

Annual European Union greenhouse gas inventory 1990–2014 and inventory report 2016

Submission to the UNFCCC Secretariat

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The full report and annexes are available at:
<http://www.eea.europa.eu/publications/european-union-greenhouse-gas-inventory-2016>

Executive summary

ES.1 Background information on greenhouse gas inventories and climate change

The European Union (EU), as a party to the United Nations Framework Convention on Climate Change (UNFCCC), reports annually on greenhouse gas (GHG) inventories for the years between 1990 and the current calendar year (t) minus two (t-2), for emissions and removals within the area covered by its Member States (i.e. emissions taking place within its territory).

The present report is the official inventory submission of the European Union for 2016 under the UNFCCC, and for 2015 and 2016 under the Kyoto Protocol (KP), in spite of the remaining deficiencies in the CRF Reporter and underlying CRF tables ⁽¹⁾⁽²⁾. The EU should not be held liable for errors caused by the CRF Reporter in the review of the information submitted. The inventory data reported in the 2015 submission under the UNFCCC have been revised in this submission. Therefore, the 2016 submission should also be considered as a resubmission of the estimates with regard to the 2015 UNFCCC submission. Due to the late availability of the current version of CRF Reporter (version 5.14, released on 3 May 2016) and the subsequent hot-fixes to resolve important issues with this version, the EU values presented in this report have derived from the direct sum of the national inventories submitted to the EU by its Member States and Iceland by 20 April. To ensure full consistency with the estimates submitted by the EU Member States to the UNFCCC, the EU plans to resubmit its inventory before the UNFCCC review, which will take place in September 2016.

The legal basis for the compilation of the EU inventory is Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting GHG emissions and for reporting other information at national and EU level relevant to climate change and repealing Decision No 280/2004/EC ⁽³⁾.

This Regulation establishes a mechanism for:

- a) ensuring the timeliness, transparency, accuracy, consistency, comparability and completeness of reporting by the EU and its Member States to the UNFCCC Secretariat;
- b) reporting and verifying information relating to commitments of the EU and its Member States pursuant to the UNFCCC, to the Kyoto Protocol and to decisions adopted thereunder, and evaluating progress towards meeting those commitments;
- c) monitoring and reporting all anthropogenic emissions by sources, and removals by sinks, of GHGs not controlled by the Montreal Protocol on substances that deplete the ozone layer in Member States;
- d) monitoring, reporting, reviewing and verifying GHG emissions and other information pursuant to Article 6 of Decision No 406/2009/EC;
- e) reporting the use of revenue generated by auctioning allowances under Article 3d(1) or (2) or Article 10(1) of Directive 2003/87/EC, pursuant to Article 3d(4) and Article 10(3) of that Directive;

⁽¹⁾ According to Decision 13/CP.20 of the Conference of the Parties to the UNFCCC, the CRF Reporter version 5.0.0 software was not functioning, so Annex I Parties were not able to submit their CRF tables. In the same Decision, the Conference of the Parties reiterated that Annex I Parties may submit their CRF tables after April 15 2015, but no later than the end of the corresponding delay in the availability of CRF Reporter. Decisions 20/CP.21 and 10/CMP.11 further noted that CRF reporter was still not functioning. 'Functioning' software means that the data on GHG emissions/removals are reported accurately, as both reporting format tables and in XML format. In 2015, the European Union made an inventory submission under the UNFCCC, but not under the Kyoto Protocol because the CRF Reporter could not deliver CRF tables for Kyoto Protocol LULUCF activities without errors.

⁽²⁾ This submission does not yet include a full set of CRF tables, because of a very recent technical issue with the CRF Reporter software, which does not allow for a proper aggregation of the EU totals. The EU is in close contact with the technical support unit of the UNFCCC secretariat and will submit the CRF tables as soon as the issue has been solved.

⁽³⁾ <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1448384547941&uri=CELEX:32013R0525> OJ L 165, 18.6.2013, pp. 13–40e.

