



# **APPLICATION OF THE EUROPEAN UNION EMISSIONS TRADING DIRECTIVE**

Analysis of national responses under Article 21 of the  
EU ETS Directive in 2019



**EUROPEAN COMMISSION**

Directorate-General for Climate Policy

Directorate C - Climate Strategy, governance and emissions from non-trading sectors

Unit C2 — Governance and Effort Sharing

*Contact: Guillaume Coron*

*E-mail: [guillaume.coron@ec.europa.eu](mailto:guillaume.coron@ec.europa.eu)*

*European Commission  
B-1049 Brussels*

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# **APPLICATION OF THE EUROPEAN UNION EMISSIONS TRADING DIRECTIVE**

Analysis of national responses under Article 21 of  
the EU ETS Directive in 2019

Oliver Gans  
Hubert Fallmann  
Machtelt Oudenes  
Christian Heller  
Eliska Bystricky  
Sjors van Iersel  
Monique Voogt

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## Abbreviation

AER	Annual Emission Report
AO	Aircraft operator
AVR	Accreditation and Verification Regulation
CA	Competent Authority
CEMS	Continuous emission measurement systems
CIMs	Commission Decision determining transitional Union-wide rules for harmonised free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC
CMR	Carbon Market Report
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> (eq)	Carbon dioxide equivalent
CORSIA	Carbon Offsetting Reduction Scheme for International Aviation
CRF	Common Reporting Format
EEA	European Environment Agency
EEA-31	European Union Member States and Iceland, Liechtenstein and Norway
ETS SF	Eurocontrol Emissions Trading Scheme Support Facility
EU	European Union
EUA	European Union allowance
EU ETS	European Union Emissions Trading System
GHG	Greenhouse gas
ICAO	International Civil Aviation Organisation
IED	Industrial Emissions Directive
kt	Kilotonne
LRF	Linear reduction factor
MP	Monitoring Plan
MRR	Monitoring and Reporting Regulation
MRV	Monitoring, Reporting and Verification
MRVA	Monitoring, Reporting, Verification and Accreditation
MS	Member States
Mt	Megatonne
MW	Megawatt
N <sub>2</sub> O	Nitrous oxide
NAB	National accreditation body
PFC	Perfluorocarbon
PJ	Petajoule



SET	Small Emitter Tool
VAT	Value added tax
VOS	Verification Opinion Statement
t	tonne
TJ	Terajoule
UNFCCC	United Nations Framework Convention on Climate Change

## EXECUTIVE SUMMARY

This is a technical report that analyses and evaluates the national responses under Article 21 of the EU Emissions Trading System Directive (EU ETS Directive<sup>1</sup>). It takes into consideration information reported for 2018 and also takes into account responses from previous years of the third period (from 2013).

MS reported 10 609 installations in the EU ETS for 2018, representing a 0.7% decrease from the number of installations in 2017. The total emissions of stationary installations decreased to 1.431 Mt CO<sub>2 (eq)</sub> whereas the emissions of aircraft operators increased to 67.5 Mt CO<sub>2 (eq)</sub>. Reporting by Member States (MS) showed high levels of completeness and timeliness similar as in previous years. Moreover, continuous improvement can be observed in data quality for the reporting of fuel emissions and especially the fuel consumption.

The EU ETS Directive is implemented well. This is reflected especially in the correct use of default and literature values, the completeness of sampling plans, the application of the highest tier approach by category B and C installations<sup>2</sup>, the decreasing number of installations employing the fall-back approach and the low number of verified annual emission reports (AER) rejected by Competent Authorities. However, there is still room for improvement on how to complete the data in the Article 21 questionnaire, in particular regarding processes in the compliance cycle that are time consuming and can last more than one year (e.g. information on conservative estimates and penalties). As these processes can cover multiple years, it is difficult to pinpoint the year to which the data relates. This complicates the analysis of the information on these processes. Furthermore, certain items in the questionnaire have been interpreted differently by Member States such as the number of small emitters using the Small Emitter Tool and the Eurocontrol Support Facility. In some MS, no improvement reports were required although some outstanding issues had been mentioned in the verification reports.

### Installations, aircraft operators and emissions in the EU ETS

According to the Article 21 reports submitted in June 2019 by 28 EU MS plus Iceland, Liechtenstein and Norway<sup>3</sup> (EEA-31), a total of 10 609 installations were reported in the EU ETS for 2018, 78 installations less than in 2017, showing a consistent decreasing trend over the years. The proportion of installations per category remained roughly the same as in 2017, with 72% of

<sup>1</sup> Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Union and amending Council Directive 96/61/EC as amended

<sup>2</sup> ETS installations are classified in the following categories, according to their average verified annual emissions in the trading period immediately preceding the current trading period (with the exclusion of CO<sub>2</sub> stemming from biomass and before subtraction of transferred CO<sub>2</sub>):

- Category A installations, when annual emissions are equal to or less than 50 000 tonnes of CO<sub>2 (eq)</sub>
- Category B installation, when annual emissions are more than 50 000 tonnes of CO<sub>2 (eq)</sub> and equal to or less than 500 000 tonnes of CO<sub>2 (eq)</sub>
- Category C installation, when annual emissions are more than 500 000 tonnes of CO<sub>2</sub>

<sup>3</sup> Whenever “Member States” (or “MS”) are mentioned in this report, it usually refers to the 2019 28 EU Member States plus Iceland, Liechtenstein and Norway.

installations in category A (7 643), 21% in category B (2 209), 7% in category C (757), and a subset of 57% installations with low emissions included in category A (6 069).

Based on the evaluation of the Article 21 questionnaire responses, the total emissions from fossil fuel combustion were 1 431 Mt CO<sub>2 (eq)</sub> for all MS in 2018. This is a decrease of 50 Mt CO<sub>2 (eq)</sub> compared to 2017 and 244 Mt CO<sub>2 (eq)</sub> compared to 2013 resulting in a 17% decrease. The most important fuel types remained natural gas, lignite and hard coal. For the first time, all 31 countries reported aggregation of activities in accordance with CRF categories for national greenhouse gas inventory system, enabling the estimation of total process emissions, which turns out to be approximately 296 Mt CO<sub>2 (eq)</sub>. Public electricity and heat production and iron and steel production are the most important CRF categories.

Biomass is commonly used throughout the EU ETS as 2 187 installations from 29 countries employed biomass, generating 1 864 PJ in energy consumption and 161 Mt CO<sub>2 (eq)</sub> emissions. The emissions of non zero-rated biomass are still minimal with about 1.2 Mt CO<sub>2 (eq)</sub> accounting for less than 1% of total emissions. Therefore 99% of these emissions either satisfied the sustainability criteria<sup>4</sup> or were not subject to sustainability criteria. The combustion sector contributed to 51% of the zero-rated emissions from biomass across all reporting countries, followed by the production of pulp with 20% and the production of paper or cardboard with 19%.

In 2018, total EU ETS emissions from waste (as fuel or input material) amounted to approximately 28 Mt CO<sub>2 (eq)</sub>, a similar amount to 2017. Italy reported the largest emissions from waste use (8.5 Mt CO<sub>2 (eq)</sub>). As in previous years, Sweden, with 13% of the total verified emissions, reported the highest proportion in use of waste as a fuel or input material.

According to the Article 21 reports, Continuous Emissions Measurement Systems (CEMS) are rarely used. Only 181 installations (less than 1.7%) in 23 countries reported the use of continuous emissions measurement systems representing 56 Mt CO<sub>2 (eq)</sub>. This corresponds to 3.3% of the total verified emissions.

Across all countries, 619 aircraft operators participated in the EU ETS (compared to 544 in 2017, and 504 in 2016). Greece shows a very high increase in the number of aircraft operators compared to previous years. About 40% of the aircraft operators in the EEA countries are small emitters, 51.1% of aircraft operators operate commercial flights, and 48.9% non-commercial.

The total aggregate emissions of all EU ETS flights<sup>5</sup> based on evaluation of the answers to Article 21 questionnaires amounted to 67.5 Mt CO<sub>2 (eq)</sub>. This is an increase of 4.2% (2.8 Mt CO<sub>2 (eq)</sub>) compared to the data reported in 2017. In total, 13.5 Mt CO<sub>2 (eq)</sub> (20%) resulted from domestic flights representing an increase of 16% (2 Mt CO<sub>2 (eq)</sub>) compared to 2017. Although the aviation sector's emission has grown in the four years of Article 21 reporting, the growth seems to decelerate. Aviation emissions have contributed to approximately 4%

<sup>4</sup> During phase 3 of the EU ETS, sustainability criteria apply to biofuels and bioliquids. No sustainability criteria apply to solid biomass or gaseous biomass (except biogas for road transport).

<sup>5</sup> The current scope of the EU ETS is according to Regulation No 421/2014

of the total emissions in the EU ETS (including stationary installations and aviation) for reporting year 2018.

### **Member States reported more complete and higher-quality information in 2018**

This year timeliness was not as good as the last few years, partly because of the additional work of CAs in preparation for the allocations of emissions allowances for the 4<sup>th</sup> trading period, for which the phase of intensive communication with operators overlapped with the preparation of the Article 21 questionnaire. The 30<sup>th</sup> June deadline for country submissions was met by 24 countries. All other countries' reports were submitted and available at the latest by the 31<sup>st</sup> July 2019.

Completeness of country reports had already reached high levels in previous years, and has remained at this high level or has increased even further. The average completeness level within EEA-31 was 99.8% (the same than the year before) with a minimum completeness level of 97%. The number of countries with 100% completeness remained constant at 25 countries.

### **Satisfactory implementation of the EU ETS Directive and related requirements**

This report outlines in which areas the EU ETS Directive, the MRR and AVR has been well implemented and in which areas there is room for further improvement.

Both the MRR and the AVR have some built-in flexibilities and simplifications that allow MS to reduce the operator's administrative burden and to overcome possible technical or cost effective difficulties in monitoring and reporting. One example is the use of default and literature values under specific conditions. The analysis of the Article 21 questionnaire responses shows that default and literature values were mostly applied to commercial fuel types such as natural gas and fuel oil. These fuels have a high consumption rate and are often used in Category A installations where the use of default values seemed to be justified and in accordance to the MRR.

Sampling plans are a key element in the determination of calculation factors and are required for laboratory analysis. 26 MS reported that sampling plans are complete and in conformance with the requirements of Articles 33 and 34 of the MRR. Article 21 reports also show that operators are less inclined than the years before to apply lower frequencies of analysis, with only 116 cases. The number of MS that encountered problems or reported issues concerning sampling plans decreased from 6 to 4.

The number of installations (category B and C) applying a derogation from the highest tiers decreased by a third between 2013 and 2018. In 2018, 97 category C installations did not apply the highest tier affecting 212 source streams. The number of category B installations with at least one derogation was also significantly reduced, from 471 in 2017 to 424 in 2018. This means that in 2018, 12.8% of category C installations (compared to 14.7% in 2013 and 13.7% in 2017) and 19% of category B installations (compared to 28% in 2013 and 21% in 2017) did not apply the highest tier in one of their source streams.

In 2018, 11 countries (no changes from the previous year) reported use of the fall-back approach. However, the number of installations for which this fall back approach was applied has slightly increased since 2016 from 34 to 38. In contrast to the increase in number of installations, the estimated emissions covered by fall-back approaches amounted to 2.8 Mt CO<sub>2 (eq)</sub>, which means a reduction of 45% or 2.3 Mt CO<sub>2 (eq)</sub> compared to the data for 2016.

Annual emission reports are verified by verifiers accredited in accordance with the AVR to ensure that emissions data have been monitored in accordance with the monitoring plan and the MRR. All MS reported that they perform additional checks to evaluate emissions and verification reports. As a result of the checks, 112 verified emission reports were rejected. This represents a low number of incidents compared to the total number of emission reports, which implies that the emission reporting process seems to be generally in compliance with the MRR and that the verification process appears to be working. However, there are big differences in how MS report this data. 15 MS had not rejected any of their emission reports during the third phase and 8 MS had rejected less than five reports. On the other hand, Lithuania and Portugal have been responsible for 71% and 83% of the reports that have been rejected in the EU in the years 2017 and 2018, respectively.

### **Areas for improvement**

Some shortcomings in the questionnaire were detected, which make it difficult to analyse and interpret some MS responses. The assessment of lengthy processes, such as conservative estimates or penalties are sometimes difficult and incomplete. In these cases, only a best estimate can be provided. When the monitoring methodology is based on mass balance, a proxy value for the net caloric value is often not provided and as a consequence, the energy consumption cannot be calculated. Different interpretation with respect to the use of the small emitters tool and the Eurocontrol Support Facility led in some cases to inconsistent results. Other areas for improvement include the submission of improvement reports, as well as the reporting of activities in accordance with CRF. Simplified approaches such as the simplified monitoring plan according to Article 13 of the MRR could be used more often.

# 1 INTRODUCTION

## 1.1 European Union Emissions Trading System

The European Union Emissions Trading System (EU ETS) is a cap and trade system for greenhouse gas (GHG) emissions of certain stationary installations and aircraft operators operating in EU Member States (MS) plus Iceland, Liechtenstein and Norway. It aims to reduce anthropogenic GHG emissions in a cost-effective and economically efficient way. The EU ETS sets a cap on the total amount of carbon dioxide (CO<sub>2</sub>) and other GHGs<sup>6</sup> that can be emitted by power plants, manufacturing installations and aircraft operators obligated under the system. The cap decreases over time so that total annual GHG emissions, as covered by the system, decrease accordingly. The EU ETS covers approximately 40% of total EU GHG<sup>7</sup> emissions and has been - until the start of the Chinese ETS - the world's biggest operating emissions trading market, accounting for over three quarters of international carbon trading.

Within the system, companies can buy and sell emission allowances as needed. They can also use limited amounts of international credits from GHG emission-reduction projects. Each allowance gives the holder the right to emit 1 tonne (t) of CO<sub>2</sub> or, subject to their permitted activity, the equivalent amount of nitrous oxide (N<sub>2</sub>O) or perfluorocarbons (PFCs).

After each year, a company must surrender enough allowances to cover all of its verified emissions subject to the EU ETS, otherwise fines are imposed. If a company reduces its emissions, it can keep the resulting spare allowances to cover its future needs or sell these allowances to another company that is short of allowances.

## 1.2 The EU ETS Directive and related policy developments

The EU ETS was established by the Emissions Trading System Directive (Directive 2003/87/EC). So far, emissions trading under the EU ETS has taken place as part of three 'trading periods': phase 1 (2005-2007), phase 2 (2008-2012) and phase 3 (2013-2020). The first trading period constituted a process of 'learning by doing.' However, the number of allowances, based on estimated needs, turned out to be high. Iceland, Norway and Liechtenstein joined in the second phase (from 2008). The number of allowances was reduced by 6.5% for that period, but the economic downturn depressed emissions, and thus demand for allowances, by even more. Aviation was brought into the system on 1<sup>st</sup> January 2012. In the third period the biggest changes have been the

<sup>6</sup> Nitrous oxide (N<sub>2</sub>O) and perfluorocarbons (PFCs), but also other GHGs under Annex II of the EU ETS Directive.

<sup>7</sup> According to Eurostat the total greenhouse gas emissions (including international aviation and indirect CO<sub>2</sub>, excluding LULUCF) for the EU-28 plus Iceland, Liechtenstein and Norway were 4 501.3 Mt CO<sub>2</sub>(eq) in 2016 ([https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Greenhouse\\_gas\\_emission\\_statistics&redirect=no#Trends\\_in\\_greenhouse\\_gas\\_emissions](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Greenhouse_gas_emission_statistics&redirect=no#Trends_in_greenhouse_gas_emissions)). In 2016 1 818.1 Mt CO<sub>2</sub>(eq) were reported in the EU ETS including stationary installations and aviation as verified emissions.

introduction of an EU-wide cap<sup>8</sup> on emissions (reduced by 1.74% each year) and a progressive shift towards auctioning of allowances in place of cost-free allocation. Croatia joined the EU ETS on 1<sup>st</sup> January 2013.

In March 2018 Directive 2003/87/EC (to enhance cost-effective emission reductions and low-carbon investments) and Decision (EU) 2015/1814<sup>9</sup> on the revision of the EU ETS for its fourth phase (2021-2030) were amended in line with the EU's 2030 climate and energy policy framework. This aims to reduce EU ETS emissions by 43% compared to 2005 mainly by a new annual emissions reduction rate – a linear reduction factor (LRF) of 2.2% from 2021 onwards (compared to the current 1.74%). Furthermore an agreement<sup>10</sup> for linking the Swiss and EU emission trading systems was reached in 2017 which was ratified in December 2019<sup>11</sup>.

Since 2013 (start of phase 3), auctioning has been the default method of allocating emission allowances. This means that businesses have to buy an increasing proportion of their allowances at auction or on the secondary market. In sectors other than power generation, a transition to auctioning takes place progressively over time. Allowances not allocated for free are to be auctioned. This share will increase in subsequent years, as the volume of allowances allocated for free decreases faster than the cap. In total, the Commission estimates that 57% of the total amount of allowances will be auctioned during 2013-2020, while the remaining allowances are available for free allocation.

The aviation sector has been included in the EU ETS since 1 January 2012<sup>12</sup>. Originally, this was to cover all flights departing and/or arriving at airports within EU ETS-participating countries. However, since 2013, only flights departing and arriving at airports in these countries have been included in the EU ETS<sup>13</sup>. For practical reasons surrender of emission allowances and reporting for 2013 was not required until 2015<sup>14</sup>. The reduced scope of the EU ETS was to help facilitate the negotiation of a global market-based mechanism for international aviation emissions. In September 2016, the International Civil Aviation Organisation (ICAO) agreed on a global market-based measure for international aviation (CORSIA, or the Carbon Offsetting Reduction Scheme for International Aviation) to achieve a collective medium-term global aspirational goal of keeping global net CO<sub>2</sub> emissions from international aviation at the same level from 2020 (so-called 'carbon neutral growth from 2020'). Subsequently, EU

<sup>8</sup> For the first two phases the cap on allowances was set at national level through national allocation plans (NAPs).

<sup>9</sup> Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments, and Decision (EU) 2015/1814

<sup>10</sup> [http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2017.322.01.0003.01.ENG&toc=OJ:L:2017:322:TOC](http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2017.322.01.0003.01.ENG&toc=OJ:L:2017:322:TOC)  
<sup>11</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A2017A1207%2801%29>

<sup>12</sup> Directive 2009/29/EC of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community

<sup>13</sup> Regulation (EU) No 421/2014 of the European Parliament and of the Council of 16 April 2014 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in view of the implementation by 2020 of an international agreement applying a single global market-based measure to international aviation emissions

<sup>14</sup> For this reason the Member States' Article 21 reports before 2015 covered only partly the aviation related topics, and cannot be used for time series in this report.



legislators agreed to extend the current reduced scope under the EU ETS until 2023<sup>15</sup>.

### 1.3 Reporting on the application of the EU ETS Directive in accordance with Article 21

The “Article 21 reports” are one key in ensuring the transparency of the EU ETS and consequently gaining the trust of participants as well as of observers. The reports allow the Commission and other stakeholders to have a consistent overview of the implementation of MRVA and other requirements in the EU ETS, and provide a solid basis for exchange of information on EU ETS implementation. Moreover, they help the Commission to support effective and consistent implementation of the EU ETS across the MS, which is essential for avoiding distortions in the European carbon market and to provide all operators and aircraft operators with a fair and level playing field.

Article 21(1) of the EU ETS Directive stipulates that each MS must submit an annual report to the European Commission on how this Directive is being applied in their country. The reports are based on a questionnaire that is set out in Commission Implementing Decision 2014/166/EU<sup>16</sup>. The Article 21 questionnaire was specifically updated for use in the third phase of the EU ETS. Furthermore an electronic reporting system (hosted by the EEA<sup>17</sup>) was introduced, which translates the questionnaire into a web-based form<sup>18</sup>. The Commission provided an explanatory note<sup>19</sup> for MS to aid better understanding of the background and interpretation of questions. These measures have led to significant improvements in the quality, timeliness and completeness of Article 21 country reports over time.

As a second element of information exchange, Article 21(2) requires the Commission to publish a report on the basis of the country reports. The Commission has fulfilled this requirement in the past partly by requesting that the European Environment Agency (EEA) compile technical reports<sup>20</sup>. In 2017 the Commission published the call for tender “Service Contract for Implementation of EU ETS: Analysis of national responses to Article 21 of the EU ETS Directive” (CLIMA.C.2/SER/2017/0005) and in 2019 a service request under the framework contract (CLIMA.001/FRA/2015/014) asking for delivering a report “Implementation of EU ETS: Analysis of national responses to Article 21 of the EU ETS Directive submitted in 2019”. The projects were awarded to a

<sup>15</sup> Regulation (EU) 2017/2392 of the European Parliament and of the Council amending Directive 2003/87/EC to continue current limitations of scope for aviation activities and to prepare to implement a global market-based measure from 2021, <http://data.europa.eu/eli/reg/2017/2392/oj>

<sup>16</sup> Commission Implementing Decision 2014/166/EU of 21 March 2014 amending Decision 2005/381/EC as regards the questionnaire for reporting on the application of Directive 2003/87/EC of the European Parliament and of the Council (notified under document C(2014) 1726) (OJ L 89, 25.3.2014, p. 45-76)

<sup>17</sup> All Article 21 reports are available from <http://rod.eionet.europa.eu/obligations/556/deliveries>

<sup>18</sup> With an XML file generator for transparent long-term data storage.

<sup>19</sup> [https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/explanatory\\_note\\_art\\_21\\_en.pdf](https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/explanatory_note_art_21_en.pdf)

<sup>20</sup> Such reports exist for the first phase of the EU ETS as well as for the third phase (MS reporting years 2014 to 2016). During the second trading phase the Article 21 questionnaire was not adjusted to the new requirements of the MRG 2007, and consequently Article 21 in general received little attention.



team consisting of Umweltbundesamt GmbH (Austria), SQ Consult B.V (The Netherlands) and Navigant (The Netherlands). The current technical report (covering EU ETS implementation in 2018 as reported under Article 21 in 2019) is the third report produced by this team and continues support to the Commission in fulfilling the requirement of Article 21(2).

This report covers submissions for the reporting year 2018 by the EU MS as well as Iceland, Liechtenstein and Norway that are part of the European Economic Area and that also participate in the EU ETS (EEA-31). Where necessary for better understanding, the project team makes added reference to information from sources other than the Article 21 reports. In recent years, based on the requirements of Article 10(5) of the EU ETS Directive for the third phase, the “Carbon Market Reports” (CMRs)<sup>21</sup> by the Commission contain information on the wider functioning of the European carbon market. They build on information sources other than the Article 21 reports, and thereby combine the reports pursuant to Articles 10(5) and 21(2) of the Directive. These reports provide valuable inputs to the Competent Authorities (CA) and other stakeholders in the MS to increase their wider understanding of the European carbon market and, where needed, learn lessons on specific implementation choices in other MS.

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<sup>21</sup> Carbon Market Report 2012:  
[https://ec.europa.eu/clima/sites/clima/files/ets/reform/docs/com\\_2012\\_652\\_en.pdf](https://ec.europa.eu/clima/sites/clima/files/ets/reform/docs/com_2012_652_en.pdf)  
 Carbon Market Report 2015:  
[https://ec.europa.eu/clima/sites/clima/files/strategies/progress/docs/com\\_2015\\_576\\_annex\\_1\\_cover\\_en.pdf](https://ec.europa.eu/clima/sites/clima/files/strategies/progress/docs/com_2015_576_annex_1_cover_en.pdf)  
 Carbon Market Report 2016:  
[https://ec.europa.eu/commission/sites/beta-political/files/report-eu-carbon-market\\_en.pdf](https://ec.europa.eu/commission/sites/beta-political/files/report-eu-carbon-market_en.pdf)  
 Carbon Market Report 2017:  
[https://ec.europa.eu/commission/sites/beta-political/files/report-functioning-carbon-market\\_en.pdf](https://ec.europa.eu/commission/sites/beta-political/files/report-functioning-carbon-market_en.pdf)  
 Carbon Market Report 2019:  
[https://ec.europa.eu/clima/sites/clima/files/strategies/progress/docs/com\\_2019\\_557\\_en.pdf](https://ec.europa.eu/clima/sites/clima/files/strategies/progress/docs/com_2019_557_en.pdf)

## 2 REPORTING BY MEMBER STATES

### 2.1 Timeliness of the Member State responses

The deadline for countries to submit their responses was 30 June 2019. 24 countries submitted before this date and were thus on time, which is 3 fewer countries than in the previous year. All seven remaining countries submitted their reports by the 31<sup>st</sup> of July 2019, a similar timing as in 2018. The overall improvement of submission timeliness seen since the start of phase 3 of the EU ETS is shown in Figure 2.1-1. This year timeliness was not as good as the last few years, at least in part due to the burden on the CAs in preparing for the allocations of emissions allowances for the 4<sup>th</sup> trading period, for which the phase of intensive communication with operators overlapped with the preparation of the Article 21 questionnaire. Figure 2.1-1 also shows that both the number and submission delay of corrections were significantly higher in the early years of phase 3. After a steady decline, in recent years the numbers have picked up again. At least a part of these corrections were triggered by bilateral discussions between the countries and the lead author of this report, in which questions on correctness and interpretation of the submitted Article 21 data is discussed, and in which often improvements are identified. Therefore the observed increase in corrections should be seen as progressive improvement of data quality of the Article 21 submissions.

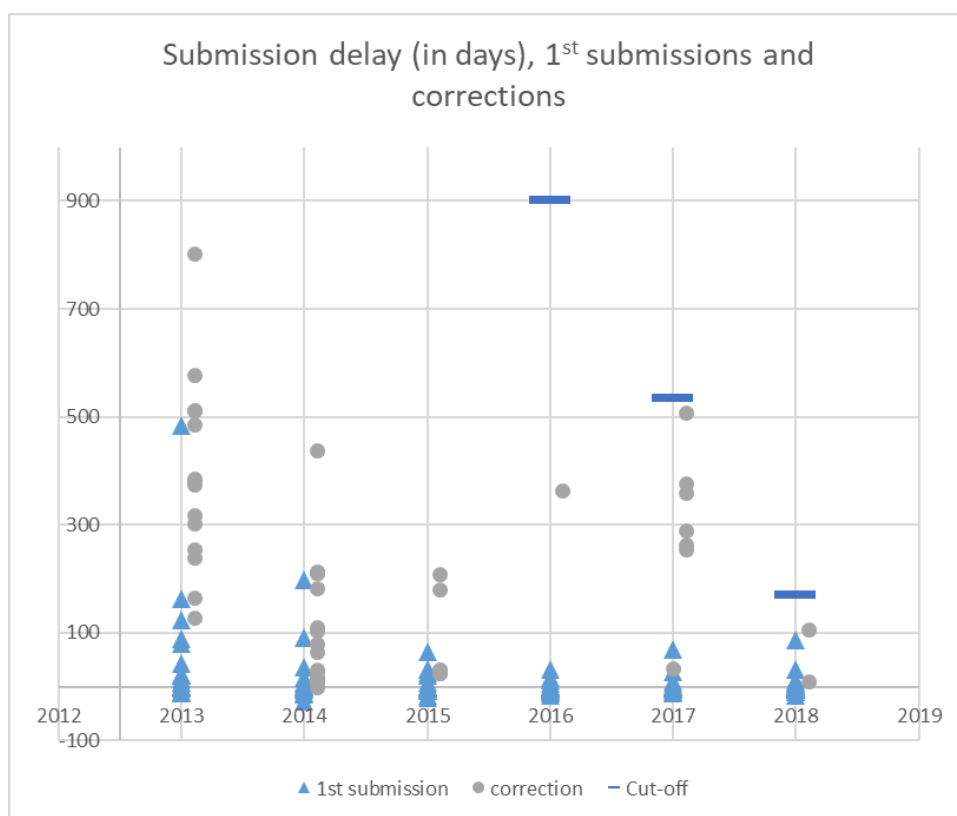


Figure 2.1-1 Difference (in number of days) between the country report submission deadline and the actual submissions of the first version and subsequent corrections, for each reporting year in the latest questionnaire format – the ordinate indicates the number of days after the deadline until the submission of either the first or the corrected version of the questionnaire. This figure was last updated on 15 November 2019, this cut-off date has been indicated in the figure as blue lines. If any future corrections were to be submitted and added to this chart, these would be shown above the blue lines.

## 2.2 Completeness of the Member State responses

Completeness of country reports had already reached high levels in previous years, and underwent a small increase in 2018 reporting. Completeness was assessed by applying the methodology developed by the EEA for previous reports analysing Article 21 responses<sup>22</sup>, and is based on calculating the percentage completed of the 66 high-level mandatory questions. The completeness percentages for each year of phase 3 per country are presented in

. The average completeness level within the EEA-31 was 99.7%, compared to 99.6% last year. Also the minimum completeness level rose to 97%. The number of countries with 100% completeness remained at 25. It should be noted that some of the missing data points are easily explained and don't impact the analysis. A detailed analysis of missing data points is included below the table.

<sup>22</sup> EEA Report 04/2017: Application of the European Union Emissions Trading Directive. Analysis of national responses under Article 21 of the EU ETS Directive in 2016. Download under <https://www.eea.europa.eu/publications/application-of-the-european-union>

Table 2.2-1 Completeness (%) of country submissions regarding the years to which the data related: 2013 to 2017.

