras ASD emissions remain stable (-0.6%). By gas the following evolutions are estimated: CO2 (incl. HFC & SF6) decreases by 3.33% (no PFCs & NF3 emissions for Luxembourg); whereas CH4 increases by 2.67% and N2O decreases by 1.13%. By sector, emissions increases are obseved for CRF sectors 2, 3 and 5, but these are rather modest: 0.6%, 2.5% and 1.3%, respectively. Emissions from 1A2 and 1A4c record a modest decrease of 2.3% and 1.1%, repectively, when compared to 2014. The largest decrease is registered for 1A1a (37.8%) due to the partial closure of the 350 MWe gasfired combined heat and power plant (Twinerg). The overall ESD emissions decrease is actually mainly driven by a 4.6% emissions reduction for 1A3b which represents 55.5% of the approximated 2015 emissons without LULUCF (and without indirect CO2 emissions) and 66% of the total ESD emissions. An important increase is observed for sectors 1A4a & 1A4b (1A4a & 1A4b together: 17.6%) which correlates with regular increases in population and workforce, as well as with an increase in heating degree days (10%) compared to 2014.

6.1.19 Luxembourg (calculated centrally by EEA and its ETC/ACM)

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

Inventory 2015
Submission 2016 v Proxy 1.0
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)]	**9 467**	**567**	**297**	**70**	**0**	**9**	**0**	**0**	**10 410**		
1. Energy	**8 916**	**51**	**65**						**9 032**		
A. Fuel combustion (sectoral approach)	8 916	16	65						8 997		
1. Energy industries	467	2	2						471		
2. Manufacturing industries and construction	1 155	2	9						1 166		
3. Transport	5 794	2	48						5 844		
4. Other sectors	1 501	10	6						1 517		
5. Other	NO	NO	NO						0		
B. Fugitive emissions from fuels	0	35	NO						35		
1. Solid fuels	NO	NO	IE						0		
2. Oil and natural gas	0	35	IE						35		
C. CO_2 transport and storage	NO								0		
2. Industrial processes and product use	**544**	**0**	**27**	**70**	**NO**	**9**	**NO**	**NO**	**651**		
A. Mineral industry	414								414		
B. Chemical industry	NO	NO	NO	IE	IE	IE	IE	IE	0		
C. Metal industry	104	NO	NO	IE	IE	IE	IE	IE	104		
D. Non-energy products from fuels and solvent use	26	NO	NO						26		
E. Electronic Industry				IE	IE	IE	IE	IE	IE		
F. Product uses as ODS substitutes				IE	IE	IE	IE	IE	IE		
G. Other product manufacture and use	NO	NO	27	IE	IE	IE	IE	IE	27		
H. Other	NO	NO	NO	IE	IE	IE	IE	IE	0		
3. Agriculture	**6**	**481**	**193**						**680**		
A. Enteric fermentation		419	0						419		
B. Manure management		62	36						97		
C. Rice cultivation		NO	0						0		
D. Agricultural soils		NO	157						157		
E. Prescribed burning of savannas		NE	NE						NE		
F. Field burning of agricultural residues		NO	NO						0		
G. Liming	6								6		
H. Urea application	NE								0		
I. Other carbon-containing fertilizers	NO								0		
J. Other	NO	NO	NO						0		
4. Land use, land-use change and forestry[(1)]	**NE**	**NE**	**NE**						**NE**		
A. Forest land	NE	NE	NE						NE		
B. Cropland	NE	NE	NE						NE		
C. Grassland	NE	NE	NE						NE		
D. Wetlands	NE	NE	NE						NE		
E. Settlements	NE	NE	NE						NE		
F. Other land	NE	NE	NE						NE		
G. Harvested wood products	NE								NE		
H. Other	NE	NE	NE						NE		
5. Waste	0	35	12						47		
A. Solid waste disposal	NO	26							26		
B. Biological treatment of solid waste		6	4						10		
C. Incineration and open burning of waste	NO,IE	NO,IE	NO,IE						0		
D. Waste water treatment and discharge		4	8						11		
E. Other	NO	NO	NO						0		
6. Other ***(as specified in summary 1.A)***									0		

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
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	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**10 410**	**1 661**	**8 749**
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	**10 410**	**1 661**	**8 749**
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.

6.1.20 Malta (submitted by Member State)

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

2015
2016
MT

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]	1 722.09	205.06	63.86	277.35	-	0.58	-	-	2 268.93	883.81	1 387.92
1. Energy	**1 721.19**	**5.07**	**9.69**						**1735.95**	**883.81**	**852.14**
A. Fuel combustion (sectoral approach)	**1 721.19**	**5.07**	**9.69**						**1735.95**	**883.81**	**852.14**
1. Energy industries	883.81	0.84	2.01						886.66	883.81	2.85
2. Manufacturing industries and construction	39.47	0.03	0.08						39.58	0	39.58
3. Transport	591.79	3.60	7.24						602.64	0	602.64
4. Other sectors	205.25	0.59	0.36						206.20	0	206.20
5. Other	0.864	0.003	0.002						0.87	0	0.87
B. Fugitive emissions from fuels	**0**	**0**	**0**						0.00	0	0.00
1. Solid fuels	0	0	0						0.00	0	0.00
2. Oil and natural gas and other emissions from energy production	0	0	0						0.00	0	0.00
C. CO_2 transport and storage									0.00	0	0
2. Industrial processes and product use	**3.19**	**0.00**	**0.57**	**277.35**	**0**	**0.58**	**0**	**0**	**281.69**	**0**	**281.69**
A. Mineral industry	0.08								0.08	0	0.08
B. Chemical industry	NO	NO	NO	NO,NA	NA	NA			0.00	0	0.00
C. Metal industry	NO,NA	NO,NA	NA			NO,NA			0.00	0	0.00
D. Non-energy products from fuels and solvent use	3.11	NA	NA						3.11	0	3.11
E. Electronic Industry									0.00	0	0.00
F. Product uses as ODS substitutes				277.35					277.35	0	277.35
G. Other product manufacture and use			0.57			0.58			1.15	0	1.15
H. Other									0.00	0	0.00
3. Agriculture	**0.00**	**45.58**	**39.37**						**84.95**	**0**	**84.95**
A. Enteric fermentation		33.31							33.31	0	33.31
B. Manure management		12.27	12.51						24.78	0	24.78
C. Rice cultivation		NO							0.00	0	0.00
D. Agricultural soils		NO	26.86						26.86	0	26.86
E. Prescribed burning of savannahs		NO	NO						0.00	0	0.00
F. Field burning of agricultural residues		NE	NE						0.00	0	0.00
G. Liming	NO								0.00	0	0.00
H. Urea application	NE								0.00	0	0.00
I. Other carbon-containing fertilizers	NO								0.00	0	0.00
J. Other	NO	NO	NO						0.00	0	0.00
4. Land use, land-use change and forestry[1]	**-2.79**								-2.79		
A. Forest land	-1.80	NE	NE						-1.80		
B. Cropland	-0.99	NE	NE						-0.99		
C. Grassland	NE	NE	NE						0.00		
D. Wetlands	NE	NE	NE						0.00		
E. Settlements	NE	NE	NE						0.00		
F. Other land	NE	NE	NE						0.00		
G. Harvested wood products	NO	NO	NO						0.00		
H. Other	NO	NO	NO						0.00		
5. Waste	**0.50**	**154.41**	**14.23**						**169.14**	**0**	**169.14**
A. Solid waste disposal	NO,NA	154.41							154.41	0	154.41
B. Biological treatment of solid waste		NA	NO,NA						0.00	0	0.00
C. Incineration and open burning of waste	0.50	0.00	0.18						0.68	0	0.68
D. Waste water treatment and discharge		NA,IE	14.05						14.05	0	14.05
E. Other	NO	NO	NO						0.00	0	0.00
6. Other ***(as specified in summary 1.A)***									0.00	0	0.00
									0.00	0	0.00
Memo items:[2]											
International bunkers	**5 444.54**	**17.80**	**12.73**						**5475.07**		
Aviation	347.28	1.21	0.87						349.36		
Navigation	5 097.26	16.59	11.86						5125.71		
Multilateral operations	**NO**	**NO**	**NO**						**NO**		
CO_2 emissions from biomass	**NE**								**NO**		
CO_2 captured	**NO**								**NO**		
Long-term storage of C in waste disposal sites	**NO**								**NO**		
Indirect N_2O			NE								
Indirect CO_2[3]	NE										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**2 271.73**	**883.81**	**1 387.92**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**2 268.93**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**2 271.73**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**2 268.93**		

(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.
A significant reduction in emissions between t-1 (proxy) and t-2 (inventory) is evident for source category 1A1 'Energy Industries'. This is the result of a number of ongoing technological investments in the local energy generation sector. More information will be presented in the national inventory report accompanying the next submission of Malta's national GHG inventory.

6.1.21 Malta (calculated centrally by EEA and its ETC/ACM)

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

Inventory 2015
Submission 2016 v Proxy 1.0
MALTA

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)	**1 713**	**209**	**66**	**251**	**0**	**1**	**0**	**0**	**2 240**		
1. Energy	**1 709**	**3**	**15**						**1 727**		
A. Fuel combustion (sectoral approach)	1 709	3	15						1 727		
1. Energy industries	858	1	2						861		
2. Manufacturing industries and construction	35	0	0						36		
3. Transport	592	2	10						604		
4. Other sectors	223	0	3						226		
5. Other	NO	NO	NO						0		
B. Fugitive emissions from fuels	0	0	NA,NO						0		
1. Solid fuels	NA,NO	NA,NO	IE						0		
2. Oil and natural gas	0	0	IE						0		
C. CO_2 transport and storage	NO								0		
2. Industrial processes and product use	**3**	**0**	**1**	**251**	**0**	**1**	**NA,NO,IE**	**NA,NO**	**255**		
A. Mineral industry	0								0		
B. Chemical industry	NO	NO	NO	IE	IE	IE	IE	IE	0		
C. Metal industry	NO	NO	NO	IE	IE	IE	IE	IE	0		
D. Non-energy products from fuels and solvent use	3	NA	NA						3		
E. Electronic Industry				IE	IE	IE	IE	IE	IE		
F. Product uses as ODS substitutes				IE	IE	IE	IE	IE	IE		
G. Other product manufacture and use	0	0	1	IE	IE	IE	IE	IE	1		
H. Other	NO	NO	NO	IE	IE	IE	IE	IE	0		
3. Agriculture	**0**	**48**	**38**						**85**		
A. Enteric fermentation		35	0						35		
B. Manure management		12	12						24		
C. Rice cultivation		NA,NO	0						0		
D. Agricultural soils		0	26						26		
E. Prescribed burning of savannas		NE	NE						NE		
F. Field burning of agricultural residues		NO	NO						0		
G. Liming	NO								0		
H. Urea application	NE								0		
I. Other carbon-containing fertilizers	NO								0		
J. Other	0	0	0						0		
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	1	159	12						171		
A. Solid waste disposal	NA,NO	157							157		
B. Biological treatment of solid waste		1	NA,NO						1		
C. Incineration and open burning of waste	1	0	0						1		
D. Waste water treatment and discharge		1	12						13		
E. Other	NO	NO	NO						0		
6. Other *(as specified in summary 1.A)*									0		
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)	NE,NO										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**2 240**	**890**	**1 350**
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	**2 240**	**890**	**1 350**
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**NE**		

6.1.22 Netherlands (submitted by MS)

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS

(Sheet 1 of 1)

Year	2015
Provisional Submission	CONFIDENTIAL (including LULUCF)
Country	NLD

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
	CO_2 equivalent (kt)								
Total (net emissions)(1)	**172.687,76**	**18.890,42**	**8.164,23**	**2.320,16**	**101,19**	**132,35**	**NO**	**NO,IE**	**202.296,10**
1. Energy	**159.096,16**	**2.319,03**	**662,01**						**162.077,21**
A. Fuel combustion (sectoral approach)	157.373,53	1.651,99	662,01						159.687,54
1. Energy industries	68.637,15	97,34	296,95						69.031,43
2. Manufacturing industries and construction	24.611,10	60,81	47,00						24.718,91
3. Transport	30.669,45	62,30	250,81						30.982,56
4. Other sectors	33.235,05	1.431,13	64,25						34.730,42
5. Other	220,79	0,41	3,01						224,21
B. Fugitive emissions from fuels	1.722,62	667,05	NA,NO,IE						2.389,67
1. Solid fuels	759,52	NO	NO						759,52
2. Oil and natural gas	963,10	667,05	NA,NO,IE						1.630,15
C. CO2 transport and storage	NO								0,00
2. Industrial processes and product use	**7.276,44**	**447,23**	**1.360,03**	**2.320,16**	**101,19**	**132,35**	**NO**	NO,IE	**11.637,40**
A. Mineral industry	1.143,80								1.143,80
B. Chemical industry	4.653,40	404,82	1.272,25	148,48	NO	NO	NO	IE	6.478,96
C. Metal industry	1.032,81	NA,NO,IE	NO	NO	3,47	NO	NO		1.036,28
D. Non-energy products from fuels and solvent use	430,73	0,31	NA,NO						431,04
E. Electronic Industry				NO	85,47	NO,IE	NO	IE	85,47
F. Product uses as ODS substitutes				2.171,68	12,25	NO	NO	NO	2.183,93
G. Other product manufacture and use	0,90	42,10	87,78	NO	NA	132,35			263,14
H. Other	14,78	NO	NO						14,78
3. Agriculture	**70,44**	**12.899,31**	**5.864,24**						**18.833,99**
A. Enteric fermentation		8.440,09							8.440,09
B. Manure management		4.459,22	673,38						5.132,60
C. Rice cultivation		NO							NO
D. Agricultural soils		NA	5.190,86						5.190,86
E. Prescribed burning of savannas		NO	NO						NO
F. Field burning of agricultural residues		NO	NO						NO
G. Liming	70,44								70,44
H. Urea application	IE								IE
I. Other carbon-containing fertilizers	NO								NO
J. Other	NO	NA	NA						NA,NO
4. Land use, land-use change and forestry(1)	**6.244,72**	**0,28**	**123,06**						**6.368,06**
A. Forest land	-2.686,03	0,27	5,98						-2.679,78
B. Cropland	2.602,07	NE,NO,IE	72,98						2.675,06
C. Grassland	4.432,98	0,01	5,60						4.438,59
D. Wetlands	63,91	NE,NO,IE	3,08						66,99
E. Settlements	1.612,84	NO	28,30						1.641,14
F. Other land	121,08	NO	7,12						128,20
G. Harvested wood products	97,86								97,86
H. Other	IE,NE,NO	IE,NE,NO	IE,NE,NO						NE,NO,IE
5. Waste	**NA,NO,IE**	**3.224,56**	**154,88**						**3.379,44**
A. Solid waste disposal	NA,NO	2.943,99							2.943,99
B. Biological treatment of solid waste		79,83	84,84						164,67
C. Incineration and open burning of waste	NA,NO,IE	NA,NO,IE	NA,NO,IE						NA,NO,IE
D. Waste water treatment and discharge		200,74	70,04						270,78
E. Other	NA	NO	NO						NA,NO
6. Other (as specified in summary 1.A)	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo items:(2)

International bunkers	**50.558,18**	**91,06**	**398,21**						51.047,45
Aviation	11.370,17	1,99	94,78						11.466,93
Navigation	39.188,02	89,07	303,43						39.580,52
Multilateral operations	IE	IE	IE						IE
CO2 emissions from biomass	12.741,98								12.741,98
CO2 captured	NA,NO								NA,NO
Long-term storage of C in waste disposal sites	NO								NO
Indirect N2O			**NE,NO**						
Indirect CO2 (3)	211,46								211,46

Total CO2 equivalent emissions without land use, land-use change and forestry	195.928,04
Total CO2 equivalent emissions with land use, land-use change and forestry	202.296,10
Total CO2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry	196.139,50
Total CO2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry	202.507,56

ETS	non-ETS
94.095,37	102.040,73

(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.