- f) monitoring and reporting on the actions taken by Member States to adapt to the inevitable consequences of climate change in a cost-effective manner;
- g) evaluating progress by the Member States towards meeting their obligations under Decision No 406/2009/EC.

The new Monitoring Mechanism Regulation has enhanced the reporting rules on GHG emissions to meet the requirements arising from international climate agreements, as well as the 2009 EU climate and energy package. Since in 2014, GHG inventory reporting has taken place under this new legal instrument, which replaces and expands the previous Monitoring Mechanism Decision 280/2004/EC.

The EU GHG inventory comprises the direct sum of emissions from the national inventories compiled by the EU Member States making up the EU-28. Energy data from Eurostat are used for the reference approach for CO₂ emissions from fossil fuels, developed by the Intergovernmental Panel on Climate Change (IPCC).

In addition, the European Union, its Member States and Iceland have jointly agreed to fulfil their quantified emissions limitation and reduction commitments for the second commitment period to the Kyoto Protocol, as reflected in the Doha Amendment. In this context, the EU and Iceland jointly report their national GHG emissions during the second commitment period of the Kyoto Protocol. This report, therefore, refers to the totals of the EU-28 plus Iceland. For reasons of clarity, please note that in some cases the terms '(EU-28) Member States' and 'EU-28'/'EU' may be used. As a general rule, these terms also refer to Iceland.

The main institutions involved in the compilation of the EU GHG inventory are the 28 Member

States plus Iceland, the European Commission Directorate-General for Climate Action (DG CLIMA), the European Environment Agency (EEA) and its European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM), Eurostat, and the Joint Research Centre (JRC).

The annual process of compiling the EU GHG inventory is described below:

1. Member States submit their annual GHG inventories by 15 January each year to the European Commission (DG CLIMA), with a copy to the EEA.
2. The EEA and its ETC/ACM, Eurostat, and the JRC then perform initial checks on the data submitted. Specific findings from the initial quality assurance/quality control (QA/QC) checks are communicated to Member States by 28 February. In addition, the draft EU GHG inventory and inventory report are circulated to Member States for review and comments by 28 February.
3. Member States check their national data and the information presented in the EU GHG inventory report, respond to specific findings from the initial QA/QC checks by the EU inventory team, send updates if necessary and review the EU inventory report by 15 March.
4. The EEA and its ETC/ACM review final inventory submissions from Member States and their responses to the initial checks, and prepare the final EU GHG inventory and inventory report by 15 April so that they can be submitted to the UNFCCC.
5. A resubmission is prepared by 27 May if needed. In 2016, due to the previously mentioned problems with the UNFCCC's CRF Reporter, the EU's inventory submission has been delayed until mid-June.