Country	2013	2014	2015	2016	2017	2018
Austria	100%	98%	100%	100%	100%	100%
Belgium	100%	98%	100%	100%	100%	98%
Bulgaria	92%	97%	100%	100%	100%	100%
Croatia	100%	100%	100%	100%	100%	100%
Cyprus	98%	100%	100%	100%	100%	100%
Czech Republic	98%	98%	98%	100%	100%	100%
Denmark	100%	98%	100%	100%	100%	100%
Estonia	97%	98%	98%	98%	100%	100%
Finland	100%	100%	100%	100%	100%	100%
France	91%	94%	91%	98%	100%	100%
Germany	98%	100%	100%	100%	100%	100%
Greece	97%	97%	98%	100%	100%	100%
Hungary	100%	100%	100%	100%	100%	100%
Iceland	98%	100%	98%	98%	98%	98%
Ireland	100%	100%	100%	100%	100%	100%
Italy	100%	97%	100%	100%	100%	98%
Latvia	98%	100%	100%	100%	98%	100%
Liechtenstein	95%	95%	94%	95%	95%	97%
Lithuania	98%	100%	100%	98%	98%	98%
Luxembourg	95%	98%	98%	97%	100%	100%
Malta <sup>23</sup>	95%	95%	97%	100%	98%	98%
Netherlands	98%	98%	98%	100%	98%	100%
Norway	97%	98%	97%	100%	100%	100%
Poland	86%	98%	98%	100%	100%	100%
Portugal	85%	98%	100%	100%	100%	100%
Romania	100%	100%	100%	100%	100%	100%
Slovakia	100%	100%	100%	100%	100%	100%
Slovenia	97%	98%	100%	100%	100%	100%
Spain	100%	100%	100%	100%	100%	100%
Sweden	97%	98%	98%	100%	100%	100%
United Kingdom	98%	100%	100%	100%	100%	100%
EU28	97.2%	98.7%	99.2%	99.7%	99.8%	99.8%
EEA-31	97.2%	98.6%	98.9%	99.6%	99.6%	99.7%

<sup>23</sup> Question 5.17, which seems to be lowering Malta's completeness rating to 98%, does not allow complete response to the question (using the provided table) in the case that no installations under any activity use biomass

The question in the Article 21 questionnaire that generated the most incomplete responses this year was question 5.7a on literature and default values that were used to calculate emissions. Three countries<sup>24</sup> did not complete that question. It could be that some of these countries do not have installations that use literature or default values. However, this was not indicated in the responses to the question. Questions on biomass emissions were left empty by Liechtenstein and Malta<sup>23</sup> for stationary installation (Question 5.17) and Iceland for aviation (Question 5.23). Malta indicated in Question 14 that there are no installations that use biomass. It is possible that not having any applicable cases is also the reason for the blank answers of the other two countries. Italy didn't fill in the name of the competent authority that is the focal point referred to in Article 69(2) of Regulation (EU) No 600/2012, but did enter the abbreviation for this entry in question 2.3, so there is no real impact of not answering this question.

In the entire third trading period the following questions resulted in the most incomplete responses. The three questions that were the most incomplete in the entire phase 3 have only 1 or 3 countries missing in 2018:

- Question 5.7 on literature and default values: This question was incomplete 26 times in the third phase. Three countries did not complete the question in 2018.
- Question 5.23 on aircraft operators using biofuels. This question was incomplete 23 times in the third phase. One country did not complete the question in 2018.
- Question 5.6 on the total emissions per CRF category. This question was incomplete 17 times in the third phase. Since 2016 all countries have completed it.

It can be concluded that completeness has significantly improved since the beginning of the third trading period, has meanwhile reached high levels, with slight improvements each year.

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<sup>24</sup> Belgium, Liechtenstein and Lithuania

### 3 COUNTRY INFORMATION ON EU ETS IMPLEMENTATION

#### 3.1 Organisation of Competent Authorities and National Accreditation Bodies

There are four types of players in the EU ETS, all having their own roles and responsibilities: operators, verifiers, Competent Authorities and National Accreditation Bodies. Competent authorities are designated by Member States according to Article 18 of the EU ETS Directive. The National Accreditation Bodies are established under Accreditation Regulation 765/2008 and are a member of the European Cooperation for Accreditation.

How Competent Authorities are organised depend very much on the legal and administrative set-up in an individual MS. Since 2016 there have been some changes in the organisation of Competent Authorities and the allocation of EU ETS activities to these authorities. In Sweden for example all MRV and inspection responsibilities have been transferred from the regional authorities to the Swedish Environmental Protection Agency. This transfer took effect from 1 January 2018 and was introduced to improve harmonisation across regions. In the last years more countries undertook several measures to centralise their EU ETS activities by transferring responsibilities from regional authorities to the central authority. In 2014 Lithuania transferred responsibilities to the central authority. In 2013 this was the case for Germany.

The degree of centralisation varies between Member States. Currently Denmark, Ireland, Iceland, Liechtenstein and Germany<sup>25</sup> have a highly centralised system in which one Competent Authority deals with all activities related to EU ETS. This includes the allocation of emission allowances, auctioning, policy making, MRV activities<sup>26</sup> as well as inspection and enforcement activities. For aviation such a centralised system is in place for Denmark, Estonia, Ireland, Iceland, Germany, Spain and Finland showing that the organisation of the Competent Authority for installations is not always the same as for aviation.

The majority of the countries (18) have a centralised system for MRV activities and inspection/enforcement while the allocation and policy making or auctioning are allocated to a different authority.

In Germany, there are local or regional authorities responsible for permitting but one centralised Competent Authority for approving the monitoring plans, dealing with changes to the monitoring plan, reviewing emission reports and approving improvement reports. In Lithuania, Czech Republic and Bulgaria regional or local authorities or inspectorates are involved in inspection whereas the rest of the MRV activities is carried out by a central authority. Ten countries have a decentralised system where multiple local and regional authorities are involved in inspection and MRV activities: e.g. approving monitoring plans, reviewing emission reports and verification reports. The decentralisation of MRV activities

<sup>25</sup> Although permitting is carried out by regional authorities.

<sup>26</sup> Approval of monitoring plans, addressing notifications of changes to the monitoring plan (including approval of significant changes to the monitoring plan), review of emission reports and verification reports, approval of improvement reports.

is in most cases influenced by the fact that local and regional authorities are also responsible for other environmental instruments such as activities related to the Industrial Emissions Directive. The type of decentralisation differs between those nine countries. The table below shows how many local or regional authorities are involved for those countries.

Country	Number of local or regional CA	MRV responsibilities
Austria	94 local authorities	Permitting, approval of monitoring plans, assessment of notifications of changes to the monitoring plan and approval of improvement reports. The review of emission reports is done by the central authority
Belgium	3 regional authorities	Each authority is responsible for all MRV activities in their region, except permitting.
Finland	1 local authority	Very small authority to address MRV activities in Åland. The rest is carried out by the central authority
France	13 regional counties which constitutes of 101 departments	All MRV activities
Latvia	8 regional authorities	All MRV activities
Poland	400 local authorities	Permitting, approval of monitoring plans, assessment of notifications of changes to the monitoring plan and approval of improvement reports. The review of emission reports is done by the central authority
Portugal	2 local authorities	Very small local authorities to address MRV activities in Madeira and Azores. The rest is carried out by the central authority
Slovak Republic	50 regional authorities	All MRV activities
Spain	19 regional authorities	All MRV activities
UK	5 regional authorities	All MRV activities

In Austria, Spain, Finland, France, Greece, Latvia, Poland, Portugal and the Slovak Republic Competent Authorities that are responsible for installation's MRV activities are organised differently than for aviation. There are often administrative or political reasons behind this. The administration of activities related to air transport is in some cases assigned to a particular Ministry of Transport or air traffic organisation which caused MS to assign the MRV activities to that organisation.

According to Article 54(1) of the Accreditation and Verification Regulation (AVR) accreditation of verifiers must be carried out by a National Accreditation Body

established pursuant to Accreditation Regulation 765/2008. Most MS have appointed one National Accreditation Body (NAB) in their country as the National Accreditation Body according to Article 54 AVR. However Cyprus and Liechtenstein do not have a National Accreditation Body and other countries such as Malta, Iceland, Ireland, Luxembourg and Lithuania have an accreditation body but it does not carry out accreditation of ETS verifiers. These countries have not sought recourse to a National Accreditation Body in another country in accordance with Article 56 of the AVR. They use foreign accredited verifiers for the verification of emission reports instead.

### **3.2 Impact of Member States organisation on coordination and cooperation between authorities**

#### **3.2.1 Coordination between multiple Competent Authorities**

Where an MS has multiple Competent Authorities, it is vital to organise appropriate coordination and information exchange lines between authorities. According to Article 10 of the MRR, the MS is required to coordinate the work of those authorities, there are differences between MS on how such coordination is organised. Coordination can be organised in a formal or informal manner. The type of coordination largely depends on the legal and political system, the extent of decentralisation and the number of Competent Authorities involved.

Countries that have one single Competent Authority assessing monitoring plans, reviewing emission reports and approving improvement reports and a different authority for permitting or inspection and enforcement benefit from good information exchange channels between the authorities. This could include a requirement in legislation to exchange information between authorities in the form of reports or other documentation. This is for example the case in Bulgaria, Czech Republic and Romania where inspection authorities send inspection reports to the authority responsible for evaluating monitoring plans. Alternatively information exchange between such authorities can also exist by having informal contact channels: e.g. telephone or e-mail contact when an issue arises.

Where multiple Competent Authorities are involved in assessing monitoring plans, dealing with updates of the monitoring plans, reviewing emission reports or approving improvement reports, a central Competent Authority to review and provide (binding) instructions on monitoring plans and emission reports will facilitate coordination. Such centralised coordination enables the Competent Authority to have a clear view of the quality of assessments made by the local authorities. It promotes harmonisation across regions and ensures that similar companies are treated equally. Latvia, Poland, the United Kingdom and Spain have organised such procedures: though the implementation thereof differs between countries. In Poland the central authority evaluates each monitoring plan and improvement report in parallel to the regional authorities and provides instructions and advice to the regional authorities that are responsible for approving monitoring plans and emission reports. In the UK and Spain general guidelines are developed that have to be followed up by the various regional authorities. Furthermore binding instructions can be provided on the evaluation of monitoring plans.



In other countries where multiple Competent Authorities assess monitoring plans, emission reports and improvement reports less formalised processes are followed for coordinating between authorities. In France and the Slovak Republic for example the central authority formulates guidelines for local authorities but these guidelines are not mandatory. Other countries such as Austria have a dedicated helpdesk to support local authorities in their interpretations. In nearly all countries that have multiple local or regional authorities structural working groups and meetings are organised. This was not the case for Austria and Slovak Republic which hold such meetings on an ad hoc basis and rely on other coordination measures. Structural and common trainings for these local or regional authorities were organised by France, Latvia and the UK, though the type and frequency of training differs between countries. Popular coordination measures in countries that have one central authority responsible for MRV activities but that have other authorities responsible for inspection, permitting or other measures include the establishment of regular CA working groups<sup>27</sup> and coordination groups<sup>28</sup>.

The coordination measures reported in relation to 2018 changed in some aspects compared to those reported for the 2013-2017 period. The Slovak Republic for example started an IT system in 2018. It should be noted that the data reported under Article 21 do not enable an assessment of the effectiveness of the coordination and cooperation.

### 3.2.2 Coordination between CA and NAB

Article 70 of the AVR requires the MS to establish an effective exchange of information and cooperation between the NAB and the CA in their country. Effective cooperation and information exchange can enable appropriate oversight on the quality of verification, in particular and the EU ETS overall. These national information exchange and cooperation channels exist on top of the formal information exchange reports that must be submitted according to the AVR: e.g. the submission of the NAB work programme and management report as required by Article 71 of the AVR and the information exchange report between the CA and NAB according to Article 73 AVR.

Not all MS have a NAB or are using their NAB to accredit ETS verifiers. However, of the 25 countries that have established a NAB for the accreditation of ETS verifiers, 12 countries<sup>29</sup> have established a working group where the CA and verifiers discuss accreditation and verification issues. Usually the NAB is present at these working groups. In some countries these working groups convene on an annual or bi-annual basis whereas in other countries these working groups are organised more frequently. Up to 2017 there has been an increase of MS organising annual meetings with the NAB and verifiers<sup>30</sup> but this has stabilised in 2018. There was only a minor change in 2018: in Belgium, Wallonia commented that normally annual meetings are held between NAB and verifiers, but not in 2018.

<sup>27</sup> Belgium, Bulgaria, Denmark, Croatia, Greece, Lithuania, Netherlands.

<sup>28</sup> Bulgaria, Croatia, Denmark, France, Greece, Netherlands and since 2018 Sweden

<sup>29</sup> Bulgaria, Croatia, Czech Republic, Denmark, France, Germany, Netherlands, Portugal, Romania, Slovakia, Spain, United Kingdom

<sup>30</sup> For example Croatia and Norway started organising annual meetings.

The most popular coordination measures are regular meetings between the NAB and the CA responsible for coordination (18 countries)<sup>31</sup> as well as the possibility to accompany the NAB delivering accreditation activities as an observer (24 countries)<sup>32</sup>. The countries that have adopted these measures has not changed since 2016.

In addition to the formal routes, some countries reported the use of additional informal methods of information exchange, such as ad hoc meetings instead of regular meetings or established working groups. In most countries ad-hoc contact between the NAB and the CA is also arranged on an informal basis through phone or e-mail.

In countries where there is no NAB or the NAB does not accredit ETS verifiers, information exchange between the Competent Authority of those countries and the NAB that accredited the verifiers carrying out verification in those countries occurs across borders as required by Chapter 6 of the AVR. By the 31<sup>st</sup> of December the NAB that has accredited the verifier submits a work programme on their planned activities to the CA of the country where those verifiers are carrying out verification. By the 1<sup>st</sup> of June of each year that same NAB submits a management report to the CA on the activities carried out and the results of assessment findings. The CA in turn has to send to the NAB an information exchange report with issues identified as a result in their review of emission reports, inspection or complaints. In some cases informal ad-hoc contact through phone or e-mail is also carried out in those countries.

### 3.3 Impact of MS organisation on other steps of the compliance chain

How the Competent Authorities and the relevant accreditation system is organised can have an impact on how certain steps in the compliance chain have been set-up. The EU ETS and the Industrial Emissions Directive (IED) are often linked regarding competences required of CAs and their knowledge of installations and therefore Belgium, France, Germany, Lithuania and Portugal have decided to let the ETS permit become part of the permit under the IED. For France this resulted in IED authorities being the responsible authorities for the assessment of monitoring plans and emission reports.<sup>33</sup> As mentioned in section 3.2.1 these countries had to implement measures to ensure that all local authorities would apply a harmonised approach and treat similar installations in an equal manner. Where EU ETS inspections are carried out, this is also done in some cases by IED authorities<sup>34</sup>. Some MS have dedicated inspectorates

<sup>31</sup> Austria (since 2016), Belgium, Germany, Denmark, Spain, Finland, France, Croatia, Ireland, Malta, the Netherlands, Norway, Portugal (since 2015), Romania, Sweden, Slovenia, Slovak Republic and the United Kingdom. Czech Republic and Estonia reported irregular meetings

<sup>32</sup> Austria, Belgium, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France (since 2016), Croatia, Hungary, Ireland, Lithuania, Latvia, Malta, Norway, Poland (since 2016), Portugal, Romania, Sweden, Slovenia, Slovak Republic and the United Kingdom. This includes Greece. However, in 2016 they did not carry out such activities because of a conflict of interest.

<sup>33</sup> For France the local authorities are involved in the approval of monitoring plans, the review of emission and verification reports and inspection.

<sup>34</sup> Belgium, France, Latvia, Lithuania, Slovak Republic

separate from the permitting authorities. These may carry out ETS inspections together or separate from IED inspections.

Because of the challenges in harmonising approaches between local authorities and the need for central authorities to have more control on the quality of the compliance processes, more Member States have made changes in the organisation of the Competent Authorities. Transferring responsibilities from regional authorities to the central authority lead to the development of new procedures on the approval of monitoring plans, review of emission reports and approval of improvement reports.

Where countries have allocated MRV responsibilities to one central authority or multiple authorities and inspection to other authorities, it is necessary that these authorities share information so that the authorities responsible for approving MPs and improvement reports, and assessing emission reports know what inspection authorities have found during inspections and can take further action: e.g. by imposing sanctions or re-assessing/updating MPs.

The Article 21 reports show that the type of decentralisation does not seem to be a key influencing factor on the share of emission reports being checked or the number of inspections carried out. The share of reports being checked in detail varies across MS regardless of whether they have multiple or one central Competent Authority. The share of reports being checked or number of inspections seems to depend more on other factors such as available resources within the CA, the number of installations and how the review of the emission reports and inspection approach is set-up. From Article 21 reports no conclusions can be formed on the quality of the checks and inspection and the impact that decentralisation has on the quality of the system overall.

### 3.4 Scope of EU ETS

#### 3.4.1 Number of installations reported

Article 19 of Commission Regulation 601/2012 includes a definition of the categories in which the operators should classify their installation based on their average verified annual emissions in the previous trading period:

- Category A includes installations with emissions lower or equal to 50 000 tonnes of CO<sub>2 (eq)</sub> (*installations with emissions below 25 000 tonnes of CO<sub>2 (eq)</sub>, declared as installations with low emissions, are a sub-set of this category*);
- Category B includes installations with emissions between 50 000 and 500 000 tonnes of CO<sub>2 (eq)</sub>;
- Category C includes installations with emissions higher than 500 000 tonnes of CO<sub>2 (eq)</sub>.

A total of 10 609 installations were reported for 2018, representing a 0.7% decrease from the number of installations in 2017, showing a consistent decreasing trend over the years. The number of installations declined by 3.7% between 2013 and 2014, by 2.2% between 2014 and 2015, by 1.4% between 2015 and 2016 and by 0.9% between 2016 and 2017.

The proportion of installations per category remained roughly the same as in previous years, with 72% of installations in category A, 21% in category B, 7% in category C, and a subset of 57% installations with low emissions included in category A.

Figure 3.4-1 and Figure 3.4-2 show the number of installations per category across countries, and the overall changes in number of installations since 2015.

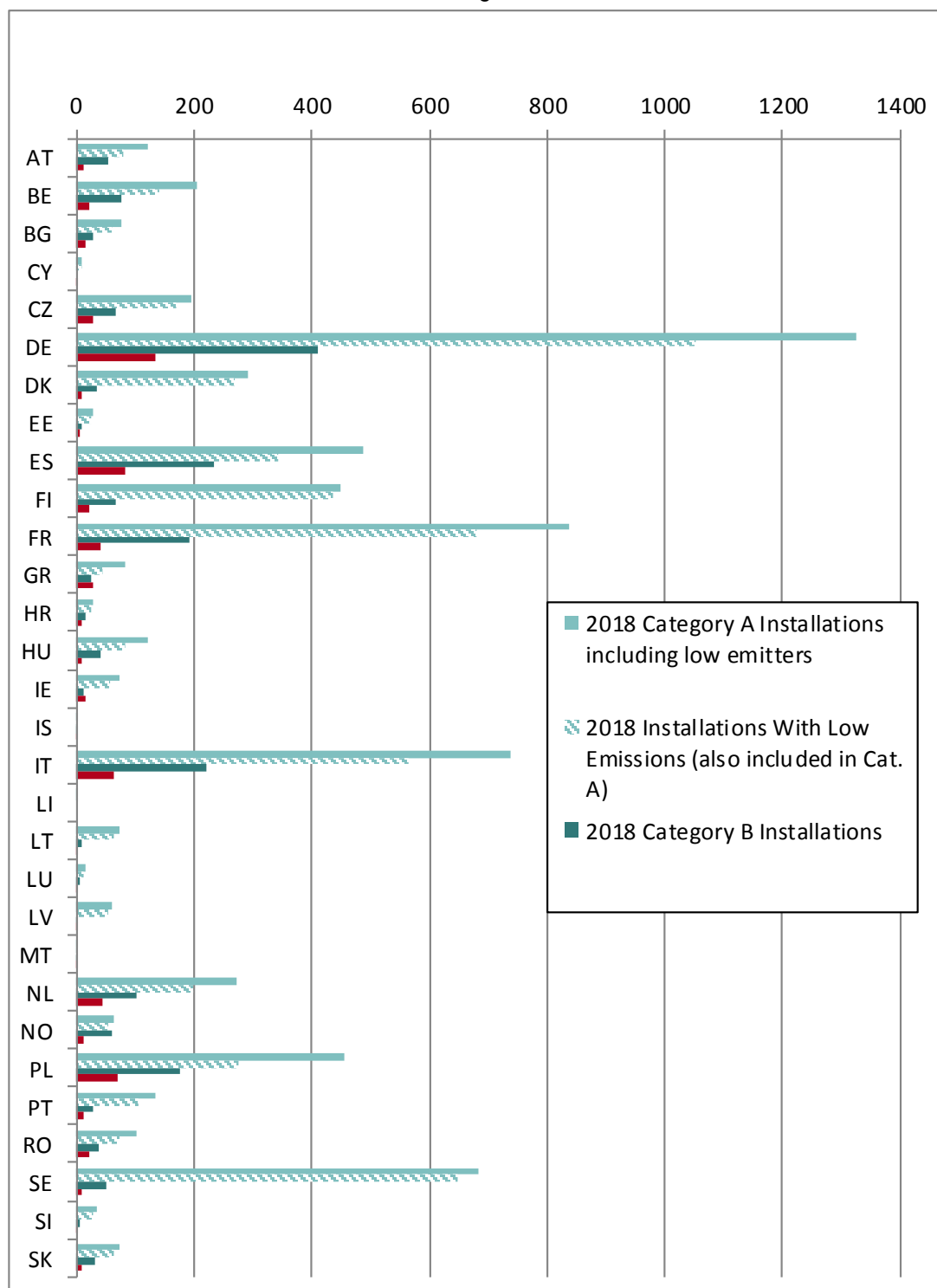


Figure 3.4-1 Number of installations per category in 2018 in the EEA-31. The country codes used are defined in the 'Abbreviations and country codes' section.

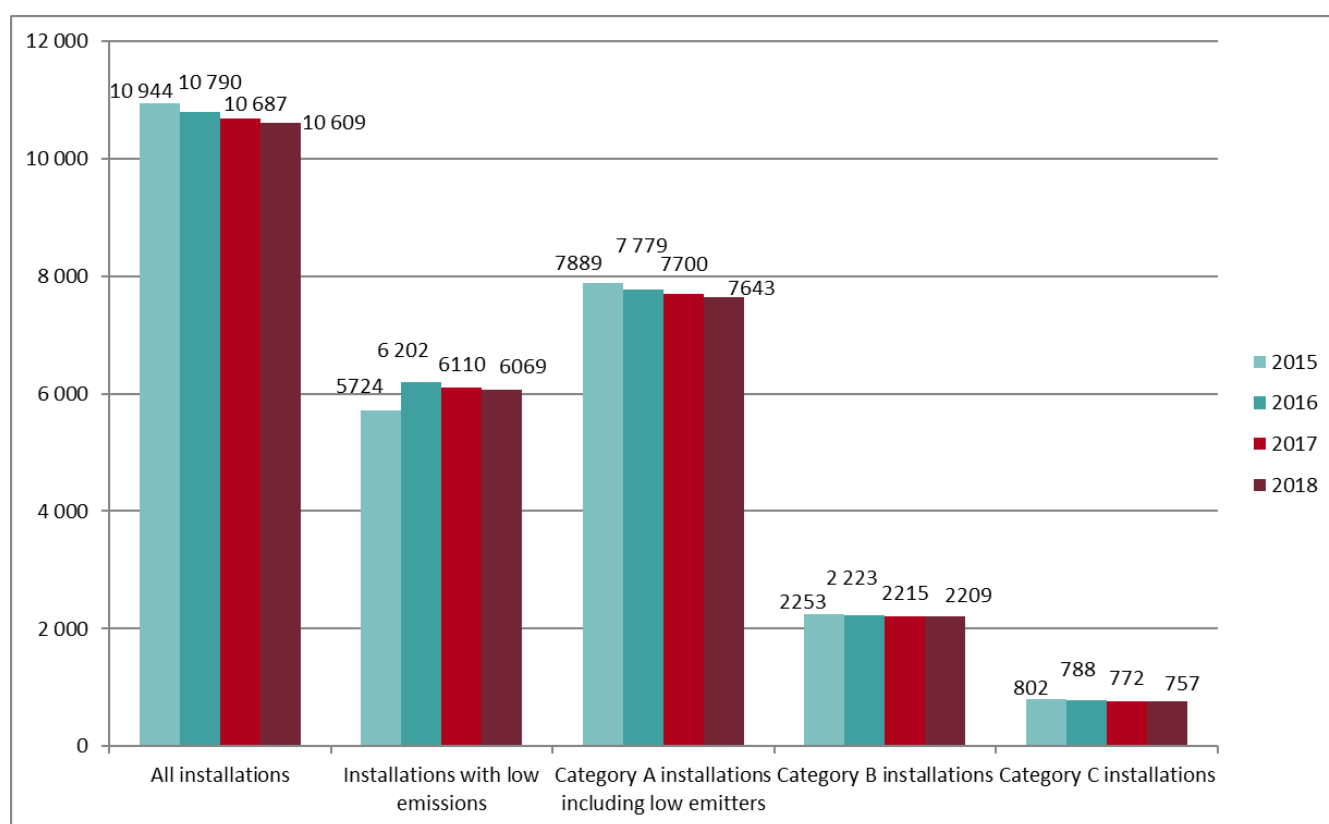


Figure 3.4-2 Evolution of number of EU ETS installations from 2015 to 2018 in the EEA-31

When considering the average emissions per installation across the different sector scopes, the sectors representing the highest amount of emissions include refining of mineral oil and the production of coke. Further peaks in the amount of emissions can be found in the production of pig iron and steel, production of cement clinker, ammonia and production of primary aluminium (see Figure 3.4-3). Data from EUTL<sup>35</sup> shows that the number of installations is the highest for combustion activities, paper, ceramics and bulk organic chemicals. Cement, mineral oil and pig iron and steel score in the middle. It shows that the most energy intensive industries emit the highest emissions.

<sup>35</sup> The source of the sector and emissions data presented in this section is an [EUTL extract dated 01/04/2019](#), combined with the activity code correction list [published by EEA](#)

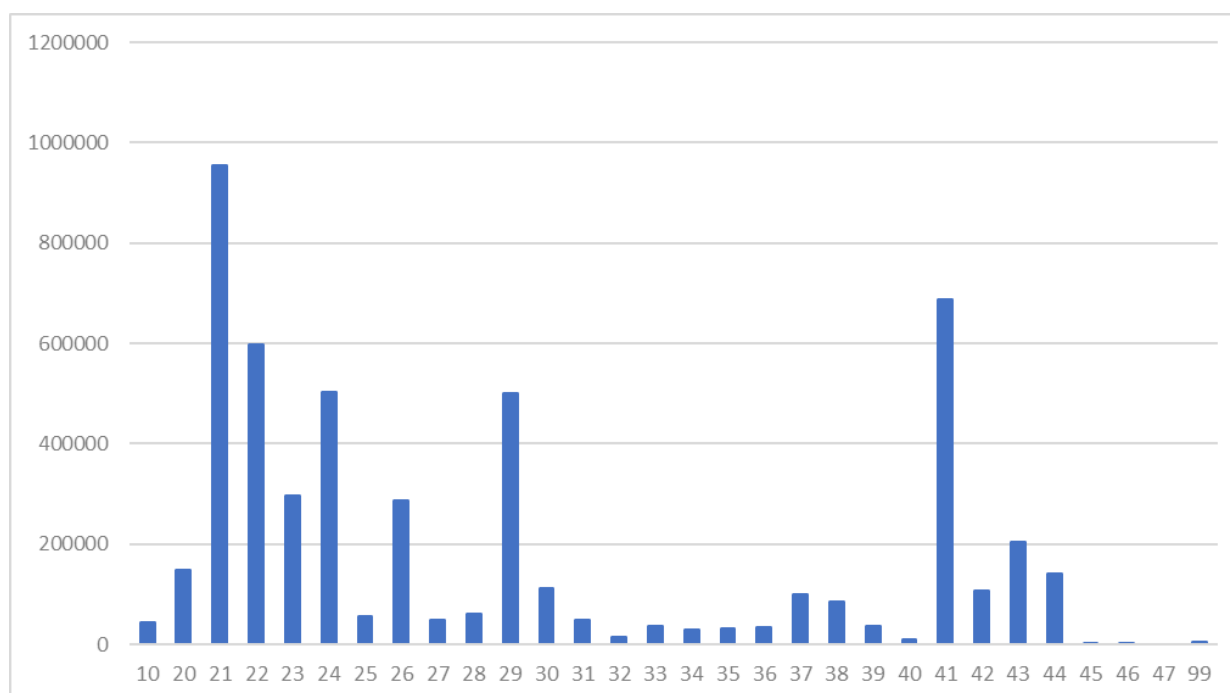


Figure 3.4-3 Average emissions per installation across sector scopes<sup>33</sup>

### 3.4.2 Excluded installations

Article 27 of the EU ETS Directive (EU, 2003) allows countries to exclude installations from the EU ETS if they report annual emissions of less than 25 000 t CO<sub>2</sub> (eq), and have a rated thermal input below 35 MW if they carry out combustion activities. Equivalent measures for achieving emission reductions must however apply to these installations. As in previous years<sup>36</sup>, the option for exclusion under Article 27 was used in 2018 by Croatia, France, Iceland, Italy, Slovenia, Spain and the United Kingdom.

The excluded emissions amounted to 1 017 kt CO<sub>2</sub> (eq) in Italy, representing 0.70% of total emissions of the country, and 2 035 kt CO<sub>2</sub> (eq) in the United Kingdom, representing 1.21% of total emissions of the country, (695 kt CO<sub>2</sub> (eq) in Spain, representing 0.56% of total emissions. The remaining countries exclude less than 150 kt CO<sub>2</sub> (eq) each, representing up to 2.24% of total emissions for each country). The total amount of excluded emissions reported by the 7 countries in 2018 was 3 940 kt CO<sub>2</sub> (eq). This amount was 0.4% smaller than in 2017, and represented 0.25% of ETS emissions in 2018<sup>37</sup>, in the same range as for previous years.

Figure 3.4-4 illustrates the countries and the sectors for which emissions are excluded under Article 27. The sectors for which emission are most often excluded are combustion activities (2 181 kt CO<sub>2</sub> (eq) excluded, spread over the 7 countries), and manufacture of ceramic products (1 278 kt CO<sub>2</sub> (eq), mainly in Italy, UK and Spain, and smaller quantities in Slovenia and Croatia, as in

<sup>36</sup> This is logical, as such an exclusion can only take place at the beginning of an EU-ETS phase.

<sup>37</sup> This is an estimate based on the declared total emissions in answer to question 5.6.

previous years). Many of the installations carrying out combustion activities may be hospitals and universities since Article 27 of the ETS Directive allows a more pragmatic approach in relation to these installations. Those installations are not the primary target of the EU-ETS and are often included because of a number of small combustion units which cumulatively reach the 20 MW threshold.