1A1 Energy Industries	More electricity production in new coalfired plants
1A3 transport	Increase in fuel sold
1A4 other sectors	CO2 increase in natural gas consumption due to colder winter than 2014
2 IPU	Overall increase due to recovering economy
3A enteric fermentation	Increased animal numbers (Cattle)
3B manure management	Increased animal numbers (Cattle)
5A solide waste disposal	Continuation of steady decrease over the years

6.1.23 Poland (submitted by MS)

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

Inventory 2015 Proxy

Submission 2016 v.0
POLAND

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)]	278.754,06	41.242,75	19.258,04	8.586,93	13,90	52,79	0,00	0,00	347.908,47		
1. Energy	**289.649,18**	**17.887,44**	**2.520,55**						**310.057,17**		
A. Fuel combustion (sectoral approach)	285.838,93	3.610,01	2.520,05						291.968,99		
1. Energy industries	157.151,39	115,66	757,56						158.024,62		
2. Manufacturing industries and cons	29.925,45	98,37	162,61						30.186,43		
3. Transport	46.672,75	97,22	632,29						47.402,26		
4. Other sectors	52.089,33	3298,76	967,60						56.355,69		
5. Other											
B. Fugitive emissions from fuels	3.810,25	14.277,43	0,50						18.088,17		
1. Solid fuels	1.705,37	11.916,58							13.621,95		
2. Oil and natural gas and other emissions from energy production	2.104,88	2.360,85	0,50						4.466,22		
C. CO_2 transport and storage									NO		
2. Industrial processes and product use	**20.410,08**	**65,09**	**749,19**	**8586,93**	**13,90**	**52,79**	**0,00**	**0,00**	**29.877,98**		
A. Mineral industry	9.791,40								9.791,40		
B. Chemical industry	5.970,48	50,51	749,19	NO	NO	NO	NO	NO	6.770,18		
C. Metal industry	2.493,87	14,57		NA	NA,NO	4,15	NA	NA	2.512,59		
D. Non-energy products from fuels and solvent use	2.154,33	NA,NO	NA,NO						2.154,33		
E. Electronic Industry				NO	NO	NO	NO	NO	0,00		
F. Product uses as ODS substitutes				8.586,93	13,90	NO	NO	NO	8.600,83		
G. Other product manufacture and use				NA	NA	48,64	NA	NA	48,64		
H. Other				NO	NO	NO	NO	NO	0,00		
3. Agriculture	**773,89**	**13.900,95**	**15.037,20**						**29.712,03**		
A. Enteric fermentation		12.286,12							12.286,12		
B. Manure management		1.588,39	2130,71						3.719,10		
C. Rice cultivation		NO							NO		
D. Agricultural soils			12.894,63						12.894,63		
E. Prescribed burning of savannahs		NO	NO						NO		
F. Field burning of agricultural residues		26,44	11,86						38,30		
G. Liming	373,84								373,84		
H. Urea application	400,05								400,05		
I. Other carbon-containing fertilizers	NO								NO, NA		
J. Other	NO	NA	NA								
4. Land use, land-use change and forestry[(1)]	**-32.603,48**	**35,26**	**64,85**						**-32.503,37**		
A. Forest land	-34.593,61	32,30	5,25						-34.556,06		
B. Cropland	429,07	NA,NO	13,02						442,09		
C. Grassland	-399,15	2,97	0,55						-395,64		
D. Wetlands	4.678,41	NA,NO	NA,NO						4.678,41		
E. Settlements	1.835,73	NO	46,03						1.881,76		
F. Other land	NA,NO	NO	NO						NA,NO		
G. Harvested wood products	-4.553,93	0,00	0,00						-4.553,93		
H. Other	NA	NA	NA						NA		
5. Waste	**524,40**	**9.354,01**	**886,26**						**10.764,66**		
A. Solid waste disposal	NA,NO	8.557,95	0,00						8.557,95		
B. Biological treatment of solid waste		129,28	92,46						221,74		
C. Incineration and open burning of waste	524,40	0,00	55,57						579,97		
D. Waste water treatment and discharge		666,78	738,22						1.405,00		
E. Other	NO	NO	NO						NO		
6. Other *(as specified in summary 1.A)*											
Memo items:[(2)]											
International bunkers											
Aviation	1.744,19	0,30	14,54						1.759,03		
Navigation	438,62	1,02	3,47						443,11		
Multilateral operations	NA	NA	NA						NA		
CO_2 emissions from biomass	34.396,31								34.396,31		
CO_2 captured									NO		
Long-term storage of C in waste disposal sites									NO		
Indirect N_2O											
Indirect CO_2 [(3)]											

Total CO_2 equivalent emissions without land use, land-use change and forestry	**380.411,84**	198.696,47	181.578,81
Total CO_2 equivalent emissions with land use, land-use change and forestry	**347.908,47**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**380.411,84**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**347.908,47**		

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 slightly increased by about 0.1% between 2014 and 2015
Main drivers for change in GHG emissions 2015/2014:
Energy - stationary fuel combustion
The main reason of slight decrease of GHG emission from fuel combustion in stationary sources (by 0.9%) is decrease in consumption of hard coal by above 2.2% and lignite by 1.2%
Transport:
Slight increase in emissions triggered by growing fuels use: petrol by 4%, diesel by 9% and LPG by 3%
Industrial processes:
Generally decrease in emissions by about 2% is observed, with exception of chemical industry where slight increase by 0.5% is caused due to higher production of Ammonia and ethylen
Agriculture:
Slight decrease (by about 2%) in emissions relates mostly to the drop in nitrogen and lime fertilisers use (respectively by about 8% and 23%
Emissions/removals for sectors **4. LULUCF and 5. Waste** are the same as for 2014

6.1.24 Portugal (submitted by MS)

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

Year: **Proxy 2015**
Submission: **July 2016**
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)]	**40 441.09**	**11 237.88**	**3 316.46**	**1 750.31**	**0.02**	**55.75**	**NO**	**NO**	**56 801.51**		
1. Energy	**46 292.71**	**549.30**	**526.96**						**47 368.97**	**24 642**	**22 727**
A. Fuel combustion (sectoral approach)	44 923.01	337.22	524.53						45 784.76	23 618	22 167
1. Energy industries	17 615.71	15.65	113.07						17 744.44	17 253	492
2. Manufacturing industries and construction	7 118.11	46.66	86.50						7 251.28	5 084	2 167
3. Transport	16 121.24	29.07	152.71						16 303.03	1 281	15 022
4. Other sectors	3 996.45	245.82	171.64						4 413.91	0	4 414
5. Other	71.49	0.01	0.60						72.10	0	72
B. Fugitive emissions from fuels	1 369.70	212.07	2.44						1 584.21	1 025	560
1. Solid fuels	0.00	8.81	0.00						8.81	6	3
2. Oil and natural gas and other emissions from energy production	1 369.70	203.26	2.44						1 575.40	1 019	556
C. CO_2 transport and storage	0.00								0.00	0	0
2. Industrial processes and product use	**4019.53**	**26.94**	**93.54**	**1750.31**	**0.02**	**55.75**	**0.00**	**0.00**	**5946.09**	**3 719**	**2 227**
A. Mineral industry	3723.04								3723.04	3 620	103
B. Chemical industry	21.21	10.01	54.37	NO	NO	NO	NO	NO	85.58	2	83
C. Metal industry	94.96	16.28	NO	NO	NO	NO	NO	NO	111.24	97	14
D. Non-energy products from fuels and solvent use	180.32	0.66	NO						180.98	0	181
E. Electronic Industry				NO	NO	NO	NO	NO	0.00	NO	NO
F. Product uses as ODS substitutes				1750.31	0.02	NO	NO	NO	1750.32	NO	1 750
G. Other product manufacture and use	0.00	0.00	39.18	0.00	NO	55.75	0.00	NO	94.93	NO	95
H. Other	NO	NO	NO	NO	NO	0.00	NO	NO	NO	0	0
3. Agriculture	**57.19**	**4 252.12**	**2 432.47**						**6 741.78**	**0**	**6 742**
A. Enteric fermentation		3 489.84							3 489.84	0	3 490
B. Manure management		592.13	190.71						782.84	0	783
C. Rice cultivation		140.84							140.84	0	141
D. Agricultural soils		NO	2 225.13						2 225.13	0	2 225
E. Prescribed burning of savannahs		NO	NO						NO	NO	NO
F. Field burning of agricultural residues		29.30	16.63						45.94	0	46
G. Liming	6.42								6.42	0	6
H. Urea application	50.77								50.77	0	51
I. Other carbon-containing fertilizers	NO								0.00	NO	0
J. Other	NO	NO	NO						0.00	NO	0
4. Land use, land-use change and forestry[(1)]	**-9 954.35**	**3.55**	**1.16**						**-9 949.63**		
A. Forest land	-12 446.74	2.96	0.12						-12 443.65		
B. Cropland	581.45	0.32	0.17						581.95		
C. Grassland	112.89	0.15	0.10						113.13		
D. Wetlands	396.37	0.00	0.11						396.47		
E. Settlements	2 461.57	0.00	0.61						2 462.18		
F. Other land	-920.31	0.12	0.06						-920.12		
G. Harvested wood products	-139.59	NA	NA						-139.59		
H. Other	NO	NO	NO						NO		
5. Waste	**26.02**	**6 405.97**	**262.32**						**6 694.31**	**0**	**6 694**
A. Solid waste disposal	0.00	3 475.85	0.00						3 475.85	0	3 476
B. Biological treatment of solid waste		24.64	12.22						36.87	0	37
C. Incineration and open burning of waste	26.02	0.15	0.71						26.87	0	27
D. Waste water treatment and discharge		2 905.32	249.39						3 154.72	0	3 155
E. Other	0.00	0.00	0.00						0.00	0	0
6. Other ***(as specified in summary 1.A)***											

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
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)]	128.40										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**66 751.14**	**28 361.52**	**38 389.62**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**56 801.51**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**66 879.54**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**56 929.91**		

(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 increase of approximately 8% of CO2 equivalent emissions in the Energy sector is explained with the increase of consumption of solid and gaseuous fuels in the energy industries sector. Partly explained by the lower production of renewable energy sources. 2015 was a dry year, thus affecting the production electricity in the dams. Fuel/Energy consumption: http://www.dgeg.pt/ Hidropower production: http://www.edp.pt/en/Investidores/publicacoes/relatorioecontas/2015/Company%20Reports%202015/RC2015_EN.pdf There is an increase of 1,9% in GHG emissions mostly due to an increase in livestock numbers (dairy cattle, non dairy cattle and swine) *c.a.3%* The -3% decrease of emissions in the waste sector are mainly determined by the reduction of the waste quantities deposited on land (5A) and the increase of biogas recovery in the more recent years.

6.1.25 Romania (calculated centrally by EEA and its ETC/ACM)

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

Inventory 2015
Submission 2016 v Proxy 1.0
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)]	**75.644**	**28.948**	**6.314**	**1.485**	**6**	**64**	**0**	**0**	**112.462**		
1. Energy	**66.583**	**11.671**	**535**						**78.790**		
A. Fuel combustion (sectoral approach)	65.573	1.161	534						67.268		
1. Energy industries	25.594	12	100						25.706		
2. Manufacturing industries and construction	14.203	28	47						14.278		
3. Transport	15.645	39	208						15.892		
4. Other sectors	9.730	1.066	175						10.971		
5. Other	402	15	3						420		
B. Fugitive emissions from fuels	1.010	10.510	2						11.522		
1. Solid fuels	NA	754	IE						754		
2. Oil and natural gas	1.010	9.756	IE						10.766		
C. CO_2 transport and storage	NO								0		
2. Industrial processes and product use	**9.010**	**11**	**408**	**1.485**	**6**	**64**	**NO**	**NO**	**10.985**		
A. Mineral industry	4.191								4.191		
B. Chemical industry	1.332	7	405	IE	IE	IE	IE	IE	1.745		
C. Metal industry	3.272	4	NO	IE	IE	IE	IE	IE	3.275		
D. Non-energy products from fuels and solvent use	216	NE,NO	NE,NO						216		
E. Electronic Industry				IE	IE	IE	IE	IE	IE		
F. Product uses as ODS substitutes				IE	IE	IE	IE	IE	IE		
G. Other product manufacture and use	NO	NO	3	IE	IE	IE	IE	IE	3		
H. Other	NE,NO	NE,NO	NE,NO	IE	IE	IE	IE	IE	0		
3. Agriculture	**41**	**12.031**	**4.837**						**16.909**		
A. Enteric fermentation		10.047	0						10.047		
B. Manure management		1.559	696						2.255		
C. Rice cultivation		0	0						0		
D. Agricultural soils		NE	3.986						3.986		
E. Prescribed burning of savannas		NE	NE						NE		
F. Field burning of agricultural residues		425	155						580		
G. Liming	16								16		
H. Urea application	25								25		
I. Other carbon-containing fertilizers	NO								0		
J. Other	NO	NO	NO						0		
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	10	5.235	533						5.778		
A. Solid waste disposal	NA	3.461							3.461		
B. Biological treatment of solid waste		28	25						52		
C. Incineration and open burning of waste	10	NE,NO	2						12		
D. Waste water treatment and discharge		1.746	507						2.253		
E. Other	NA	NA	NA						0		
6. Other *(as specified in summary 1.A)*									0		

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
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)]	NE,NO										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**112.462**	**42.396**	**70.065**
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	**112.462**	**42.396**	**70.065**
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

(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.

The estimates at the level of sub-sector and gas in this table have been compiled according to the methodology described in Annex chapter 6.2. The EEA proxy estimates are based on a bottom up approach (by sector, gas and country). The uncertainty in the numbers increases at finer levels of detail, particularly for non-CO2 emissions. The uncertainty is lowest for CO2 emissions from fuel combustion.

6.1.26 Slovakia (submitted by MS)

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

Year 2015
Submission v1.1 (15-07-2016)
Country SVK

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]	**27.482,19**	**4.319,30**	**2.431,91**	**556,92**	**8,50**	**14,45**	**NO**	**NO**	**34.813,27**		
1. Energy	**25.645,68**	**1.669,91**	**193,14**						**27.508,72**	**13.252,63**	**14.256,08**
A. Fuel combustion (sectoral approach)	25.622,04	241,26	193,14						26.056,43	13.252,63	12.803,79
1. Energy industries	7.481,18	21,65	60,88						7.563,71	6.889,78	673,93
2. Manufacturing industries and construction	7.071,84	18,65	40,46						7.130,95	6.165,84	965,11
3. Transport	6.356,76	16,08	61,02						6.433,85	180,18	6.253,67
4. Other sectors	4.662,46	184,29	30,67						4.877,42	16,83	4.860,59
5. Other	49,79	0,59	0,11						50,49	NO	50,49
B. Fugitive emissions from fuels	23,64	1.428,65	0,00						1.452,29	NO	1.452,29
1. Solid fuels	22,55	383,15	NO						405,70	NO	405,70
2. Oil and natural gas and other emissions from energy production	1,09	1.045,50	0,00						1.046,59	NO	1.046,59
C. CO_2 transport and storage	NO								NO	NO	NO
2. Industrial processes and product use	**8.324,07**	**1,65**	**221,88**	**556,92**	**8,50**	**14,45**	**NO**	**NO**	**9.127,47**	**7.928,58**	**1.198,89**
A. Mineral industry	2.198,97								2.198,97	2.090,42	108,55
B. Chemical industry	1.616,65	0,40	140,25	NO	NO	NO	NO	NO	1.757,30	1.419,30	338,00
C. Metal industry	4.410,43	1,25	NO	NO	8,50	NO	NO	NO	4.420,18	4.418,86	1,32
D. Non-energy products from fuels and solvent use	98,02	NO	NO						98,02	NO	98,02
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				556,92	NO	NO	NO	NO	556,92	NO	556,92
G. Other product manufacture and use	NO	NO	81,63	NO	NO	14,45	NO	NO	96,08	NO	96,08
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
3. Agriculture	**80,73**	**1.200,54**	**1.875,18**						**3.156,46**	**NO**	**3.156,46**
A. Enteric fermentation		1.048,44							1.048,44	NO	1.048,44
B. Manure management		152,10	195,11						347,21	NO	347,21
C. Rice cultivation		NO							NO	NO	NO
D. Agricultural soils		NO	1.680,07						1.680,07	NO	1.680,07
E. Prescribed burning of savannahs		NO	NO						NO	NO	NO
F. Field burning of agricultural residues		NO	NO						NO	NO	NO
G. Liming	17,37								17,37	NO	17,37
H. Urea application	63,37								63,37	NO	63,37
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]	**-6.574,45**	**0,69**	**8,80**						**-6.564,96**		
A. Forest land	-5.007,22	0,69	0,04						-5.006,49		
B. Cropland	-802,82	NO	8,25						-794,57		
C. Grassland	-188,46	NO	0,48						-187,98		
D. Wetlands	NO	NO	0,00						0,00		
E. Settlements	63,21	NO	0,01						63,22		
F. Other land	91,48	NO	0,01						91,49		
G. Harvested wood products	-730,64	NO	NO						-730,64		
H. Other	NO	NO	NO						NO		
5. Waste	**6,16**	**1.446,51**	**132,91**						**1.585,58**	**NO**	**1.585,58**
A. Solid waste disposal	NO	1.047,75	NO						1.047,75	NO	1.047,75
B. Biological treatment of solid waste		87,30	78,06						165,36	NO	165,36
C. Incineration and open burning of waste	6,16	0,84	5,36						12,36	NO	12,36
D. Waste water treatment and discharge		310,63	49,49						360,12	NO	360,12
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**

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
Memo items:[2]											
International bunkers	**135,54**	**0,07**	**3,06**						**138,67**		
Aviation	120,95	0,05	1,19						122,19		
Navigation	14,59	0,02	1,87						16,48		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	**7.846,93**								**7.846,93**		
CO_2 captured	**NO**								**NO**		
Long-term storage of C in waste disposal sites	**3.548,52**								**3.548,52**		
Indirect N_2O			**NE,NO,IE**								
	NE,NO,IE										
Indirect CO_2 [3]	**NE,NO,IE**										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**41.378,23**	**21.181,21**	**20.197,01**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**34.813,27**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**41.378,23**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**34.813,27**		

(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 and 1.A.2 based on the EU ETS reports of verified GHG emissions. Disaggregation into subcategories is based on the reporting under Article 21 of the EU ETS directive. Share of ETS/ESD is based on distribution of the 2014 inventory. EU ETS share is more than 80% in this subcategories. Categories 1.A.4 and 1.A.5 were extrapolated based on trend. In transport category 1.A.3, extrapolation was used for liquid fuels based on previous trend with addition of the pipeline transport (real data). Similar extrapolation is used also for 1.B category.
MEMO ITEMS: Emissions are not significant and therefore are estimated on the same level as in the previous year 2014
IPPU: Categories 2.A, 2.B and 2.C were estimated based on the EU ETS report of verified GHG emissions. ESD emissions in categories 2.A, 2.B, 2.C, 2.D and 2.G were extrapolated based on the 5-years increase. In the category 2.F only 2% increase was considered.
AGRICULTURE: Activity data for the most important categories of animals were downloaded from the SLOVSTAT database. Numbers of livestock for non-key categories, such as goats and horses, were not available during approximation, therefore method of extrapolation was used. Extrapolation was applied also for not key sources like following: Liming, Inorganic N- fertilizers, Urea application, Sewage sludge. The methodology for the approximation was consistent with the IPCC 2006 GL. We assumed that 2015 emissions will remain on the same value, or it will slightly decrease caused by decrease in animal numbers of livestock except dairy cattle, laying hens, turkeys, and ducks. Methane emissions from enteric fermentation for Dairy cattle category increased, because Ym parameter increased comparing to previous year. Consumption of Inorganic N-Fertilizer increased, what caused an increase in this category.
LULUCF: A. FOREST LAND: Emissions of CO2 are preliminary calculated using new input data from 2015. CH4 and N2O emissions are not significant and were estimated at the same level as in 2014. 4.B CROPLAND - Emissions are estimated on the same level as in the previous year 2014 because all input data for the calculation are not available. C. GRASSLAND: Emissions of CO2 are preliminary calculated using new input data from 2015. N2O emissions are not significant and were estimated at the same level as in 2014. D. WETLANDS: Input data for reporting N2O emissions are not significant and were estimated at the same level as in 2014. E. SETTLEMENTS: Emissions of CO2 are preliminary calculated using new input data from 2015. F. OTHER LAND: Emissions of CO2 are preliminary calculated using new input data from 2015. G. HWP: New input data for 2015 are not yet available. Emissions were estimated at the same level as in 2014 as the harvested wood volume in 2015 was at the same level as in 2014.
WASTE: Emissions stable, on the same level as previous year.