ES.2 Summary of greenhouse gas emission trends in the EU

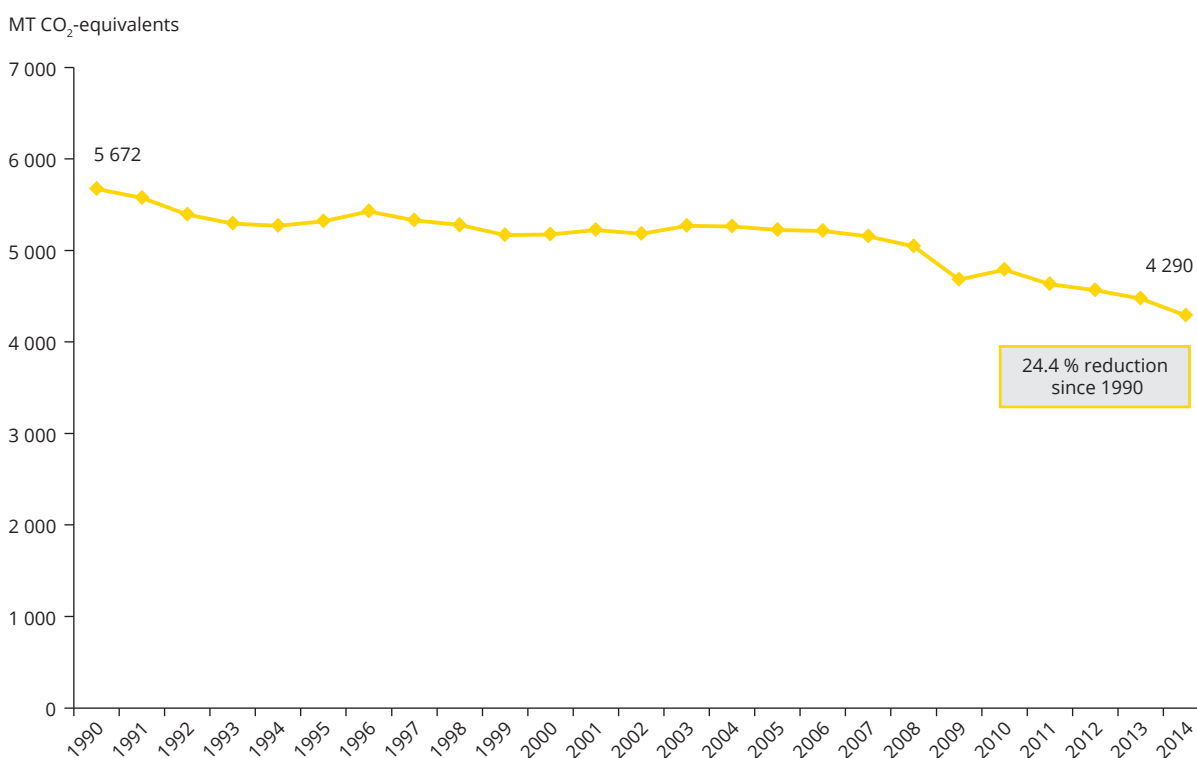
Total GHG emissions — excluding Land Use, Land Use Change and Forestry (LULUCF) — in the EU-28 plus Iceland amounted to 4 290 million tonnes CO₂-equivalent in 2014 (including indirect CO₂ emissions). All GHG emission totals provided in this report include indirect CO₂ emissions ⁽⁴⁾.

In 2014, total GHG emissions were 24.4 % (1 382 million tonnes CO₂-equivalent) below 1990 levels. Emissions decreased by 4.1 % (185 million tonnes CO₂-equivalent) between 2013 and 2014 (Figure ES.1).

Main trends by source category, 1990–2014

In 2014, total GHG emissions (excluding LULUCF) in the EU-28 plus Iceland reached their lowest level since 1990. There has been a progressive decoupling of gross domestic product (GDP) and GHG emissions compared to 1990, with an increase in GDP of about 47 % alongside a decrease in emissions of more than 24 % over the period. This was partly due to growing shares of renewables, less carbon intensive fuels in the energy mix and improvements in energy efficiency. GHG emissions decreased in the majority of sectors between 1990 and 2014, with the notable exception of transport, including international

Figure ES.1 EU-28 plus Iceland GHG emissions (excl. LULUCF)



Notes: GHG emissions data for the EU-28 plus Iceland as a whole refer to domestic emissions (i.e. within the territory), include indirect CO₂, and do not include emissions and removals from LULUCF; nor do they include emissions from international aviation and international maritime transport. CO₂ emissions from biomass with energy recovery are reported as a Memorandum item according to UNFCCC guidelines and are not included in national totals. In addition, no adjustments for temperature variations or electricity trade are considered. The global warming potentials are those from the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).