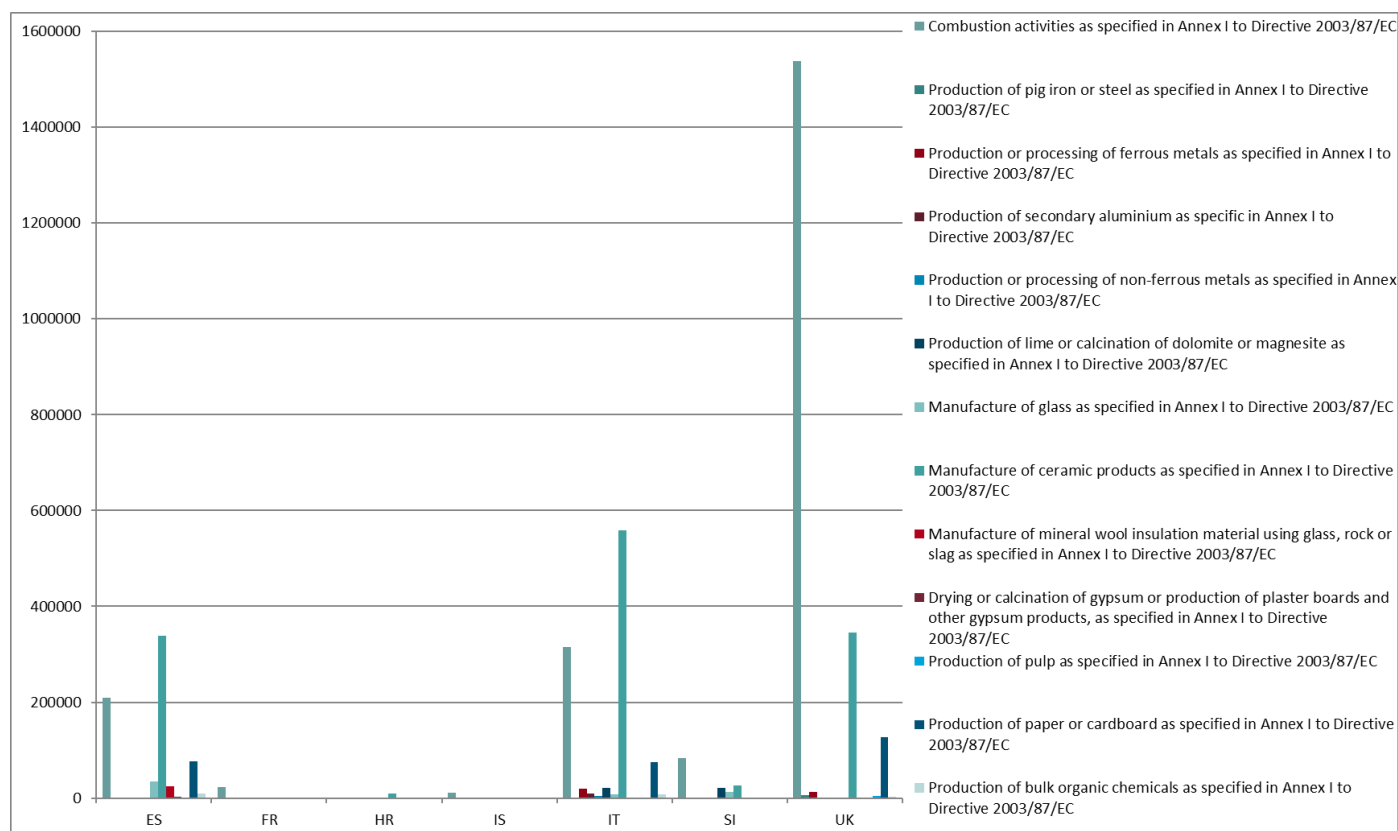


Figure 3.4-4 Amount of emissions (in t CO<sub>2</sub> (eq)) excluded under Article 27 in 2018, split per Annex I activity

### 3.4.3 Aircraft operators

Countries report annually the number of aircraft operators carrying out activities in their country, distinguishing between commercial and non-commercial ones. They also indicate which of these are small emitters, meaning aircraft operators whose flights, in aggregate, emit less than 25 000 t CO<sub>2</sub> (eq)/year (full scope), or which operated fewer than 243 flights per period for three consecutive four-month periods.

Figure 3.4-4 illustrates the number of aircraft operators per type in 2018 in each country. Greece shows a very high increase in the number of non-commercial operators compared to previous years (108 in 2018 compared to 24 in 2017), and therefore comes in second in the total number of aircraft operators. The UK, France and Germany have a relatively constant number of aircraft operators as in previous years, with numbers that remain amongst the highest, as has been the case since 2015: in total, respectively 142 (76 non-commercial and 66 commercial, with 58.5% of small emitters), 86 (49 non-commercial, 37

commercial, with 60.5% of small emitters) and 71 operators (23 non-commercial and 48 commercial, with 35.2% of small emitters).

Across all countries, less than half of the 619 operators are small emitters (258 operators, i.e. 41.7% of all operators), 51.1% are operating for commercial purposes (316 operators), and 48.9% for non-commercial (303 operators). Compared to previous years, the share of non-commercial operators has increased relatively to the number of commercial operators, from 41% on average over the previous 3 years to almost half of all operators in 2018. In parallel, the share of small emitters has seen a relative decrease, as can be seen on Figure 3.4-5. These changes seem to be directly linked to the evolution of the number of non-commercial operators reported by Greece.

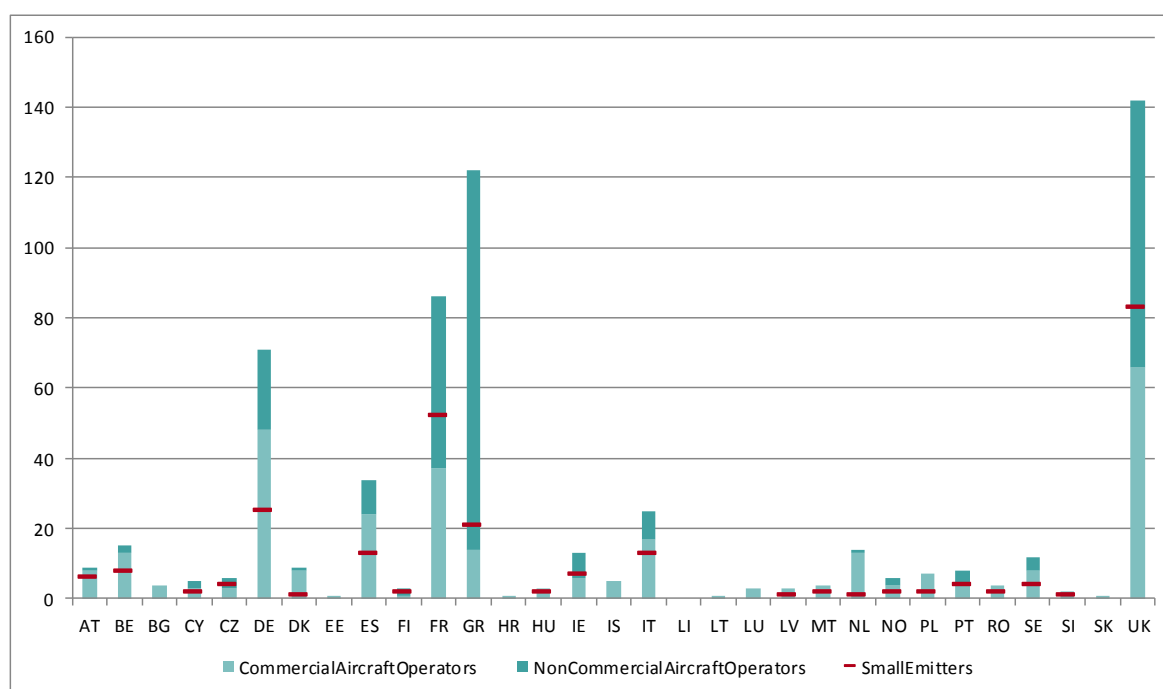


Figure 3.4-5 Number of aircraft operators in 2018 per country and per type

When aircraft operators are performing aviation activities covered by the EU ETS for the first time, they are obliged to submit a monitoring plan to the CA of the administering MS.<sup>38</sup> If they have not done so, they are not included in the above figure. Ten countries indicated in 2018 that additional aircraft operators for which they are responsible as the administering MS should have submitted a monitoring plan, and complied with other requirements under Directive 2003/87/EC. This number has gone back to the level of 2016 (while there were 11 in 2014 and 2015, 10 in 2016, there were only 9 in 2017), although the countries are not the same (3 answered “yes” to the question, in contrast with the previous year, and 2 others answered “no” but had answered “yes” the

<sup>38</sup> According to Article 18a EU ETS Directive each aircraft operator is assigned to one Member State. In the case of an aircraft operator with a valid operating license granted by an EU Member State, it is the Member State which granted that license. In other cases it is the Member State with the greatest estimated attributed aviation emissions from flights performed by that aircraft operator in the base year. For further information please see section 3.3. of Guidance Document 2 on The Monitoring and Reporting Regulation – General guidance for Aircraft Operators.



previous year<sup>39</sup>). The estimated number of additional aircraft operators that should have submitted a monitoring plan is 35 for 2018 (in the same range as in 2016 when it was 34, and below the value of 43 in 2017).

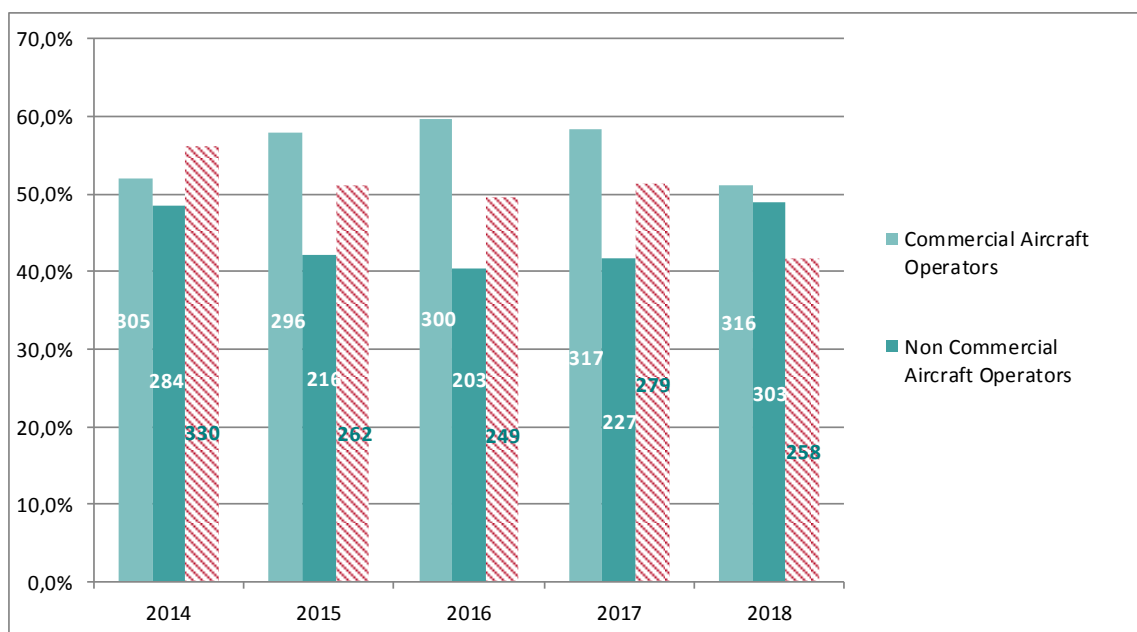


Figure 3.4-6 Evolution of the share of aircraft operators per type since 2014 (numbers on bars are absolute numbers of aircraft operators, while the height of bars illustrates the share of each type of operator; the small emitters are included in the commercial and non commercial aircraft operators).<sup>40</sup>

### 3.5 Verifiers

An important stakeholder in the EU ETS compliance chain is the verifier, also called verification body, that verifies the operator's emission reports. According to the AVR a verifier must be a legal body or legal person accredited by a NAB. Article 54(2) of the AVR also allows MS to certify verifiers that are natural persons, if they comply with the relevant AVR requirements. Since 2015 there have been no natural person verifiers certified pursuant to Article 54(2) of the AVR.

During verification the verifier checks the implementation of the monitoring plan and whether the emission report is free from material misstatements. The aim is to ensure that emissions have been monitored in accordance with the MRR and that reliable and correct emission data are being reported. Key principles of verification are embedded in Article 7 of the AVR: e.g. the requirement to carry out the verification with a reasonable level of assurance and to be independent from operators and Competent Authorities. The requirements laid down in the AVR apply to all ETS verifiers irrespective of where they are based.

<sup>39</sup> Countries that answered "yes" in 2018 in contrast with the previous year were the UK, Greece and Austria, and countries that answered "no" in 2018 in contrast with the previous year were Italy and Belgium.

<sup>40</sup> The small emitters represent commercial and non-commercial aircraft operators. An indication of the number of aircraft operators that are non-commercial or commercial cannot be given for small emitters based on Article 21 reports.

As mentioned before Cyprus, Iceland, Ireland, Liechtenstein, Lithuania, Luxembourg and Malta do not have a NAB or a NAB that is active in ETS accreditation. The emission reports of operators from those countries are verified by “foreign verifiers” (i.e. verifiers accredited by a National Accreditation Body in another Member State). Twenty-four countries have at least one verifier accredited by their NAB. In 17 of those countries, verifiers accredited in other Member States (foreign verifiers) are carrying out verification. Seven other countries, Austria, Finland, France, Greece, Italy, Latvia and Slovenia only have national verifiers accredited by their own National Accreditation Body verifying installation’s emission reports in their country. For aviation, the Czech Republic, Greece, Latvia and Romania have only national verifiers.

Figure 3.5-1 and 3.5-2 show the number of verifiers by scope and by MS. In general verifiers are accredited for several scopes. The total number of accredited verifiers can therefore not be deduced from these figures. However, data available on the websites of national accreditation bodies<sup>41</sup> show that in some countries such as Slovenia<sup>42</sup> and Bulgaria<sup>43</sup> the number of verifiers is limited whereas in other countries such as Germany the number is significantly greater. Countries with a limited number of verifiers usually have foreign verifiers operating the market.

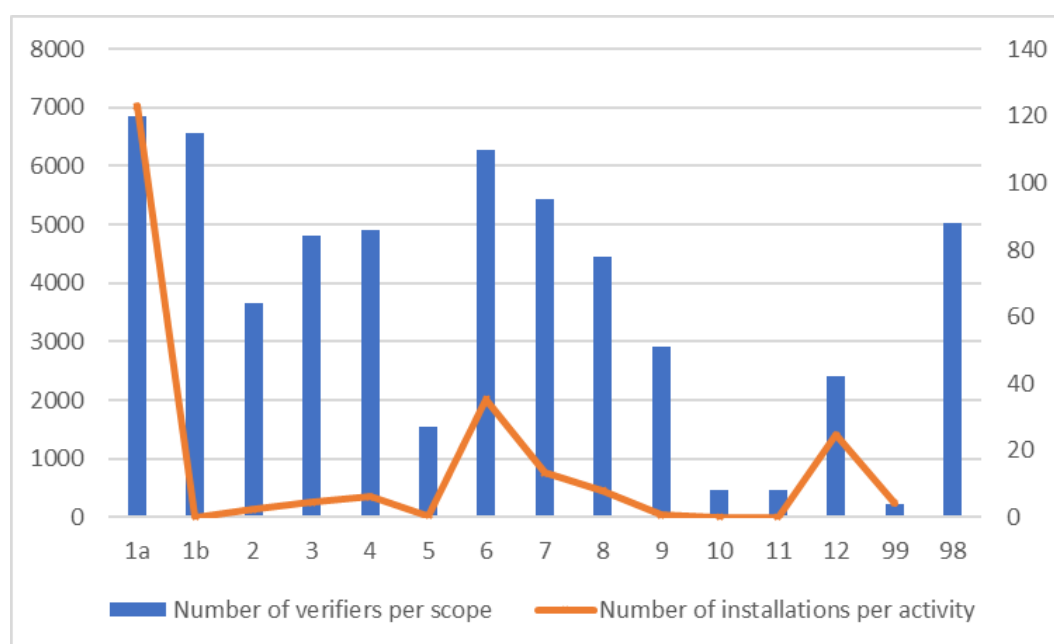


Figure 3.5-1 Number of Verifiers per scope across the MS in 2018, compared to the number of installations for each of these scopes, based on annex I activities. The list of scopes can be found in Annex I of the AVR.

<sup>41</sup> Data can be retrieved on the websites of National Accreditation Bodies through the European Co-operation for Accreditation list of access points to NABs accrediting verifiers for EU ETS: <http://www.europeanaccreditation.org/information/national-accreditation-bodies-having-been-successfully-peer-evaluated-by-ea>

<sup>42</sup> 2 national verifiers

<sup>43</sup> 3 national verifiers

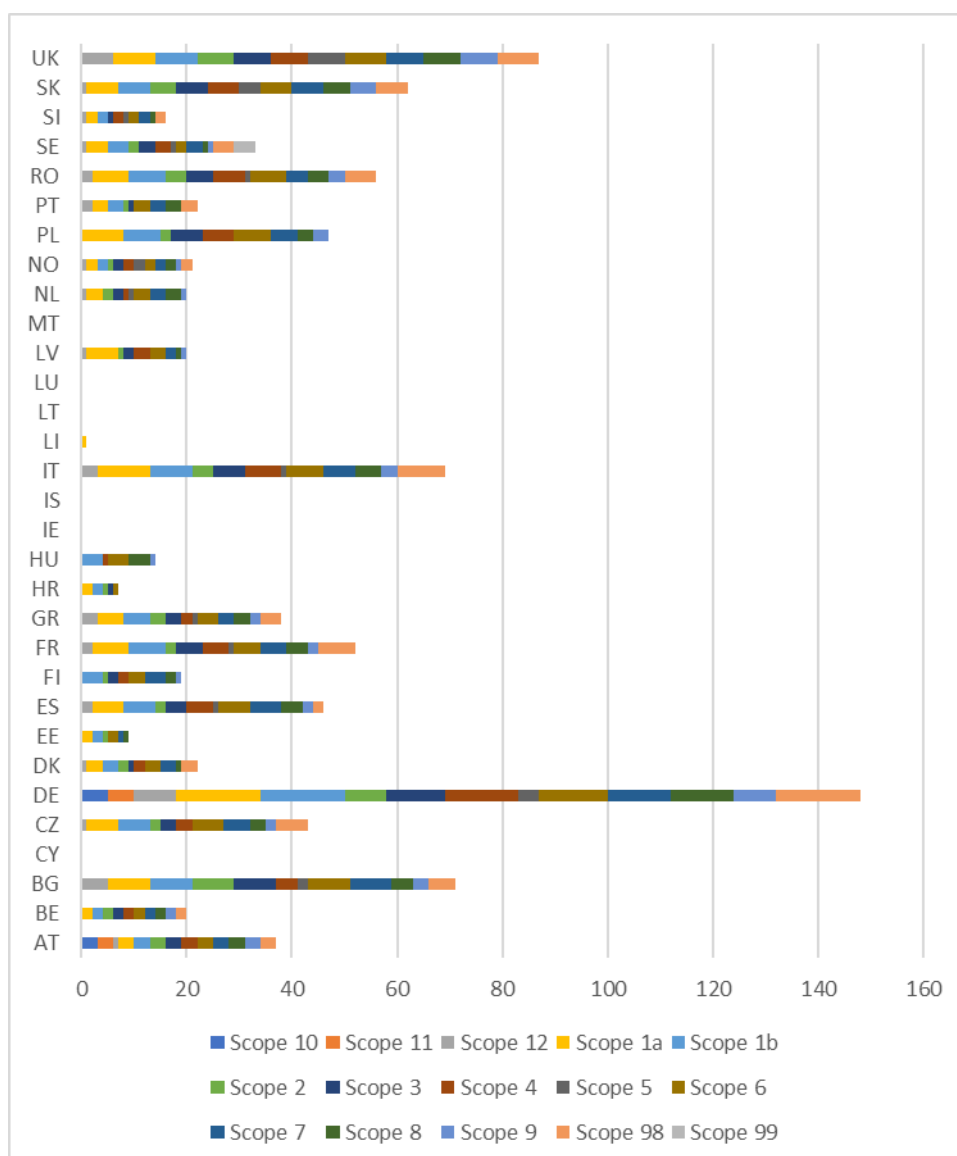


Figure 3.5-2 Number of Verifiers per MS and per scope in 2018. The list of scopes can be found in Annex I of the AVR

The highest coverage of verifiers was detected for scope 1 (combustion) followed by scope 6 the production of cement clinker, lime or calcination of dolomite or magnesite, the manufacture of glass, ceramic products, mineral wool and the drying or calcination of gypsum. These numbers correlate well with the high number of installations carrying out these activities. The lowest numbers were observed for scope 10 (capture and transport of greenhouse gases), scope 11 (geological storage of greenhouse gases) and scope 99 (installations opted in the EU ETS scheme). These activities were reported only by two MS (see section 3.4.2) which aligns to why only a limited number of verifiers are accredited against that scope.

Continuing the trend identified previously, the number of verifiers accredited against specific scopes has further decreased. Only for sector scope 98<sup>44</sup> has the number increased (from 85 to 88 verifiers overall). For the allocation for the fourth trading period verified baseline data reports had to be submitted by a verifier accredited against scope 98 by May or June 2019. As not all verifiers in MS were accredited against such scope in the third trading period, some of these verifiers started preparing for this development and requested an extension of the scope of their accreditation in 2018. The number of verifiers remained constant for scopes 10, 11 and 99. In most countries the number of verifiers accredited against the scopes is stable only changing marginally over the years: 19 countries had no change at all, and 7 others had a change by less than 10%. Four countries have seen more important changes, although for most of them these are not major: the number of verifiers was reduced by 26% in the Czech Republic (from 58 to 43), by 17% in the Netherlands (from 24 to 20), by 16% in Romania (from 67 to 56) and by 12% in Austria (from 67 to 56).

Figure 3.5-1 further compares the number of verifiers to the number of installations that operate within each scope (based on the installations' annex I activities), and Figure 3.5-1 indicates how many installations that would mean in theory per verifier, although as verifiers are often accredited for several scopes, these numbers are over-estimated. The results show that for scope 1 (combustion activities) there were probably less than 200 verifiers<sup>45</sup> for 7032 installations, for scope 12 (aviation activities) there were 42 verifiers for 1403 aircraft operators, and for scope 99 (activities that are opted-in the EU ETS) where there are only 4 verifiers for 238 installations, and all are present in Sweden. The number of verifiers compared to the number of installations seems to point at capacity problems. However, a number of installations in the aviation sector, combustion sector and the sector for opt-in activities are relatively simple or small which can mean a less extensive verification if the risks are low. For other sector scopes, the relation between the number of verifiers per scope versus the number of installations seems reasonable. It is noted that verifiers carrying out verification of allocation data need to be accredited against scope 98 and the specific sector scope relevant for the installation. In Figure 3.5-1 the number of verifiers is not offset against the number of installations for sector scope 98.

From these figures no conclusions can be drawn for the number of verifiers per MS for a sector scope in relation to the number of installations. An accurate analysis cannot be made as the total number of verifiers is not asked for in the Article 21 reports and verifiers can be accredited against multiple scopes. As mentioned before the websites of the National Accreditation Bodies shows variations between MS. For that reason a number of verifiers use foreign verifiers. The number of verifiers that carried out verification in another MS than the MS in which they were accredited by the National Accreditation Body has remained constant for installations at 70, and has increased for aviation, from 53 in 2017 to 57 in 2018.

<sup>44</sup> Activities pursuant to Article 10a ETS Directive (verification of allocation data).

<sup>45</sup> There were, in 2018, 120 verifiers for scope 1a and 115 for scope 1b; in Figure 3.5-3, these are counted as if this would lead to a total of 235 verifiers for scope 1, but in practice a number of verifiers are accredited for both scope 1a and 1b, so the number of verifiers available per installation is over-estimated there.

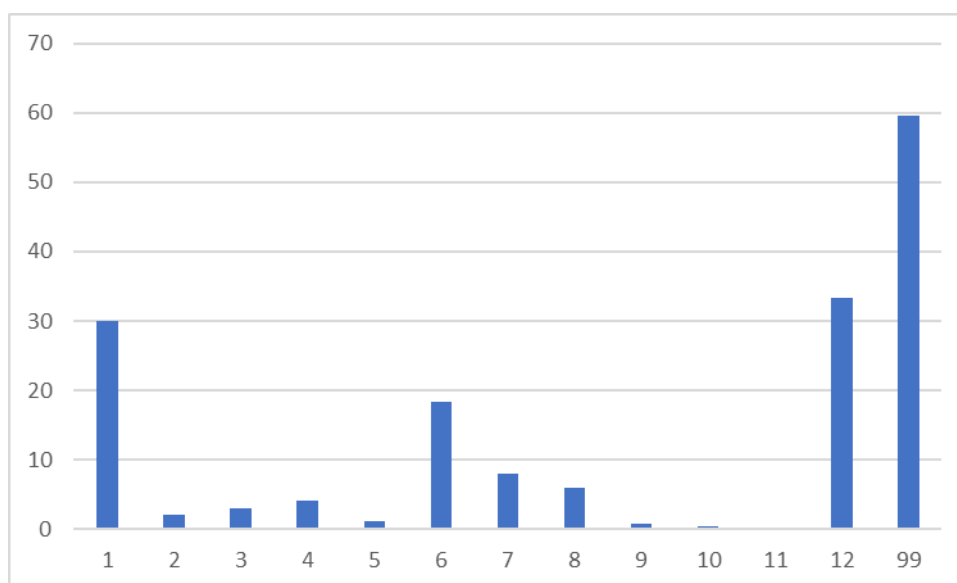


Figure 3.5-3 Number of Verifiers per MS and per scope in 2018. The list of scopes can be found in Annex I of the AVR

### 3.6 Effective approaches for implementation

An effective implementation can be realised by establishing procedures for issuing and changing permits, approving monitoring plans, dealing with changes to the monitoring plans, reviewing emission reports and verification reports and approving improvement reports. These procedures often depend on country specific factors and structures. Certain tools can significantly facilitate the implementation: either by making operators and aircraft operators aware of the rules or by managing the workflow between Competent Authorities and operators or aircraft operators.

#### 3.6.1 Procedures for effective implementation

Installations that operate in the EU ETS are required to have a greenhouse gas emission permit, issued by the CA in accordance with Articles 5 and 6 of the EU ETS Directive. These permits must be updated if changes to the functioning of the relevant installation occur. The permitting procedures can differ very much between Member States: the deadlines and timelines for notification of changes to permits, the competent authorities involved, the content of the permits, the procedural steps and length of the procedure concerned. Some countries have lengthy processes with official opportunities for interested parties to make objections in the permitting procedure whereas other countries have more condensed procedures. These differences affected how Member States organised monitoring plan processes and notification of changes to the monitoring plan and permitting. In 2018, 1 969 permit updates were reported, a number comparable to changes in previous years (1 886 in 2017 and 1 840 in 2016). As in previous years, the number of updates varies a lot between countries, which is explained by different levels of requirements for such updates: in a number of countries, a change to the monitoring plan does not

necessarily require a permit update. This is in particular the case for France, the Netherlands and Germany, which contributes<sup>46</sup> to the low number of permit changes, as can be seen in Figure 3.6-1, despite the relatively high number of installations in these countries<sup>47</sup>. In most of these countries it takes more time to update permits requiring official stakeholder consultations. For Germany the federal state authorities are responsible for permitting and permit updates whereas a central authority, DEHSt is responsible for the approval of monitoring plans. The permit is mostly about what is to be monitored (i.e. which installations, activities, source stream, emission sources) and the monitoring plan focuses on how the monitor. The DEHSt has the opportunity to provide comments when permits or permit updates are issued; vice versa the state authorities is allowed to comment before monitoring plans are approved. As updates to the monitoring plan often need to be realised more quickly, the procedures for updating permits and monitoring plans have been separated. For these countries therefore a year with few or no updates will often take place. In nearly 25% of countries a change in the monitoring plan will not lead to a change to the permit. A change to the permit usually occurs in those countries when there is a significant capacity change. In other countries permits can be updated in all cases of changes to the monitoring plan (e.g. based on Article 69 of the MRR) as well as anytime the operator requests such a change. This is for example the case in over 15% of the countries in which the monitoring plan is part of the permit, and therefore changing the former will automatically lead to an update of the latter. In such cases the number of updates can be several hundred (489 for the UK in 2018, representing 58% of the total number of installations). Close to half of the countries update permits only in case of significant changes to the monitoring plan (based on Article 15(3) of the MRR).

Figure 3.6-1 compares the number of permit changes in the past four years with the number of installations included in the EU ETS in each country. The two countries with the most frequent permit updates<sup>48</sup> relative to the number of installations are Norway and the UK, which are the two countries in which changes to monitoring plan will most often trigger updates of permits (in Norway, in addition to changes in the monitoring plan, changes such as ownership, operator or name of installation will also result in an update of the permit). A high number of permit updates was also realised in Spain (348 permit updates in relation to 806 installations). In that country the permit is updated in the case of a significant change to the monitoring plan. In other countries permit updates relative to the number of installations were less. This was in some cases also true for countries in which a change to the monitoring plan leads to an update of the permit: for example in Finland (92 permit updates in relation to 549 installations), Cyprus (0 permit updates in relation to 11 installations), Czech republic (73 permit updates in relation to 292 installations), Slovak Republic (17 permit updates in relation to 115 installations).

<sup>46</sup> Another reason for the low number of permit changes is the fact that the procedures for changing permits may take a long time. In some countries, such as the Netherlands, the decision to update a permit will depend on administrative and legislative procedures, and such updates will not be required in all cases where the monitoring plan is changed.

<sup>47</sup> Other countries in which permits are not updated following a change in the monitoring plan are MT, LT, IT and GR.

<sup>48</sup> In 2015, Liechtenstein also had a very high number of permit updates compared to the number of installations. As there are only 2 installations from LI in the EU ETS, this is however not as outstanding.