6.1.27 Slovenia (submitted by MS)

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

Year 2015
Submission 2016
Country Slovenia

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)]	**13.583,861**	**1.989,686**	**812,674**	**347,314**	**15,740**	**15,521**	**NO**	**NO**	**16.764,796**		
1. Energy	**12.845,633**	**400,030**	**142,121**						**13.387,784**	**5.476,291**	**7.911,493**
A. Fuel combustion (sectoral approach)	12.790,235	156,657	142,121						13.089,012	5.420,921	7.668,091
1. Energy industries	4.576,925	2,376	21,119						4.600,419	4.421,807	178,612
2. Manufacturing industries and construction	1.598,911	5,153	16,236						1.620,299	999,114	621,185
3. Transport	5.322,096	7,041	57,247						5.386,385		5.386,385
4. Other sectors	1.288,581	142,086	47,488						1.478,155		1.478,155
5. Other	3,722	0,001	0,031						3,754		3,754
B. Fugitive emissions from fuels	55,398	243,374	0,000						**298,772**	55,370	243,402
1. Solid fuels	55,334	209,969	NA,NO						265,303	55,370	209,933
2. Oil and natural gas and other emissions from energy production	0,064	33,405	0,000						33,469		33,469
C. CO_2 transport and storage	NO								NO		NO
2. Industrial processes and product use	**710,849**	**NA,NO**	**78,672**	**347,314**	**15,740**	**15,521**	**NO**	**NO**	**1.168,097**	**633,299**	**534,798**
A. Mineral industry	452,901								452,901	434,434	18,467
B. Chemical industry	48,229	NA,NO	NO	NO	NO	NO	NO	NO	48,229	NO	48,229
C. Metal industry	192,038	NA,NO	NA	NO	15,740	NO	NO	NO	207,779	198,865	8,914
D. Non-energy products from fuels and solvent use	17,681	NA	NA						17,681		17,681
E. Electronic Industry				NO	NO	NO	NO	NO	NO		NO
F. Product uses as ODS substitutes				347,314	NO	NO	NO	NO	347,314		347,314
G. Other product manufacture and use	NO	NO	78,672	NO	NO	15,521	NO	NO	94,193		94,193
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA		NO
3. Agriculture	**10,084**	**1.181,058**	**537,878**						**1.729,020**		**1.729,020**
A. Enteric fermentation		932,705							932,705		932,705
B. Manure management		248,353	97,296						345,650		345,650
C. Rice cultivation		NO							NO		NO
D. Agricultural soils		NO	440,582						440,582		440,582
E. Prescribed burning of savannahs		NO	NO						NO		NO
F. Field burning of agricultural residues		NO	NO						NO		NO
G. Liming	0,660								0,660		0,660
H. Urea application	9,424								9,424		9,424
I. Other carbon-containing fertilizers	NO								NO		NO
J. Other	NO	NO	NO						NO		NO
4. Land use, land-use change and forestry [(1)]											
A. Forest land											
B. Cropland											
C. Grassland											
D. Wetlands											
E. Settlements											
F. Other land											
G. Harvested wood products											
H. Other											
5. Waste	**17,294**	**408,597**	**54,003**						**479,895**		**479,895**
A. Solid waste disposal	NA,NO	310,331	NO						310,331		310,331
B. Biological treatment of solid waste		7,039	5,035						12,074		12,074
C. Incineration and open burning of waste	17,294	0,001	0,099						17,394		17,394
D. Waste water treatment and discharge		91,226	48,870						140,096		140,096
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**
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	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**16.764,796**	**6.109,590**	**10.655,206**
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.

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 2015, emissions of GHG increased by 1.1% compare to 2014.

Emissions in Energy sector increased by 1%, mainly due to the increase in electricity pro
The trend of 1.A fuel combustion of gaseous and liquid fuels widely follows the trend in preliminary energy statistics:
http://pxweb.stat.si/pxweb/Database/Environment/18_energy/04_18180_fuels/04_1
Natural gas consumption increased by -6.2% (approx. +1.6 PJ) and consumption of liquid fuels slightly decreased (-0.4%).
According to the ETS data on consumption of solid fuels, use of coal in power plants increased by 4.4% (+1.8 PJ), due to the strong decrease of hydro energy.

Emissions from IPPU increased by 2.8%,
The main reason is increase of F-gases (7.2%) and N2O use. The majority of data in this sector is from ETS. Most of data is from ETS.

Emissions in agriculture sector increased by 1.7% due to increase in animal population.
Total cattle increased by 3.4%, whereas dairy cows increased by 4.3 % (and milk yield increased by 1.3%); poultry number increased by 9.4%
http://pxweb.stat.si/pxweb/Database/Environment/15_agriculture_fishing/05_animal_production/01_15174_number_livestock/01_15174_nun

GHG emissions from waste sector decreased by 2.9% due to the decrease of methane emissions from SWDS.

6.1.28 Spain (submitted by MS)

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

Year 2015
Submission
Country SPAIN

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)	**238.921,08**	**39.000,03**	**19.087,56**	**10.706,17**	**65,71**	**201,22**	**NA,NO**	NA,NO	**307.981,77**		
1. Energy	**250.192,41**	**2.915,61**	**1.848,25**						**254.956,27**	**120.639**	**134.317**
A. Fuel combustion (sectoral approach)	246.123,48	1.956,04	1.847,35						249.926,88	119.654	130.273
1. Energy industries	87.285,67	400,22	520,63						88.206,52	85.516	2.691
2. Manufacturing industries and construction	40.331,53	488,52	228,79						41.048,84	33.800	7.249
3. Transport	81.675,53	89,91	816,74						82.582,19		82.582
4. Other sectors	36.830,76	977,38	281,19						38.089,33	339	37.751
5. Other	IE	IE	IE						IE	IE	IE
B. Fugitive emissions from fuels	4.068,92	959,56	0,90						5.029,39	985	4.044
1. Solid fuels	26,73	189,14	NA,NE						215,87	0	216
2. Oil and natural gas and other emissions from energy production	4.042,20	770,42	0,90						4.813,52	985	3.828
C. CO_2 transport and storage											
2. Industrial processes and product use	**19.975,99**	**171,26**	**823,09**	**10.706,17**	**65,71**	**201,22**	**NA,NO**	NA,NO	**31.943,44**	16.631	**15.313**
A. Mineral industry	12.213,32								12.213,32	11.506	707
B. Chemical industry	3.547,29	153,44	434,07	157,82	NA,NO	NA,NO	NA,NO	NA,NO	4.292,62	1.300	2.993
C. Metal industry	3.292,75	17,82		NA,NO	61,62	NA,NO	NA,NO	NA	3.372,19	3.361	11
D. Non-energy products from fuels and solvent use	922,63								922,63	464	459
E. Electronic Industry				NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes				10.548,35	4,09	NA,NO	NA,NO	NA,NO	10.552,44	0	10.552
G. Other product manufacture and use			388,89	NA,NO	NA,NO	201,22	NA,NO	NA,NO	590,11	0	590
H. Other			0,12	NA	NA	NA	NA	NA	0,12		
3. Agriculture	**510,34**	**21.372,42**	**14.812,41**						**36.695,17**	**0**	**36.695**
A. Enteric fermentation		12.146,84							12.146,84	0	12.147
B. Manure management		8.070,51	2.393,32						10.463,82	0	10.464
C. Rice cultivation		519,50							519,50	0	519
D. Agricultural soils		IE	12.325,62						12.325,62	0	12.326
E. Prescribed burning of savannahs		NO	NO						NO	NO	NO
F. Field burning of agricultural residues		635,57	93,47						729,04	0	729
G. Liming	37,91								37,91	0	38
H. Urea application	472,43								472,43	NE	472
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)	**-31.757,66**	**121,67**	**291,82**						**-31.344,17**		
A. Forest land	-34.247,79	14,72	11,12						-34.221,94		
B. Cropland	-26,71	NO,NE,IE	93,91						67,20		
C. Grassland	1.542,88	106,95	128,25						1.778,08		
D. Wetlands	-2,60	NO	NE,NO						-2,60		
E. Settlements	1.139,63	NO	52,98						1.192,61		
F. Other land	65,81	NO	5,56						71,37		
G. Harvested wood products	-228,88								-228,88		
H. Other	NO	NO	NO						NO		
5. Waste	**NA,NO,IE**	**14.419,06**	**1.311,99**						**15.731,06**	**0**	**15.731**
A. Solid waste disposal	NA,NO	13.104,52							13.104,52	0	13.105
B. Biological treatment of solid waste		419,48	340,78						760,25	0	760
C. Incineration and open burning of waste	NO,IE	0,76	9,34						10,11	0	10,11
D. Waste water treatment and discharge		893,50	961,48						1.854,98	0	1.855
E. Other	NA	0,80	0,39						1,20	0	1,20
6. Other *(as specified in summary 1.A)*	NA	NA	NA	NA	NA	NA					

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
Memo items:(2)											
International bunkers	38.754,87	32,82	323,60						39.111,29		
Aviation	14.214,73	0,62	134,48						14.349,83		
Navigation	24.540,14	32,20	189,13						24.761,46		
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	26.068,57								26.068,57		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	NE								NE		
Indirect N_2O											
Indirect CO_2 (3)	NE										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	**339.325,94**	**137.270,03**	**202.055,90**
Total CO_2 equivalent emissions with land use, land-use change and forestry	**307.981,77**		
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	**339.325,94**		
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	**307.981,77**		

(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.

CRF1+CRF2: Interannual rise of ETS emissions of + 10 %. http://www.eea.europa.eu/data-and-maps/data/data-viewers/emissions-trading-viewer
1A1a: Rise of electricity generation (+0.3 %). Increased participation of fossil fuels in the mix (coal: +22 % and natural gas: +20 % compared to 2014). http://www.ree.es/es/balance-diario/nacional/2015/12/31
1A1b: increase of ETS emissions in refinery sector (+2 %). http://www.eea.europa.eu/data-and-maps/data/data-viewers/emissions-trading-viewer
1A1c: Reduction of emissions in coke production (-9 %). http://www.eea.europa.eu/data-and-maps/data/data-viewers/emissions-trading-viewer
1A2: wide increase of industrial activity.
1A3: rise of aviation kerosene (+4 %); rise of road fossil fuels (+4 % diesel; +1 % gasoline). http://www.cores.es/es/estadisticas
1A4: rise of natural gas consumption in RCI (+6%)
2A: increased cement consumption (+5 %) and lime (+5%). https://www.oficemen.com/noticia.asp?id_rep=1935
2F: reduction of fluorinated gas consumption (-45%) for refrigeration and particularly those with high warming potential. Data from the Spanish Tax Agency regarding the implementation of the F-Gases Tax (http://www.agenciatributaria.es/AEAT.internet/Inicio/Aduanas_e_Impuestos_Especiales/Impuestos_Especiales/Impuesto_sobre_los_Gases_Fluorados_de_Efecto_Invernadero/Preguntas_Frecuentes/Preguntas_Frecuentes.shtml).
3A-3B: cattle rise (between +2 and +5%). http://www.magrama.gob.es/es/estadistica/temas/estadisticas-agrarias/ganaderia/encuestas-ganaderas/#para4
3D: reduction (-3%) of mineral fertilizers consumption http://www.magrama.gob.es/es/estadistica/temas/estadisticas-agrarias/agricultura/estadisticas-medios-produccion/fertilizantes.aspx

6.1.29 Sweden (submitted by MS)

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

Year 2015
Submission Subm 2016 proxy
Country Sweden

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									**38603,24908**		
A. Fuel combustion (sectoral approach)											
1. Energy industries									9122,840583		
2. Manufacturing industries and construction									7441,999705		
3. Transport									17897,6472		
4. Other sectors									3366,884205		
5. Other									163,2672955		
B. Fugitive emissions from fuels									610,6100876		
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									**6464,351178**		
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									**7143,424756**		
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									**1521,511123**		
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)*											

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Unspecified mix of HFCs and PFCs	NF_3	Total	ETS	non-ETS
Memo items:[(2)]											
International bunkers									8.279,74		
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	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	53.732,54	19.752,09	33.980,44
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.

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

This information, for year 2015, is publicly available (in Swedish only) at:

http://www.naturvardsverket.se/Sa-mar-miljon/Klimat-och-luft/Klimat/utslappen-av-vaxthusgaser/Snabbstatistik-utslapp-av-vaxthusgaser-2015/

In the webpage at the Swedish EPA somewhat different sectors than CRF are used.

Road transport accounts for one-third of total national emissions. The result show that the previous decrease of emissions from road transport have stopped between 2014 and 2015. The previous decreasing trend (between 2008 and 2014) is due to the increase usage of biofuels, the low-blending into diesel is increasing which contributes to this trend, and also an increased numbers of fuel-efficient cars.

Emissions from energy industries have decreased between 2014 and 2015. These emissions are strongly linked to variations in temperature and precipitation. However, in 2015 it was almost as warm in Sweden as in 2014. The total emissions from industry have decreased a little between year 2014 and 2015. The main reason behind the decrease in emissions in energy industries (CRF 1A1) and industry (CRF 1A2 and 2) was production disturbances. More analysis will be possible to make in detail when the ordinary data for year 2015 is available.
The emissions from the waste sector and agricultural sector have been estimated by using trend analysis, i.e. the emissions are declining at the same rate as the historical trends.

6.1.30 United Kingdom (submitted by MS)

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

Year 2015
Submission 2015 provisional inventory
Country United Kingdom of Great Britain and Northern 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)									CO_2 equivalent (Gg)	
Total (net emissions)[(1)]	**414 400**	**53 500**	**21 900**	**16 300**	**300**	**500**	**NO**	**0.00**	**506 900**		
1. Energy	**396 600**	**IE**	**IE**							**132 100**	**264 500**
A. Fuel combustion (sectoral approach)	392 500	IE	IE							131 700	260 800
1. Energy industries	131 500	IE	IE							95 200	36 300
2. Manufacturing industries and construction	53 800	IE	IE							23 900	29 900
3. Transport	116 000	IE	IE							11 000	105 000
4. Other sectors	89 300	IE	IE							1 500	87 700
5. Other	1 900	IE	IE							NO	1 900
B. Fugitive emissions from fuels	4 100	IE	IE							400	3 700
1. Solid fuels	200	IE	IE							NO	200
2. Oil and natural gas and other emissions from energy production	3 900	IE	IE							400	3 500
C. CO_2 transport and storage	NO									NO	NO
2. Industrial processes and product use	**16 100**	**IE**	**IE**	**IE**	**IE**	**IE**	**NO**	**IE**		**9 900**	**6 200**
A. Mineral industry	6 600									5 700	800
B. Chemical industry	4 100	IE	IE	IE	IE	NO	NO	NO		2 200	1 900
C. Metal industry	4 200	IE	IE	IE	IE	IE	NO	NO		2 000	2 300
D. Non-energy products from fuels and solvent use	1 200	IE	IE							NO	1 200
E. Electronic Industry				IE	NO	NO	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	NO	IE	IE	NO	NO		NO	NO
H. Other	NO	IE	NO	NO	NO	NO	NO	NO		NO	NO
3. Agriculture	**1 400**	**IE**	**IE**							**0**	**1 400**
A. Enteric fermentation		IE								NO	NO
B. Manure management		IE	IE							NO	NO
C. Rice cultivation		NO								NO	NO
D. Agricultural soils		NE	IE							NO	NO
E. Prescribed burning of savannahs		NO	NO							NO	NO
F. Field burning of agricultural residues		NO	NO							NO	NO
G. Liming	1 000									NO	1 000
H. Urea application	400									0	400
I. Other carbon-containing fertilizers	NO									NO	NO
J. Other	NO	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	**300**	IE	IE							**NO**	**300**
A. Solid waste disposal	NE,NO	IE								NO	NE,NO
B. Biological treatment of solid waste		IE	IE							NO	NO
C. Incineration and open burning of waste	300	IE	IE							NO	300
D. Waste water treatment and discharge		IE	IE							NO	NO
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**

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

Indirect CO_2 [(3)]											

Total CO_2 equivalent emissions without land use, land-use change and forestry				
Total CO_2 equivalent emissions with land use, land-use change and forestry				
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry				
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry				

(1) For carbon dioxide (CO_2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions 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.
Estimated CO_2 emissions for 2015 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-2015 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416820/methodology_summary.pdf The calculations described in the above document are carried out using UK only data excluding the Crown Dependencies and Overseas Territories The data presented above is consistent with this data set, no changes have been made to the geographical coverage. Emissions are presented in Gg and rounded to the nearest 100 Gg, consistent with the UK's statistical release. Note that totals are rounded from full precision data, and therefore do not match the sum of the rounded data presented here CO2 from LULUCF is excluded in accordance with Article 17 of the Implementing Regulation 749/214 Non-CO2 emissions are available only at an aggregated level. The total presented here include LULUCF emissions. IE notation indicates this. Emissions from LULUCF in 2014 for non-CO_2 gases were 0.031 $MtCO_2e$ CH4 and 0.72 $MtCO_2e$ for N_2O. As only aggregated figures for non-CO_2 gases are available, the comparison of ETS and non-ETS emissions in columns M and N are CO_2 only. The use of NO in column M has been used to cover emissions not occurring in ETS and/or the category as a whole. EU ETS emission for 3H is not zero, reported emissions are for use of urea and are 0.04 Gg CO_2.