⁽⁴⁾ According to the UNFCCC reporting guidelines, Annex I Parties may report indirect CO₂ from the atmospheric oxidation of CH₄, CO and NMVOCs. For Parties that decide to report indirect CO₂, the national totals will be presented with and without indirect CO₂. The EU national total includes indirect CO₂ emissions if Member States have reported them. The CRF tables include national totals, including and excluding indirect CO₂ emissions.

transport, and refrigeration and air conditioning. At the aggregate level, emissions reductions were largest for manufacturing industries and construction, electricity and heat production, and residential combustion. A combination of factors explains lower emissions in industrial sectors, such as improved efficiency and carbon intensity as well as structural changes in the economy, with a higher share of services and a lower share of more-energy-intensive industry in the total GDP. The economic recession that began in the second half of 2008 also had an impact on emissions from industrial sectors. Emissions from electricity and heat production decreased strongly since 1990. In addition to improved energy efficiency, there has been a move towards less carbon intensive fuels. Between 1990 and 2014, the use of solid and liquid fuels in thermal stations decreased strongly whereas natural gas consumption almost doubled, resulting in reduced CO₂ emissions per unit of fossil fuel energy generated. Emissions in the residential sector also represented one of the largest reductions. Energy efficiency improvements from better insulation standards in buildings and a less carbon-intensive fuel mix can partly

explain the lower demand for space heating in the EU as a whole over the past 24 years. The year 2014 was also the hottest year on record, leading to substantially lower heat demand. There has also been a very strong increase in CO₂ emissions from biomass combustion, which has contributed to lower GHG emissions in the EU. In terms of the main GHGs, CO₂ was responsible for the largest reduction in emissions since 1990. Reductions in emissions from N₂O and CH₄ have been substantial, reflecting lower levels of mining activities, lower agricultural livestock, and lower emissions from managed waste disposal on land and from agricultural soils.

For a more detailed analysis, see the upcoming EEA working paper "Analysis of key trends and drivers in greenhouse gas emissions in the EU between 1990 and 2014", to be published alongside the final GHG inventory submission to the UNFCCC.

Table ES.1 shows those sources that made the largest contribution to the change in total GHG emissions in the EU plus Iceland between 1990 and 2014.

Table ES.1 Overview of EU-28 plus Iceland source categories whose emissions increased or decreased by more than 20 million tonnes CO₂-equivalent in the period 1990–2014

Source category	Million tonnes (CO ₂ -equivalent)
Road transportation (CO ₂ from 1.A.3.b)	124
Refrigeration and air conditioning (HFCs from 2.F.1)	99
Aluminium production (PFCs from 2.C.3)	- 20
Fugitive emissions from natural gas (CH ₄ from 1.B.2.b)	- 20
Enteric fermentation: dairy cattle (CH ₄ from 3.A.1)	- 21
Agricultural soils: direct N ₂ O emissions from managed soils (N ₂ O from 3.D.1)	- 25
Cement production (CO ₂ from 2.A.1)	- 28
Fluorochemical production (HFCs from 2.B.9)	- 29
Nitric acid production (N ₂ O from 2.B.2)	- 45
Enteric fermentation: cattle (CH ₄ from 3.A.1)	- 47
Commercial/institutional (CO ₂ from 1.A.4.a)	- 56
Adipic acid production (N ₂ O from 2.B.3)	- 57
Manufacture of solid fuels and other energy industries (CO ₂ from 1.A.1.c)	- 62
Coal mining and handling (CH ₄ from 1.B.1.a)	- 75
Managed waste disposal sites (CH ₄ from 5.A.1)	- 76
Iron and steel production (CO ₂ from 1.A.2.a +2.C.1)	- 105
Residential: fuels (CO ₂ from 1.A.4.b)	- 140
Manufacturing industries (excl. iron and steel) (energy-related CO ₂ from 1.A.2 excl. 1.A.2.a)	- 299
Public electricity and heat production (CO ₂ from 1.A.1.a)	- 346
Total	- 1 382

Notes: As the table only presents sectors whose emissions have increased or decreased by at least 20 million tonnes CO₂-equivalent, the sum for each sector grouping does not match the total change listed at the bottom of the table.