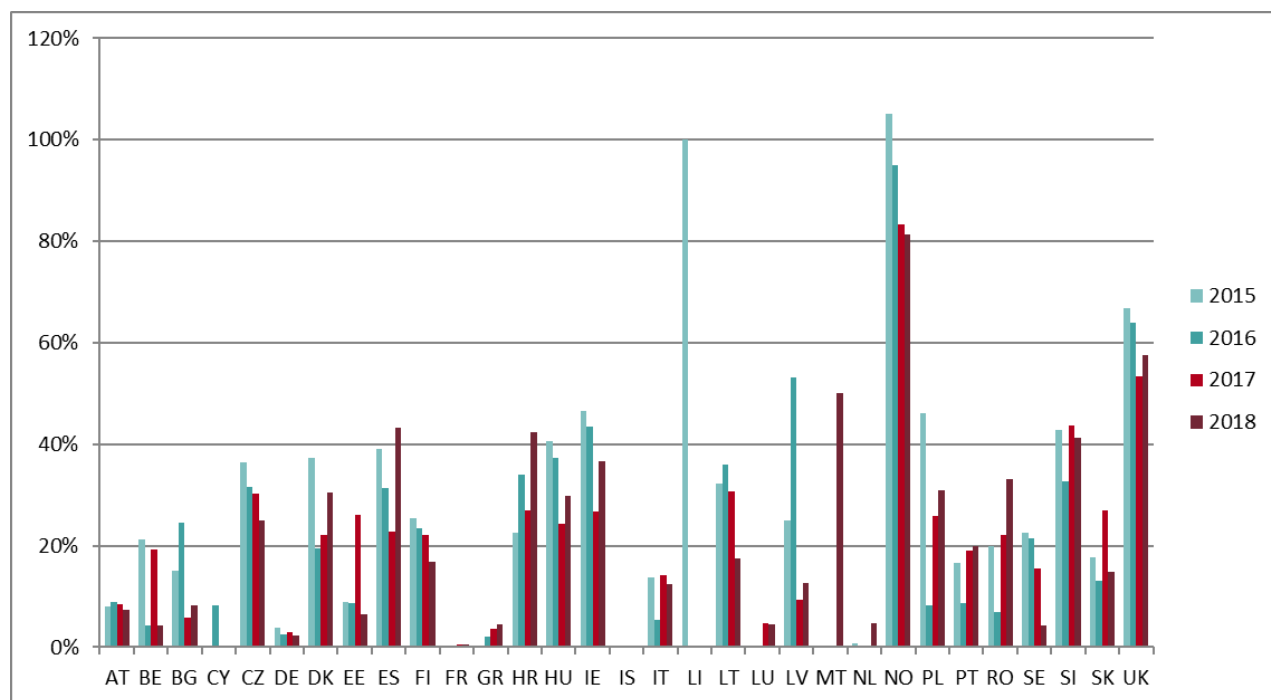


Figure 3.6-1 Evolution of the number of permit changes, expressed as a percentage of the total number of installations per country, from 2015 to 2018

Annex I of the EU ETS Directive lists industrial activities that are covered by the system. Countries indicate every year in their Article 21 submissions which activities are included in their country and which not. Less changes to permits occurred in 2018 compared to the previous year<sup>49</sup>: only 5 new sectors were introduced in total across the EU. Figure 3.6-2 provides an overview of the number of countries in which permits have been issued for each of the Annex I activities.

<sup>49</sup> In 2017, 6 new sectors had been introduced in total, and 4 no longer included in one or more of the countries.

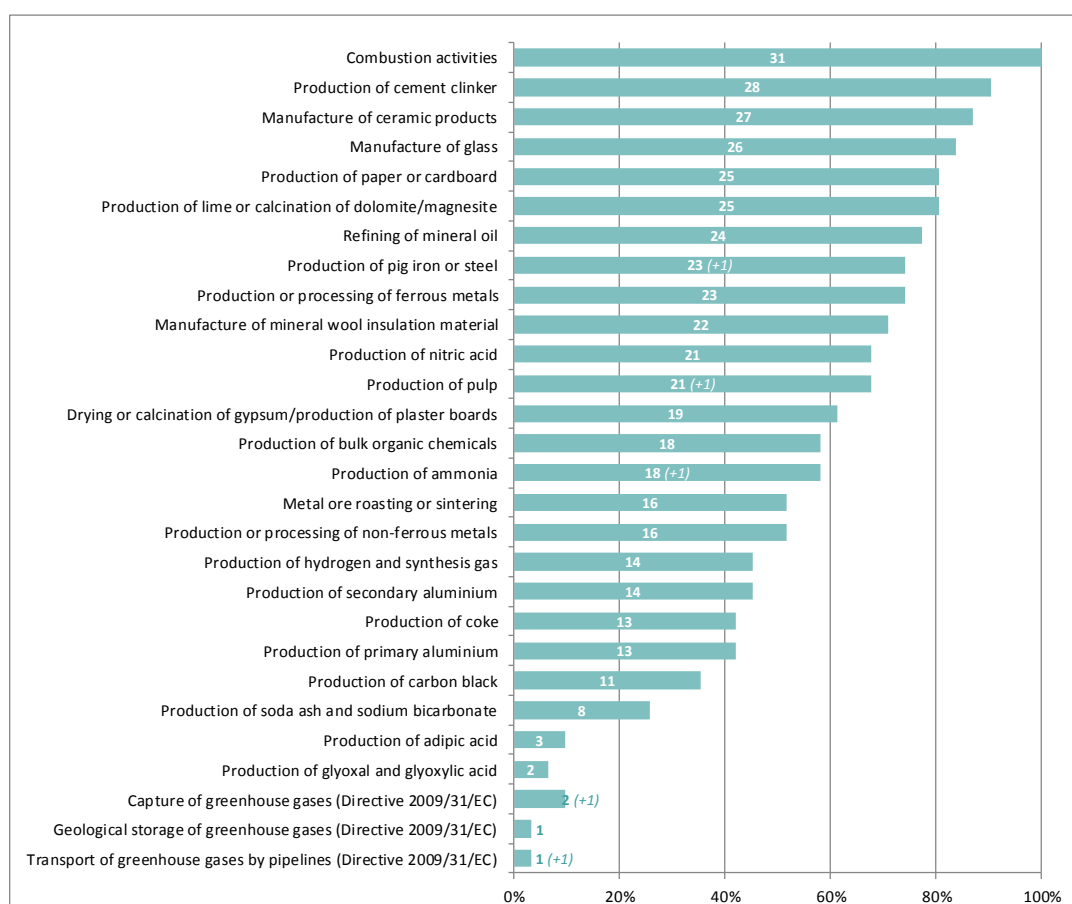


Figure 3.6-2 Number of countries that have issued one or more permits for each of the Annex I activities by 2018 in EU ETS, and share of total numbers that this represents: the length of the bars represent the number of countries that issued permit(s) expressed as percentage of the 31 EU+EFTA countries, the numbers on the bars indicate the number of countries, and in parentheses the changes in these numbers compared to 2017 (e.g. one additional country issued one or more permits in 2018 for Annex I activity “Production of pulp”) <sup>50</sup>

Based on the Article 21 reports no conclusions can be made on the effectiveness of procedures for the approval of monitoring plans, notification of changes to monitoring plans and the approval of sampling plans or improvement reports. It is evident though that limited resources can have an impact on how the CA has organised its internal procedures and on what tools they use for effective implementation.

### 3.6.2 Tools for effective implementation

There are different tools that can facilitate the implementation of MRV requirements. One of these instruments are guidance documents that explain

<sup>50</sup> It should be noted that corrections have been received on some of the data impacting not only 2018 but also previous years. Therefore some differences may appear compared to the previous report.



how the requirements in the MRR and the AVR must be interpreted. Such guidance have been developed by the Commission.<sup>51</sup> Because of the extensiveness of Commission guidance material and tools there is less need for countries to adopt national specific guidance. Still 16 countries have developed additional guidance to explain national specific issues or procedures. Some countries developed guidance for operators and aircraft operator on how monitoring plans are addressed by the Competent Authority and national specific procedures for notification of changes in the monitoring plan. Other countries focused on specific and complicated monitoring issues such as uncertainty assessment, monitoring specific issues related to waste tyres, sustainability of biofuels and bioliquids. In addition, countries have often developed specific instructions on how to complete templates or how to use an IT system in a country.

Another important element to promote harmonisation across countries, operators and aircraft operators is the use of templates for monitoring plans, emission reports, verification reports and improvement reports. According to Article 74 of the MRR, countries may require the operator and aircraft operator to use electronic templates or specific file formats<sup>52</sup> for the submission of monitoring plans, emission reports, verification reports and improvement reports. Those templates and file formats must contain at least the information included in the Commission's templates and file formats for these documents.<sup>53</sup> Competent Authorities have reported that where operators or aircraft operators use templates this improves the quality of monitoring and reporting while at the same time facilitating the approval and review processes of the CA and verifier.

Table 3.6-1 shows the countries using electronic templates or specific file formats for 2018.

Table 3.6-1 IT templates and file format usage in 2018

<b>Member States reporting usage in 2018</b> (changes from 2017 have been indicated between square brackets[ ], other values are unchanged from 2017)		<b>Customised electronic templates</b>	<b>Specific file formats</b>
Installations	Monitoring plans (MP)	10	3 [+1]
	Emission reports (AER)	12	5 [+1]
	Verification reports (VR)	8	3 [+1]
	Improvement reports (IR)	7	2
Aircraft operators	Monitoring plans	3	2
	Emission reports	3	2
	Verification reports	3	2
	Improvement reports	4	1

<sup>51</sup> [https://ec.europa.eu/clima/policies/ets/monitoring\\_en#tab-0-1](https://ec.europa.eu/clima/policies/ets/monitoring_en#tab-0-1)

<sup>52</sup> File formats can for example be XML language developed for EU ETS-dedicated IT systems, such as the Commission's "XETL", see [https://ec.europa.eu/clima/policies/ets/monitoring\\_en#tab-0-1](https://ec.europa.eu/clima/policies/ets/monitoring_en#tab-0-1).

<sup>53</sup> The Commission has developed templates for monitoring plans, emission reports, verification reports and improvement reports which has been published on the Commission website: [https://ec.europa.eu/clima/policies/ets/monitoring\\_en#tab-0-1](https://ec.europa.eu/clima/policies/ets/monitoring_en#tab-0-1).

These MS specific templates or formats must have at least the same content as the Commission templates. In most cases the national templates or file formats are versions of these Commission templates, however, the extent to which they have been adapted to MS specific needs varies. Some MS have implemented minor adjustments whereas other MS require more significant elements to be added to the documents such as elements to ensure compliance with Article 24 of the CIMS.<sup>54</sup>

As mentioned in the last report from 2017 a growing number of MS are now using the Commission templates for the different reports. In 2018 the only change to the two preceding years is that Slovakia has transformed the Commission's MP, AER and VR templates for installations into a web-based system.

The number of MS that have customised templates of file formats for the different aircraft operator's monitoring plan and reports significantly differs from those of installations. Some countries that use an IT system and therefore national specific file formats do not require aircraft operators to apply these. In some cases this is true because different authorities are involved for the management of MRV and the regular IT systems are not available to them. There is also less need to require aircraft operators to report additional items than prescribed in the Commission template. The vast majority of the countries report using the Commission templates without modification.

An increasing number of countries reported having an automated system for electronic data exchange. Currently Austria, Belgium Walloon region, Denmark, Finland, Germany, Hungary, Ireland, Latvia, Norway, Portugal, Slovakia, some regions in Spain, Sweden and the UK are using an IT system and more MS are expected to either implement their own IT system or make use of DECLARE.<sup>55</sup>

It should be noted that there is a large variation in both the type and the scope of the IT systems implemented in the countries. In some countries the automated system covers the whole MRV compliance chain and provides access to all stakeholders whereas in other countries an online tool is used only for reporting, permitting or monitoring plans, still other countries only have internal IT systems within the Competent Authority which do not allow operators to submit data through the IT system. These systems are only intended to facilitate the workflow within the Competent Authority. In some countries such as Spain, in which some Competent Authority tasks are delegated to regional authorities, different regions may have their own IT system whereas other regions use templates. In all countries that use an IT system measures have been taken to ensure compliance with Article 75 MRR.

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<sup>54</sup> Commission Decision of 27 April 2011 determining transitional Union-wide rules for harmonised free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council

<sup>55</sup> Web-based application to manage submission and reporting on EU ETS.

### 3.7 Changes in free allocation

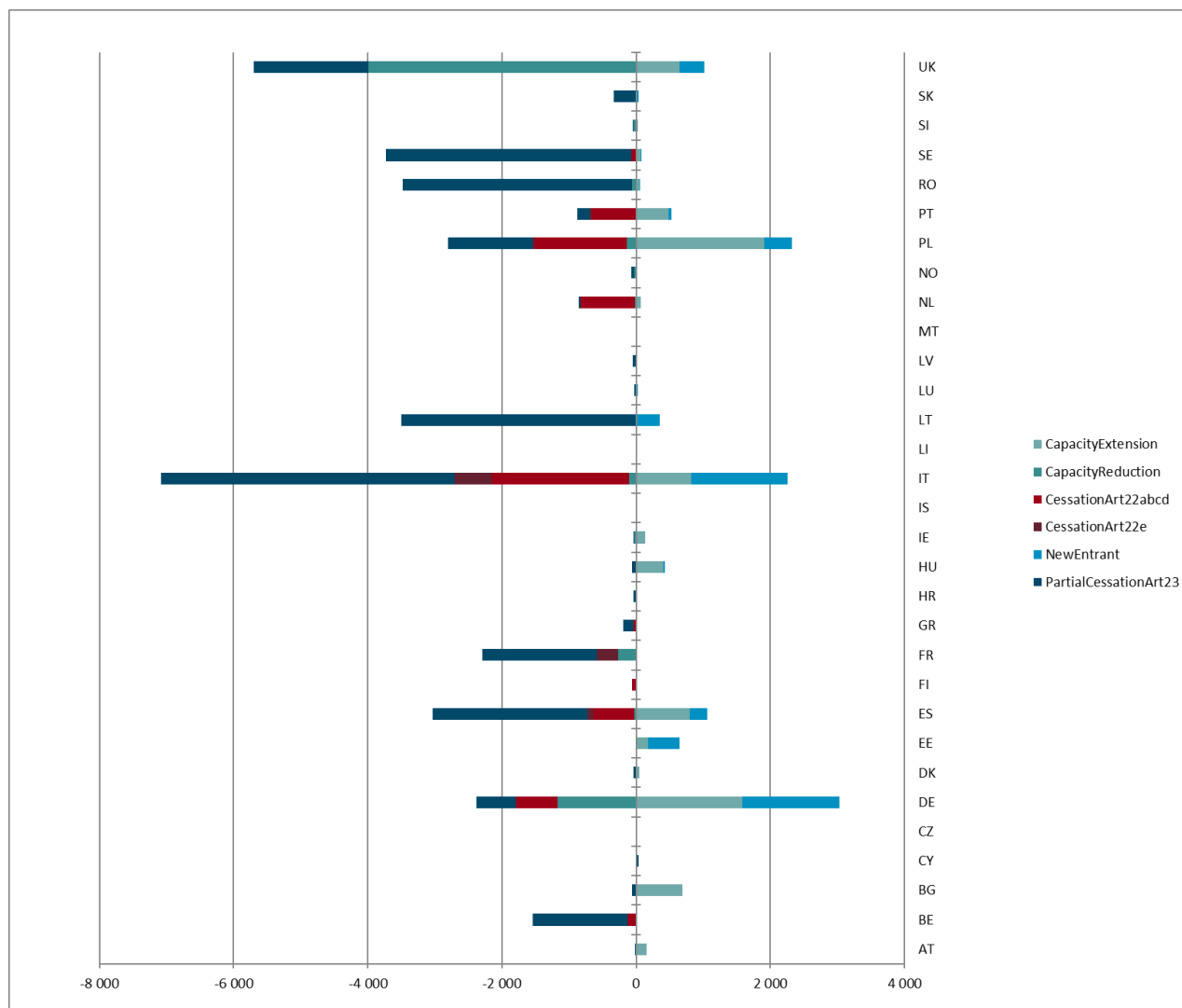
Similar to previous years, all countries except Iceland, Liechtenstein and Malta<sup>56</sup> reported changes to free allocations (pursuant to Article 10a of the EU ETS Directive) in 2018; in contrast to the last two years, Cyprus also reported changes to free allocation (6 partial cessations). The total amount of allocation changes, including all types of changes, decreased considerably in 2018 compared to 2017: in absolute values, changes in allocation amounted to 52 093 kt CO<sub>2</sub> (eq) in 2018 compared to 113 189 kt CO<sub>2</sub> (eq) in 2017 (while it was equal to 70 618 kt CO<sub>2</sub> (eq) in 2016, 168 068 kt CO<sub>2</sub> (eq) in 2015 and 279 667 kt CO<sub>2</sub> (eq) in 2014); the net allocation change<sup>57</sup> in 2018 was -26 281 kt CO<sub>2</sub> (eq) (compared to -82 919 kt CO<sub>2</sub> (eq) in 2017, and -44 689 kt CO<sub>2</sub> (eq) in 2016). Figure 3.7-1, which presents the amount of allocation changes in 2018 per type of change and per country, illustrates that unlike in 2017 when capacity reductions had reached half of the changes, the distribution per type of allocation change in 2018 was closer to what it was in 2016 and in the years before that, with partial cessations representing the highest share (close to 50% in 2018 with 25 740 kt CO<sub>2</sub> (eq)). Figure 3.7-2 compares the number of changes to the total number of installations for each type of change and each country. Partial cessations are still the most frequent types of changes, as was the case in the previous years, but the share is reducing over time. In 2018, 653 allocation changes out of an overall total of 1294 were partial cessations. These changes represented 6.2% of the total number of installations (down from 7.1% in 2017).

Four countries indicated that possible allocation changes have been identified by the Competent Authority, which have not been notified by the operator, which is lower than in 2017 by half. The total number of cases slightly decreased from 22 in 2017 to 20 in 2018. These cases were generally identified either from the analysis of the annual emission reports (by Competent Authorities, or by verifiers), when comparing emission data with those of the previous year, or from activity level data if those are collected by the Competent Authority<sup>58</sup>.

<sup>56</sup> No stationary installations in Malta are eligible for free allocations under the EU ETS

<sup>57</sup> The absolute values include all allocation changes in terms of amount of allocated allowances, whatever the type of change. The net allocation changes take into account whether the change was an allocation reduction (i.e. significant capacity reduction, partial or full cessation of operation) or increase (significant capacity extension, new installation or new sub-installation); the former are subtracted from the latter.

<sup>58</sup> Reporting of activity levels is not mandatory in all Member States.



*Figure 3.7-1 Quantity of emission allowances corresponding to allocation changes in 2018 (in 1000 EUAs), per type of change and per country. Negative changes correspond to allocation reductions (i.e. capacity reductions, cessations and partial cessations), and positive changes correspond to additional allocations (i.e. capacity extensions and greenfield)*

*NB: Article 22 in the legend refers to the CIMs.*

*It should be noted that for some countries (e.g. Estonia), the allocation changes are too small to be visible on this graph, although allocation changes did happen as is illustrated by Figure 3.7-2.*

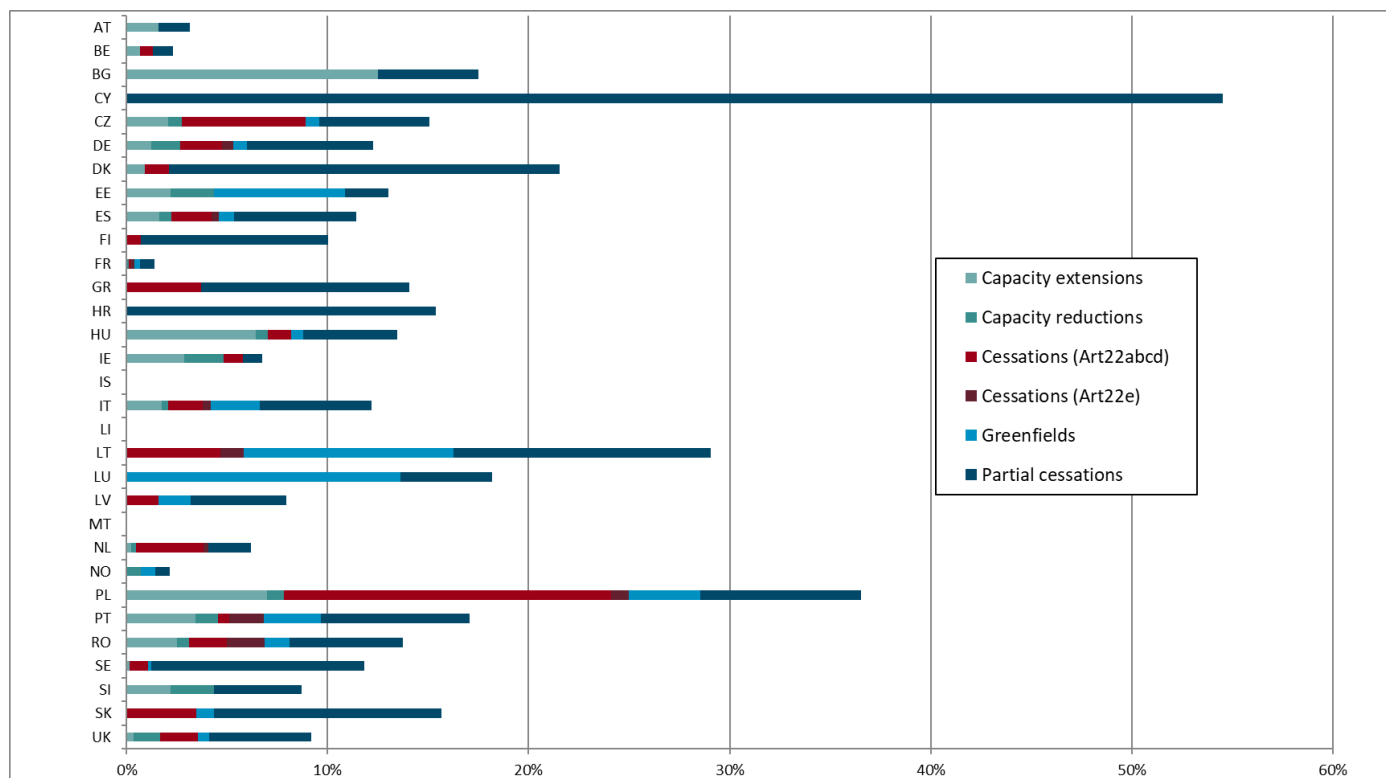


Figure 3.7-2 Number of allocation changes compared to total number of installations, per type of change and per country in 2018 (e.g. the number of allocation changes in Bulgaria corresponds to 17.5% of the total number of EU-ETS installations in the country, split mainly between capacity extensions and partial cessations)

NB: Article 22 in the legend refers to the CIMs

## 4 INFORMATION ON EMISSIONS, SOURCE STREAMS, BIOMASS AND WASTE USE

This chapter provides information on the fuel consumption and related emissions for stationary installations and aircraft operators. The most important fuel types are analysed, and changes over the time are described. The analysis compares the aggregated total emissions for each reported CRF category for combustion and process emissions. Section 4.2 gives an overview of inherent and transferred CO<sub>2</sub> as defined under Article 48 and 49 of the MRR. Furthermore, section 4.3 analyses the use of continuous emissions measurement (CEMS) in accordance with Article 40 of the MRR. Information on biomass emissions is described in section 4.4 showing how much sustainable and non-sustainable biomass is used in installations covered by the EU ETS. Finally, the chapter covers how much emissions come from waste used as fuel or input material.

### 4.1 Emissions and source streams

The Article 21 questionnaire asks for information on fuel consumption and related fossil fuel emissions in the EU ETS for stationary installations and aircraft operators. Fuel used for non-combustion purposes (i.e. fuel used as process raw material) is not included<sup>59</sup>. From the previous technical reports<sup>60</sup> it can be concluded that the majority of EU ETS emissions originate from combustion. The most important fuel types are natural gas, lignite and hard coal contributing to approximately 75% of all combustion emissions. This section assesses what changes have occurred for the most important fuels used and evaluates how the emissions originating from fuel combustion have developed over the years. The section also analyses the distribution of fuel over the different categories and shows if the consumption of fuels with a lower emission factor (e.g. decline of hard coal and increase of the use of natural gas) has increased with time. It gives an overview on whether the total emissions reported have increased or decreased by country or by fuel type. The process emissions in this section (approximately 15% of the total aggregated emissions) are summed up together with the total combustion emissions and evaluated for the different CRF categories. Finally, the fuel consumption of aircraft operators is analysed and the increase of emissions for domestic and international flights was described.

<sup>59</sup> Germany include fuels used as process input as a change in reporting would result in an inconsistent time line.

<sup>60</sup> Application of the European Union Emissions Trading Directive. Analysis of national responses under Article 21 of the EU ETS Directive (EU publications “technical report 2018 and 2017” written by the project consortium; EEA Report 04/2017; EEA Report 06/2016; EEA Report 03/2015). Download under <https://op.europa.eu/en/publication-detail/-/publication/4c3f7bf0-7d08-11e9-9f05-01aa75ed71a1/language-en/format-PDF/source-106608388> and <https://publications.europa.eu/en/publication-detail/-/publication/fc2b7891-704d-11e8-9483-01aa75ed71a1/language-en/format-PDF/source-81623785> [https://www.eea.europa.eu/publications#c7=en&c11=5&c14=&c12=&b\\_start=0](https://www.eea.europa.eu/publications#c7=en&c11=5&c14=&c12=&b_start=0)

### 4.1.1 Fuel consumption and emissions of stationary installations

Based on the evaluation of MS' responses to the Article 21 questionnaire, the total emissions from fossil fuel combustion were 1 431 Mt CO<sub>2</sub> (eq) and the total fossil fuel consumption was 18 158 PJ for the EEA-31 in 2018. This is respectively 50 Mt CO<sub>2</sub> (eq) and 699 PJ less than the reported data in 2017. Compared to 2013, emissions were reduced by 244 Mt CO<sub>2</sub> (eq) (17%).

The most important source streams, each representing a share of over 20% of the total emissions, were hard coal, lignite (and sub-bituminous coal) and natural gas. Other important source streams include mainly refinery gas (and other process derived gases) and other fossil fuels types (not covered by the other specified fuels) with 8.1% and 6.7% (see Figure 4.1-1).

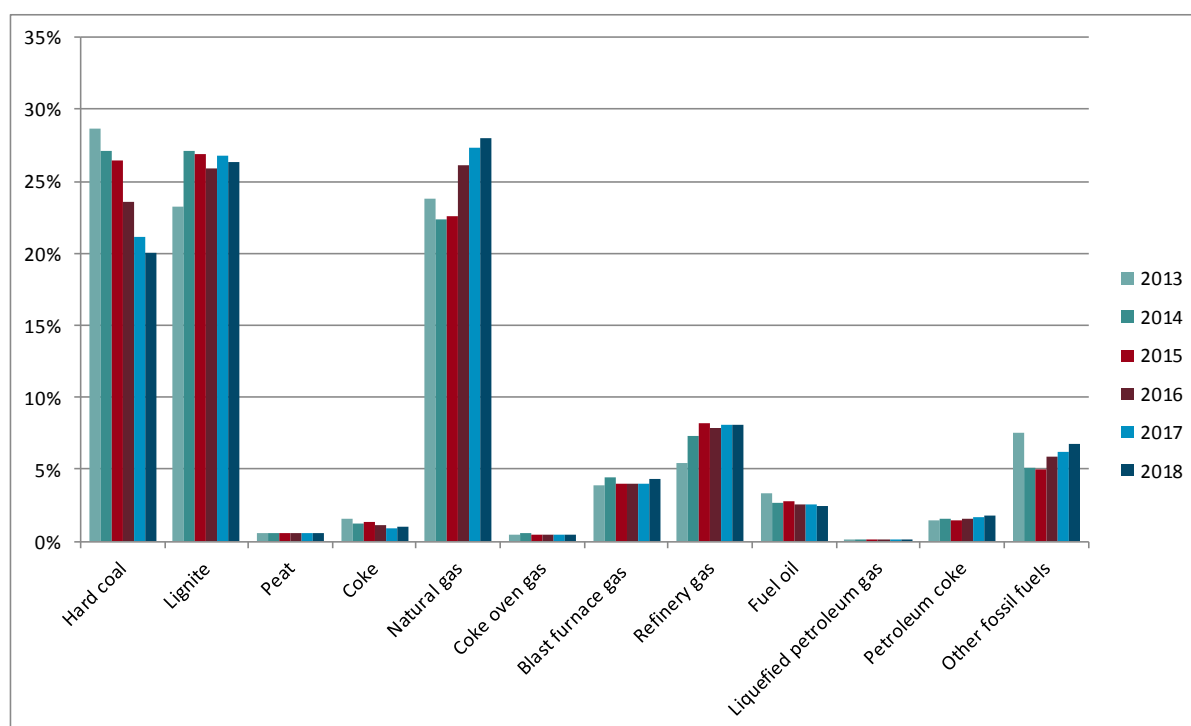


Figure 4.1-1 Evolution of the share of emissions of each fuel type (%)

Figure 4.1-2 represents the fossil emissions of the different fuel types in Mt CO<sub>2</sub> (eq).