6.1.31 Iceland (submitted by MS)

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

Inventory 2015
Submission 2017 v5
ICELAND

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
	CO_2 equivalent (kt)								
Total (net emissions) [(1)]	9520,20	2846,33	464,41	164,30	103,73	2,22	NO	NO	13101,19
1. Energy	1563,41	7,50	43,96						1614,87
A. Fuel combustion (sectoral approach)	1402,93	3,05	43,96						1449,94
1. Energy industries	2,35	0,00	0,01						2,36
2. Manufacturing industries and construction	24,70	0,02	0,05						24,76
3. Transport	830,81	1,86	28,73						861,40
4. Other sectors	545,07	1,17	15,17						561,42
5. Other									
B. Fugitive emissions from fuels	160,48	4,45	NA,NO						164,94
1. Solid fuels	NO	NO	NA,NO						NA,NO
2. Oil and natural gas	160,48	4,45	NO						164,94
C. CO_2 transport and storage	NO								NO
2. Industrial processes and product use	1700,94	1,42	2,44	164,30	103,73	2,22	NO	NO	1975,04
A. Mineral industry	0,75								0,75
B. Chemical industry	NA,NO,IE	NO,IE	NO		NO	NO	NO	NO	NA,NO,IE
C. Metal industry	1699,85	1,42			103,72				1804,98
D. Non-energy products from fuels and solvent use	0,34	NE,NO	NE,NO						0,34
E. Electronic Industry									
F. Product uses as ODS substitutes				164,30	0,01				164,31
G. Other product manufacture and use	NE	NE	2,44			2,22			4,66
H. Other									
3. Agriculture	0,37	344,07	403,23						747,67
A. Enteric fermentation		294,19							294,19
B. Manure management		49,88	42,32						92,20
C. Rice cultivation		NO							NO
D. Agricultural soils		NA,NE,NO	360,90						360,90
E. Prescribed burning of savannas									
F. Field burning of agricultural residues		NO	NO						NO
G. Liming	0,03								0,03
H. Urea application	0,35								0,35
I. Other carbon-containing fertilizers									
J. Other									
4. Land use, land-use change and forestry [(1)]	6248,13	2254,39	5,90						8508,43
A. Forest land	-301,15	0,67	5,46						-295,03
B. Cropland	115,88	82,51	NA,IE						198,39
C. Grassland	7027,97	545,25	0,44						7573,66
D. Wetlands	-599,27	1625,96	NA,NO						1026,69
E. Settlements	4,70		NE,IE						4,70
F. Other land	NE,NA		NA						NE,NA
G. Harvested wood products	NE								NE
H. Other									
5. Waste	7,35	238,95	8,88						255,18
A. Solid waste disposal	NE,NA	232,26							232,26
B. Biological treatment of solid waste		2,01	1,80						3,81
C. Incineration and open burning of waste	7,35	0,35	0,29						7,99
D. Waste water treatment and discharge		4,32	6,79						11,11
E. Other									
6. Other ***(as specified in summary 1.A)***									

Memo items: [(2)]									
International bunkers	758,80	0,58	6,32						765,71
Aviation	553,99	0,10	4,66						558,75
Navigation	204,81	0,49	1,66						206,95
Multilateral operations	NO	NO	NO						NO
CO_2 emissions from biomass	NO								NO
CO_2 captured	NO								NO
Long-term storage of C in waste disposal sites									
Indirect N_2O			NE						
Indirect CO_2 [(3)]	NE								
Total CO_2 equivalent emissions without land use, land-use change and forestry									4592,76
Total CO_2 equivalent emissions with land use, land-use change and forestry									13101,19
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry									4592,76
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry									13101,19

(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.

6.1.32 Norway (submitted by MS)

Preliminary greenhouse gas emissions in 2015 in Norway.
Date: 20160630

GHG Proxy* estimates - 2015, Norway.			
*Emissions in million tonnes CO2-equivalents ** *			
	2015	***Change in per cent***	
		Since 1990	***2014 - 2015***
Totals excluded LULUCF	**53,9**	**3,9**	**1,5**
Oil and gas extraction	15,1	82,8	2,3
Manufacturing industries and mining	12	-38,9	3,1
Energy supply	1,7	311,2	-0,9
Heating in other industries and households	1,3	-52,6	2,2
Road traffic	10,3	32,2	0,8
Aviation, navigation, fishing, motor equipment etcetera	6,3	13,7	-0,3
Agriculture	4,4	-9,7	1,7
Other	2,9	6,4	-2,1
ETS, excluded aviation	25,7		3,0
Aviation, ETS domestic fraction	1,1		
Non-ETS	27,1		
* Published 20th May 2016. Source: Statistics Norway.			
* Please note that proxy data for 2015 for the LULUCF-sector is not available. According to the 2016 National Inventory Report, net removals from the LULUCF sector were -25,4 million tonnes CO2-equivalents in 2014.			
** Excluding international shipping and aviation.			

6.1.33 Switzerland (submitted by MS)

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

Approximated inventory 2015
Submission 2016 v1
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]	38.671,85	5.038,86	2.392,67	1.493,88	47,05	241,75	NO	0,29	47.886,34		
1. Energy	36.539,78	285,92	218,55						37.044,25	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 and other emissions from energy production											
C. CO_2 transport and storage											
2. Industrial processes and product use	2.063,73	2,12	48,88	1.493,88	47,05	241,75	NO	0,29	3.897,69	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	45,54	4.112,53	1.932,59						6.090,65	NO	6.090,65
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]	NE	NE	NE						NE		
A. Forest land											
B. Cropland											
C. Grassland											
D. Wetlands											
E. Settlements											
F. Other land											
G. Harvested wood products											
H. Other											
5. Waste	9,89	637,61	192,05						839,56	NO	839,56
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)***	12,92	0,68	0,60	NO	NO	NO	NO	NO	14,19	NO	14,19

Memo items:[2]											
International bunkers	NE	NE	NE						NE		
Aviation											
Navigation											
Multilateral operations	NO	NO	NO						NO		
CO_2 emissions from biomass	NE								NE		
CO_2 captured	NO								NO		
Long-term storage of C in waste disposal sites	NE								NE		
Indirect N_2O			NE								

Indirect CO_2[3]	120,79										

	Total	ETS	non-ETS
Total CO_2 equivalent emissions without land use, land-use change and forestry	47.886,34	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	48.007,13		
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.
In the different sectors, emission changes from 2014 to 2015 were mainly caused by the following drivers: ***Sector 1 'Energy'*** (i) Cooler meteorological conditions during winter time, leading to an increase in CO_2 emissions from heating fuels. (ii) Reduced fuel tourism due to the strong value of the Swiss franc, leading to a decrease of Swiss emissions from transport fuels. (iii) Interruption of operation (for an indefinite period) of one of the two Swiss refineries. ***Sector 2 'Industrial processes and product use'*** (i) Reduced CO_2 emissions from cement production (based on data from cement plants). ***Sector 3 'Agriculture'*** (i) Reduced livestock, leading to a decrease of CH_4 emissions. (ii) Reduced use of mineral fertilizer, leading to a decrease of N_2O emissions from soils. **Sector 5 'Waste'** (i) Reduced emissions of CH_4 from waste disposal sites (based on model simulations, disposal of burnable solid waste is prohibited since the year 2000).

6.2 Annex II. Methodology for the proxy inventories calculated centrally

The proxy inventory is now largely based on estimates from member states with gap filling only where necessary. As a preparation ETC/ACM calculates in behalf of EEA for all EU-28 Member States and Iceland proxy GHG inventories in cases complete or partially gap-filling is necessary. Detail on the methodology of the proxy calculated by EEA that is used for gap filling is provided here.

For the central calculation of proxy inventories inventory data submitted with a cut-off date of 25 May 2016 was used.

6.2.1 Energy

6.2.1.1 1.A Energy – Fuel combustion

Methods and data sources used

Up to four different approaches for the estimation of CO_2 emissions from Fuel Combustion based on different data sources and methods were calculated for each Member State as presented in Table 20.

Table 20 Overview of approaches used for the estimation of CO_2 emissions from 1.A fuel combustion

	Approach I	Approach II	Approach III	Approach IV
Data sources	BP energy review	Eurostat monthly energy statistics	EUTL data, Eurostat data , World Steel data and further data source	Member States' national energy statistics
Method	2015 consumption trend for solid, liquid and gaseous fuels applied to inventory data for 2014	2015 consumption trend for solid, liquid and gaseous fuels applied to inventory data for 2014	detailed estimation for inventory source categories 1A1, 1A2, 1A3 and 1A4, constant emissions for 1A5	2015 consumption trend for solid, liquid and gaseous fuels applied to inventory data for 2014

Source: Öko-Institut

In Approach I, the main source for the estimation of CO_2 emissions from source category 1.A (Energy - Fuel Combustion) is the most recent BP Statistical Review of World Energy, which contains individual data for 21 EU Member States. No data are published for Croatia, Cyprus, Estonia, Latvia, Luxembourg, Malta, Slovenia and Iceland in this source. The share of these (small) countries in primary energy consumption amounts to approximately 2 % of total EU consumption, with some differences regarding individual energy sources. The BP data refer to primary energy consumption and covers only commercially traded fuels.

Approach II is based on Eurostat monthly energy statistics which reflect Member States' submissions of monthly Oil and Gas Questionnaires and monthly Coal Questionnaires to Eurostat. No data are published for Iceland in this source and due to data problems data for Sweden cannot be used this year.

In contrast to all other approaches for CO_2 emissions from sector 1.A (Fuel Combustion), Approach III makes use of CO_2 estimates for categories 1.A.1 (Energy Industries – chapter 6.2.1.2), 1.A.2 (Manufacturing Industries and Construction – chapter 6.2.1.3), 1.A.3 (Transport – chapter 6.2.1.4) and 1.A.4 (Other sectors i.e. Commercial/Institutional, Residential and Agriculture/Forestry/Fishing – chapter 6.2.1.5). In this 'bottom up' approach those CO_2 emission estimates for 2015 are complemented with reported 2014 CO_2 emissions for category 1.A.5 (Other) in order to estimate 2015 CO_2 emissions for 1.A (Fuel Combustion) CO_2 emissions.

In Approach IV, finally, early national energy statistics are used: For a considerable number of Member States, preliminary energy statistics are available. Fuel consumption data were (if necessary) converted in energy units and aggregated to solid, liquid & gaseous and – if available – to peat and other fuel categories.

CO_2 emissions reported in source category 1.A (Fuel Combustion) are split up in the CRF by the fuel categories solid fuels, liquid fuels, gaseous fuels, peat and other fuels. CO_2 emissions from other fuels cover mostly municipal or industrial waste incineration or co-incineration of secondary waste-type fuels. CO_2 emissions from the biomass fuel category are not accounted for in CRF category 1.A (Fuel Combustion) and were consequently not included in the estimation.

All data sources were used in order to derive specific information for the development of CO_2 emissions from the fuel categories solid, liquid, gaseous and peat fuels, as defined in the CRF with source category 1.A (Fuel Combustion). For each of those fuel categories a fuel consumption trend 2014 to 2015 was derived from the respective data sources (this applies to approaches I (BP), II (Eurostat) and IV (national energy statistics)). 2015 CO_2 emissions per fuel category were then estimated by multiplying the CO_2 emissions in that fuel category of the previous year by the fuel category specific consumption trend. None of the data sources provided information on the development of CO_2 emissions from the other fuels category. Thus 2015 CO_2 emissions from other fuels in source category 1.A (Fuel Combustion) were approximated using the respective emissions as reported by the Member States for 2015. The general approach to the CO_2 emission calculation for 1.A (Fuel combustion) is depicted in Equation 1 (applies to approaches I (BP), II (Eurostat) and IV (national energy statistics)):

Equation 1

$$E^{Y}_{1A,CO2} = \frac{C^{Y}_{solid}}{C^{Y-1}_{solid}} \cdot E^{Y-1}_{solid,CO2} + \frac{C^{Y}_{liquid}}{C^{Y-1}_{liquid}} \cdot E^{Y-1}_{liquid,CO2} + \frac{C^{Y}_{gaseous}}{C^{Y-1}_{gaseous}} \cdot E^{Y-1}_{gaseous,CO2}$$
$$+ \frac{C^{Y}_{peat}}{C^{Y-1}_{peat}} \cdot E^{Y-1}_{peat,CO2} + E^{Y-1}_{other\ fuels,CO2}$$

with

$E^{Y}_{1A,CO2}$	*CO_2 emissions in source category 1A*
$C^{Y}_{solid/liquid/gaseous/peat}$	*consumption of solid/liquid/gaseous fuels*
$C^{Y-1}_{solid/liquid/gaseous/peat}$	*consumption of solid/liquid/gaseous fuels in the previous year*
$E^{Y-1}_{...,CO2}$	*CO_2 emissions in the respective fuel category in the previous year*

In approach III (Bottom-up) the calculation approach is as follows:

Equation 2

$$E^{Y}_{1A,CO2} = E^{Y}_{1A1,CO2} + E^{Y}_{1A2,CO2} + E^{Y}_{1A3,CO2} + E^{Y-1}_{1A4,CO2} + E^{Y-1}_{1A,5CO2}$$

with

$E^{Y}_{1A,CO2}$	*CO_2 emissions in source category 1A*
$E^{Y}_{1A1/1A2/1A3/1A4,CO2}$	*CO_2 emission estimates in source category 1A1 / 1A2 / 1A3 / 1A4*
$E^{Y-1}_{1A5,CO2}$	*CO_2 emissions in source category 1A5 in the previous year*

All approaches were calculated for the years 2009 to 2015 (for BP data longer time series were available) and were compared with Member States' final inventory emissions.

Subsequently, for each Member State the result of one approach was chosen as final result for the CO_2 emission estimate from fuel combustion. Criteria for this final choice based on the analysis of time series and an expert judgement of the validity of the provisional Eurostat and Member States' energy statistics include:

- Deviation of approaches' estimates to final Member State's inventory data in past years.
- An analysis of the likeliness of trend change year X vs. year X-1 with different approaches.
- If available, deviation between approaches' estimates and Member States proxy inventory submissions.
- A check how well different approaches compare and whether the selected approach seems to be an outlier (i.e. if the results of one approach differ strongly from others do not use that approach).

The BP data source (approach I) was chosen for Hungary, Ireland, Lithuania, Malta, the Netherlands and the United Kingdom. Approach II using Eurostat data was chosen for Bulgaria, the

Czech Republic, Denmark, Greece, Italy, Luxembourg and Poland. The bottom-up approach (Approach III) relying on EUTL data, Eurostat energy and transport data, World Steel data and earlier officially reported emission data was chosen for Austria, Belgium, Croatia, Cyprus, Estonia, France, Latvia, Malta, Spain, Sweden and Slovakia. Early national energy statistics data (Approach IV) were chosen for Finland, Germany, Portugal, Romania, Slovenia and Iceland.

The estimation for CH_4 emissions from source category 1.A (Fuel Combustion) is based on the approximated trend of CO_2 emissions and depicted in Equation 3:

Equation 3

$$E^{Y}_{1A,CH4} = \frac{E^{Y}_{1A,CO2}}{E^{Y-1}_{1A,CO2}} \cdot E^{Y-1}_{1A,CH4}$$

with

$E^{Y}_{1A,CH4}$	*CH_4 emissions for source category 1A*
$E^{Y}_{1A,CO2}$	*CO_2 emissions for source category 1A as estimated in this report*
$E^{Y-1}_{1A,CO2}$	*CO_2 emissions for source category 1A from previous year*
$E^{Y-1}_{1A,CH4}$	*CH_4 emissions for source category 1A from previous year*

The estimation for N_2O emissions from source category 1.A (Fuel Combustion) is similar to CH_4 (Equation 4):

Equation 4

$$E^{Y}_{1A,N2O} = \left(\frac{E^{Y}_{1A,CO2}}{E^{Y-1}_{1A,CO2}}\right) \cdot E^{Y-1}_{1A,N2O}$$

with

$E^{Y}_{1A,N2O}$	*N_2O emissions for source category 1A*
$E^{Y}_{1A,CO2}$	*CO_2 emissions for source category 1A as estimated in this report*
$E^{Y-1}_{1A,CO2}$	*CO_2 emissions for source category 1A from previous year*
$E^{Y-1}_{1A,N2O}$	*N_2O emissions for source category 1A from previous year*

Results for 2015

The CO_2 emissions in category 1.A (Fuel Combustion) account for approximately 75 % of overall greenhouse gas emissions (without LULUCF) in EU plus Iceland. As mentioned above, 2015 CO_2 emissions in this category are based on different approximation approaches. Table 21 shows the calculation results for all Member States subject to gap-filling for 2014 and highlights the approaches chosen per Member State.

Table 21 2015 CO_2 emissions for source category 1.A Fuel combustion in various approximation approaches

Gg CO2	**Approach I** BP (Trend)	**Approach II** Eurostat monthly (trend)	**Approach III** Bottom up: 1A1+1A2+1A3+ 1A4+ $(1A5)_{Y-1}$	**Approach IV** preliminary national energy statistics (trend)
AT	51 460	51 664	51 997	51 714
BE	83 846	84 028	85 181	not available
BG	43 853	43 396	43 904	43 013
CY	not available	5 944	5 891	5 884
CZ	89 581	89 403	91 695	not available
DE	747 101	742 788	745 313	747 710
DK	32 745	32 403	33 251	33 785
EE	not available	15 606	14 820	12 900
ES	246 958	234 452	247 852	248 050
FI	40 218	40 160	39 340	39 985
FR	314 103	315 331	322 418	319 162
UK	395 077	398 305	398 236	394 938
GR	69 689	69 794	71 176	not available
HR	not available	15 481	15 451	16 077
HU	40 578	41 256	39 684	not available
IE	35 934	35 763	35 925	36 310
IT	341 548	335 096	335 324	338 939
LT	10 332	10 258	10 397	10 299
LU	not available	8 916	8 942	8 916
LV	not available	6 607	6 688	5 816
MT	not available	1 811	1 709	not available
NL	153 579	152 374	160 042	153 776
PL	289 852	289 453	290 098	287 612
PT	44 907	45 023	45 693	45 186
RO	64 779	64 857	65 015	65 573
SE	36 472	not available	36 954	37 219
SI	not available	12 666	12 746	12 512
SK	25 922	27 463	26 121	not available
IS	not available	not available	not available	1 587

Note: The result for the approach chosen as the best guess per Member State is highlighted in colour.