Main trends by source category, 2013–2014

Total GHG emissions (excluding LULUCF) decreased by 185 million tonnes CO₂-equivalent (4.1 %) between 2013 and 2014. This significant decrease in emissions in 2014 came with an increase in GDP of 1.4 %. This resulted in a lower GHG-emissions intensity of GDP in the EU in 2014, which can be attributed to the sharp decline in the consumption of heat and electricity. This was in turn triggered by the lower heat demand from households due to the milder winter conditions in Europe. The sustained increase in non-combustible renewables for electricity generation also contributed to lower emissions in 2014. Over 80 % of the total GHG emissions reduction in 2014 was accounted for by lower CO₂ emissions from gas and solid fuels from thermal power stations as well as by lower CO₂ emissions from

gas in the residential and commercial sectors. Primary energy consumption declined overall, with emissions decreasing for all fossil fuels, particularly natural gas, but also for hard coal and lignite. The consumption of renewables increased in terms of primary energy. This led to a further improvement in the carbon intensity of the EU energy system in 2014. Germany and the United Kingdom accounted for about 45% of the total GHG emissions reduction at EU level in 2014.

Table ES.2 shows the source categories making the largest contribution to the change in GHG emissions in the EU-28 plus Iceland between 2013 and 2014.

Table ES.3 gives an overview of total GHG emissions by Member States, illustrating where the main changes occurred.

Table ES.2 Overview of EU-28 plus Iceland source categories whose emissions increased or decreased by more than 3 million tonnes CO₂-equivalent in the period 2013–2014

Source category	Million tonnes (CO ₂ -equivalent)
Road transportation (CO ₂ from 1.A.3.b)	7
Iron and steel production (CO ₂ from 1.A.2.a +2.C.1)	6
Cement production (CO ₂ from 2.A.1)	3
Chemicals: fuels (CO ₂ from 1.A.2.c)	- 3
Petroleum refining (CO ₂ from 1.A.1.b)	- 4
Managed waste disposal sites (CH ₄ from 5.A.1)	- 5
Manufacturing industries (excl. iron and steel) (energy-related CO ₂ from 1.A.2 excl. 1.A.2.a)	- 18
Commercial/institutional (CO ₂ from 1.A.4.a)	- 23
Residential (CO ₂ from 1.A.4.b)	- 66
Public electricity and heat production (CO ₂ from 1.A.1.a)	- 85
Total	- 185

Notes: As the table only presents sectors whose emissions have increased or decreased by at least 3 million tonnes CO₂-equivalent, the sum for each country grouping does not match the total change listed at the bottom of the table.

Table ES.3 GHG emissions in million tonnes CO₂-equivalent (excl. LULUCF)