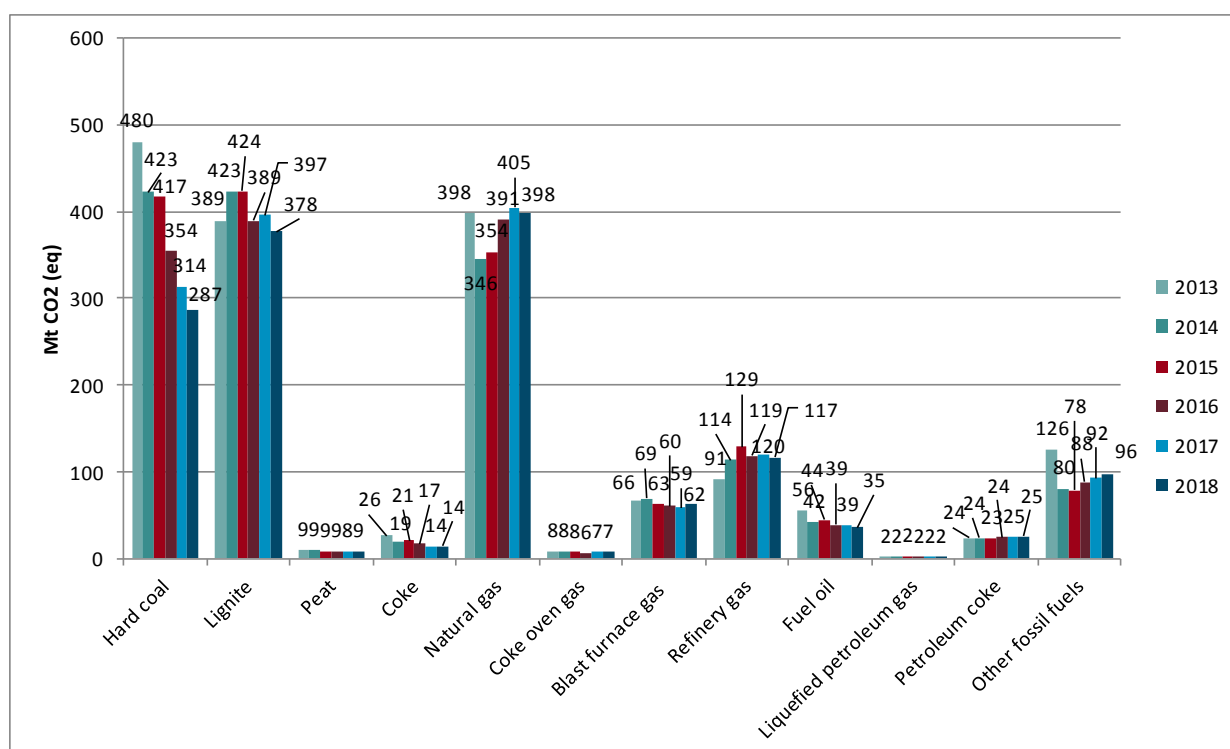


Figure 4.1-2 Total emissions from combustion of fossil fuels emissions in Mt CO<sub>2</sub> (eq)

The national responses in the Article 21 reports show that the total emissions of fossil fuels decreased from 1 677 Mt CO<sub>2</sub> (eq) in the year 2013 to 1 431 Mt CO<sub>2</sub> (eq) in 2018. Hard coal is the fossil fuel that showed the most significant reduction in emissions of all fossil fuel types. This is largely because the consumption of hard coal has been reduced by more than 40% since 2013. Emissions from combustion of hard coal decreased from 480 Mt CO<sub>2</sub> (eq) in 2013 to 287 Mt CO<sub>2</sub> (eq) in 2018. The fact that hard coal is used less in the EU Member States can also be observed in Figure 4.1-2 showing that the share of hard coal decreased from 28.6% in 2013 to just over 20% in 2018. The share of natural gas on the other hand increased from 23.8% (398 Mt CO<sub>2</sub> (eq)) to 27.8% (398 Mt CO<sub>2</sub> (eq)) in the years of the third trading period, although in absolute numbers the emissions were constant.

The consumption of peat, refinery gas, liquefied petroleum gas, petroleum coke and blast furnace gas remains more or less constant whereas the consumption of lignite, coke, and fuel oil like hard coal is decreasing. The use of other fossil fuels types was rising slightly during the last five years.



In terms of energy content, natural gas remained the most significant consumed fuel (7 083 PJ) in 2018, followed by lignite with 3 522 PJ and hard coal with 3 075 PJ. Figure 4.1-3 gives an overview of the changes in fuel consumption as well as fuel emissions (as percentages) between the years 2017 and 2018. The graph indicates the corresponding absolute values (2018) of consumption (in PJ) and emissions (in Mt CO<sub>2 (eq)</sub>) for each fuel type.

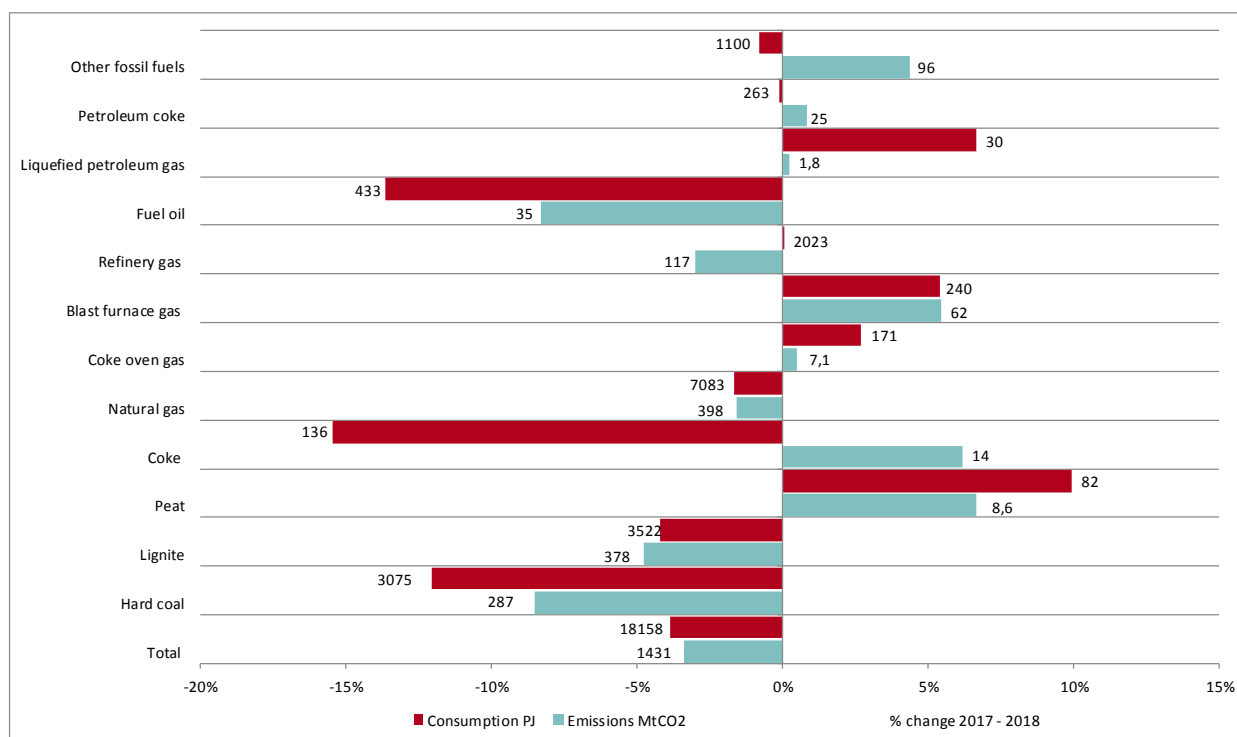


Figure 4.1-3 Difference [in %] in fuel consumption [in PJ] and emissions [in Mt CO<sub>2 (eq)</sub>] in the EU ETS, by fuel type, between 2016 and 2017

Figure 4.1-3 shows a huge improvement in the last year. In previous years deviations in the data of more than 50% were observed, in particular related to the consumption of fuel. This year the data deviated less than 10%, though there were a few exceptions (e.g. coke, fuel oil and hard coal) where deviations in the consumption data between 10 and 15% were observed. In general the increases and/or decreases of consumption data show parallels with similar trends in the emissions data. Overall consumption and emissions from fuel combustion decreased by about 3%.

Figure 4.1-4 illustrates the development of fuel consumption (in PJ) and emissions (in Mt CO<sub>2 (eq)</sub>) per country between 2017 and 2018.

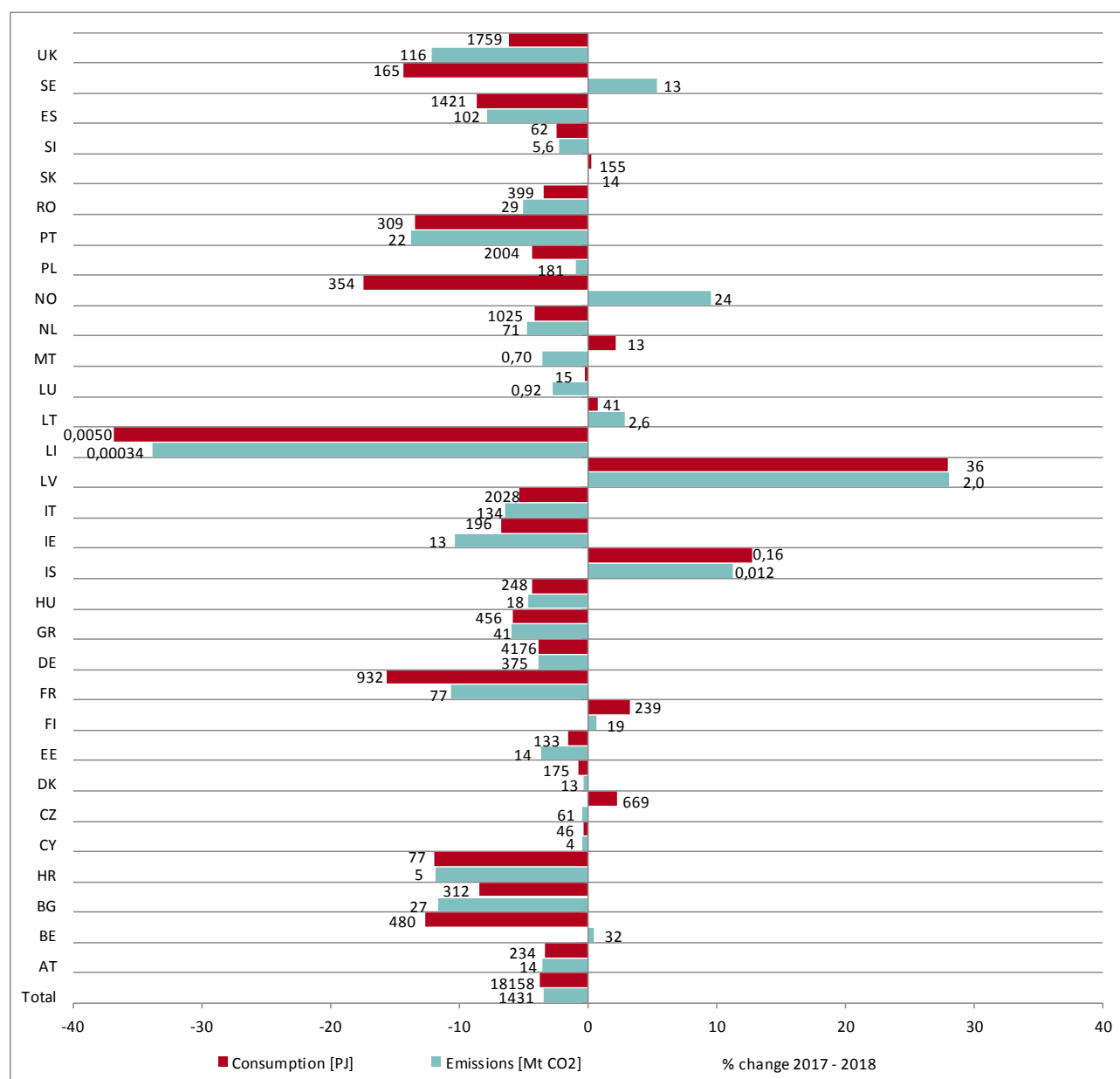


Figure 4.1-4 Difference [in %] in fuel consumption [in TJ] and emissions [in Mt CO<sub>2</sub> (eq)] in the EU ETS, by country, between 2017 and 2018

Total fuel consumption as well as total CO<sub>2</sub> emissions in the EU was reduced between 2017 and 2018. Germany reported the highest fuel consumption (4 176 PJ) of all countries, followed by Italy (2 028 PJ) and Poland (2 004 PJ). The most significant CO<sub>2</sub> emitters are Germany (375 Mt CO<sub>2</sub> (eq)), Poland (181 Mt CO<sub>2</sub> (eq)) and Italy (134 Mt CO<sub>2</sub> (eq)).

As described in the previous chapter the Article 21 report data has improved enormously because the discrepancies between consumption and emission have been reduced. An increase or decrease over 20% could only be observed in MS with very low emission levels. Liechtenstein reports a reduction in consumption and emissions of more than 30% compared to 2017. However, in Liechtenstein the emissions were twice as high last year because of fluctuation

in their production of energy. Latvia reports an increase in consumption and emissions of about 30%. Although the deviations may be considered as high the absolute numbers are still very small compared to other MS. All other countries report changes of less than 20%. The fact that this year consumption data shows similar trends as for emissions data and less deviations were observed indicates that Member States improved the way they completed question 5.5 in the Article 21 questionnaire. The only countries with somewhat higher discrepancies are Norway and Sweden where the consumption decreased and the emissions increased. However, the discrepancies in both MS are far less than observed in other years.

### 4.1.2 Combustion and process emissions

Article 73 of the MRR requires operators to report emissions from their Annex I activities in accordance with Codes from the CRF<sup>61</sup> for national greenhouse gas inventory systems. The objective of reporting emissions against CRF category codes in the Article 21 questionnaire is to assist MS and the EU as a whole to improve the quality of data relevant for the national inventories, as well as to enable the Commission to assess the data consistency between the EU ETS and the national inventories reported to the UNFCCC.

For the Article 21 questionnaire, all 31 countries reported aggregations of their operator data in 2018, distinguishing between process or combustion CRF categories (Figure 4.1-5)<sup>62</sup>. The consistency of the provided data was analysed by comparing it to the data presented in section 4.1.1, and by comparing the sum of combustion and process emissions with the total verified emissions. The reported combustion data for most countries were very similar to those presented in section 4.1, and can therefore be considered consistent. Some MS presented combustion data with different results (mainly where emissions were reported as t CO<sub>2</sub>/t without a net caloric value).

The sum of process and combustion emissions were cross checked with the total verified emissions. Total process emissions are estimated at approximately 296 Mt CO<sub>2 (eq)</sub> and overall emissions from fossil fuel combustion amounted to 1 431 Mt CO<sub>2 (eq)</sub> (see chapter 4.1.1) summing up to 1 727 Mt CO<sub>2 (eq)</sub> for the EEA-31 in 2018. These estimations are in line with the verified emissions of 1 682 Mt CO<sub>2 (eq)</sub>.

Figure 4.1-5 shows the share of combustion and process emissions per country in 2018. In nearly all MS, the combustion emissions are more important with a share of over 50%. The exception is Iceland where emissions are predominantly stemming from processes.

<sup>61</sup> National GHG inventories are divided into sectors that are assigned a CRF category for easy identification. For example, public electricity and heat production has the CRF category 1A1a.

<sup>62</sup> Combustion emissions arise from the combustion of fuel in order to generate energy. Process emissions cover all emissions from industry, except those from fuel combustion, which includes those from chemical and metal production, and mineral products such as lime and cement.

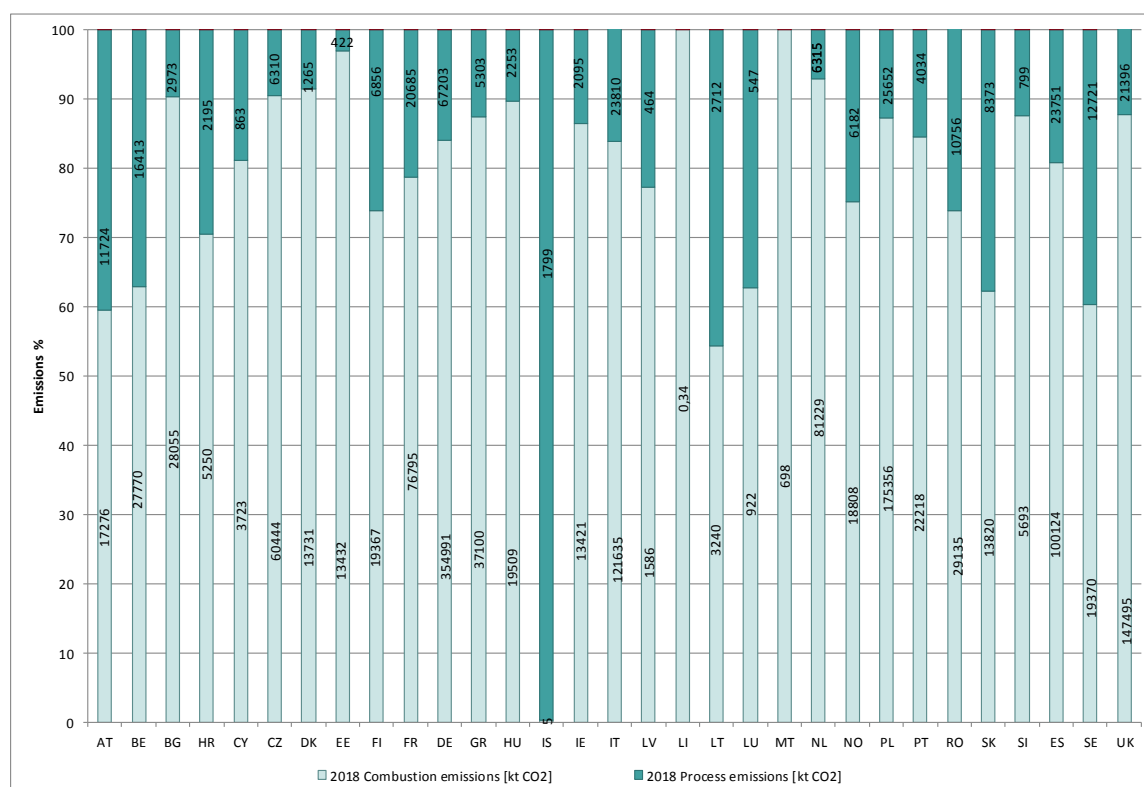
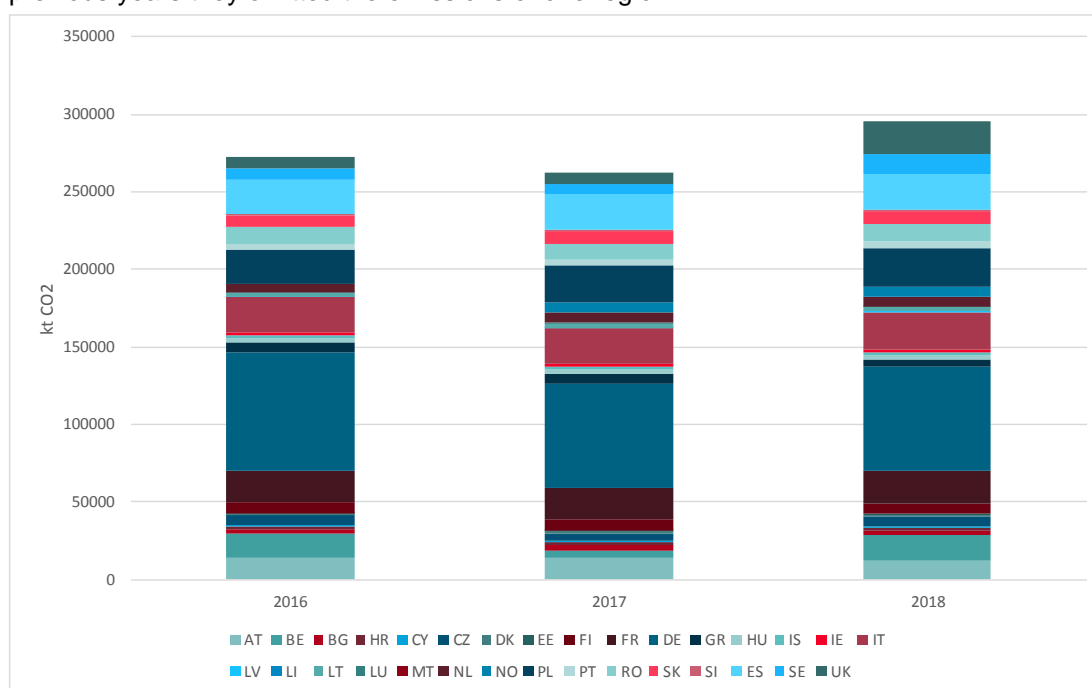


Figure 4.1-5 Share of combustion and process emissions per country in 2018

The total emissions from processes has risen from 262 Mt to 296 Mt CO<sub>2</sub> (eq) in the last year (see Figure 4.1-6). This can be explained mainly due to the increase of emissions reported by United Kingdom (from 7 to 21 Mt CO<sub>2</sub> (eq)) and by Belgium which reported emissions from all three regions whereas in previous years they omitted the emissions of one region.

Figure 4.1-6 Total emissions from processes in kt CO<sub>2</sub> (eq)

The CRF combustion category 1A1a (public electricity and heat production) accounted for 52% of the total and 63% of combustion emissions reported in 2018. The next largest category was 1A1b (petroleum refining) with 6.1% and 7.4%, respectively. The process categories 2C1 (iron and steel production) and 2A1 (cement production) accounted for 32% and 24% respectively of the total process emissions reported in 2018 (see Figure 4.1-7).

Countries were allowed either to report emissions jointly for combustion and process categories, or separately for the specific combustion and process categories. Joint reporting of the categories were fairly common. For example, for the iron and steel manufacturing sector, process emissions under CRF category 1A2a, a combustion source, have been reported jointly with 2C1 (iron and steel). Because of the joint reporting of process and combustion emissions under one category it is therefore difficult to interpret the data.

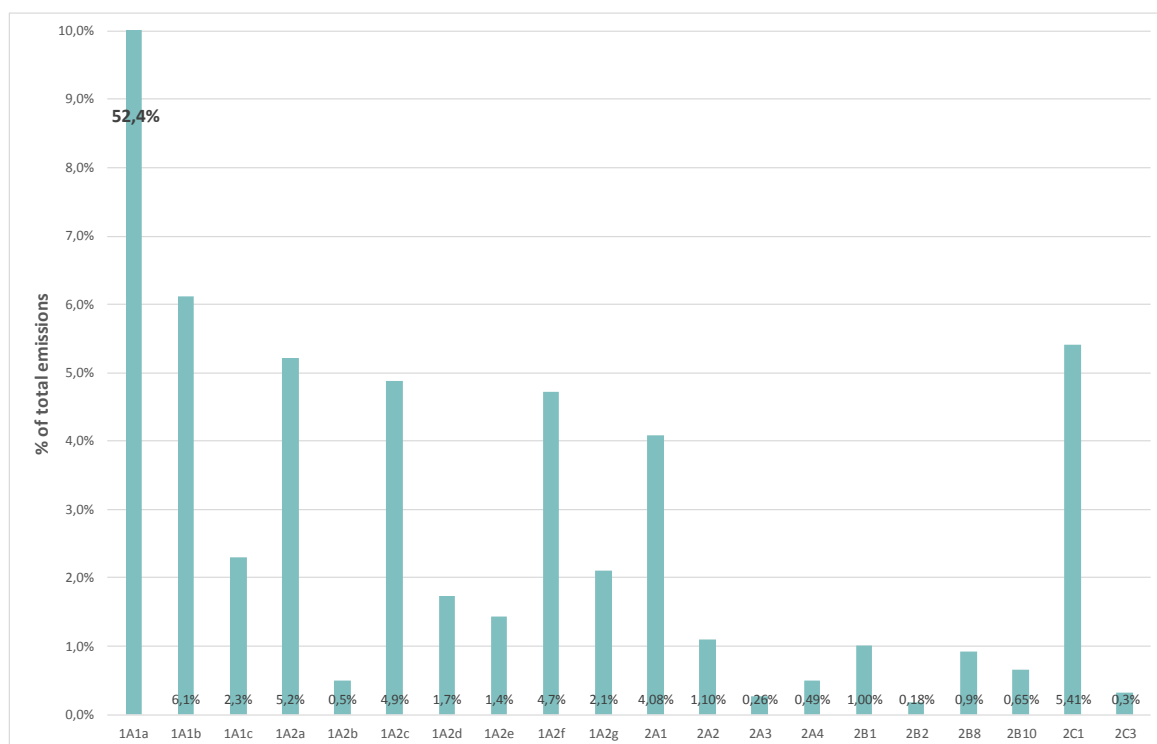


Figure 4.1-7 Proportions of the CRF categories in % of total emissions

### 4.1.3 Fuel consumption and emissions of aircraft operators

Each aircraft operator that falls under the scope of the EU ETS has to determine the annual CO<sub>2</sub> emissions from its aviation activities. One of the parameters to calculate total emissions is the fuel consumption that aircraft operators must determine for each flight and for each fuel, including fuel consumed by the auxiliary power unit. The MRR provides two main methods for determining the fuel consumption: method A and method B. These methods differ mainly in the time at which fuel contained in tanks is measured, but not necessarily in the type of aircraft. Operators must use the method that provides the most complete and timely data, combined with the lowest uncertainty, without incurring unreasonable costs. Small emitters may estimate their fuel consumptions.

According to Article 21 reports, most aircraft operators (211) use method B; with 38 using method A. 512 aircraft operators reported their emissions under EU ETS for 2018, 28 less than 2017. Small emitters are allowed to use the specific reporting tools as specified by Article 54 of the MRR.

These tools are the Small Emitters Tool (SET) and the Eurocontrol EU ETS Support Facility (ETS SF) from which a draft Annual Emission Report can be downloaded on the basis of the associated flight data information and the small emitter tool. However small emitters can also choose to apply one of the standard methods to determine their fuel consumption instead of the simplified methodology allowed under Article 54(2) of the MRR.

The use of the SET and Eurocontrol SF are still the most common way of determining fuel consumption by small emitters. Countries reported that these methods were used by the large majority of small emitters (more than 90%). SET was used by 116 aircraft operators and additionally 151 small emitters generated their emission reports based upon the ETS SF. Countries have interpreted the questionnaire in different ways with regard to the use of methods for small emitters. The Article 21 questionnaire asks for the number of small emitters using SET to determine the fuel consumption. Certain MS (e.g. France and the United Kingdom as described in their comment section) may have summed up both aircraft operators using SET as well as ETS SF for reporting aircraft operators employing SET. Depending on the interpretation of this question, the numbers of aircraft operators are partially inconsistent across different questions.

In the 2018 reports method A and method B were chosen by 5 and 20 small emitters, respectively. These are nearly the exact same numbers than for the year 2017, only one small emitter less chose method B in 2018.

SET was also employed by 97 aircraft operators to determine the emissions of flights for which data was not available in accordance with Article 65(2) of the MRR. This is a slight decrease compared to the numbers presented in 2017 (100 aircraft operators). The monitoring plans of 66 aircraft operators specify the use of surrogate data for flights for which data was not available compared to 59 aircraft operators in 2017.

The total aggregate emissions of all EU ETS flights based on the evaluation of answers to the Article 21 questionnaires were 67.5 Mt CO<sub>2 (eq)</sub> in 2018. This is an increase of 4.2% (2.8 Mt CO<sub>2 (eq)</sub>) compared to the data reported in 2017 (see Figure 4.1-8). These emissions are reported under the current scope of the EU ETS according to Regulation No 421/2014, i.e. covering only intra-EEA

flights. In total, 13.5 Mt CO<sub>2</sub>(eq) (20%) resulted from domestic flights<sup>63</sup> representing an increase of 16% (2 Mt CO<sub>2</sub>(eq)). Thus, the emission of domestic flights has increased proportionally higher than for international flights. The proportion of emissions from domestic aviation ranges from 0.3% (Cyprus and Slovakia) to 89% (Romania). This proportion largely depends on how aircraft operators are assigned to administering MS and has no relation to domestic emissions in national GHG inventories.

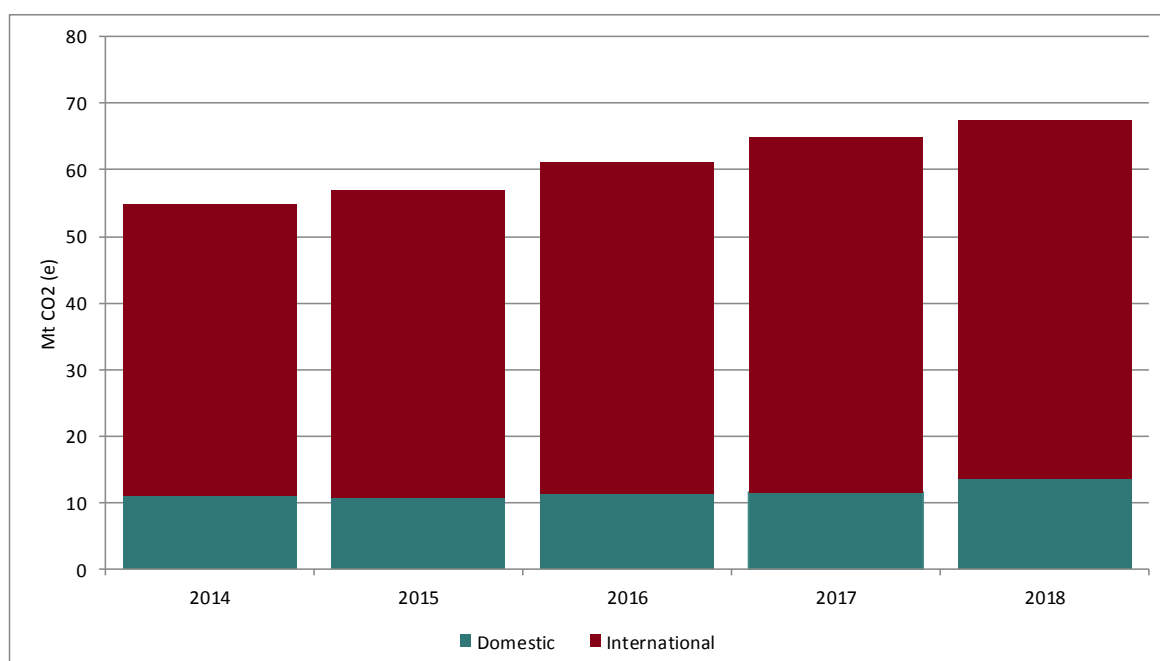


Figure 4.1-8 Fuel emissions for aircraft operators of all countries, distinguishing domestic and international flights within the EEA [Mt CO<sub>2</sub>(eq)]

Figure 4.1-8 shows a clear growth in the emissions from the aviation industry. Total CO<sub>2</sub> emissions increased from 55 Mt CO<sub>2</sub>(eq) to 68 Mt CO<sub>2</sub>(eq) over the last five years. This increase was caused by both international and domestic aviation activities with an increase of 10 and 2 Mt CO<sub>2</sub>(eq) between 2014 and 2018, respectively. Although emissions from the aviation sector have increased in all four years, the rate of growth in emissions seems to decelerate in the last three years (see Figure 4.1-9).