Source: EEA's proxy GHG emissions

6.2.1.2 1.A.1 Energy Industries

The GHG emissions for source category 1.A.1 (Energy Industries) were estimated on the basis of a separate analysis of the following source categories

- Public Electricity and Heat Production (1.A.1.a)
- Petroleum Refining (1.A.1.b)
- Manufacture of Solid Fuels and Other Energy Industries (1.A.1.c)

The main data source for the estimation of CO_2 emissions from source category 1.A.1.a (Public Electricity and Heat Production) is an analysis of the verified emissions data reported by installations covered under the EU ETS and recorded in the EUTL. Öko-Institut undertook a supplementary analysis on an installation-by-installation basis to separate the electricity generation installations from industrial combustion installations which are both reported under main activity code 20 in the ETS data (Combustion installations with a rated thermal input exceeding 20 MW). Based on these data the emissions were calculated as follows:

Equation 5

$$E^{Y}_{1A1a,CO2} = \frac{E^{Y}_{CITL(1/power)}}{E^{Y-1}_{CITL(1/power)}} \cdot E^{Y-1}_{1A1a,CO2}$$

with

$E^{Y}_{1A1a,CO2}$	CO_2 emissions for source category 1A1a
$E^{Y-1}_{1A1a,CO2}$	CO_2 emissions for source category 1A1a from previous year
$E^{Y}_{CITL(...)}$	CITL emissions for combustion / electricity generation installations
$E^{Y-1}_{CITL(...)}$	CITL emissions for combustion / electricity generation installations from previous year

A second approach based on monthly Eurostat data on net electricity generation data from conventional power plants (Eurostat time series nrg_105m, Eurostat energy indicator 16_107104) was also analysed.

Equation 6

$$E^{Y}_{1A1a,CO2} = \frac{AR^{Y}_{MS(power production)}}{AR^{Y-1}_{MS(power production)}} \cdot E^{Y-1}_{1A1a,CO2}$$

with

$E^{Y}_{1A1a,CO2}$	CO_2 emissions for source category 1A1a
$E^{Y-1}_{1A1a,CO2}$	CO_2 emissions for source category 1A1a from previous year
$AR^{Y}_{MS(...)}$	Eurostat data on net electricity production (conventional power plants)
$AR^{Y-1}_{MS(...)}$	Eurostat data on net electricity production (conventional power plants) from previous year

Finally, CO_2 emissions from source category 1.A.1.a were calculated using EUTL emission data on power plants identified by Öko-Institut for Cyprus, Czech Republic, Denmark, Estonia, Germany, Greece, Hungary, Italy, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and United Kingdom. EUTL main activity code 20 emission data was used to estimate 1.A.1.a CO_2 emissions for Austria, Bulgaria, Croatia, Finland, Latvia, Lithuania and Luxembourg. Monthly Eurostat data on net electricity generation from conventional power plants was used to estimate 1.A.1.a CO_2 emissions for Belgium, France and Sweden.

Two different approaches were used for CH_4 or N_2O emissions from source category 1.A.1.a (Public Electricity and Heat Production):

1. For the Member States with no strong correlation between CO_2 and CH_4 respectively N_2O emissions in the previous years the average 2012–2014 of the CH_4 respectively N_2O emission data from the last inventory submissions were used.
2. For the Member States with a significant correlation for the trends of CO_2 and CH_4 respectively N_2O emissions in the previous years, the projection of CH_4 respectively N_2O emissions is based on the following equation:

Equation 7

$$E^{Y}_{1A1a,CH4\,or\,N2O} = \frac{E^{Y}_{1A1a,CO2}}{E^{Y-1}_{1A1a,CO2}} \cdot E^{Y-1}_{1A1a,CH4\,or\,N2O}$$

with

$E^{Y}_{1A1a,CH4\,or\,N2O}$ CH4 or N2O emissions for source category 1A1a

$E^{Y-1}_{1A1a,CH4\,or\,N2O}$ CH4 or N2O emissions for source category 1A1a from previous year

$E^{Y}_{1A1a,CO2}$ CO2 emissions for source category 1A1a (see above)

$E^{Y-1}_{1A1a,CO2}$ CO2 emissions for source category 1A1a from previous year

To estimate 1.A.1.a CH_4 emissions the first option (average of 2012–2014) was used for all EU-28 member States except Belgium, Cyprus, Greece and Malta where the second option (estimates on the basis of trend dynamics) was chosen.

To estimate 1.A.1.a N_2O emissions the first (average of 2012–2014) was used for Austria, Belgium, Denmark, Estonia, Finland, France, Hungary, Italy, Latvia, Lithuania, Luxembourg, Portugal, Slovakia, Spain and United Kingdom. The second option (estimates on the basis of trend dynamics) was chosen for Bulgaria, Croatia, Cyprus, Czech Republic, Germany, Greece, Ireland, Malta, Netherlands, Poland, Romania, Slovenia and Sweden.

Two different approaches were used to estimate CO_2 emissions from 1.A.1.b (Refineries):

1. For the Member States with no strong correlation between CO_2 emissions and EUTL data Main activity code 21 (Refining of mineral oil) in the previous years the average 2012–2014 of the CO_2 emission data from the last inventory submissions were used.
2. For the Member States with a significant correlation between CO_2 emissions and EUTL data Main activity code 21 in the previous years, the projection of CO_2 emissions is based on the following equation:

Equation 8

$$E^{Y}_{1A1b,CO2} = \frac{E^{Y}_{EUTL}}{E^{Y-1}_{EUTL}} \cdot E^{Y-1}_{1A1b,CO2}$$

with

$E^{Y}_{1A1b,CO2}$	*CO_2 emissions for source category 1A1b*
$E^{Y-1}_{1A1b,CO2}$	*CO_2 Emissions for source category 1A1b from previous year*
E^{Y}_{EUTL}	*EUTL emissions from refineries*
E^{Y-1}_{EUTL}	*EUTL emissions from refineries for previous year*

The first option (average of 2012–2014) was used for Belgium, Bulgaria, Croatia, Hungary, Netherlands, Poland, Portugal, Romania and Slovakia. The second option (estimates on the basis of trend dynamics) was chosen for Austria, Czech Republic, Germany, Denmark, Spain, Finland, France, Greece, Ireland, Italy, Lithuania, Sweden and United Kingdom. Some countries (Cyprus, Estonia, Latvia, Luxembourg, Malta and Slovenia) did not report CO_2 emissions for 1.A.1.b therefore no emissions were estimated.

For CH_4 and N_2O emissions from source category 1.A.1.b (Petroleum Refining) two different approaches were used

1. For the Member States with no strong correlation between CO_2 and CH_4 respectively N_2O emissions in the previous years the average 2012–2014 of the CH_4 respectively N_2O emission data from the last inventory submission were used.
2. For the Member States with a significant correlation for the trends of CO_2 and CH_4 respectively N_2O emissions in the previous years, the projection of CH_4 respectively N_2O emissions is based on the following formula:

Equation 9

$$E^{Y}_{1A1b,CH4\ or\ N2O} = \frac{E^{Y}_{1A1b,CO2}}{E^{Y-1}_{1A1b,CO2}} \cdot E^{Y-1}_{1A1b,CH4\ or\ N2O}$$

with

$E^{Y}_{1A1b,CH4\ or\ N2O}$	*CH_4 or N_2O emissions for source category 1A1b*
$E^{Y-1}_{1A1b,CH4\ or\ N2O}$	*CH_4 or N_2O emissions for source category 1A1b from previous year*
$E^{Y}_{1A1b,CO2}$	*CO_2 emissions for source category 1A1b (see above)*
$E^{Y-1}_{1A1b,CO2}$	*CO_2 emissions for source category 1A1b from previous year*

To estimate 1.A.1.b CH_4 emissions the first option (average of 2012–2014) was used for Austria, Estonia, Greece, Ireland, Lithuania, Poland, Portugal, Romania, Sweden, and United Kingdom. The second option (estimates on the basis of trend dynamics) was chosen for Bulgaria, Croatia, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy and Netherlands. Some countries (Cyprus, Estonia, Latvia, Luxembourg, Malta and Slovenia) did not report CH_4 emissions for 1.A.1.b therefore no emissions were estimated.

To estimate 1.A.1.b N_2O emissions the first option (average of 2012–2014) was used for Austria, Belgium, Croatia, Estonia, France, Greece, Ireland, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Sweden and United Kingdom. The second option (estimates on the basis of trend dynamics) was chosen for Bulgaria, Czech Republic, Germany, Denmark, Finland, Hungary and Italy. Some countries (Cyprus, Estonia, Latvia, Luxembourg, Malta and Slovenia) did not report N_2O emissions for 1.A.1.b therefore no emissions were estimated.

For the source category 1.A.1.c (Manufacture of Solid Fuels and Other Energy Industries) for CO_2, CH_4 as well as N_2O no relevant other data source for activity data or emission data of year 2015 was identified. Therefore the emission data from the last inventory submission were used as proxy estimate for 2015.

The total greenhouse gas emissions for source category 1.A.1 (Energy Industries) were calculated as the sum of the estimates for the source categories 1.A.1.a, 1.A.1.b and 1.A.1.c (see above).

CO_2, CH_4 and N_2O emissions from 1.A.1 Energy industries in Iceland were calculated with a special top-down method, see chapter 6.2.1.7.

6.2.1.3 1.A.2 Manufacturing Industries and Construction

The main source for the estimation of CO_2 emissions from source category 1.A.2 (Manufacturing Industries and Construction) are the verified emissions data from the EUTL. To calculate CO_2 emissions from 1.A.2 several aggregates of ETS emissions used:

1. Aggregate of fuel combustion activities, including the following ETS main activity codes:
    - 20 Combustion of fuels *excluding all power plants identified by Öko Institute except those that were identified to use waste gas from the iron and steel industry*
    - 22 Production of coke
    - 23 Metal ore roasting or sintering
    - 24 Production of pig iron or steel
    - 25 Production or processing of ferrous metals
    - 29 Production of cement clinker
    - 30 Production of lime, or calcination of dolomite/magnesite
    - 31 Production of glass
    - 32 Production of ceramics
    - 34 Production or processing of gypsum or plasterboard
    - 35 Production of pulp
    - 36 Production of paper or cardboard
2. Aggregate of fuel combustion activities without cement production and related activities, including the following ETS main activity codes:
    - 20 Combustion of fuels *excluding all power plants identified by Öko Institute except those that were identified to use waste gas from the iron and steel industry*
    - 22 Production of coke

   - 23 Metal ore roasting or sintering
   - 24 Production of pig iron or steel
   - 25 Production or processing of ferrous metals
   - 31 Production of glass
   - 32 Production of ceramics
   - 35 Production of pulp
   - 36 Production of paper or cardboard
3. Aggregate of iron and steel production related activities, including the following ETS main activity codes:
   - 20 Combustion of fuels, *only those power plants identified by Öko Institute that were identified to use waste gas from the iron and steel industry*
   - 22 Production of coke
   - 23 Metal ore roasting or sintering
   - 24 Production of pig iron or steel
   - 25 Production or processing of ferrous metals
4. Aggregate of fuel combustion activities without iron and steel production related activities , including the following ETS main activity codes:
   - 20 Combustion of fuels *excluding all power plants identified by Öko Institute*
   - 29 Production of cement clinker
   - 30 Production of lime, or calcination of dolomite/magnesite
   - 31 Production of glass
   - 32 Production of ceramics
   - 34 Production or processing of gypsum or plasterboard
   - 35 Production of pulp
   - 36 Production of paper or cardboard
5. Aggregate of glass/ceramics and paper related activities, including the following ETS main activity codes:
   - 20 Combustion of fuels *excluding all power plants identified by Öko Institute*
   - 31 Production of glass
   - 32 Production of ceramics
   - 35 Production of pulp
   - 36 Production of paper or cardboard
6. Other activities, in the following ETS main activity code:
   - 99 Other

Based on these EUTL emission data aggregates two different approaches for the 1.A.2 CO_2 emissions were used:

1. For the Member States with no strong correlation between CO_2 emissions and any of the six EUTL data aggregates in the previous years the average 2012–2014 of the CO_2 emission data from the last inventory submissions were used.

2. For the Member States with a significant correlation between CO_2 emissions and any of the six EUTL data aggregates in the previous years, the projection of CO_2 emissions is based on the following equation:

Equation 10

$$E_{1A2,CO2}^{Y} = \frac{E_{CITL(...)}^{Y}}{E_{CITL(...)}^{Y-1}} \cdot E_{1A2,CO2}^{Y-1}$$

with

$E_{1A2,CO2}^{Y}$	*CO_2 emissions for source category 1A2*
$E_{1A2,CO2}^{Y-1}$	*CO_2 emissions for source category 1A2 from previous year*
$E_{CITL(...)}^{Y}$	*EUTL emissions for installations reported under different main activities*
$E_{CITL(...)}^{Y-1}$	*EUTL emissions for installations reported under different main activities from previous year*

The first option (trend changes of ETS main activity codes 20 [without power plants except waste gas], 22–25, 29–32, 34–36) was used for Denmark, Germany, Italy, Latvia, Poland, Portugal, Spain and the United Kingdom.

The fourth option (trend changes of ETS main activity codes 20 [without power plants except waste gas], 29–32, and 34–36) was used for Austria, Belgium, Finland, the Netherlands, Slovakia and Sweden.

The fifth option (trend changes of ETS main activity codes 20 [without power], 31–32, and 34–36) was used for France and Slovenia.

The second option (trend changes of ETS main activity codes 20 [without power plants except waste gas], 22–25, and 34–36), the third option (trend changes of ETS main activity codes 20 [without power plants], 22–25) and the sixth option (trend changes from ETS main activity code 99) were analysed but finally not used.

For Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Ireland, Lithuania, Luxembourg, Malta and Romania the average 2012–2014 of the CO_2 emission data from the last inventory submission were used.

For CH_4 emissions from source category 1.A.2 two different approaches were used

1. For the Member States with no strong correlation between CO_2 and CH_4 emissions in the previous years, the average 2012–2014 of the CH_4 emission data from the last inventory submission were used.
2. For the Member States with a significant correlation for the trends of CO_2 and CH_4 emissions in the previous years, the projection of CH_4 emissions is based on the following formula:

Equation 11

$$E^{Y}_{1A2,CH4} = \frac{E^{Y}_{1A2,CO2}}{E^{Y-1}_{1A2,CO2}} \cdot E^{Y-1}_{1A2,CH4}$$

with

$E^{Y}_{1A2,CH4}$	*CH_4 emissions for source category 1A2*
$E^{Y-1}_{1A2,CH4}$	*CH_4 emissions for source category 1A2 from previous year*
$E^{Y}_{1A2,CO2}$	*CO_2 emissions for source category 1A2 (see above)*
$E^{Y-1}_{1A2,CO2}$	*CO_2 emissions for source category 1A2 from previous year*

The first option (average of 2012–2014) was used for Belgium, Bulgaria, Cyprus, the Croatia, Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland and Italy. The second option (estimates on the basis of trend dynamics) was chosen for Austria, Germany, Lithuania, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden, and the United Kingdom.

Two different approaches were used for N_2O emissions from source category 1.A.2:

1. For the Member States with no strong correlation between CO_2 and N_2O emissions in the previous years the average 2012–201 of the N_2O emission data from the last inventory submission were used.
2. For the Member States with a significant correlation for the trends of CO_2 and N_2O emissions in the previous years, the projection of N_2O emissions is based on the following formula.

Equation 12

$$E^{Y}_{1A2,N2O} = \frac{E^{Y}_{1A2,CO2}}{E^{Y-1}_{1A2,CO2}} \cdot E^{Y-1}_{1A2,N2O}$$

with

$E^{Y}_{1A2,N2O}$	*N_2O emissions for source category 1A2*
$E^{Y-1}_{1A2,N2O}$	*N_2O emissions for source category 1A2 from previous year*
$E^{Y}_{1A2,CO2}$	*CO_2 emissions for source category 1A2 (see above)*
$E^{Y-1}_{1A2,CO2}$	*CO_2 emissions for source category 1A2 from previous year*

The first option (average of 2012–2014) was used for Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Finland, Greece, Hungary, Portugal, Romania, Slovakia, Slovenia, Sweden and the United Kingdom. The second option (estimates on the basis of trend dynamics) was chosen for Denmark, Estonia, Germany, Italy, Lithuania, Malta, the Netherlands, and Spain.

CO_2, CH_4 and N_2O emissions from 1.A.2 Manufacturing industries and construction in Iceland were calculated with a special top-down method, see chapter 6.2.1.7

6.2.1.4 1.A.3 Transport

The main sources for the estimation of CO_2 emissions from source category 1.A.3 (Transport) are the following Eurostat data, extracted from Eurostat's database:

- Monthly data for the observed gross inland deliveries of motor gasoline, transport diesel and aviation fuels;

Based on these data sources three slightly different options to calculate the CO_2 emissions were developed. Out of these, the most suitable approach was chosen for each Member State taking into account the performance of the respective approximation approaches to reproduce the reported emissions of previous years.