Member State	1990	2014	2013–2014	Change 2013–2014	Change 1990–2014
	(million tonnes)	(million tonnes)	(million tonnes)	(%)	(%)
Austria	78.8	76.3	- 3.7	- 4.6	- 3.2
Belgium	146.0	113.9	- 5.5	- 4.6	- 22.0
Bulgaria	104.0	57.2	2.3	4.1	- 45.0
Croatia	34.8	24.5	- 0.6	- 2.3	- 29.7
Cyprus	5.7	8.4	0.4	5.4	47.9
Czech Republic	199.3	125.9	- 4.9	- 3.7	- 36.8
Denmark	70.7	51.2	- 4.3	- 7.7	- 27.6
Estonia	40.0	21.1	- 0.6	- 2.8	- 47.3
Finland	71.3	59.1	- 4.2	- 6.6	- 17.1
France	548.1	458.9	- 27.6	- 5.7	- 16.3
Germany	1 246.1	900.2	- 43.3	- 4.6	- 27.8
Greece	104.8	101.4	- 3.3	- 3.1	- 3.3
Hungary	94.1	57.2	- 0.3	- 0.6	- 39.2
Ireland	56.2	58.3	- 0.3	- 0.5	3.7
Italy	521.9	418.6	- 20.3	- 4.6	- 19.8
Latvia	26.2	11.3	0.0	- 0.3	- 56.9
Lithuania	47.1	19.0	- 0.1	- 0.7	- 59.6
Luxembourg	12.9	10.8	- 0.4	- 3.9	- 16.3
Malta	2.0	3.0	0.0	1.0	49.1
Netherlands	222.2	187.1	- 8.0	- 4.1	- 15.8
Poland	472.9	380.3	- 13.2	- 3.3	- 19.6
Portugal	60.7	64.6	- 0.4	- 0.5	6.5
Romania	251.9	109.8	- 0.3	- 0.2	- 56.4
Slovakia	74.7	40.6	- 2.3	- 5.3	- 45.6
Slovenia	18.6	16.6	- 1.7	- 9.5	- 10.9
Spain	285.9	328.9	1.5	0.5	15.0
Sweden	71.9	54.4	- 1.6	- 2.8	- 24.4
United Kingdom	796.6	523.7	- 42.5	- 7.5	- 34.3
EU-28 (Convention)	5 665.5	4 282.1	- 185.0	- 4.1	- 24.4
United Kingdom (KP)	799.8	527.2	- 42.6	- 7.5	- 34.1
Iceland	3.6	4.6	0.1	1.4	26.5
EU-28 + Iceland (KP)	5 672.3	4 290.2	- 185.0	- 4.1	- 24.4

Note: KP, Kyoto Protocol.

ES.3 Summary of emissions and removals by main greenhouse gas

Table ES.4 gives an overview of the main trends in the EU-28 plus Iceland GHG emissions and removals for the period 1990–2014. By far the most important GHG is CO₂, which accounted for 81 % of total EU-28 emissions in 2014, excluding LULUCF. In 2014, EU-28 CO₂ emissions excluding LULUCF were 3 474 million tonnes, which was 22 % below 1990 levels. Compared to 2013, CO₂ emissions decreased by 5 %. Emissions of CH₄, PFCs, and SF₆ decreased in 2014, while those of N₂O, HFCs and NF₃ increased.

More detailed information can be found in Chapter 2.

ES.4 Summary of emissions and removals by main source and sink category

Table ES.5 gives an overview of EU-28 plus Iceland GHG emissions in the main source categories for the period 1990–2014. The most important sector by far is energy (i.e. combustion and fugitive emissions), which accounted for 78 % of total EU emissions in 2014. The second largest sector is agriculture (10 %), followed by industrial processes (9 %). More detailed trend descriptions are included in the individual sector chapters (Chapters 3–7).

Table ES.4 Overview of EU-28 plus Iceland GHG emissions and removals from 1990 to 2014 in million tonnes CO₂-equivalent

Greenhouse gas emissions	1990	1995	2000	2005	2010	2011	2012	2013	2014
Net CO ₂ emissions/removals	4 209	3 922	3 851	3 973	3 620	3 474	3 417	3 332	3 163
CO ₂ emissions (without LULUCF)	4 474	4 216	4 176	4 301	3 946	3 800	3 739	3 657	3 474
CH ₄	748	682	621	553	495	484	480	467	462
N ₂ O	401	364	323	302	257	253	250	251	253
HFCs	29	44	53	72	103	105	108	110	112
PFCs	26	17	12	7	4	4	4	4	4
Unspecified mix of HFCs and PFCs	5.7	5.8	2.1	0.9	0.4	0.2	0.2	0.2	0.2
SF ₆	11	15	11	8	6	6	6	6	6
NF ₃	0.02	0.04	0.12	0.16	0.12	0.13	0.09	0.07	0.07
Total (with net CO₂ emissions/removals)	5 429	5 050	4 873	4 916	4 485	4 327	4 265	4 171	3 999
Total (without CO₂ from LULUCF)	5 694	5 344	5 198	5 244	4 812	4 653	4 587	4 496	4 311
Total (without LULUCF)	5 672	5 320	5 175	5 223	4 791	4 632	4 565	4 475	4 290

Notes: CO₂ emissions include indirect CO₂.