<sup>63</sup> The emissions of a flight are defined as domestic if the departure country is the same as the arrival country.

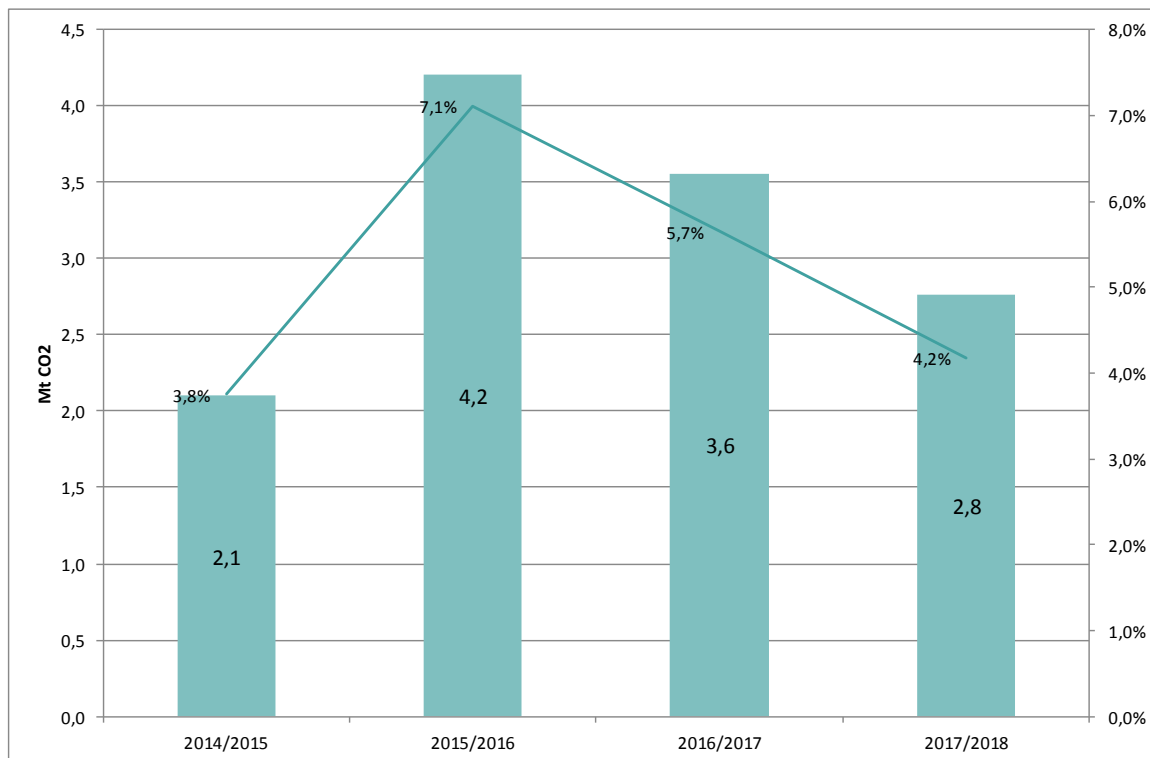


Figure 4.1-9 Differences (growth) of emissions in Mt CO<sub>2(eq)</sub> and [%] between two consecutive years.

Aviation emissions have contributed approximately 4.0% to the total emissions in the EU ETS (including stationary installations and aviation) for the reporting year 2018, compared to 3.8% in 2017.

In the stacked chart of Figure 4.1-10 the brighter bars on the left represent the domestic flights, whereas the darker bars are the emissions originating from international flights. As can be seen in this figure, the highest contribution came from airlines administered by the United Kingdom followed by Ireland and Germany. The majority of domestic flights have been reported by operators administered by France, Germany, Ireland, Italy, Norway, Spain, Sweden and the United Kingdom. (This does not mean that the domestic flights were internal flights within the reporting country).



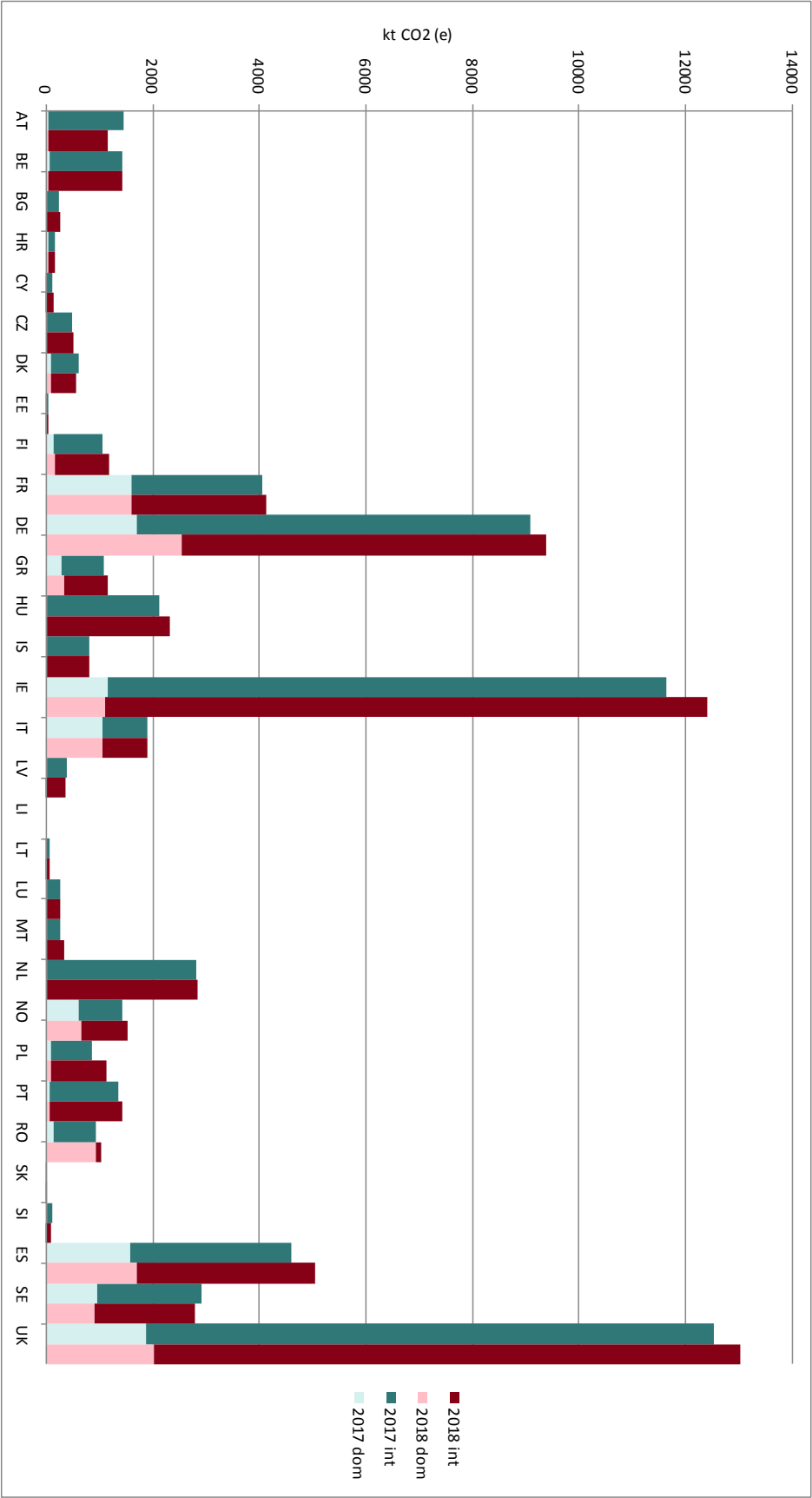


Figure 4.1-10 Emissions [kt CO<sub>2</sub> (eq)] from domestic and international flights reported for 2017 and 2018 by all countries.

## 4.2 Inherent and transferred CO<sub>2</sub>

Inherent CO<sub>2</sub> is defined as CO<sub>2</sub> in gaseous form that is already present in a (gaseous) fuel such as natural gas or in process gases (e.g. blast furnace gas or coke oven gas). According to Article 48 of the MRR, inherent CO<sub>2</sub> that is subsequently transferred out of the installation as part of a fuel to another installation subject to EU ETS activity shall not be counted as emissions of the installation of origin, but taken into account by the installation from which it is finally emitted. However, if the transfer occurs to an installation outside the scope of the EU ETS, it shall be counted as emissions of the installation where it originates.

Article 49 of the MRR regulates the treatment of all other types of transferred CO<sub>2</sub>. As for inherent CO<sub>2</sub>, the emissions are attributed to the direct emitter where transfers with the aim of geological storage in accordance with the CCS Directive<sup>64</sup> are concerned.

Question number 5.14 of the Article 21 questionnaire asks for an overview of the types of transfer that occurred in the reporting period and for the magnitude of inherent and transferred CO<sub>2</sub> transferred out of an ETS installation. This enables analysis of how the requirements in both articles have been applied across Europe. Information on the party receiving the inherent or transferred CO<sub>2</sub> is essential to assess whether the requirements in Article 48 and 49 of the MRR have been properly met.

Twelve countries reported a transfer of inherent CO<sub>2</sub> in 2018. The number of installations involved in such transfers remained constant at 133 in 2018. More than half of the installations (i.e. 68 installations) are located in Germany, followed by 36 Polish installations. The highest amounts of transferred/received CO<sub>2</sub> are calculated for Germany (54%) followed by Belgium (16%) and Spain (7%).

Figure 4.2-1 shows that Germany reported the highest total amounts of CO<sub>2</sub> transferred (26.7 Mt CO<sub>2 (eq)</sub>) and received (26.7 Mt CO<sub>2 (eq)</sub>), followed by Belgium which reported the second largest amount of CO<sub>2</sub> transferred (8 Mt CO<sub>2 (eq)</sub>); this amount being transferred between EU ETS installations only. Overall, the total amount of reported inherent CO<sub>2</sub> increased by approximately 10% compared to last year mainly because Belgium and Spain reported higher levels for 2018.

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<sup>64</sup> Directive 2009/31/EC.

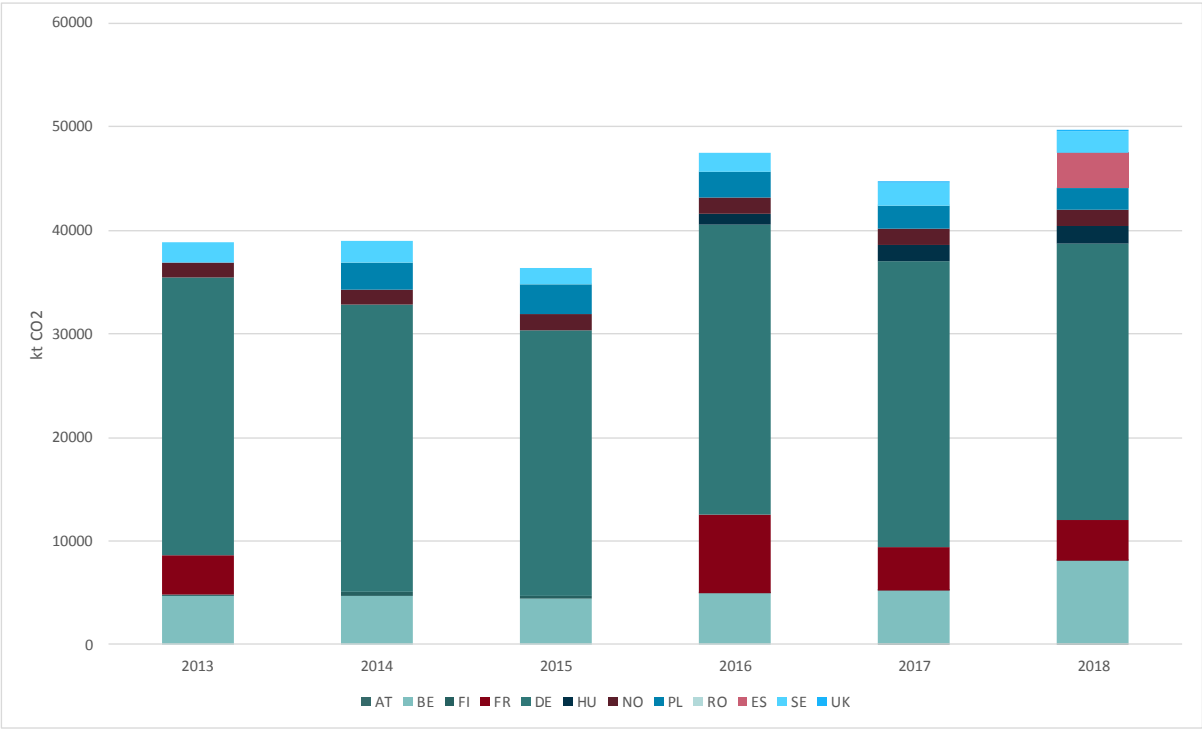


Figure 4.2-1 Total amounts of inherent CO<sub>2</sub> (eq) (in Mt) transferred to EU ETS installations per country in 2018.

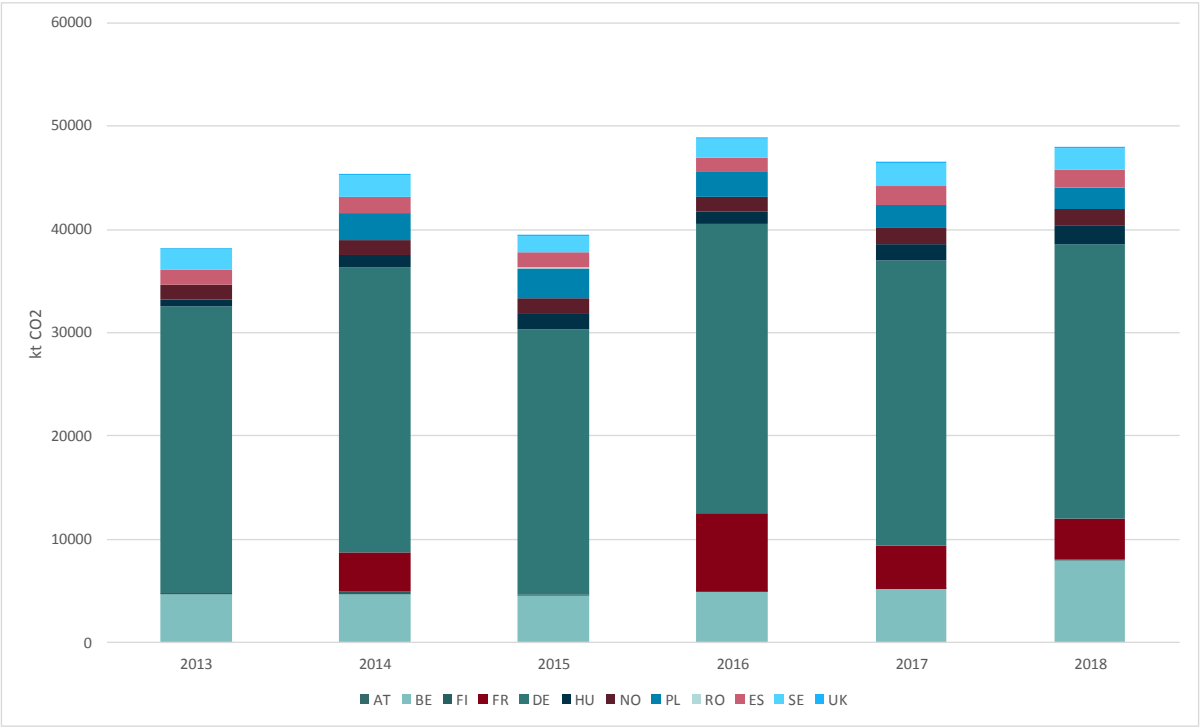


Figure 4.2-2 Total amounts of inherent CO<sub>2</sub> (eq) (in Mt) received from EU ETS installations per country in 2018.

### 4.3 Analysis of the use of CEMS

The MRR allows two main types of monitoring approaches: Calculation-based methods (as used by the vast majority of installations) and measurement-based methods, using Continuous Emission Measurement Systems (CEMS). Installations with emissions of nitrous oxide (N<sub>2</sub>O) as laid down in section 16 of Annex IV have to use a measurement-based monitoring methodology. CEMS also have to be applied for the quantification of CO<sub>2</sub> transferred pursuant to Article 49 of the MRR. In other cases, the operator is free to choose either the calculation-based method or to employ measurement-based methodologies for CO<sub>2</sub> emissions. In the latter case the operator has to provide evidence that for each emission source the tiers required in accordance with Article 41 are complied with. There are several other general requirements to be fulfilled. The measurements must be carried out applying methods based on international and specified standards. Furthermore, the operator shall ensure that laboratories carrying out measurements, calibrations and relevant equipment assessments for CEMS are accredited in accordance with EN ISO/IEC 17025 for the relevant analytical methods or calibration activities. The measurement based emissions must be corroborated using a calculation based approach. The operator shall also consider all relevant aspects of the CEMS such as the location of the equipment, calibration, measurement, quality assurance and quality control. The application of CEMS requires the monitoring of the volumetric flow of the gas stream where the measurement takes place.

CEMS as monitoring methodology is used only in a minority of stationary installations in total. Overall, 181 installations in 23 MS have been reported to use measurement based technologies for monitoring GHG emissions in the reporting year 2018 (67 operators for N<sub>2</sub>O emissions). This is approximately 1.7% of all installations. Installation applying CEMS can be most frequently found in Germany (38 representing 21% of all installations in the 23 MS applying CEMS), France (24 representing 13%), the Czech Republic (19 representing 10%) and Sweden (13 representing 7.2%). Overall approximately 56 Mt CO<sub>2 (eq)</sub> were monitored by a measurement-based monitoring methodology in 2018. This corresponds to 3.3% of the total verified emissions. Figure 4.3-1 shows the emissions of CO<sub>2 (eq)</sub> monitored by CEMS for the last six years.

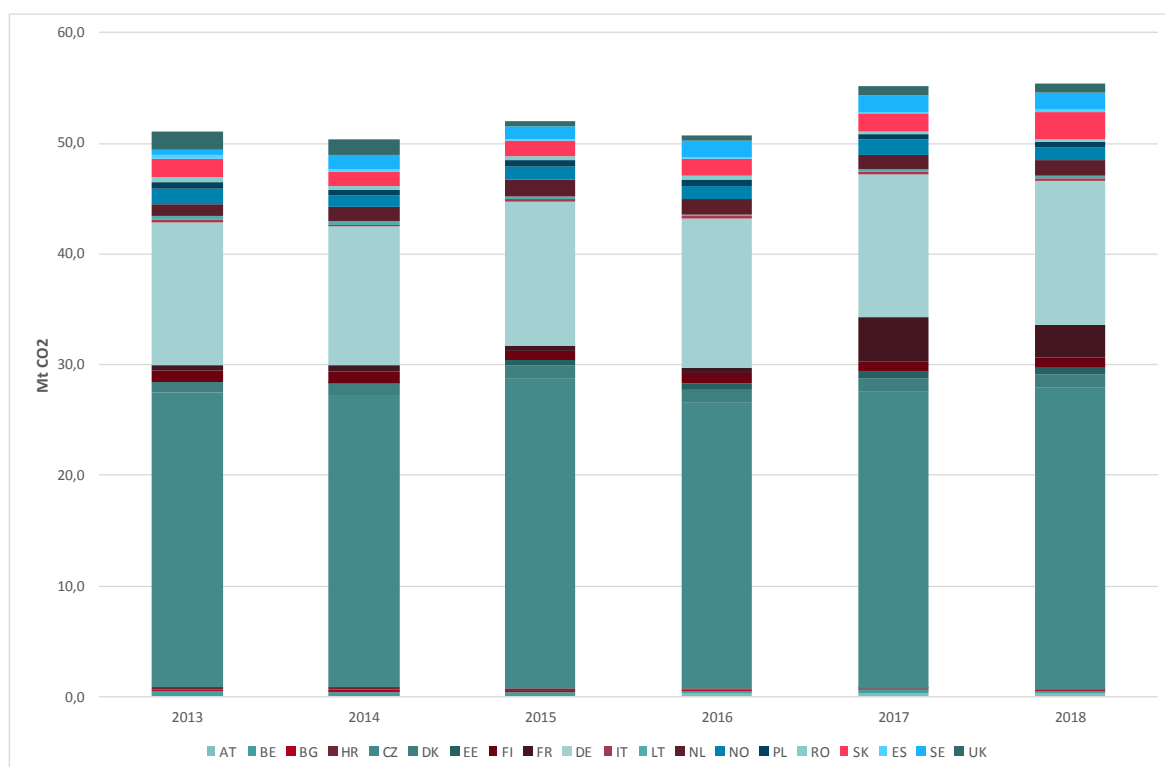


Figure 4.3-1 Emissions monitored by CEMS in Mt CO<sub>2</sub> (eq) for the years from 2013 to 2018.

As can be clearly seen in Figure 4.3-1 emissions covered by CEMS were relative constant between 2013 and 2016 but in 2017 an additional 4.5 Mt CO<sub>2</sub> was reported which represents a rise of 8.2%. This can be mainly explained by an increase in the use of CEMS in France. Since then the emissions monitored by CEMS can be considered as constant. There has been no significant changes in 2018 compared to 2017. The Czech Republic is still the highest contributor with a share of approximately 50% followed by Germany with a share of 25%.

In 16 out of the 181 installations (8.8%) the measured flue gas contained biomass which can complicate the determination of the fossil CO<sub>2</sub> emissions. The MRR applies the premise that with current equipment it is not possible to continuously measure the biomass fraction of the emitted CO<sub>2</sub> with sufficient reliability. Thus, any biomass has to be determined by a calculation-based approach for subtracting it from the total emissions determined by measurement. Most of these installations originate from Sweden (10 installations). The other 6 installations are situated in the Czech Republic (3), Germany (1), Lithuania (1) and Slovakia (1).

#### 4.4 Biomass use by installations and aircraft operators

The development of energy from renewable sources constitutes an important part of the package of measures needed to reduce greenhouse gas emissions. Burning biomass is one of the possible sources of renewable energy.

Following Directive 2009/28/EC on the promotion of the use of energy from renewable sources, the MRR defines biomass as the biodegradable fraction of products, waste and residues of biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste. Bio-liquids means liquid fuel for energy purposes other than for transport, including electricity and heating and cooling, produced from biomass, whereas biofuels means liquid or gaseous fuel for transport produced from biomass. For EU ETS purposes the emission factor can be set to zero, if the definition of the term “biomass” is fulfilled and where – if biofuels or bio-liquids are concerned – the sustainability criteria pursuant to Article 17(1) of Directive 2009/28/EC are met.

The only reliable data sources for biomass use in the EU ETS are annual emission reports. The Article 21 questionnaire therefore puts special interest on how much sustainable and non-sustainable biomass is used in installations covered by the EU ETS. Biomass and biofuels are an important issue for stationary installations and aviation respectively, with their objective of reducing fossil CO<sub>2</sub> emissions. It is therefore essential to know how the requirements on the use of bio-liquids and biofuels, and of biomass overall are being applied, how effective the requirements are, how the situation on use develops over the years, and how much sustainable (and non-sustainable) bio-liquids and biofuels are being used by installation and aircraft operators obligated under EU ETS.

#### **4.4.1 The use of biomass in installations**

The fuels combusted within the EU ETS were overwhelmingly of fossil origin in 2018. However, the use of biomass is common throughout the MS as 29 countries (the same number as in previous years) report biomass utilization in installations. Only Liechtenstein and Malta do not report any use of biomass. Although MS have still different interpretations of reporting biomass emissions the data quality seemed to improved significantly in the last two years. The emissions rose from 139 Mt in 2017 to 161 Mt in 2018. These emissions correspond to an energy consumption of 1676 PJ (2017) and 1864 PJ (2018) resulting in a similar increase in consumption and emission. A comparison with the first years of reporting was difficult to make due to incomplete data sets (e.g. biomass emissions in t CO<sub>2</sub>) of some MS.

MS stated that 2 187 out of 10 609 installations (21% of all reporting installations under the EU ETS) reported the use of biomass in 2018. Figure 4.4-1 distinguishes between category A, B and C installations and shows the number of installations combusting biomass compared to the total number of installations. The percentage is increasing with the size of installations' emissions (i.e. the percentage of category C installations burning biomass is higher than those for category B and A installations). More than 26% of category C installations combust biomass whereas the percentage of category B and A installations are 23% and 19%, respectively.

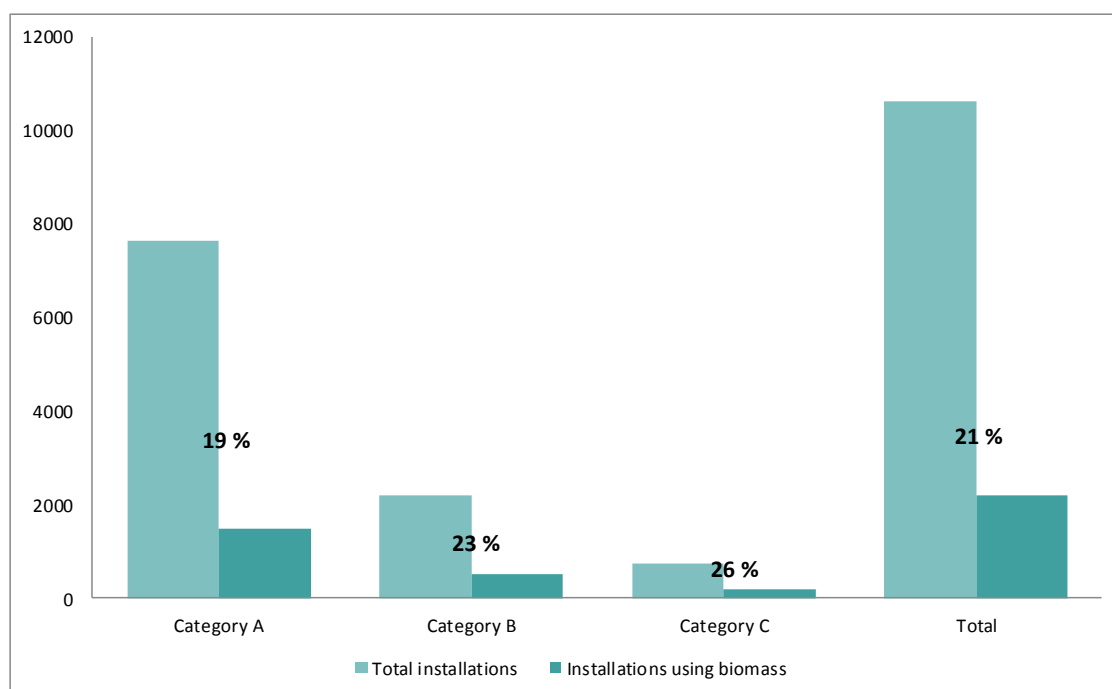


Figure 4.4-1 Number of category A, B and C installations using biomass

These figures translate into 1 487 category A (68%), 504 category B (23%) and 196 category C (9%) installations. These installations jointly emitted approximately 161 Mt biogenic CO<sub>2</sub>. The emissions of biomass which are zero-rated correspond to more than 10% of the total fossil combustion emissions of 1 431 Mt CO<sub>2 (eq)</sub>. The emissions of non zero-rated biomass are still minimal with about 1.2 Mt CO<sub>2 (eq)</sub> accounting for less than 1% of total emissions. This might change in the near future because of the ongoing discussions about changes in the MRV system regarding biomass, especially reporting sustainability criteria for solid biomass. Category A installations contribute to about 48% with 77 Mt zero rated CO<sub>2</sub> whereas Category B and C installations emitted 53 and 30 Mt CO<sub>2</sub> (33% and 19%), respectively.

It would be interesting to analyse whether the use of biomass is increasing over the years. However, due to incomplete reporting in previous years this has to be done carefully. Although the emissions remained relatively constant between 2015 to 2017 the last year showed a significant increase of more than 20 Mt CO<sub>2</sub> (see Figure 4.4-2). To be able to compare the different data sets, proxy data has to be used to fill the data gap for the Italian and French emissions. The Italian 2014 emissions of category A installations were replaced by the mean value of the years 2013, 2015, 2016 and 2017. The French emissions for 2015 for all installation categories were calculated with the mean values of 2013, 2014, 2016 and 2017.

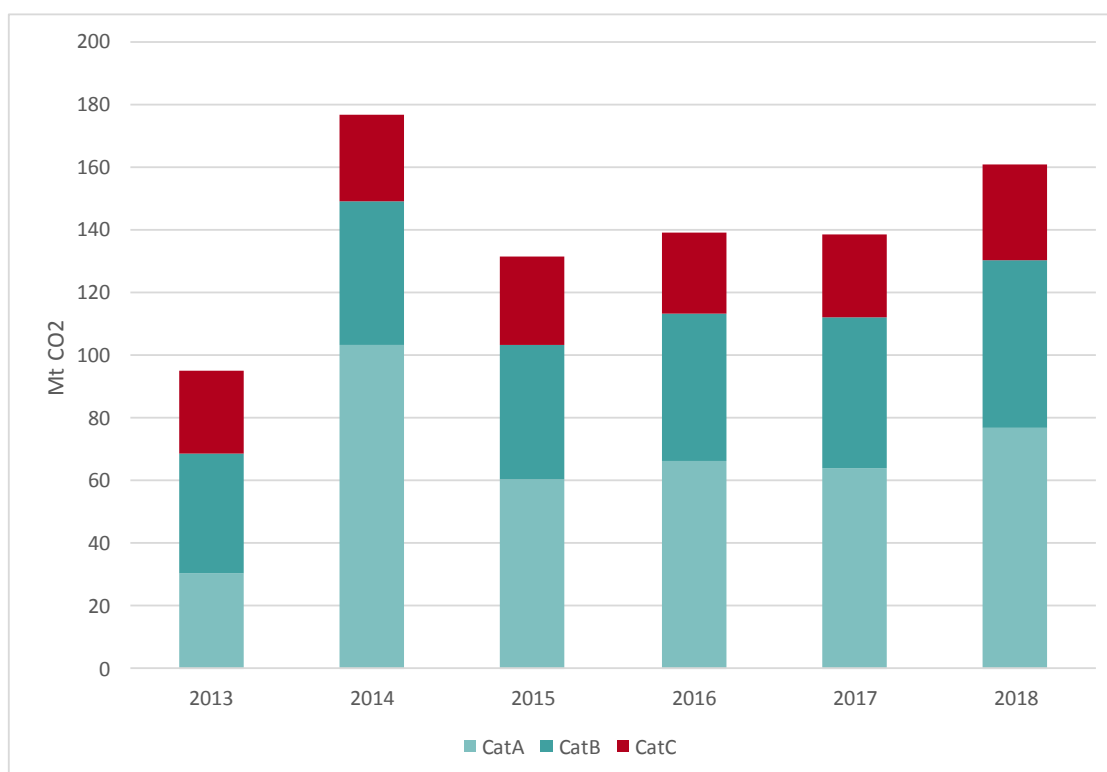


Figure 4.4-2 Emissions in Mt CO<sub>2</sub> (eq) originating from biomass between 2013 and 2018.