Option 1 for calculating CO_2 emissions (Equation 13) was chosen for Austria, Bulgaria, Czech Republic, Estonia, Spain, France, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Romania and Slovenia:

Equation 13

$$E^{Y}_{1A3,CO2} = \left(\frac{E^{Y}_{MS,CO2} + E^{Y}_{AD,CO2}}{E^{Y-1}_{MS,CO2} + E^{Y-1}_{AD,CO2}}\right) \cdot E^{Y-1}_{1A3b,c,d,e,CO2} + \frac{E^{Y}_{K,CO2}}{E^{Y-1}_{K,CO2}} \cdot E^{Y-1}_{1A3a,CO2}$$

with

$E^{Y}_{1A3,CO2}$	*CO_2 emissions for source category 1A3*
$E^{Y}_{MS,CO2}$	*CO_2 emissions motor spirit (monthly total of internal market deliveries) x CO_2 factor*
$E^{Y}_{AD,CO2}$	*CO_2 emissions automotive diesel (monthly total of internal market deliveries) x CO_2 factor*
$E^{Y-1}_{MS,CO2}$	*CO_2 emissions motor spirit (monthly total of internal market deliveries) x CO_2 factor*
$E^{Y-1}_{AD,CO2}$	*CO_2 emissions automotive diesel (monthly total of internal market deliveries) x CO_2 factor*
$E^{Y-1}_{1A3b,c,d,e,CO2}$	*CO_2 emissions for source category 1A3 b,c,d,e from previous year*
$E^{Y}_{K,CO2}$	*CO_2 emissions kerosene (monthly total of internal market deliveries) x CO_2 factor*
$E^{Y-1}_{K,CO2}$	*CO_2 emissions kerosene (monthly total of internal market deliveries) x CO_2 factor*
$E^{Y-1}_{1A3a,CO2}$	*CO_2 emissions for source category 1A3a from previous year (civil aviation)*

Country - specific CO_2 factors are calculated using net calorific values and implied emission factors based on the CRF submissions of the previous year

Option 2 (Equation 14) was chosen for Cyprus, Denmark, Finland, Greece, Croatia, Hungary, Italy, Latvia, Malta, Sweden, Slovakia and the United Kingdom:

Equation 14

$$E^{Y}_{1A3,CO2} = Fw_{t} \cdot E^{Y-1}_{1A3,CO2}$$

with

$E^{Y}_{1A3,CO2}$ *CO2 emissions for source category 1A3*

Fw_{t} *Weighted Factor*

$E^{Y-1}_{1A3,CO2}$ *CO2 emissions for source category 1A3 from previous year*

$$Fw_{t} = \frac{C^{Y}_{motorspirit}}{C^{Y-1}_{motorspirit}} \cdot S^{Y}_{t,\,motorspirit} + \frac{C^{Y}_{automotivediesel}}{C^{Y-1}_{automotivediesel}} \cdot S^{Y}_{t,\,automotivediesel} + \frac{C^{Y}_{kerosene}}{C^{Y-1}_{kerosene}} \cdot S^{Y}_{t,\,kerosene}$$

with

$C^{Y}_{motorspirit}$ *Consumption of motor spirit (monthly total of internal market deliveries)*

$C^{Y-1}_{motorspirit}$ *Consumption of motor spirit (monthly total of internal market deliveries) previous year*

$S^{Y}_{t,\,motorspirit}$ *Share (mass) of motor spirit in total consumption of regarded fuels*

$C^{Y}_{automotivediesel}$ *Consumption of automotive diesel (monthly total of internal market deliveries)*

$C^{Y-1}_{automotivediesel}$ *Consumption of automotive diesel (monthly total of internal market deliveries) previous year*

$S^{Y}_{t,\,automotivediesel}$ *Share (mass) of automotive diesel in total consumption of regarded fuels*

$C^{Y}_{kerosene}$ *Consumption of kerosene (monthly total of internal market deliveries)*

$C^{Y-1}_{kerosene}$ *Consumption of kerosene (monthly total of internal market deliveries) previous year*

$S^{Y}_{t,\,kerosene}$ *Share (mass) of kerosene in total consumption of regarded fuels*

Option 3 for calculating CO_2 emissions (Equation 15) was chosen for Belgium, Germany and Ireland:

Equation 15

$$E^{Y}_{1A3,CO2} = Fw_{m} \cdot E^{Y-1}_{1A3b,c,d,e,CO2} + \frac{C^{Y}_{kerosene}}{C^{Y-1}_{kerosene}} \cdot E^{Y-1}_{1A3a,CO2}$$

with

$E^{Y}_{1A3,CO2}$ — CO_2 emissions for source category 1A3

Fw_{m} — Weighted Factor

$E^{Y-1}_{1A3b,c,d,e,CO2}$ — CO_2 emissions for source category 1A3 b,c,d,e from previous year

$C^{Y}_{kerosene}$ — Consumption of kerosene (monthly total of internal market deliveries)

$C^{Y-1}_{kerosene}$ — Consumption of kerosene (monthly total of internal market deliveries) previous year

$E^{Y-1}_{1A3a,CO2}$ — CO_2 emissions for source category 1A3a from previous year (civil aviation)

$$Fw_{m} = \frac{C^{Y}_{motorspirit}}{C^{Y-1}_{motorspirit}} \cdot S^{Y}_{m,\,motorspirit} + \frac{C^{Y}_{automotivediesel}}{C^{Y-1}_{automotivediesel}} \cdot S^{Y}_{m,\,automotivediesel}$$

with

$C^{Y}_{motorspirit}$ — Consumption of motor spirit (monthly total of internal market deliveries)

$C^{Y-1}_{motorspirit}$ — Consumption of motor spirit (monthly total of internal market deliveries) previous year

$S^{Y}_{m,\,motorspirit}$ — Share (mass) of motor spirit in total consumption of motor spirit and automotive diesel

$C^{Y}_{automotivediesel}$ — Consumption of automotive diesel (monthly total of internal market deliveries)

$C^{Y-1}_{automotivediesel}$ — Consumption of automotive diesel (monthly total of internal market deliveries) previous year

$S^{Y}_{m,\,automotivediesel}$ — Share (mass) of automotive diesel in total consumption of motor spirit and automotive diesel

The estimation for CH_4 emissions from source category 1.A.3 (Transport) is based on the approximated trend of CO_2 emissions and depicted in Equation 16:

Equation 16

$$E^{Y}_{1A3,CH4} = \left(\frac{E^{Y}_{1A3,CO2}}{E^{Y-1}_{1A3,CO2}}\right) \cdot E^{Y-1}_{1A3,CH4}$$

with

$E^{Y}_{1A3,CH4}$ — CH_4 emissions for source category 1A3

$E^{Y}_{1A3,CO2}$ — CO_2 emissions for source category 1A3 as approximated using CO_2 options $1-3$ respectively

$E^{Y-1}_{1A3,CO2}$ — CO_2 emissions for source category 1A3 from previous year

$E^{Y-1}_{1A3,CH4}$ — CH_4 emissions for source category 1A3 from previous year

The estimation for N_2O emissions from source category 1.A.3 (Transport) is similar to CH_4 (Equation 17):

Equation 17

$$E^{Y}_{1A3,N2O} = \left(\frac{E^{Y}_{1A3,CO2}}{E^{Y-1}_{1A3,CO2}}\right) \cdot E^{Y-1}_{1A3,N2O}$$

with

$E^{Y}_{1A3,N2O}$ N_2O *emissions for source category 1A3*

$E^{Y}_{1A3,CO2}$ CO_2 *emissions for source category 1A3 as approximated using* CO_2 *options* $1-3$ *respectively*

$E^{Y-1}_{1A3,CO2}$ CO_2 *emissions for source category 1A3 from previous year*

$E^{Y-1}_{1A3,N2O}$ N_2O *emissions for source category 1A3 from previous year*

CO_2, CH_4 and N_2O emissions from 1.A.3 Transport in Iceland were calculated with a special top-down method, see chapter 6.2.1.7.

6.2.1.5 1.A.4 Other sectors

The CO_2 emissions from source category 1.A.4 (Other sectors) were estimated based on the following approaches:

1. Trend change of heating degree days (HDD)
2. Trend change of gross domestic product (GDP)
3. Trend change of gas consumption
4. Trend change of heating oil consumption
5. Average of 2012–2014
6. Subtraction from bottom-up calculation for sector 1.A

The first four approaches are applied individually for the subsectors for each of the 1.A.5 subsectors which are 1.A.4.a (Commercial and institutional), 1.A.4.b (Residential) and 1.A.4.c (Agriculture, forestry and fishing):

Equation 18

$$E^{Y}_{1A4x,CO2} = \frac{AR^{Y}_{\text{HDD or GDP or gas or oil}}}{AR^{Y-1}_{\text{HDD or GDP or gas or oil}}} \cdot E^{Y-1}_{1A4x,CO2}$$

with

$E^{Y}_{1A4x,CO2}$	*CO_2 emissions for source category 1A4a, 1A4b or 1A4c*
$E^{Y-1}_{1A4x,CO2}$	*CO_2 emissions for source category 1A4a, 1A4b or 1A4c from previous year*
$AR^{Y}_{HDD\ or\ GDP\ or\ gas\ or\ oil}$	*HDD or GDP or consumption of gas or oil*
$AR^{Y-1}_{HDD\ or\ GDP\ or\ gas\ or\ oil}$	*HDD or GDP or consumption of gas or oil previous year*

The third option is a simple average of 2012–2014 emissions.

In the fourth option: approximated emissions of source category 1.A.4 are estimated by a subtraction approach: Based on the real-time projection for the source categories 1.A, 1.A.1, 1.A.2 and 1.A.3 and constant emissions for 1.A.5, the emissions for the source categories 1.A.4 were calculated based on the following formula:

Equation 19

$$E^{Y}_{1A4} = E^{Y}_{1A} - E^{Y}_{1A1} - E^{Y}_{1A2} - E^{Y}_{1A3} - E^{Y}_{1A5}$$

with

E^{Y}_{i} *Emissions for source category i*

This subtraction method was used for all member states, where total 1.A emissions were estimated using another approach than approach III (bottom-up approach). As a consequence sub-sectoral emissions for 1.A.4.a/1.A.4.b/1.A.4.c are not used in that approach.

The following Table 22 shows which approach was used for which Member State.

Table 22 Methods used to estimate CO2 emissions from 1.A.4 Other sectors

Member State	1.A.4	1.A.4.a	1.A.4.b	1.A.4.c
AT	Sum	Average 2012–2014	HDD trend	GDP trend
BE	Sum	HDD trend	HDD trend	Average 2012–2014
BG	Subtraction		Not used	
CY	Sum	Average 2012–2014	Average 2012–2014	GDP trend
CZ	Subtraction		Not used	
DE	Subtraction		Not used	
DK	Subtraction		Not used	
EE	Sum	Average 2012–2014	Average 2012–2014	Average 2012–2014
ES	Sum	Average 2012–2014	Oil trend	GDP trend
FI	Subtraction		Not used	
FR	Sum	Gas trend	HDD trend	GDP trend
GR	Subtraction		Not used	
HR	Sum	Gas trend	HDD trend	GDP trend
HU	Subtraction		Not used	
IE	Subtraction		Not used	
IT	Subtraction		Not used	
LT	Subtraction		Not used	
LU	Subtraction		Not used	
LV	Sum	HDD trend	Gas trend	Average 2012–2014
MT	Sum	Average 2012–2014	Average 2012–2014	Average 2012–2014
NL	Subtraction		Not used	
PL	Subtraction		Not used	
PT	Subtraction		Not used	
RO	Subtraction		Not used	
SE	Sum	Average 2012–2014	HDD trend	GDP trend
SI	Subtraction		Not used	
SK	Sum	Average 2012–2014	HDD trend	Average 2012–2014
UK	Subtraction		Not used	
IS	Subtraction		Not used	

Source: EEA's ETC/ACMAs a result, the emissions from 1.A.4 have higher uncertainties than the other source categories in the energy sector.

For CH_4 and N_2O emissions from source category 1.A.4, the calculation is based on the following formula:

Equation 20

$$E^{Y}_{1A4,CH4orN2O} = \frac{E^{Y}_{1A4,CO2}}{E^{Y-1}_{1A4,CO2}} \cdot E^{Y-1}_{1A4,CH4orN2O}$$

with

$E^{Y}_{1A4,CH4orN2O}$	*CH_4 or N_2O emissions for source category 1A4*
$E^{Y-1}_{1A4,CH4orN2O}$	*CH_4 or N_2O emissions for source category 1A4 from previous year*
$E^{Y}_{1A4,CO2}$	*CO_2 emissions for source category 1A4 (see above)*
$E^{Y-1}_{1A4,CO2}$	*CO_2 emissions for source category 1A4 from previous year*

CO_2, CH_4 and N_2O emissions from 1.A.4 Other sectors in Iceland were calculated with a special top-down method, see chapter 6.2.1.7.

6.2.1.6 1.A.5 Other Fuel Combustion

For all Member States and all three gases (CO_2, CH_4 and N_2O), inventory data from previous year was used as emission estimate for source category 1.A.5 (Other Fuel Combustion). As a result, the emissions from 1.A.5 have higher uncertainties than the other source categories in the energy sector.

CO_2, CH_4 and N_2O emissions from 1.A.5 Other in Iceland were calculated with a special top-down method, see chapter 6.2.1.7.

6.2.1.7 Special top-down method for Iceland

Iceland does not report full energy data to Eurostat and fuel combustion sector contributes to only approximately 32 % to total emissions of Iceland (excluding LULUCF). According to Iceland's latest GHG inventory only liquid fossil fuels (except for a vanishingly small 0.01 % share of solid fuels) are consumed. Therefore a much simpler approach for calculating fuel combustion emissions of Iceland was used:

Equation 21

$$E_{1Ax,Gas}^{Y} = \frac{AR_{liquid}^{Y}}{AR_{liquid}^{Y-1}} \cdot E_{1Ax,Gas}^{Y-1}$$

$$with$$

$$E_{1Ax,Gas}^{Y} \quad CO2, CH4 \ or \ N2O \ emissions \ for \ source \ category \ 1A, 1A1, 1A2, 1A3, 1A4 \ or \ 1A5$$

$$E_{1A1b,N2O}^{Y-1} \quad CO2, CH4 \ or \ N2O \ emissions \ for \ source \ category \ 1A, 1A1, 1A2, 1A3, 1A4 \ or \ 1A5 \ from \ previous \ year$$

$$AR_{liquid}^{Y} \quad Activity \ data \ of \ liquid \ fuel \ consumption$$

$$AR_{liquid}^{Y} \quad Activity \ data \ of \ liquid \ fuel \ consumption \ from \ previous \ year$$

So the change of liquid fossil fuel consumption in Iceland was applied to the source category 1.A (Fuel Combustion), all subcategories (1.A.1 to 1.A.5) and all relevant greenhouse gases (CO_2, CH_4 and N_2O). As this method applies one fossil liquid fuel consumption trend to all subsectors and all gases, this can be named as a form of top-down approach.

6.2.1.8 1.B Fugitive Emissions

The CO_2 and CH_4 emissions for source category 1.B (Fugitive Emissions from Fuels) were estimated on the basis of a separate analysis of the following source categories:

- Solid Fuels (1.B.1);
- Oil (1.B.2.a);
- Natural Gas (1.B.2.b);
- Venting (1.B.2.c.1);
- Flaring (1.B.2.c.2);
- Other (1.B.2.d).

The estimates for CO_2 and CH_4 emissions for source category 1.B.1 (Solid Fuels) are based on the monthly production data for hard coal and lignite (nrg_101m, indicator code 100100, Eurostat product codes 2111 and 2210) from Eurostat. Two different approaches were used for CO_2 and CH_4 emissions from source category 1.B.1 (Solid Fuels):

1. For the Member States with no strong correlation between CO_2 respectively CH_4 emissions and monthly production data for hard coal or lignite from Eurostat in the previous years the average 2012–2014 of the CO_2 respectively CH_4 emission data from the last inventory submissions were used.
2. For the Member States with a significant correlation for the trends of CO_2 respectively CH_4 emissions in the previous years, the projection of CO_2 respectively CH_4 emissions is based on the following equation:

Equation 22

$$E^{Y}_{1B1,CO2\,or\,CH4} = \frac{AR^{Y}_{coal-prod}}{AR^{Y-1}_{coal-prod}} \cdot E^{Y-1}_{1B1,CO2\,or\,CH4}$$

with

$E^{Y}_{1B1,CO2\,or\,CH4}$	CO_2 *or* CH_4 *emissions for source category 1B1*
$E^{Y-1}_{1B1,CO2\,or\,CH4}$	CO_2 *or* CH_4 *emissions for source category 1B1 from previous year*
$AR^{Y}_{coal-prod}$	*Hard coal or lignite production*
$AR^{Y-1}_{coal-prod}$	*Hard coal or lignite productionfor previous year*

For Czech Republic where hard coal production is the main determinant for CO_2 emissions from source category 1.B.1, the primary hard coal production (Eurostat nrg_101m, indicator code 100100, Eurostat product code 2111) was used for the projection of CO_2 emissions arising from this source category. For Germany the primary lignite production (Eurostat nrg_101m, indicator code 100100, Eurostat product code 2210) was used to estimate 1.B.1 CO_2 emissions. For all other Member states that report CO_2 emissions from 1.B.1, the inventory data, average 2012-2014, from the last available submission were used.

For Bulgaria, Greece, Slovakia and Slovenia where lignite production is the main determinant for CH_4 emissions from source category 1.B.1, the primary production data for lignite (Eurostat nrg_101m, indicator code 100100, Eurostat product code 2210) were used. For Czech Republic where hard coal production is the main determinant for CH_4 emissions from source category 1.B.1, the primary hard coal production (Eurostat nrg_101m, indicator code 100100, Eurostat product code 2111) was used. For all other Member states that report CH_4 emissions from 1.B.1, the inventory data, average 2012-2014, from the last available submission were used.

For calculating CO_2 and CH_4 emissions from 1.B.2.a, 1.B.2.b, 1.B.2.c.1 and 1.B.2.c.2 the correlation of several trends has been reviewed.

- Eurostat crude oil production (nrg_102m, indicator code 100100, product code 3100);
- Eurostat gas consumption (nrg_102m, indicator code 100900, product code 4100);
- Eurostat gas production (nrg_102m, indicator code 100100, product code 4100);
- EUTL main activity code 21 (refineries).

The estimates for CO_2 and CH_4 emissions for source category 1.B.2.a, 1.B.2.b, 1.B.2.c.1 and 1.B.2.c.2 are based on these data sources. Two different approaches were used for CO_2 and CH_4 emissions from source categories 1.B.2.a, 1.B.2.b, 1.B.2.c.1 and 1.B.2.c.2:

1. For the Member States with no strong correlation between CO_2 respectively CH_4 emissions and any of the reviewed data sources in the previous years the average 2012–2014 of the CO_2 respectively CH_4 emission data from the last inventory submissions were used.