Table ES.5 Overview of EU-28 GHG emissions (in million tonnes CO₂-equivalent) in the main source and sink categories for the period 1990 to 2014

Greenhouse gas source and sink	1990	1995	2000	2005	2010	2011	2012	2013	2014
1. Energy	4 358	4 091	4 019	4 117	3 800	3 651	3 604	3 520	3 328
2. Industrial processes	513	493	448	454	389	384	372	371	375
3. Agriculture	549	479	465	440	428	428	425	429	436
4. Land use, land-use change and forestry	- 244	- 270	- 303	- 307	- 305	- 304	- 300	- 304	- 291
5. Waste	244	250	238	207	170	164	159	151	146
6. Other	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01
Indirect CO ₂ emissions	8.34	7.06	6.30	5.46	4.62	4.50	4.39	4.29	4.10
Total (with net CO₂ emissions/removals)	5 429	5 050	4 873	4 916	4 485	4 327	4 265	4 171	3 999
Total (without LULUCF)	5 672	5 320	5 175	5 223	4 791	4 632	4 565	4 475	4 290

Notes: CO₂ emissions include indirect CO₂.

ES.5 Summary of EU Member State emission trends

Table ES.6 gives an overview of Member State contributions to EU GHG emissions for the period 1990–2014. Member States show large variations in GHG emissions trends.

The overall EU GHG emissions trend is dominated by the two largest emitters, Germany (21 %) and the United Kingdom (12 %), which accounted for one third

of total EU GHG emissions in 2014. By 2014, these two Member States had achieved total domestic GHG emissions reductions of 619 million tonnes CO₂-equivalent compared to 1990, not counting carbon sinks and the use of Kyoto mechanisms.

About 45 % of the EU's net decrease in GHG emissions was accounted for by Germany and the United Kingdom. The main reasons for the favourable trend in Germany were an increase in the efficiency of power and heating plants and the economic

Table ES.6 Overview of EU-28 plus Iceland contributions to total GHG emissions (excl. LULUCF) from 1990 to 2014 in million tonnes CO₂-equivalent