In 2018, in the EU ETS, the combustion sector accounted for 54% of the zero-rated biomass emissions across all reporting countries followed by the production of pulp with 21% and the production of paper or cardboard with 20%.

#### 4.4.2 The use of biofuels in the aviation industry

Biofuels are one possible element to reduce aviation emissions. However, until now it has not been used on a wide range and even the few users that reported in previous years have stopped to use biofuels. In the reporting year 2018 no aircraft operator has employed biofuels. However, the importance of biofuels in the aviation industry is expected to increase in order to achieve the greenhouse gas emission reduction objectives set for this sector and because of higher cost for the purchase of allowances in the future. Therefore, the trend in aviation biofuel use should be carefully followed in the future.



## 4.5 Emissions from waste used as fuel or input material

In 2018, 26 countries (one more than 2017; i.e. Luxembourg for the first time) reported CO<sub>2</sub> emissions from waste used as a fuel or input material. Iceland, Liechtenstein and Malta reported zero emissions from waste. As information on emissions from waste was not available or incomplete for The Netherlands and Norway no information was provided by those countries. This was largely due to operators not having reported those emissions in their emission reports. Belgium could also only report partial emissions from waste due to missing data. Furthermore, some countries had difficulty in identifying and classifying the relevant emission source streams as the codes for reporting waste according to Community list of wastes were omitted from operator's reports.

In 2018, the total EU ETS emissions from waste as a fuel or input material were approximately 28 Mt CO<sub>2 (eq)</sub>. Of the 26 countries that reported their emissions from waste, nine reported a decrease and 17 reported an increase in waste emissions. However, these data have to be treated carefully because of the above-mentioned reporting limitations. Overall, the emissions have increased by 1.2% in the last year for the reporting MS.

Figure 4.5-1 provides the aggregated emissions for each reporting country between 2013 and 2018. Italy reported the biggest emissions from waste use (8.5 Mt CO<sub>2 (eq)</sub>). As in previous years, Sweden with 13% compared to the total verified emissions reported the highest proportion in use of waste as a fuel or input material, followed by Denmark with 11%.

The emissions from the use of waste have been relatively constant for the last three years, around 28 Mt CO<sub>2 (eq)</sub>. When the emissions from waste use in absolute numbers are compared, Italy showed a slight decrease in the use of waste whereas Poland increased their waste use. The sharp decrease in Spain for 2017 is stabilised in 2018 and the level maintained the same. In Denmark, Italy, Latvia and Sweden emissions from waste used as a fuel or input material ranged between 5.0% and 13.1% of their EU ETS totals. In other countries these emissions were less than 2.5% of their total emissions.

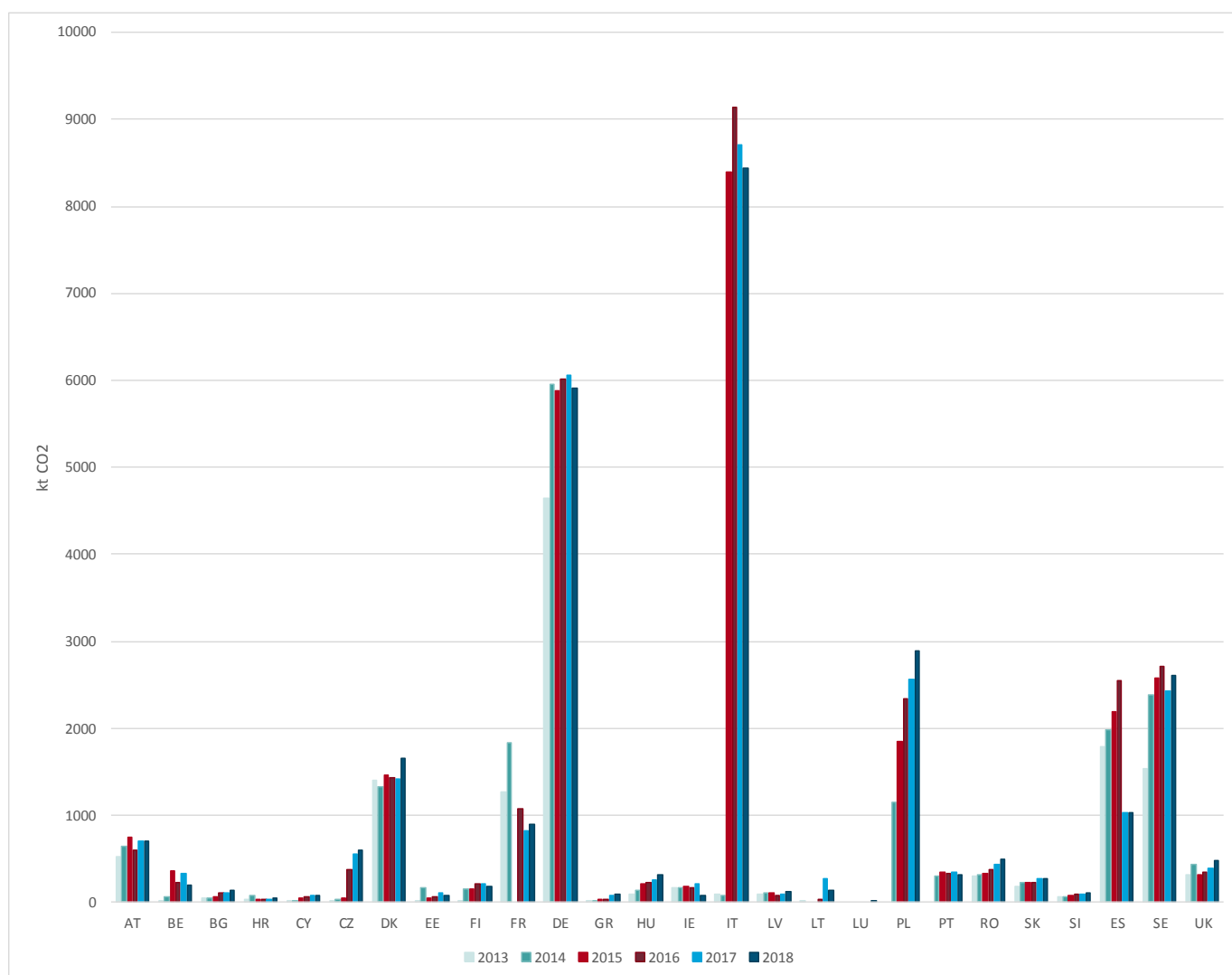


Figure 4.5-1 Emissions from waste as fuel or input material [kt CO<sub>2</sub> (eq)] by country.

## 5 INFORMATION ON ROBUSTNESS OF THE MRV SYSTEM

This chapter provides information on how robust the MRV system is for both stationary installations and the aviation sector. The chapter gives an overview of whether the MRV system is implemented satisfactorily. It shows how default values for calculation factors are used by MS, how sampling plans are applied, to what extent the fall-back approach is applied and to what extent there is deviation from analysis frequencies and derogation from the highest tier approach. It tries to find whether an improvement over time can be identified in the monitoring and reporting in MS and what shortcomings still have to be eliminated.

### 5.1 Stationary Installations

This section analyses how and on what areas the MRV system is improving for stationary installations. The detailed analysis of the Article 21 reports indicates that in general default and literature values are applied in accordance with the requirements of the MRR. In most cases literature values were used in relation to natural gas and fuel oil; fuels that are frequently used in Category A installations and where the application of literature values seems to be justified. The Article 21 reports show that the Competent Authorities have a good overview of the sampling plans that operators have to submit according to Article 33 MRR for the determination of their calculation factors. Most MS reported that these plans are for the most part complete and in accordance with the requirements of the MRR. Sampling plans were drawn up in all cases in 26 MS. Only four countries (two less than 2017) encountered problems or issues concerning sampling plans. The Competent Authorities allowed only few operators to use a different frequency of analysis than the ones listed in Annex VII of the MRR because of unreasonable costs.

The possibility to derogate from the highest tier was less extensively used than in earlier years and the number of installations using this exception is decreasing constantly. Although the number was already low (less than one thousand category B and C installations), it has further decreased significantly to about 500 installations over the last five years. Also, the fall-back approach, an exception of the normal tier approaches, is used only by a very small number of installations.

There are also indications that the improvement principle is working. Considering the short time between submission of the annual emission report and the deadline for the submission of the required improvement report, the submission rate for improvement reports is consistently high at approximately 90% and has raised even further to 95% this year. The high number of outstanding issues in the verification reports indicates that the principle to improve continuously is a key issue including for verifiers. The rate of rejection of emission reports is very low although the additional control measures of Competent Authorities are extensive. All this shows that verification combined with additional control measures by Competent Authorities are effective instruments to assess the accurateness of emissions and compliance with the requirements and to follow-up on these issues.

More details on these findings are provided in the following sections.

### 5.1.1 Application of default values

Articles 26, 31 and Annex IV of the MRR specify the situations in which installation operators can use default values for calculation factors instead of data based on sampling and laboratory analyses. The type of default value applicable is determined by the relevant tier definition. Tier 1 requires the use of a different type of default value than tier 2. As an indicator for the application of low tiers, the Article 21 questionnaire in the first part of question 5.7 asks for “type I default values”<sup>65</sup> and literature values agreed with the Competent Authority (which includes country specific inventory factors).

29 countries reported using literature or default values. As in the previous year Liechtenstein and Lithuania did not report the use of any default or literature values for calculation factors. Belgium commented that no new default values were approved by the Competent Authorities compared to previous years. For the calculations in this chapter the values of 2017 were taken for Belgium. The installation operators covered by the EU ETS used 10 679 default values (8 219 literature values agreed with the Competent Authority<sup>66</sup> and 2 460 type I default values<sup>67</sup>). Compared to 2017 the number of default values according to Article 31 (1) (c) (d) and (e) has increased by 312. This increase was due to the higher use of literature values (see Figure 5.1-1).

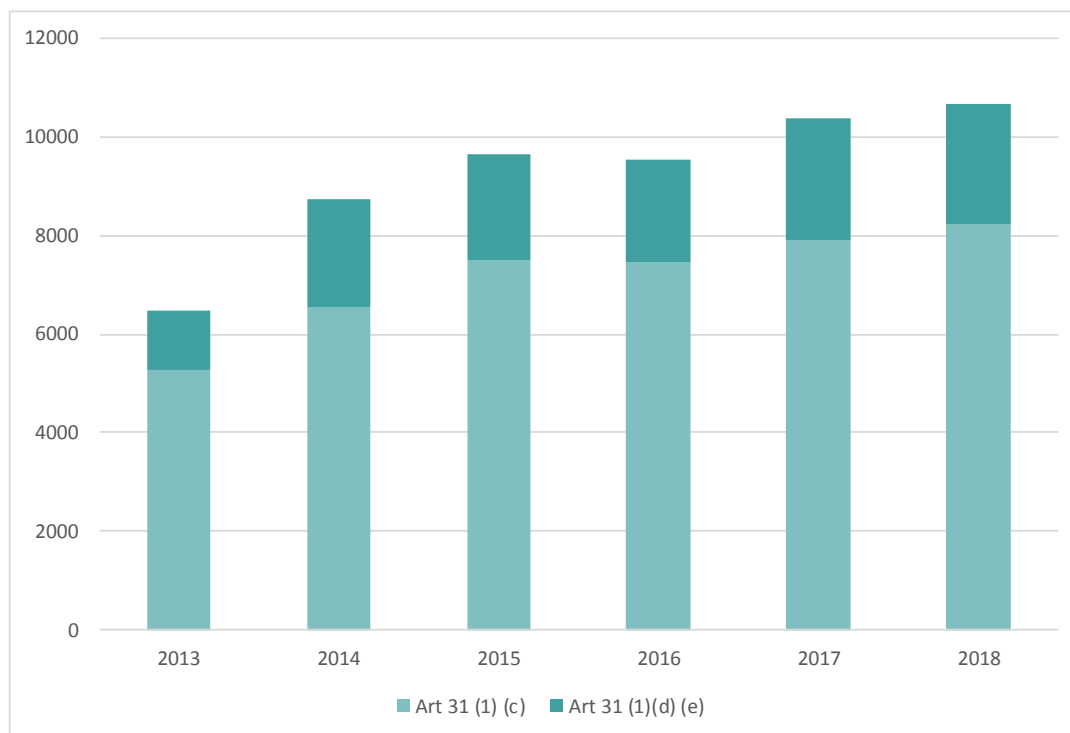
The high number of default values can be partly explained by the fact that often several values for the different calculation factors were reported for each source stream where default values are allowed (i.e. net calorific value and emission factor). Germany reported the highest number of default values with 5 624 cases, followed by Poland and the United Kingdom with 1 947 and 588 cases respectively. In contrast, 16 of the 29 countries reported fewer than 50 occurrences. As the combustion process is the most applied activity listed in Annex I to the EU ETS Directive, literature values are likely to dominate in comparison to default values according to Article 31(1) (d) and (e) (see Figure 5.1-1.). Consequently, natural gas and fuel oil were the fuels where constant values were most often applied. More than 95% of reported calculation factors for natural gas and fuel oil were reported as literature values agreed with the Competent Authority.

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<sup>65</sup> Type I default values are values referred to in points (d) and (e) of Article 31(1) of the MRR. They represent the lowest tier for calculation factors. Type II default values are country specific emission factors in accordance with points (b) and (c) of Article 31(1), i.e. values used for the national GHG inventory and values agreed with the Competent Authority, to be used for tier 2. For more information see the Commission’s Guidance Document No. 1, “The Monitoring and Reporting Regulation – General guidance for installations”, [https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/gd1\\_guidance\\_installations\\_en.pdf](https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/gd1_guidance_installations_en.pdf)

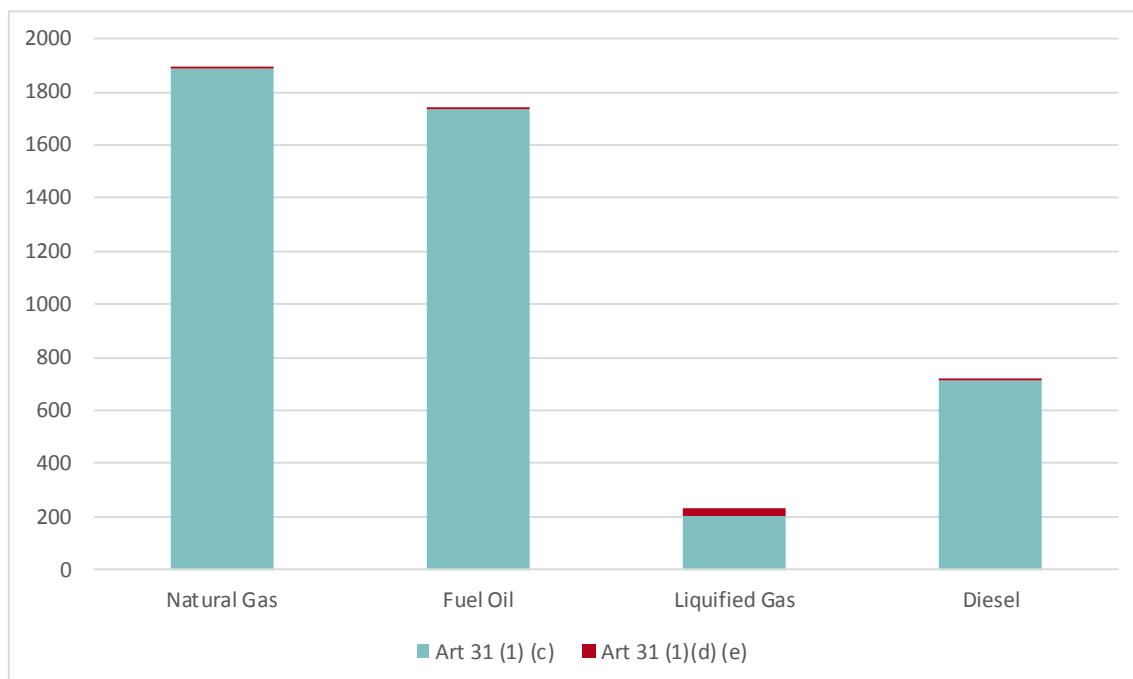
<sup>66</sup> based upon point (c) of Article 31(1) of the MRR

<sup>67</sup> constant values in accordance with points (d) or (e) of Article 31(1) of the MRR



*Figure 5.1-1 Number of reported literature values (Article 31(1) (c)) and default values (Article 31(1) (d) and (e))*

Germany as the main contributor to default values was studied in detail. It applied 4 777 literature values and 847 default values. The literature values came basically from four input materials (i.e. natural gas, fuel oil, diesel and liquefied gas) summing up to a total of 4°532 cases (see Figure 5.1-2). The number of literature values seems plausible based on the number of category A installations (1325) and the share of de-minimis source streams (43% of all source streams) in Germany. Moreover, fuel oil, diesel and liquefied gas are commercial standard fuels for which literature values are permissible for major source streams in category B and C installations. On the other part default values were applied in numerous different input material with a low number of cases per input.



*Figure 5.1-2 Number of reported literature values for the four most abundant fuel types in Germany as the main contributor of standard values (Article 31(1) (c)) and default values (Article 31(1) (d) and (e))*

The MRR defines as minimum requirements for category A installations for commercial standard fuels a tier 2a/2b approach for the calculation factors. Literature values in accordance with point (c) of Article 31(1) can be applied for reaching the required tier. Each category A installation using commercial standard fuels such as natural gas and/or fuel oil is therefore eligible to apply such literature values. Germany reported more than 70% of their installations as Category A installation (i.e. 1 325) (see section 3.4.). Therefore, the high number of cases where literature values were applied for above mentioned fuel types seems reasonable even if these values are not connected to the corresponding installations and source streams in the Article 21 report.

Lignite and hard coal are other typical fuels with high consumption in the EU ETS (see section 4.1.1). Although both fuel types were extensively used (e.g. in many big power generation plants representing category B and C installations) and their consumption was more or less as high as that of natural gas, the numbers for the reported default values of lignite and hard coal were relatively low with approximately 500 cases compared to 3 000 cases for natural gas. This might be an indication that the MRV system is working (i.e. the number of default values for fuel mainly used in category B and C installations is much smaller than the number of default values for fuels often used in category A installations). The application frequency of default values and literature values is, in general, considered appropriate and in line with the MRR.

Standard factors from the MRR Annex VI (Article 31(1)(a)) were used slightly more often than constant values in accordance with points (d) or (e) of Article 31(1) of the MRR. 24 countries reported 2 423 cases for 2018. This is 100 cases less than the year before. France reported the highest number of occurrences (910) followed by the Netherlands and Italy with 477 and 279 respectively (see Figure 5.1-3). Interestingly, all three countries have reported the exact same numbers for the last three years.

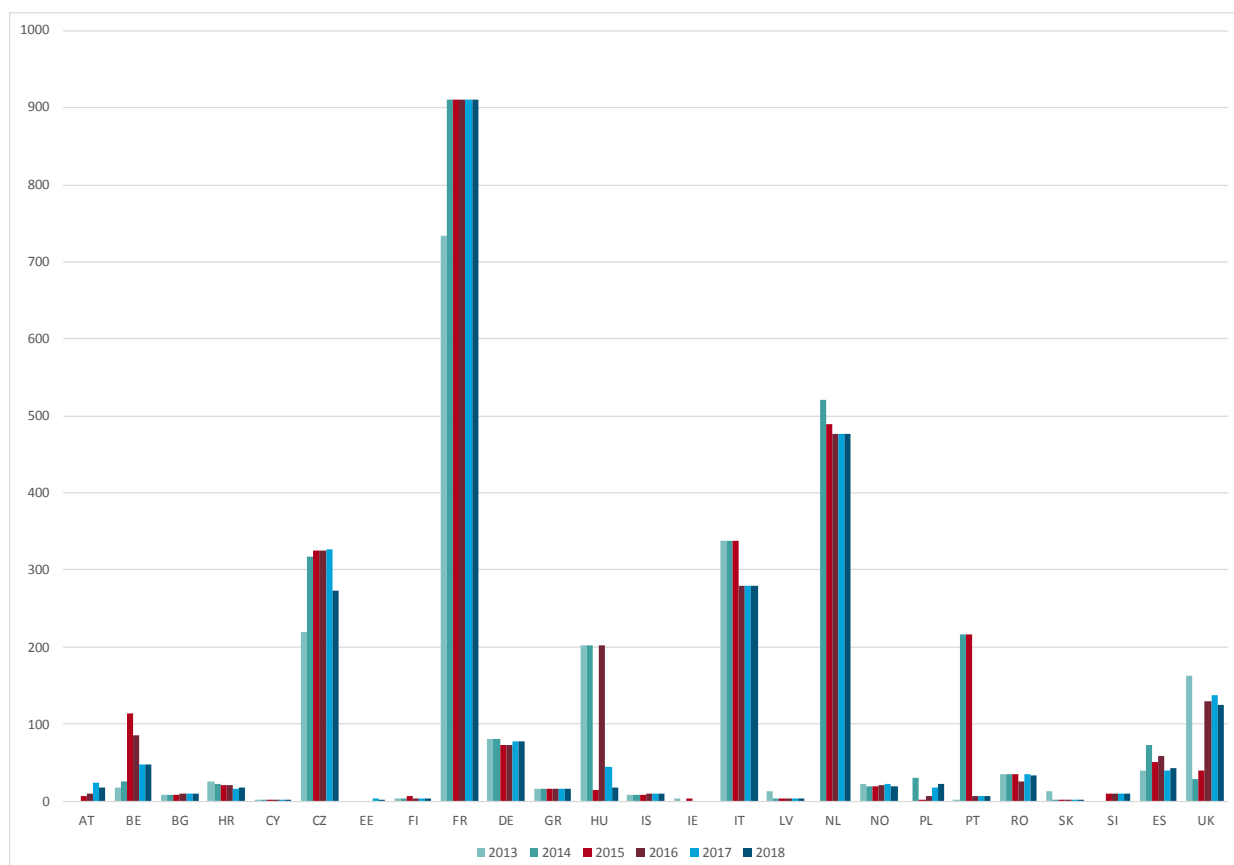


Figure 5.1-3 Number of Annex VI default values for 2013 to 2018 reported by countries

### 5.1.2 Information about sampling plans and frequency of analysis

Apart from the determination of activity data, one of the key elements in monitoring is the determination of calculation factors. The latter can be determined either by default values (see section 5.1.1) or by laboratory analysis. Laboratory analysis requires samples taken from the material or fuel according to an approved sampling plan to ensure representative samples and to obtain a valid result.

According to Article 21 data, in 26 countries sampling plans were drawn up in all cases required under Article 33 of the MRR, the same number of countries as in 2017 (see Figure 5.1-4). Spain reported four installations, two of which representing installations with low emissions that did not submit the required sampling plans. Liechtenstein also mentioned installations with low emissions which did not submit the sampling plans. Luxembourg informed about new installations that could not submit their sampling plans on time. Poland referred to some problems in the application of sampling plans due to technical infeasibility. Sweden could not answer this question, as it could not automatically extract the information from the monitoring plans.

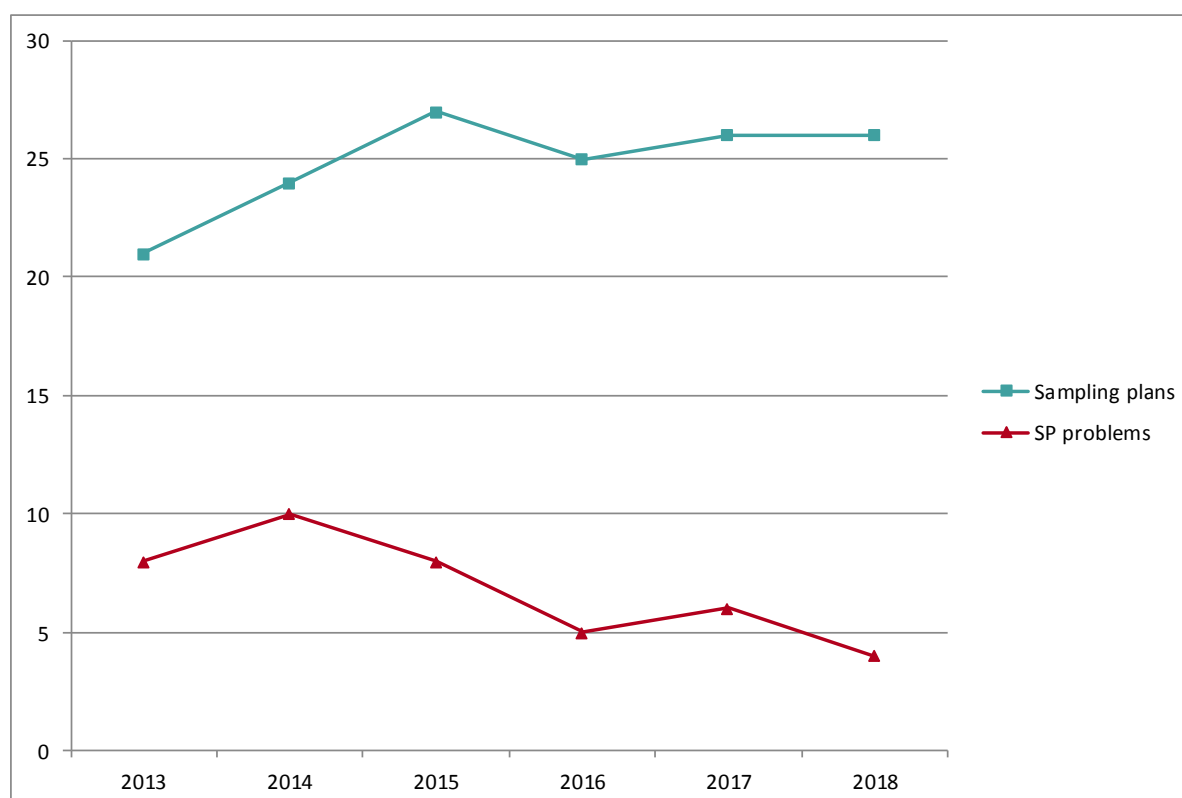


Figure 5.1-4 Number of Member States where sampling plans were drawn up in all cases and number of Member States who reported problems or issues concerning sampling plans ("SP problems")



In 116 cases, the Competent Authority allowed the operator to use a different frequency of analysis than the required analysis frequency in Annex VII of the MRR because of unreasonable costs. This means a slight increase in numbers (7 cases more than in 2017) for 2018.

It can be generally concluded that sampling plans across the EU are complete and comply with the requirements of Articles 33 and 34 of the MRR. Only in few cases the operators are allowed to use a different frequency of analysis than the ones listed in Annex VII of the MRR.

### 5.1.3 Derogation from highest tiers

Articles 26 and 41 of the MRR stipulate that operators shall apply the highest tier monitoring methodology, as stated in Annexes II and VIII of the MRR. Instead of the defined highest tiers, category A installations are able to apply at least the tiers specified in Annex V of the MRR for major source streams. Regardless of the installation category, the same tiers of Annex V are applicable for commercial standard fuels with regard to calculation factors. However, if the operator can prove that it would be technically infeasible or would incur unreasonable costs, they may apply a methodology that is one tier lower for large installations (category C) or two tiers lower for small and medium installations (categories A and B).

Figure 5.1-5 shows the decline in the number of installations (category C and B) applying a derogation from highest tiers according to Article 26(1) of the MRR claiming unreasonable costs or technical infeasibility. The figure also shows the number of affected source streams (of category C installations) for the years 2013 to 2018. The number of category C installations that did not apply the highest tier methodology decreased from 128 to 97 between 2013 and 2018. Those 97 category C installations applied lower tiers than required to 212 affected source streams. That implies also a reduction by 77 source streams compared to the year 2017. The number of category B installations with at least one derogation from the highest tier each was also significantly reduced, from 666 in 2013 to 424 in 2018.