2. For the Member States with a significant correlation for the trends of CO_2 respectively CH_4 emissions in the previous years, the projection of CO_2 respectively CH_4 emissions is based on the following equation:

Equation 23

$$E^{Y}_{1B2\,a,b,c\;CO2\,or\,CH4} = \frac{E^{Y}_{EUTL} \text{ or } AR^{Y}_{Eurostat}}{E^{Y-1}_{EUTL} \text{ or } AR^{Y-1}_{Eurostat}} \cdot E^{Y-1}_{1B2a,b,c\;CO2\,or\,CH4}$$

with

$E^{Y}_{1B2a,b,c\;CO2\,or\,CH4}$	*CO_2 or CH_4 emissions for source category 1B2a,b,c*
$E^{Y-1}_{1B2a,b,c\;CO2\,or\,CH4}$	*CO_2 or CH_4 emissions for source category 1B2a,b,c from previous year*
$AR^{Y}_{Eurostat}$	*Crude oil production, Gas production or Gas consumption*
$AR^{Y-1}_{Eurostat}$	*Crude oil production, Gas production or Gas consumption for previous year*
E^{Y}_{EUTL}	*Emissions of refineries from EUTL*
E^{Y-1}_{EUTL}	*Emissions of refineries from EUTL for previous year*

The following table displays the selected methods.

Table 23 Methods used to estimate fugitive emissions from Oil, Gas or Venting and Flaring

Approach	1B2a CO2	1B2a CH4	1B2b CO2	1B2b CH4	1B2c1 CO2	1B2c1 CH4	1B2c2 CO2	1B2c2 CH4
Crude Oil Production	CZ, DE, PL	FR, PL		HR, RO	CZ, FR, IT, LT, RO	CZ, FR, IT, LT, RO	CZ, IT, LT, RO	CZ, LT, PL, RO
Gas Production			HR	AT				
Gas Consumption			LV, PT, RO, SI	FR, IT, LU, SI, UK		GR, PL	PL	
EUTL Refineries	AT, ES, FR	AT, FI, SE						
Average (2012–2014)	BE, BG, DK, GR, HR, HU, IT, LT, NL, PT, RO, SE, SI, SK, UK	BE, BG, CZ, DE, DK, ES, GR, HR, HU, IE, IT, LT, NL, PT, RO, SK, UK, IS	AT, BE, BG, CZ, DE, DK, EE, ES, FI, FR, GR, HU, IE, IT, LT, LU, MT, NL, PL, SE, SK, UK	BE, BG, CZ, DE, DK, EE, ES, FI, GR, HU, IE, LT, LV, NL, PT, SE, SK	BG, DK, ES, GR, HR, HU, LV, NL, PL, SI, SK, UK	BE, BG, DK, ES, HR, HU, LV, NL, SI, SK, UK	BE, BG, DE, DK, ES, FI, FR, GR, HU, NL, PT, SE, SI, SK, UK	BG, DE, DK, ES, FI, FR, GR, HU, IT, NL, PT, SE, SI, SK, UK

Source: EEA's ETC/ACM

Two different approaches were used to estimate CO_2 and CH_4 emissions from 1.B.2.d (Other fugitive emissions):

1. For the Member States where no corresponding national CO_2 resp. CH_4 emissions data was found the average 2012–2014 of the CO_2 resp. CH_4 emission data from the last inventory submissions were used.
2. For the Member States with a significant correlation between CO_2 emissions and EUTL data Main activity code 29 in the previous years, the projection of CO_2 emissions is based on the following equation:

Equation 24

$$E^{Y}_{1B2d,CO2\,or\,CH4} = \frac{E^{Y}_{national,CO2\,or\,CH4}}{E^{Y-1}_{national,CO2\,or\,CH4}} \cdot E^{Y-1}_{1B2d,CO2\,or\,CH4}$$

with

$E^{Y}_{1B2d,CO2\,or\,CH4}$ *CO2 or CH4 emissions for source category 1B2d*

$E^{Y-1}_{1B2d,CO2\,or\,CH4}$ *CO2 or CH4 emissions for source category 1B2d from previous year*

$E^{Y}_{national,CO2\,or\,CH4}$ *CO2 or CH4 emissions of from relevant national statistics*

$E^{Y-1}_{national,CO2\,or\,CH4}$ *CO2 or CH4 emissions of from relevant national statistics from previous year*

Average of 2012–2014 CO_2 emissions was used as estimate for 1.B.2.d CO_2 emissions for Greece, Hungary, Italy, Poland and Portugal. Average of 2012–2014 CH_4 emissions was used as estimate for 1.B.2.d CH_4 emissions for Hungary, Italy and Romania. For Iceland trend change of national data on CO_2 resp. CH_4 emissions from geothermal power plants[37] was used to calculate 1.B2.d CO_2 and CH_4 estimates. All other EU-28 Member States did not report 1.B.2.d CO_2 or CH_4 emissions therefore no emissions were estimated.

For all N_2O emissions from source category 1.B (Fugitive Emissions from Fuels) the emissions data from the last inventory submissions were used.

6.2.2 Industrial Processes and Product Use

6.2.2.1 2.A Mineral products

The emissions from 2.A Mineral products are based on CO_2 emission data for Cement (2.A.1) Lime (2.A.2) and Glass Production (2.A.3) from the EUTL data which were used as an index of the evolution of the emissions from the production of cement clinker, lime or glass production.

Two different approaches were used to estimate CO_2 emissions from 2.A.1 (Cement production):

3. For the Member States with no strong correlation between CO_2 emissions and EUTL data Main activity code 29 (Cement production) in the previous years the average 2012–2014 of the CO_2 emission data from the last inventory submissions were used.
4. For the Member States with a significant correlation between CO_2 emissions and EUTL data Main activity code 29 in the previous years, the projection of CO_2 emissions is based on the following equation:

Equation 25

$$E_{2A3}^{Y} = \frac{E_{EUTL}^{Y}}{E_{EUTL}^{Y-1}} \cdot E_{2A1}^{Y-1}$$

with

E_{2A7}^{Y}	*Emissions for source category 2A1*
E_{2A3}^{Y-1}	*Emissions for source category 2A1 from previous year*
E_{EUTL}^{Y}	*EUTL emissions for the production of glass production*
E_{EUTL}^{Y-1}	*EUTL emissions for the production of glass production from previous year*

[37] Talnaefni Orkustofnunar / Orkustofnun Data Repository: OS-2016-T007-01 Gaslosun jarðvarmavirkjana og hitaveitna 1969-2015 / Gas Emissions of Geothermal Power Plants and Utilities 1969-2015, http://www.nea.is/media/talnaefni/OS-2016-T007-01.xlsx, 23 May 2016.

Average of 2012–2014 emissions was used as estimate for Hungary. Cyprus and Iceland did not report 2.A.1 emissions for cement production therefore no emissions were estimated. For all other EU-28 Member States, emissions were estimated based on EUTL data Main activity code 29.

Two different approaches were used to estimate CO_2 emissions from 2.A.2 (Lime production):

1. For the Member States with no strong correlation between CO_2 emissions and EUTL data Main activity code 30 (Lime production) in the previous years the average 2012–2014 of the CO_2 emission data from the last inventory submissions were used.
2. For the Member States with a significant correlation between CO_2 emissions and EUTL data Main activity code 30 in the previous years, the projection of CO_2 emissions is based on the following equation:

Equation 26

$$E_{2A2}^{Y} = \frac{E_{EUTL}^{Y}}{E_{EUTL}^{Y-1}} \cdot E_{2A2}^{Y-1}$$

$$\begin{array}{ll} \textit{with} & \\ E_{2A7}^{Y} & \textit{Emissions for source category 2A3} \\ E_{2A3}^{Y-1} & \textit{Emissions for source category 2A3 from previous year} \\ E_{EUTL}^{Y} & \textit{EUTL emissions for the production of glass production} \\ E_{EUTL}^{Y-1} & \textit{EUTL emissions for the production of glass production} \\ & \textit{from previous year} \end{array}$$

Average of 2012–2014 emissions was used as estimate for Cyprus, Denmark, Latvia, Lithuania and Portugal. Iceland did not report 2.A.2 emissions for lime production therefore no emissions were estimated. For all other EU-28 Member States, emissions were estimated based on EUTL data Main activity code 30.

Two different approaches were used to estimate CO_2 emissions from 2.A.3 (Glass production):

1. For the Member States with no strong correlation between CO_2 emissions and EUTL data Main activity code 31 (Manufacture of glass) in the previous years the average 2012–2014 of the CO_2 emission data from the last inventory submissions were used.
2. For the Member States with a significant correlation between CO_2 emissions and EUTL data Main activity code 31 in the previous years, the projection of CO_2 emissions is based on the following equation:

Equation 27

$$E_{2A3}^{Y} = \frac{E_{EUTL}^{Y}}{E_{EUTL}^{Y-1}} \cdot E_{2A3}^{Y-1}$$

with

E_{2A7}^{Y}	*Emissions for source category 2A3*
E_{2A3}^{Y-1}	*Emissions for source category 2A3 from previous year*
E_{EUTL}^{Y}	*EUTL emissions for the production of glass production*
E_{EUTL}^{Y-1}	*EUTL emissions for the production of glass production from previous year*

Average of 2012–2014 emissions was used as estimate for Finland and Latvia. Cyprus, Ireland, Malta and Iceland did not report 2.A.3 emissions for glass production therefore no emissions were estimated. For all other EU-28 Member States, emissions were estimated based on EUTL data Main activity code 30.

Estimates for CO_2 emissions in source category 2.A.4 (Other use of carbonates) are described in chapter 6.2.2.4.

6.2.2.2 2.B Chemical industry

The estimates for GHG emissions for source category 2.B (Chemical industry) are based on detailed estimates for the following gases and source categories: CO_2 emissions from 2.B.1 (Ammonia production), N_2O emissions from 2.B.2 (Nitric acid production), CO_2 and N_2O emissions from 2.B.3 (Adipic acid production) and CO_2 emissions from 2.B.7 (Soda ash production). The remaining sub-categories and gases of 2.B are estimated using trend extrapolations.

Two different approaches were analysed to estimate CO_2 emissions from 2.B.1 (Ammonia production):

1. For the Member States with no strong correlation between CO_2 emissions and EUTL data Main activity code 41 (Production of ammonia) in the previous years the average 2012–2014 of the CO_2 emission data from the last inventory submissions were used.
2. For the Member States with a significant correlation between CO_2 emissions and EUTL data Main activity code 41 in the previous years, the projection of CO_2 emissions is based on the following equation:

Equation 28

$$E_{2B1}^{Y} = \frac{E_{EUTL}^{Y}}{E_{EUTL}^{Y-1}} \cdot E_{2B1}^{Y-1}$$

with

E_{2B1}^{Y}	*Emissions for source category 2B1*
E_{2B1}^{Y-1}	*Emissions for source category 2B1 from previous year*
E_{EUTL}^{Y}	*EUTL emissions for the production of ammonia*
E_{EUTL}^{Y-1}	*EUTL emissions for the production of ammonia from previous year*

Average of 2012–2014 emissions was used as 2.B.1 CO_2 emission estimate for Belgium, Czech Republic, France, Hungary and Romania, as in none of these Member States 2.B.1 CO_2 emissions showed good correlation to EUTL data Main activity code 41. For Austria, Bulgaria, Croatia, Germany, Greece, Italy, Lithuania, Netherlands, Poland, Slovakia, Spain and United Kingdom trend change of EUTL data Main activity code 41 was used to estimate 2.B.1 CO_2 emissions. Cyprus, Denmark, Estonia, Finland, Ireland, Latvia, Luxembourg, Malta, Portugal, Slovenia, Sweden and Iceland did not report 2.B.1 emissions for ammonia production therefore no emissions were estimated.

Two different approaches were analysed to estimate N_2O emissions from 2.B.2 (Nitric acid production):

1. For the Member States with no strong correlation between N_2O emissions and EUTL data Main activity code 38 (Production of nitric acid) in the previous year's N_2O emission data for the year 2014 from the last inventory submissions were used.[38]
2. For the Member States with a significant correlation between N_2O emissions and EUTL data Main activity code 38 in the previous years, the projection of N_2O emissions is based on the following equation:

[38] Due to the inclusion of N_2O emissions from nitric acid production in the EU ETS from 2013 on in most Member States these emissions have fallen quite substantially since 2012. Therefore the usual "average 2012–2014 approach" if no significant correlation between inventory and EUTL data was found does not make sense.

Equation 29

$$E_{2B2}^{Y} = \frac{E_{EUTL}^{Y}}{E_{EUTL}^{Y-1}} \cdot E_{2B2}^{Y-1}$$

with

E_{2B1}^{Y}	*Emissions for source category 2B2*
E_{2B1}^{Y-1}	*Emissions for source category 2B2 from previous year*
E_{EUTL}^{Y}	*EUTL emissions for the production of nitric acid production*
E_{EUTL}^{Y-1}	*EUTL emissions for the production of nitric acid production from previous year*

2014 emissions was used as 2.B.2 N_2O emission estimate for Czech Republic, Greece, Croatia, Hungary, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Slovakia and United Kingdom, as in none of these Member States 2.B.2 N_2O emissions showed good correlation to EUTL data Main activity code 38. For Austria, Belgium, Bulgaria, Finland, France, Spain and Sweden trend change of EUTL data Main activity code 38 was used to estimate 2.B.2 N_2O emissions. Cyprus, Denmark, Estonia, Ireland, Latvia, Luxembourg, Malta, Slovenia and Iceland did not report 2.B.2 emissions for nitric acid production therefore no emissions were estimated.

Estimates for CO_2 emissions from 2.B.3 (Adipic acid production) for France and Italy where calculated as the average 2012–2014 of the CO_2 emission data from the last inventory submissions. Likewise estimates for N_2O emissions from 2.B.3 for France, Germany and Italy where calculated as the average 2012–2014 of the N_2O emission data from the last inventory submissions. All other EU-28 Member States and Iceland did not report 2.B.3 emissions for adipic acid production therefore no emissions where estimated.

Two different approaches were analysed to estimate CO_2 emissions from 2.B.7 (Soda ash production):

1. For the Member States with no strong correlation between CO_2 emissions and EUTL data Main activity code 44 (Production of soda ash and sodium bicarbonate) in the previous year's CO_2 emission data for the year 2014 from the last inventory submissions were used.[39]

[39] Due to the inclusion of N_2O emissions from nitric acid production in the EU ETS from 2013 on in most Member States these emissions have fallen quite substantially since 2012. Therefore the usual "average 2012–2014 approach" if no significant correlation between inventory and EUTL data was found does not make sense.

2. For the Member States with a significant correlation between CO_2 emissions and EUTL data Main activity code 44 in the previous years, the projection of CO_2 emissions is based on the following equation:

Equation 30

$$E_{2B7}^{Y} = \frac{E_{EUTL}^{Y}}{E_{EUTL}^{Y-1}} \cdot E_{2B7}^{Y-1}$$

with

E_{2B7}^{Y} *Emissions for source category 2B7*

E_{2B7}^{Y-1} *Emissions for source category 2B7 from previous year*

E_{EUTL}^{Y} *EUTL emissions for the production of soda ash and sodium bicarbonate*

E_{EUTL}^{Y-1} *EUTL emissions for the production of soda ash and sodium bicarbonate from previous year*

Average of 2012–2014 emissions was used as 2.B.7 CO_2 emission estimate for France, Italy, Romania and United Kingdom, as in none of these Member States 2.B.7 CO_2 emissions showed good correlation to EUTL data Main activity code 44. For Bulgaria, Germany and Spain trend change of EUTL data Main activity code 44 was used to estimate 2.B.7 CO_2 emissions. All other EU-28 Member States and Iceland did not report 2.B.7 emissions for soda ash production therefore no emissions were estimated.

Estimates for all other emissions in source category 2.B (Chemical industry) are described in chapter 6.2.2.4.

6.2.2.3 2.C Metal industry

The estimates for GHG emissions for source category 2.C (Metal Production) are based on detailed CO_2 estimates for source categories 2.C.1 (Iron and Steel Production), 2.C.2 (Ferroalloy production) and 2.C.3 (Aluminium production) and trend extrapolations remaining sub-categories of source category 2.C.

For calculating CO_2 emissions from 2.C.1 the correlation of several trends has been analysed. The estimates are based on monthly production data from the World Steel Association or on EUTL data. The following trends have been analysed:

1. Crude steel production data from the World Steel Association;
2. Blast furnace iron production data from the World Steel Association;
3. EUTL main activity code 24 (Production of pig iron or steel);
4. EUTL main activity code 24 (Production of pig iron or steel) and including those power plants in the EUTL that where identified to use waste gases from the iron and steel industry;

5. EUTL main activity code 24 (Production of pig iron or steel) and including those power plants in the EUTL that where identified to use waste gases from the iron and steel industry; EUTL main activity code 22 (Production of coke), 23 (Metal ore roasting or sintering) 24 (Production of pig iron or steel) and including those power plants in the EUTL that where identified to use waste gases from the iron and steel industry;

The estimates for CO_2 emissions for source category 2.C.1 (Iron and Steel Production) are based on the formula:

Equation 31

$$E^{Y}_{2C1,CO2} = \frac{AR^{Y}_{steel}}{AR^{Y-1}_{steel}} \cdot E^{Y-1}_{2C1,CO2}$$

with

$E^{Y}_{2C1,CO2}$	*CO_2 emissions for source category 2C1*
$E^{Y-1}_{2C1,CO2}$	*CO_2 emissions for source category 2C1 from previous year*
AR^{Y}_{steel}	*Crude steel or blast furnace iron production or EUTL data*
AR^{Y-1}_{steel}	*Crude steel or blast furnace iron production or EUTL data for previous year*

Data from World Steel Association was used as activity data to estimate 2.C.1 CO_2 emissions for the following Member States: For Austria, Hungary, Italy and Italy crude steel production data (option 1) and for Belgium and Slovakia blast furnace iron production data (option 3) was used for calculation.