Member State	1990	1995	2000	2005	2010	2011	2012	2013	2014
Austria	78.8	79.8	80.4	92.8	84.9	82.6	79.9	80.0	76.3
Belgium	146.0	154.0	149.2	144.8	133.3	122.8	118.8	119.4	113.9
Bulgaria	104.0	73.5	58.3	62.7	59.8	65.1	60.0	54.9	57.2
Croatia	34.8	24.4	27.0	31.1	29.0	28.4	26.1	25.0	24.5
Cyprus	5.7	7.1	8.4	9.3	9.6	9.3	8.7	8.0	8.4
Czech Republic	199.3	158.1	150.9	148.7	140.2	138.8	134.7	130.7	125.9
Denmark	70.7	78.6	71.1	66.7	63.6	58.4	53.5	55.5	51.2
Estonia	40.0	19.9	17.1	18.3	19.9	20.5	19.4	21.7	21.1
Finland	71.3	71.8	70.0	69.5	75.9	68.0	62.4	63.3	59.1
France	548.1	547.0	554.3	554.8	514.5	487.0	488.4	486.5	458.9
Germany	1 246.1	1 118.5	1041.1	989.9	939.4	920.2	924.7	943.5	900.2
Greece	104.8	110.8	127.7	136.0	118.7	115.7	112.2	104.7	101.4
Hungary	94.1	75.7	73.6	75.9	65.5	63.8	60.1	57.6	57.2
Ireland	56.2	59.9	69.3	70.4	62.3	58.2	58.7	58.5	58.3
Italy	521.9	533.4	554.5	578.9	508.4	494.8	468.7	438.9	418.6
Latvia	26.2	12.8	10.4	11.4	12.3	11.5	11.4	11.3	11.3
Lithuania	47.1	21.6	18.7	22.3	20.1	20.6	20.4	19.1	19.0
Luxembourg	12.9	10.1	9.7	13.0	12.2	12.1	11.8	11.2	10.8
Malta	2.0	2.5	2.6	3.0	3.1	3.2	3.3	3.0	3.0
Netherlands	222.2	232.2	220.3	214.4	213.8	200.0	195.3	195.0	187.1
Poland	472.9	445.2	392.2	396.9	406.2	403.3	396.9	393.4	380.3
Portugal	60.7	71.4	84.0	88.2	70.4	68.9	67.1	65.0	64.6
Romania	251.9	182.8	140.5	146.6	117.0	121.7	120.1	110.0	109.8
Slovakia	74.7	54.7	49.9	51.5	46.5	45.7	43.3	42.9	40.6
Slovenia	18.6	18.8	19.1	20.5	19.6	19.6	19.0	18.3	16.6
Spain	285.9	325.7	385.1	438.5	360.8	360.4	355.4	327.4	328.9
Sweden	71.9	74.0	68.9	67.0	65.0	61.0	57.6	55.9	54.4
United Kingdom	796.6	748.8	713.8	692.1	610.2	562.1	579.2	566.3	523.7
EU-28 (Convention)	5 665	5 313	5 168	5 215	4 782	4 623	4 557	4 467	4 282
United Kingdom (KP)	799.8	752.2	717.3	695.7	613.9	565.7	582.6	569.8	527.2
Iceland	3.6	3.4	4.0	3.9	4.7	4.5	4.6	4.5	4.6
EU-28 + Iceland (KP)	5 672	5 320	5 175	5 222	4 790	4 631	4 565	4 475	4 290

Note: KP, Kyoto Protocol.

restructuring of the five new Länder after the German reunification, particularly in the iron and steel sector. Other important reasons include a reduction in the carbon intensity of fossil fuels (with the switch from coal to gas), a strong increase in renewable energy use and waste management measures that reduced the landfilling of organic waste. Lower GHG emissions in the United Kingdom were primarily the result of liberalising energy markets and the subsequent fuel switch from oil and coal to gas in electricity production. Other reasons include the shift towards more efficient combined cycle gas turbine stations, decreasing iron and steel production and the implementation of methane recovery systems at landfill sites.

ES.6 Other information

International aviation and maritime transportation

GHG emissions from international aviation increased by over 95 % between 1990 and 2014. GHG emissions from international shipping increased by 24 % during the same 24-year period. In 2014, emissions from international aviation overtook emissions from international shipping (138 million tonnes CO₂-equivalent and 135 million tonnes CO₂-equivalent respectively). Together, the two sectors accounted for about 6 % of the total EU GHG emissions in 2014.

For detailed information on emissions from international bunkers, see Section 3.7 of this report.

Information on recalculations

According to UNFCCC Reporting Guidelines, the inventory for the whole time series should be estimated using the same methodologies, and the underlying activity data and emissions factors should be used in a consistent manner, ensuring that changes in emissions trends are not introduced as a result of changes in estimation methods. Thus, recalculations of past emissions data occur every year based on GHG inventory improvements by Member States, and should ensure the consistency of the time series and be carried out to improve the accuracy and/or completeness of the inventory.

Based on EU Member States' GHG inventories in 2016, total EU GHG emissions (excluding LULUCF) for 2013 were 0.3 % lower than those reported in the 2015 GHG inventories. Total EU emissions in 1990, reported in 2016 GHG inventories, were 0.4 % lower than the 1990 emissions reported in 2015 inventories.

For detailed information on recalculations, see Chapter 10 and the sector-specific recalculations in the sectoral chapters of the main report.

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