EUTL data was used to calculate 2.C.1 CO_2 estimates for eleven Member States: Option 3 was used for Bulgaria, Finland, Germany, Greece, Luxembourg, Portugal, Slovenia and Spain, option 4 for the Czech Republic and Sweden and option 5 for France.

For Member States with no strong correlation between one of the trends and CO_2 emissions in the previous years, the emission data average 2012–2014 from the last inventory submission were used. This includes Croatia, Latvia, Lithuania, the Netherlands, Poland, Romania and the United Kingdom.

Cyprus, Denmark, Estonia, Ireland, Malta and Iceland did not report emissions in 2.C.1 for 2014 and therefore no emissions were estimated for 2015.

Estimates for all other emissions in source category 2.C (Metal production) are described in chapter 6.2.2.4.

6.2.2.4 Other source categories

For all other source categories covering Industrial Processes and Product Use (CRF 2), 2015 activity data from alternative data sources are lacking. These categories were extrapolated from 2016 GHG inventories, either by linear trend extrapolation via minimum square deviation or by taking the constant values of the year 2014. Constant values were used when past trends were inconsistent and strongly fluctuating. Trend extrapolations were used when the historic time series showed good correlations[40] with a linear trend. Time spans ranging from three years (2012-2014) –to fifteen years (2000–2014) were analysed regarding linear trends and best fitting time span was chosen for linear trend extrapolation.

The following tables provide a detailed overview of methods and data sources used for each source category and Member State. For further split of F-gas emissions into individual subcategories see chapter 4.1.3.2.

[40] A "good correlation" in the context of this report is interpreted as an adjusted coefficient of determination (R^2) of the trend is greater than or equal to 0.80.

Table 24 Methods used to estimate emissions from fluorinated gases in Industrial Processes and Product Use

Sector			**2**		
Gas	*HFCs*	*PFCs*	*Unspecified Mix of HFCs and PFCs*	*SF6*	*NF3*
AT	15	p	p	p	3
BE	15	p	p	p	p
BG	3	4	p	p	p
CY	p	p	p	3	p
CZ	3	4	p	3	p
DE	13	p	p	3	p
DK	5	6	4	p	p
EE	4	p	p	4	p
ES	3	p	p	3	p
FI	3	5	p	3	p
FR	3	3	3	3	p
GR	9	p	p	p	p
HR	p	4	p	10	p
HU	3	p	p	p	p
IE	3	p	p	3	3
IT	6	p	p	3	3
LT	11	p	p	p	p
LU	3	p	p	4	p
LV	6	p	p	15	p
MT	3	p	p	p	p
NL	3	3	4	15	p
PL	3	3	p	3	p
PT	p	6	p	15	p
RO	5	p	p	15	p
SE	3	p	p	7	p
SI	7	4	p	4	p
SK	4	p	p	p	p
UK	3	p	p	5	3
IS	3	p	p	3	p

Note: p = previous year value; figures from 3 to 15 = number of years the interpolation took into account, e.g. 3 = 2012-2014 or 15 = 2000-2014. Sectors and gases with notations keys (IE, NA, NE and/or NO) in all mentioned sectors are not shown here.

Table 25 Methods used to estimate emissions from other source categories of Mineral products and Chemical industry

Sector	**2A4**	**2B1**	**2B1**	**2B4**	**2B4**	**2B5**	**2B5**	**2B6**	**2B8**	**2B8**	**2B10**	**2B10**	**2B10**
Gas	*CO2*	*CH4*	*N2O*	*CO2*	*N2O*	*CO2*	*CH4*	*CO2*	*CO2*	*CH4*	*CO2*	*CH4*	*N2O*
AT	3	p	p	p	p	4	p	p	p	p	p	p	p
BE	p	p	p	p	p	p	p	p	3	p	6	p	p
BG	14	p	p	p	p	4	p	p	p	6	p	p	p
CY	p	p	p	p	p	p	p	p	p	p	p	p	p
CZ	p	p	p	p	p	p	p	p	p	p	p	p	p
DE	p	p	p	p	p	p	p	p	3	p	p	p	p
DK	15	p	p	p	p	p	p	p	p	p	6	p	p
EE	p	p	p	p	p	p	p	p	p	p	p	p	p
ES	p	p	p	p	3	4	3	p	p	p	p	p	p
FI	4	p	p	p	p	p	p	p	p	p	p	p	p
FR	3	p	p	p	p	3	p	p	10	12	p	p	3
GR	10	p	p	p	p	p	p	p	p	p	p	p	p
HR	15	3	3	p	p	p	p	p	p	p	p	p	p
HU	4	p	p	p	p	p	p	p	p	3	p	p	p
IE	p	p	p	p	p	p	p	p	p	p	p	p	p
IT	3	p	p	p	p	9	p	p	p	3	p	p	p
LT	p	p	p	p	p	p	p	p	p	p	p	p	p
LU	p	p	p	p	p	p	p	p	p	p	p	p	p
LV	3	p	p	p	p	p	p	p	p	p	p	p	p
MT	3	p	p	p	p	p	p	p	p	p	p	p	p
NL	p	p	p	p	4	p	p	p	5	p	p	p	p
PL	3	p	p	p	p	p	p	p	p	p	p	p	p
PT	3	p	p	p	p	p	p	p	p	p	p	p	p
RO	6	p	p	p	p	p	3	p	p	p	p	p	p
SE	p	p	p	p	p	3	p	p	p	p	14	p	p
SI	p	p	p	p	p	p	p	p	p	p	p	p	p
SK	5	p	p	p	p	p	p	p	4	p	p	p	p
UK	p	p	p	p	p	p	p	3	3	3	p	3	3
IS	5	p	p	p	p	p	p	p	p	p	p	p	p

Note: p = previous year value; figures from 3 to 15 = number of years the interpolation took into account, e.g. 3 = 2012-2014 or 15 = 2000-2014. Sectors and gases with notations keys (IE, NA, NE and/or NO) in all mentioned sectors are not shown here.

Table 26 Methods used to estimate emissions from other source categories of Industrial Processes and Product Use

Sector	2C	2C	2C4	2C5	2C6	2C7	2D	2D	2D	2G	2G	2G	2H
Gas	*CH4*	*N2O*	*CO2*	*CO2*	*CO2*	*CO2*	*CO2*	*CH4*	*N2O*	*CO2*	*CH4*	*N2O*	*CO2*
AT	p	p	p	p	p	p	15	p	p	10	p	p	p
BE	p	p	p	p	p	p	p	p	p	p	p	p	p
BG	p	p	p	p	p	p	p	p	p	p	p	p	4
CY	p	p	p	p	p	p	9	p	p	3	p	3	p
CZ	12	p	p	p	3	p	p	p	p	p	p	p	p
DE	p	p	p	3	p	p	5	p	15	p	3	4	p
DK	p	p	p	3	p	p	p	3	3	p	p	p	p
EE	p	p	p	p	p	p	5	p	p	p	p	4	p
ES	p	p	p	12	p	3	15	p	p	p	p	6	p
FI	5	p	p	p	p	10	p	p	p	p	p	5	p
FR	p	p	p	p	4	p	3	3	5	p	p	4	p
GR	8	p	p	3	p	p	3	p	p	9	p	3	p
HR	p	p	p	p	p	p	6	p	p	p	p	p	p
HU	p	p	p	p	p	p	3	p	p	p	p	p	p
IE	p	p	p	p	p	p	3	p	p	p	p	5	p
IT	4	p	p	p	p	p	10	p	p	p	p	3	p
LT	p	p	p	p	p	p	13	p	p	p	p	p	p
LU	p	p	p	p	p	p	3	p	p	p	p	p	p
LV	p	p	p	p	p	p	p	p	p	p	p	3	p
MT	p	p	p	p	p	p	p	p	p	p	p	p	p
NL	p	p	p	p	p	p	p	4	p	3	p	4	p
PL	4	p	p	3	p	p	3	p	p	p	p	p	p
PT	3	p	p	p	p	p	14	3	p	p	p	13	p
RO	p	p	p	p	p	p	p	p	p	p	p	3	p
SE	p	p	p	p	p	p	p	p	p	p	p	11	3
SI	p	p	p	3	p	p	p	p	p	p	p	p	p
SK	3	p	p	3	3	p	p	p	p	p	p	p	p
UK	4	4	p	p	p	p	p	15	15	p	p	p	p
IS	p	p	p	p	p	p	p	p	p	p	p	3	p

Note: p = previous year value; figures from 3 to 15 = number of years the interpolation took into account, e.g. 3 = 2012-2014 or 15 = 2000-2014. Sectors and gases with notations keys (IE, NA, NE and/or NO) in all mentioned sectors are not shown here.

6.2.3 Agriculture

6.2.3.1 3.A Enteric fermentation

Enteric fermentation emissions were calculated using livestock data and previous year's emissions. Livestock data were obtained from Eurostat and emissions data were from the annual inventory data in CRF format submitted by each Member State to the European Environment Agency.

Eurostat livestock data was used for dairy cattle, non-dairy cattle, sheep and swine. Livestock population is the main driver for these emissions, and the 2013 to 2014 change in the number of head of livestock species/category in each Member State was applied to the 2013 inventory emissions for corresponding species/category of livestock. The proxy CH_4 emissions for source category 3A cattle, sheep and swine were calculated based on the following equation:

Equation 32: 3A. Enteric fermentation emissions for dairy cattle, non-dairy cattle, sheep and swine

$$E_{3\mathrm{A,T}}^{Y} = \frac{N_{\mathrm{T}}^{Y}}{N_{\mathrm{T}}^{Y-1}} \cdot E_{3\mathrm{A,T}}^{Y-1}$$

$with:$

Y	*inventory year*
$3A$	*enteric fermentation*
T	*species / category of livestick*
N_T	*number of head of livestock species / category in country*
$E_{3A,T}^{Y}$	*enteric fermentation emissions for the year Y and livestock T*

3.A.4 Other livestock: Member State emissions inventories for enteric fermentation (and manure management) emissions from livestock other than cattle, sheep and swine typically include: goats, horses, buffalo, poultry, mules and asses. Horses, mules and asses are not covered by Eurostat animal production statistics and the data for poultry is for poultry meat production and not directly comparable to inventory categories. Data for buffalo are available but they constitute a small part of the bovine herd in all countries except Italy. Data on goats [apro_mt_lsgoat] is available but goats cause only a comparatively small amount of total agriculture emissions. Therefore, the emissions of the 3.A.4 Other livestock category (and the 3.B.4 Other livestock category) were updated using emissions data of previous five years and trend extrapolation. The Microsoft Excel TREND function returns values along a linear trend matching known data points, using the least squares method.

6.2.3.2 3.B Manure management

Manure management emissions calculations use the same approach as for Enteric Fermentation. Emissions are calculated using livestock data and previous year's emissions. Livestock data were obtained from Eurostat and emissions data were from the annual inventory data in CRF format submitted by each Member State to the European Environment Agency.

Eurostat livestock data was used for dairy cattle, non-dairy cattle, sheep and swine. Given that livestock population is the main driver for these emissions, the 2013 to 2014 change in the number of head of livestock species/category in each Member State was applied to the 2013 inventory emissions for corresponding species/category of livestock. The CH_4 emissions for source category 3B cattle, sheep and swine were calculated based on the following equation:

Equation 33: 3B. Manure management CH_4 emissions for dairy cattle, non-dairy cattle, sheep and swine

$$E^{Y}_{3\mathrm{B,T}} = \frac{N^{Y}_{\mathrm{T}}}{N^{Y-1}_{\mathrm{T}}} \cdot E^{Y-1}_{3\mathrm{B,T}}$$

$$\begin{array}{ll} \textit{with}: & \\ Y & \textit{inventory year} \\ 3B & \textit{Manure managment} \\ T & \textit{species / category of livestick} \\ N_T & \textit{number of head of livestock species / category in country} \\ E^{Y}_{3A,T} & \textit{Manure management emissions for the year Y and livestock T} \end{array}$$

3.B.4 Other livestock: Member State emissions inventories for manure management emissions from livestock other than cattle, sheep and swine typically include: goats, horses, buffalo, poultry, mules and asses. Horses, mules and asses are not covered by Eurostat animal production statistics and the data for poultry is for poultry meat production and not easily comparable to inventory categories. Data for buffalo are available but they constitute a small part of the bovine herd in all countries except Italy. Data on goats [apro_mt_lsgoat] is available but goats cause only a comparatively small amount of total agriculture emissions. Therefore, the CH_4 emissions of the 3.B.4 Other livestock category were updated using emissions data of previous five years and trend extrapolation.

For 3.B Manure management N_2O emissions, an earlier EEA proxy methodology was also based on the sum of estimates using population by animal type sub-sectors where possible and otherwise either trend extrapolation or the previous year's value. Analysis of this detailed approach against subsequently reported emissions showed no appreciable gain in accuracy when compared to trend extrapolation. Therefore, 3.B Manure management N_2O emissions were updated using emissions data of previous five years and trend extrapolation.

6.2.3.3 3.D Agricultural Soils

Emissions from 3.D Agricultural Soils occur mainly as N_2O produced as a result of applying fertilizers, manure, and other agricultural practices. No Member States report CH_4 emissions from soils.

The EEA proxy for this sub-sector uses emissions data of previous five years and trend extrapolation.

An earlier EEA proxy methodology for N_2O emissions for 4.D Agricultural Soils[41], was based on the sum of trend estimates of most of the sub-sectors within the 4.D.1 Direct Soil Emissions category. That is from: 4.D.1.1 Synthetic Fertilizers, 4.D.1.2 Animal Manure applied to Soils, 4.D.1.3

[41] Note that "4.D" is correct here as we are referring to previous proxy calculations aligned with reporting for Revised 1996 IPCC Guidelines.

N-fixing crops, 4.D.1.4 Crop residue, 4.D.1.5 Cultivation of Histosols and 4.D.1.6 Other Direct Emissions. For each Member States and each subsector the estimates were based on either trend extrapolation or taking the previous year's value. Analysis of this detailed approach against subsequently reported emissions showed no appreciable gain in accuracy. This was also the case for the other categories: 4.D.2. Pasture, Range and Paddock Manure; 4.D.3. Indirect Emissions and 4.D.4. Other.

Emissions from Synthetic Fertilizers (3.D.a.1) typically contribute 25% of soil related emissions. There is Eurostat data for fertiliser use for 24 Member States for 2000 and only up to 2013. Although this data could not be used for proxy calculations, the trend in artificial nitrogen fertiliser use largely matches the time series for EU plus Iceland's emissions from 3.D Agricultural Soils.

6.2.3.4 Other source categories in the agricultural sector

Simple approaches were chosen for all remaining agricultural source categories. Either a linear trend extrapolation was used if the past data showed a consistent linear trend. Where the past trend was fluctuating, the emissions from the latest year were kept constant.

6.2.4 Waste

For all source categories covering waste (CRF 5), 2015 activity data from alternative data sources are lacking. Therefore waste emissions were extrapolated from 2016 GHG inventories, either by linear trend extrapolation via minimum square deviation or by taking the constant values of the year 2014. Constant values were used when past trends were inconsistent and strongly fluctuating. Trend extrapolations were used when the historic time series showed good correlations[42] with a linear trend. Time spans ranging from three years (2012–2014) to fifteen years (2000–2014) were analysed regarding linear trends and best fitting time span was chosen for linear trend extrapolation.

Table 27 shows the approach used for each of the six countries for which gap filled proxies are used.

Table 27 Methods used to estimate emissions from Waste

Sector	5A	5A	5B	5B	5C	5C	5C	5D	5D	5E	5E	5E
Gas	*CO2*	*CH4*	*CH4*	*N2O*	*CO2*	*CH4*	*N2O*	*CH4*	*N2O*	*CO2*	*CH4*	*N2O*
AT	p	4	p	p	p	p	p	3	3	p	p	p
BE	p	10	4	4	5	p	p	13	3	p	p	p
BG	p	3	p	p	p	p	p	p	4	p	p	p

[42] A "good correlation" in the context of this report is interpreted as an adjusted coefficient of determination (R^2) of the trend is greater than or equal to 0.80.

CY	p	6	p	p	p	p	p	3	3	p	p	p
CZ	p	11	4	3	3	3	3	13	4	p	p	p
DE	p	3	15	15	p	p	p	7	p	p	p	p
DK	p	9	5	p	p	p	p	3	p	p	p	p
EE	p	5	p	p	p	3	3	3	3	p	p	p
ES	p	3	p	p	p	3	3	15	3	p	p	p
FI	p	3	p	p	p	p	p	4	3	p	p	p
FR	p	3	5	4	p	15	10	11	4	p	p	p
GR	p	3	p	11	p	p	p	p	p	p	p	p
HR	p	15	4	5	p	p	p	3	4	p	p	p
HU	p	7	9	11	3	10	p	3	10	p	p	p
IE	p	3	p	p	12	3	5	4	4	p	p	p
IT	p	14	15	3	3	3	3	9	4	p	p	p
LT	p	3	3	3	p	p	p	15	8	p	p	p
LU	p	11	p	p	p	p	p	4	3	p	p	p
LV	p	7	p	p	3	p	6	p	7	p	p	p
MT	p	13	3	p	p	p	p	4	3	p	p	p
NL	p	4	p	10	p	p	p	p	15	p	p	p
PL	p	8	p	p	p	p	5	5	3	p	p	p
PT	p	3	11	3	3	p	p	p	p	p	p	p
RO	p	15	9	9	6	p	p	3	12	p	p	p
SE	p	6	3	3	3	p	p	p	8	p	p	p
SI	p	3	7	7	7	p	p	3	3	p	p	p
SK	p	3	p	p	4	3	p	9	12	p	p	p
UK	p	5	15	15	p	13	p	p	4	p	p	p
IS	p	3	3	3	p	10	3	3	6	p	p	p

Note: p = previous year value; figures from 3 to 15 = number of years the interpolation took into account, e.g. 3 = 2012-2014 or 15 = 2000-2014. Sectors and gases with notations keys (IE, NA, NE and/or NO) in all mentioned sectors are not shown here.