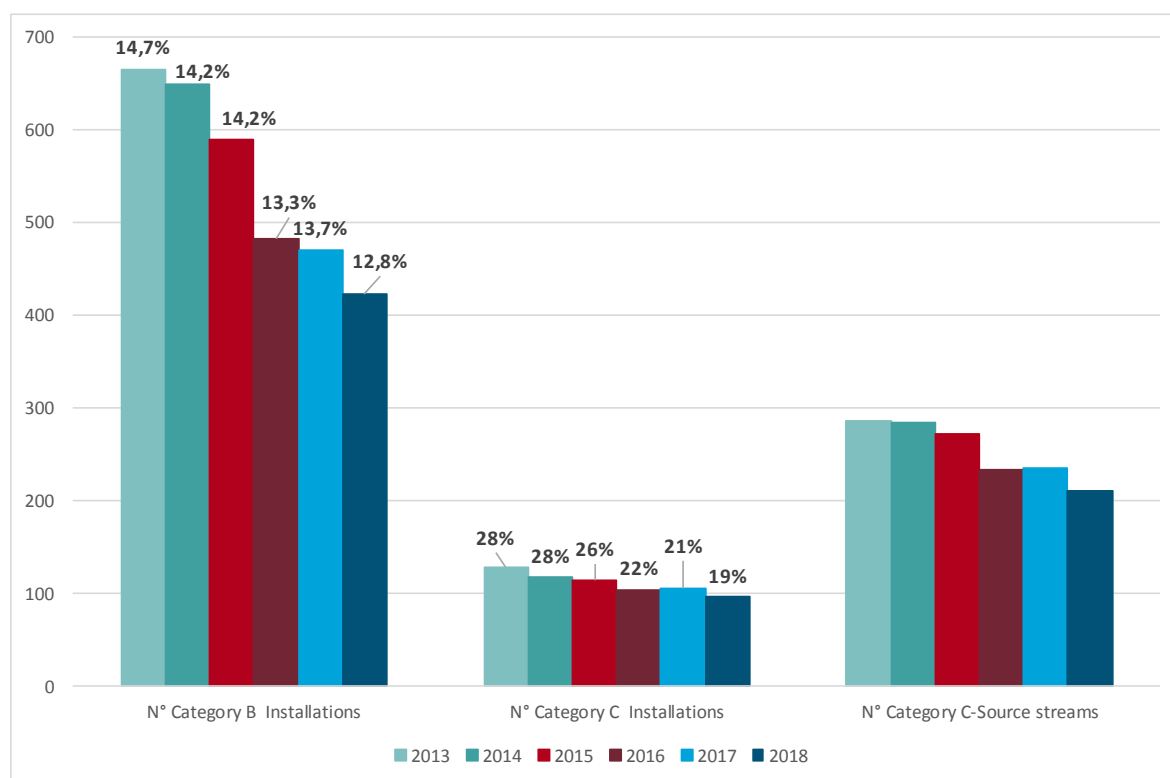


Figure 5.1-5 Number of installations (category C and B) including the percentage of total category B and C installations and affected major source streams (category C) derogating from the highest tiers approach for the years 2013 to 2018

As explained in section 3.4 the total number of installations has decreased as well. Therefore, it is useful to look at the proportion between installations derogating from the highest tier approach and the total number of installations to be able to evaluate possible improvements in the MRV system. In 2018, 12.8% of category B installations did not apply the highest tier in one of their source streams compared to 14.7% in the year 2013 and 13.7% in the year 2017. The relative reduction for category C installations was even stronger with a decrease from 28% in 2013 to 19% in 2018, indicating that an increasing number of installations fulfilled the requirements of the MRR than at the start of the third trading period.

#### 5.1.4 The fall-back approach

Under strict conditions, Article 22 of the MRR allows the operator to apply a non-tier methodology (known as the “fall-back methodology”) to selected source streams or emission sources. In 2018, 11 countries (no changes from the previous year) reported using the fall-back approach. The number of installations has slightly increased since 2016 from 34 to 38. Contrary to the increase in number of installations the estimated emissions covered by fall-back approaches amounted to 2.8 Mt CO<sub>2</sub> (eq) which means a reduction of 45% or 2.3 Mt CO<sub>2</sub> (eq) compared to the data for 2016. The Netherlands reported 9 installations applying the fall-back approach and contributed more than 48% of the total emissions arising from a fall-back approach. However the emissions

were reduced by nearly 0.6 Mt CO<sub>2</sub>(eq) in the Dutch installations. Romania was the country that reported the highest numbers of installations applying the fall-back approach as well as the highest corresponding emissions.

Only 0.35% of the installations under the EU ETS representing 0.14% of the total verified emissions uses a fall-back approach. This shows that the fall-back methodology is an exception to overcome problems in applying the tier system.

### 5.1.5 Improvement reports

Article 69 of the MRR requires operators to explore possibilities to improve the monitoring methodology. An operator must submit for the Competent Authority's approval a report containing information about improvements for achieving higher tiers, if the "required" tiers are not yet applied, and to provide justification if the operator applies a fall-back methodology. Furthermore, the report has to contain information on each non-conformity identified and/or possible improvement and recommended by the verifier in the verification report.

Twenty-seven countries reported on the number of installations that were required to submit, and that had actually submitted, improvement reports. Sweden reported on the number of improvement reports submitted, but could not state the number required. Latvia, Liechtenstein and Lithuania had either no installation where an improvement report was required or could not report any data. The data should be interpreted carefully because late submissions of improvement reports after the deadline of the Article 21 report, 30 June, are possible due to extension of the deadline permitted by the Competent Authority (no later than 30 September of the same year in which the Article 21 report has to be submitted).

Overall, installations submitted to the Competent Authority 1 958 improvement reports out of the required 2 060 (see Figure 5.1-6).

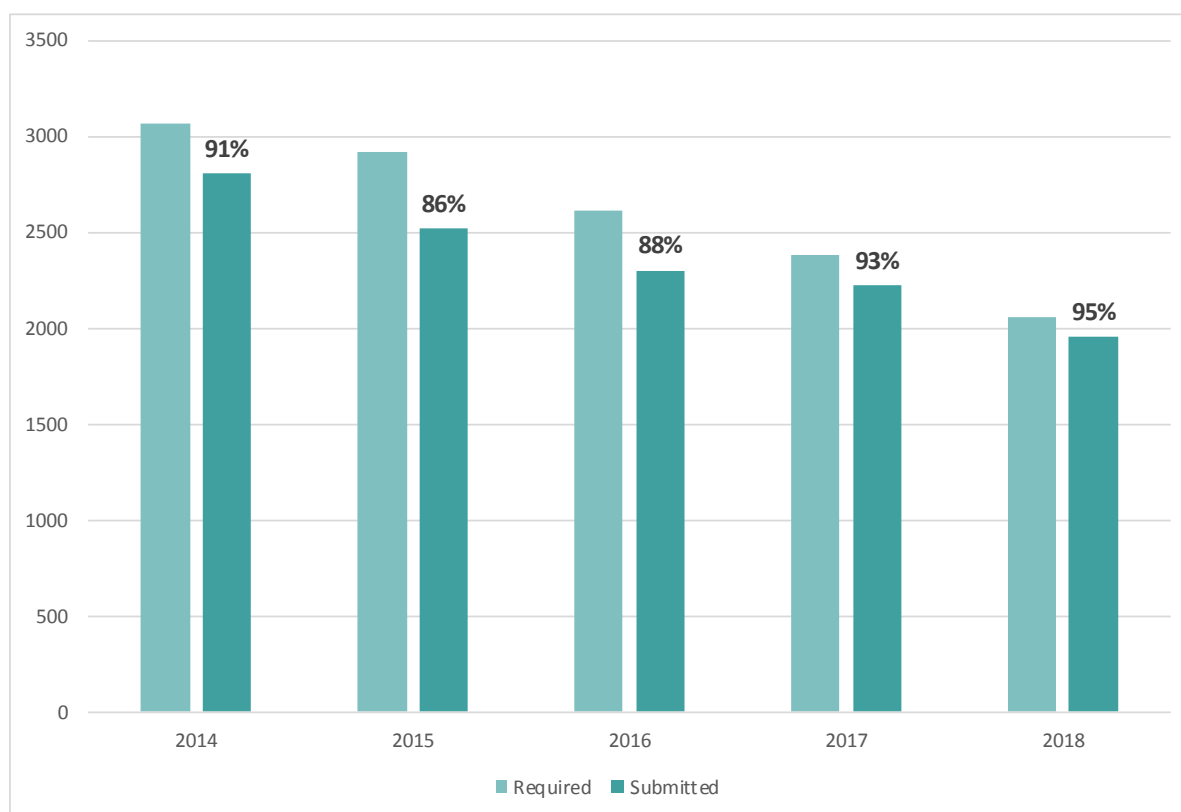


Figure 5.1-6 Sum of improvement reports for the years 2014 to 2018 (required and submitted) and percentage of submitted to required.

The proportion between submitted and required increased during the last four years from 86 to 95%. The absolute number of improvement reports required and submitted by operators decreased once again.

Fourteen countries report that all reports required were actually submitted.

The number of outstanding issues in verification reports amounted to 3 900 in 2018. A direct comparison to submitted improvement reports cannot be made because several issues could be dealt with in one improvement report. Table 5.1-1 presents the number of outstanding issues in verification reports by the type of issue between 2013 and 2018.

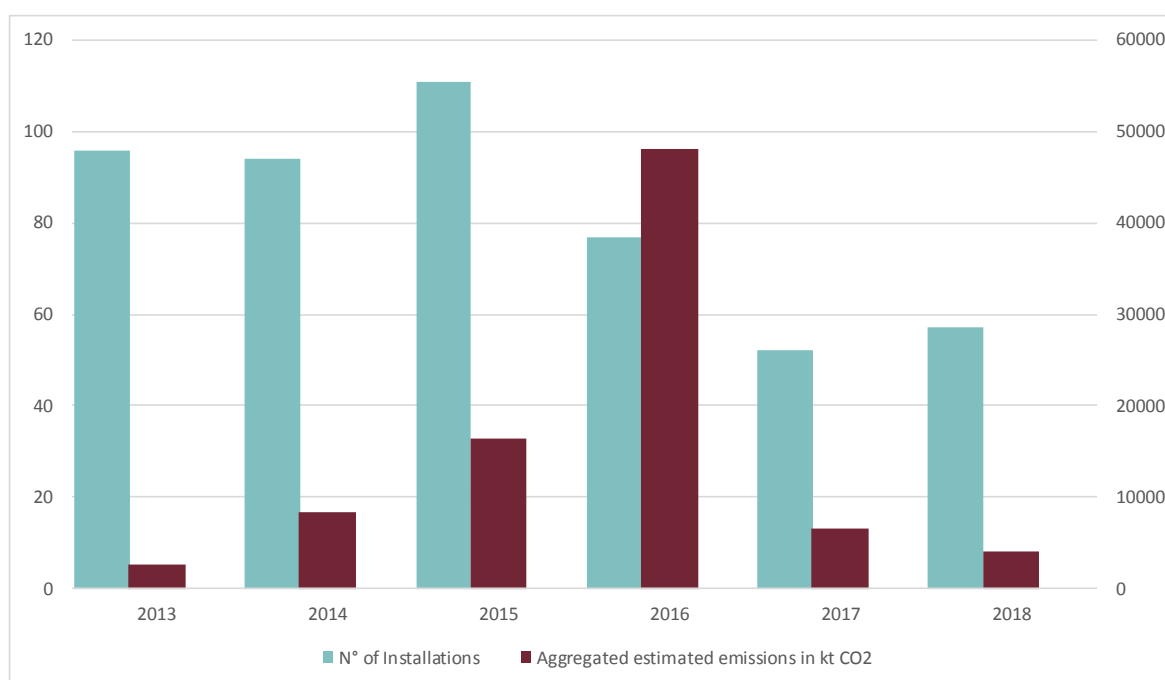
Table 5.1-1 Outstanding issues in verification reports, 2013–2018

Type of Issue	2013	2014	2015	2016	2017	2018
Non-material misstatements	664	383	165	347	284	279
Non-conformities that do not lead to a negative VOS	1 691	977	1 165	1 173	1 412	1 180
Non-compliance with MRR	1 092	652	794	770	957	763
Recommendations for improvement	2 728	2 148	2 119	2 199	1 902	1 678
<b>Total</b>	<b>6 175</b>	<b>4 160</b>	<b>4 243</b>	<b>4 489</b>	<b>4 555</b>	<b>3 900</b>

After a large drop in the amount of outstanding issues from 2013 to 2014, the total amount of issues slightly increased between 2014-2017. A reduction, especially in non-conformities, non-compliances and recommendations is observed for this reporting year. Across MS similar types of non-conformities, non-compliance issues and recommendations of improvement could be identified. The most common issues identified included for example omitted source streams or sources, recommendations to update procedures, missing data gaps, tiers not met, threshold exceeded.

### 5.1.6 Conservative estimation of emissions

Article 70 of the MRR regulates when the Competent Authority must conservatively estimate emissions (i.e. if no verified annual emission report is submitted; if the verified annual emission report is not in line with the MRR; if the verification process is not in line with the AVR; or if the verification report contains a “not satisfactory” opinion statement). Figure 5.1-7 shows the number of installations for which Competent Authorities made conservative estimations. It also presents the aggregated estimated emissions for those installations. These numbers require careful interpretation. Until 2016 the United Kingdom had the highest contribution in both the number of installations for which conservative estimations were made, as well as in the corresponding estimated emissions. They have not reported any cases for 2017 and 2018 so far and thus the numbers of installations have declined for all MS to just above 50 and the corresponding emissions decreased substantially (see Figure 5.1-7).



*Figure 5.1-7 Number of installations for which the Competent Authority made a conservative estimation with the aggregated estimated emissions in kt CO<sub>2</sub> (eq) for the years 2013 to 2018. As explained in the main text, data for the last years may be incomplete.*

Table 5.1-2 gives an overview of the conservative estimations as a percentage of the total verified emissions.

*Table 5.1-2 Conservative Estimations in % of the total verified emissions between 2013 and 2018*

2013	2014	2015	2016	2017	2018
0,42%	0,33%	0,38%	0,29%	0,19%	0,17%

### 5.1.7 Checks on emission reports/verification reports

The annual process of monitoring, reporting, verification of emissions and the Competent Authority's procedure for reviewing emission and verification reports are often referred to as part of the "compliance cycle". Reported data must be accurate to create trust in the functioning and reliability of the EU ETS. Accurate data increases the public's confidence in how the requirements to surrender emission allowances equivalent to the number of emissions have been complied with. A robust monitoring, reporting and verification system is vital in achieving accurate data. In EU ETS the cycle starts with a monitoring plan which has to be approved by the Competent Authority and which has to be in line with the MRR. Operators are subsequently required to monitor their emissions throughout the year according to the monitoring plan and to draft their annual emission report based upon the monitoring results. Annual Emission Reports must be verified by a verifier accredited by the National Accreditation Body in accordance with the AVR. The objective of verification is to ensure that emissions data have been monitored in accordance with the MRR and that reliable and correct emissions data are being reported. To achieve the objective of verification and to ensure that the verification is of high quality and sufficiently robust, the verifier has to check the accurateness of the data and the implementation of the monitoring plan. The verification bodies are assessed each year by the National Accreditation Body to check whether the verification body and its personnel undertaking verification activities have (and continue to have) the competence to carry out verification; are performing verification in line with the AVR and meet all AVR requirements to ensure harmonised implementation throughout the EEA-31. Checks by the Competent Authority on annual emission reports and verification reports are an additional quality control measure to improve overall quality of the emission and verification reports (see Figure 5.1-8).

All MS reported that they perform additional checks to evaluate emission and verification reports. The Competent Authorities in 27 countries checked all reports for completeness and internal consistency and 20 of them reported that all AERs were reviewed in detail against the corresponding monitoring plan. The other 10 MS reported that they review at least a certain percentage against the corresponding monitoring plan.

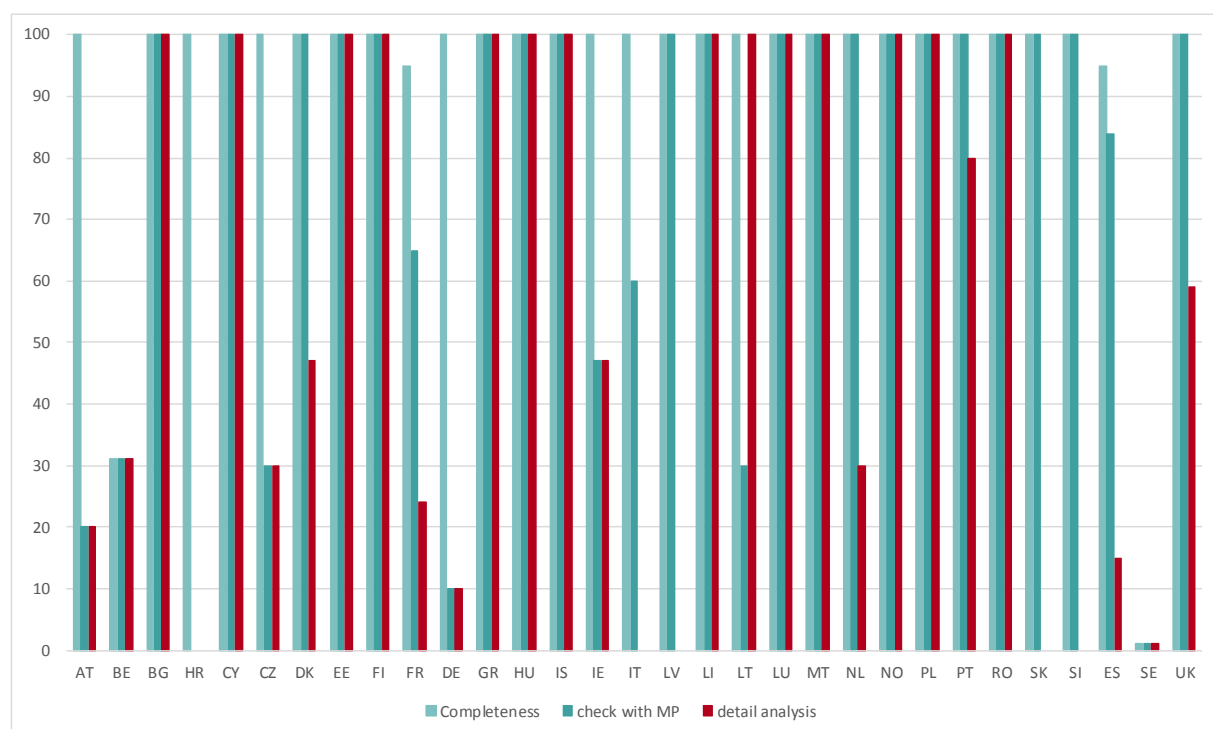


Figure 5.1-8 Additional checks for completeness and internal consistency, for consistency with the monitoring plan and of emission reports that were analysed in detail in [%].

Other performance checks included checking against allocation data (by 20 countries to 100% and 6 to a certain percentage), comparing to other data (by 13 countries to 100% and 10 to a certain percentage) and detailed analyses of emission reports (by 14 countries to 100% and 12 to a certain percentage). When only a percentage of the reports were checked in detail, often a risk based approach was used to select the installations for which a detail check was applied.

As a result of the checks, 12 verified emission reports, across three countries, were rejected because of non-compliance in 2018, a decrease of 55 compared to 67 rejections in 2017. On the other hand the number of emission reports (from three countries) on rejected because of reasons other than non-compliances increased to 100 (compared to 53 in 2017). Overall MS report 112 emission reports that had been rejected compared to 120 in the previous year. Lithuania was again the country with the highest reported number of rejections (71 compared to 69 in 2017). The emissions report were rejected mainly because of missing CRF categories, because of missing or negative verification reports, derogations of required tiers. The operators have been requested to correct and resubmit their emission reports.

Those results show that in relation to the total number of emission reports the number of rejections and incidents is quite low. However, the variations in how MS reported the data was high. 15 MS had not rejected any of their emission reports during the third phase and 8 MS had rejected less than five reports. On the other hand, Lithuania and Portugal have been responsible for 71% and 83% of the rejected reports for 2017 and 2018, respectively. There are no obvious differences in the additional checks carried out by those two countries

compared to the others that can explain the high number of rejections. It is suspected that diverse interpretation of the MRR and AVR in the individual MS might have led to the different level of rejection.

### 5.1.8 Waive of site visits

The verifier must conduct a site visit during the verification to be able to conclude that the operator's emission report is free from material misstatements. Only under specific conditions and exceptional circumstances can a site visit be waived (Article 31(1) of the AVR). Nine countries, one more than in 2017, reported waiving site visits in 2018 for 102 installations with emissions of more than 25 000 t CO<sub>2</sub> (eq) (compared to 93 in 2017 and 116 in 2016). Furthermore, 15 countries waived site visits for installations with low emissions<sup>68</sup> in 2018, one less than in 2017. In general, site visits were waived for 582 installations with low emissions compared to 812 in 2017 (corresponding to 9.6% of all installation with low emissions). The Scandinavian countries Sweden, Denmark and Finland waived the highest number of visits (120, 119 and 87 visits, respectively).

## 5.2 Aircraft operators

Unlike for stationary installations, derogations from the highest tier approach are very seldom applied to aircraft operators. Sampling plans and frequencies of analysis for the determination of calculation factors are also not relevant because only commercial fuel types are consumed in the aviation sector for which standard factors are applicable. Only in exceptional cases are biofuels consumed which require the application of sampling plans and analysis frequencies, but biofuels were not used in 2018 (see chapter 4.4.2). The verification process for aircraft operators concentrates more on data verification (e.g. tracing data back to the primary data source, cross-checking with internal and external data sources, carrying out recalculation of parts of the overall emissions calculation and checking the overall control that manages the data flow activities), analysis of fluctuation and trends in the data and checking the correct application of the monitoring methodology.

The monitoring of the activity data (i.e. fuel uplift) is controlled by various instruments already installed within the aviation sector because of the special needs in this industry. As a simplification for small emitters the Small Emitter Tool (SET) was developed to estimate fuel consumption of the corresponding flight, which can be used to estimate the emissions. The Eurocontrol Support Facility (EU ETS SF) is another tool that can be applied by aircraft operators as well as Competent Authorities to check completeness of flights and the corresponding emissions. Therefore, analysis of the robustness of the aviation MRV system concentrates on compliance with improvement report requirements, application of conservative estimation of emissions, analysis of the outstanding issues reported by the verifiers and the additional checks carried out by Competent Authorities on the verified emission reports.

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<sup>68</sup> As referred to in Article 47(2) of the MRR.



### 5.2.1 Improvement reports

Article 69 of the MRR requires aircraft operators to explore possibilities to improve the monitoring methodology. An aircraft operator must submit for the Competent Authority's approval a report containing information on each possible improvement and/or non-conformity identified and recommended by the verifier in the verification report.

17 countries reported on the number of aircraft operators who were required to submit improvement reports. In the year before aircraft operators from 21 countries had to submit improvement reports. This year, 14 MS either had no aircraft operator for which an improvement report was required or could not report any data. Overall, aircraft operators submitted 67 improvement reports to the Competent Authority compared to the 88 required in 2018 (see Figure 5.2-1). Since 2015 there has been a steady decline in required and submitted improvement reports for aircraft operators. The submission of improvement reports in relation to the required improvement reports in the aviation sector has improved significantly from 2014 to 2015, with an increase from 27% to 73%. However, since then no further improvement can be observed, as the share is still below 80% in 2018. Moreover, the proportion between required and submitted improvement report is still significantly lower than for operators of stationary installations.

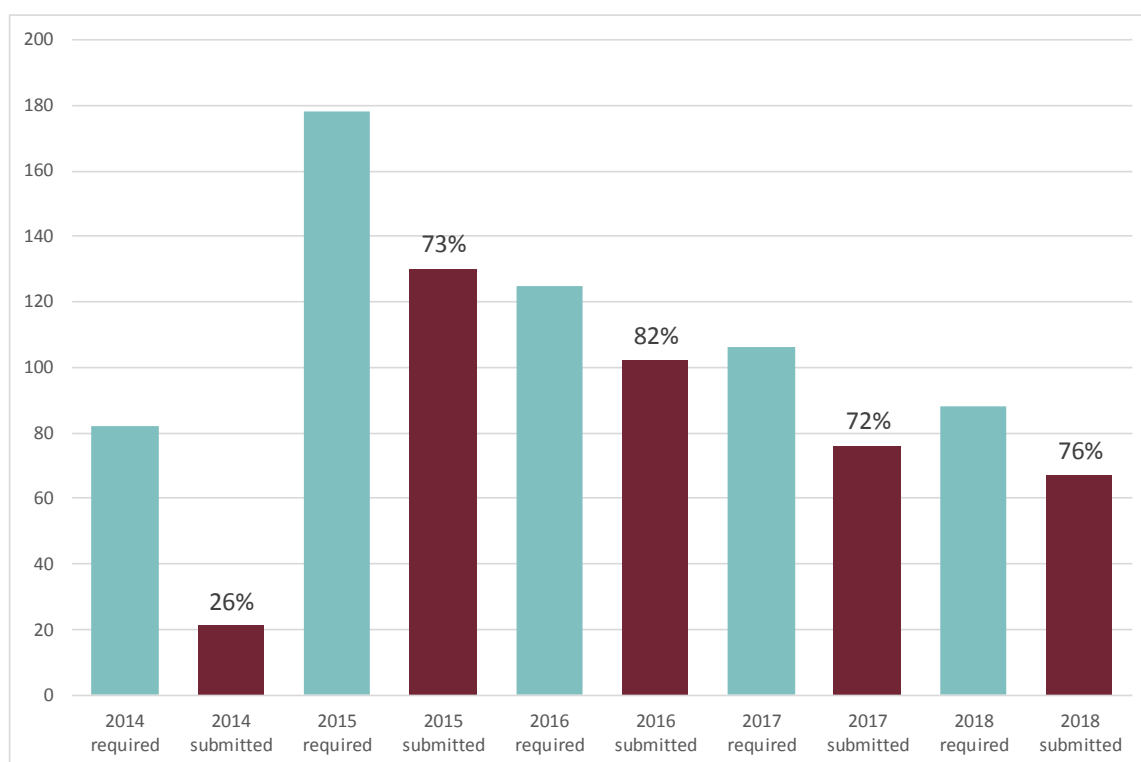


Figure 5.2-1 Sum of improvement reports for the years 2014 to 2016 (required and submitted) and percentage of submitted to required.

Twenty countries reported 132 outstanding issues in the verification reports for 2018. Table 5.2-1 presents the number of outstanding issues in verification reports by the type of issue. Several countries (Cyprus, Lithuania and Malta)

reported outstanding issues but no improvement reports were required from their aircraft operators. This years' number of issues decreased slightly during last year. Before 2016 a significant decrease in numbers could be observed. No issue related to tonne-kilometre reports was reported since no such reports were required.

*Table 5.2-1 Outstanding issues in verification reports, 2013–2018*

Type of Issue	2014	2015	2016	2017	2018
Non-material misstatements	43	37	17	23	25
Non-conformities that do not lead to a negative VOS	40	36	21	26	20
Non-compliance with MRR	25	21	15	17	9
Recommendations for improvement	149	137	95	78	78
<b>Total</b>	<b>257</b>	<b>231</b>	<b>148</b>	<b>144</b>	<b>132</b>

## 5.2.2 Checks on emission reports/verification reports

As for installations, emission and verification reports from aircraft operators were checked by CAs as an additional quality control measure to monitor the overall quality of the reports. In 28 countries checks were made on emission reports and verification reports (not by Hungary, Latvia and Liechtenstein<sup>69</sup>). There were no changes compared to 2017 on this. 27 countries checked the emission and verification reports for completeness and internal consistency, of which 25 countries checked all reports. The United Kingdom assessed 97% of the reports on these aspects whereas Sweden checked 20% of all reports. 23 MS reviewed in detail against the corresponding monitoring plan. Checks by France, Sweden and United Kingdom were lower with 5%, 20% and 95%, respectively.

Other performance checks included cross checks with other data (24 countries) and detailed analysis of emissions reports (by 22 countries). 18 MS analysed 100% of their emission reports in detail, Sweden up to 20%, Belgium up to 33%, Denmark up to 89% and United Kingdom up to 32% of all reports.

<sup>69</sup> Liechtenstein did not report any aircraft operators

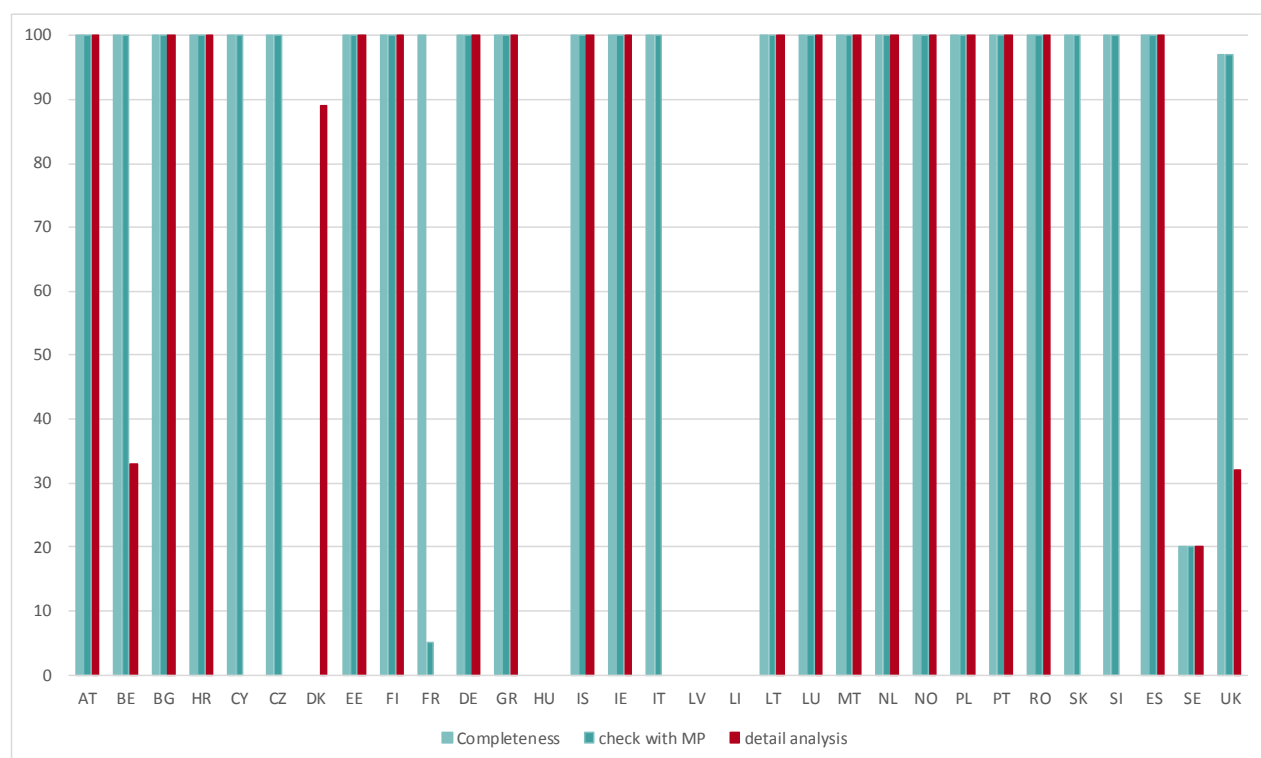


Figure 5.2-2 Additional checks for completeness and internal consistency, for consistency with the monitoring plan and of emission reports that were analysed in detail in [%].

As a result of the checks, one verified emission reports for non-compliance and one emission report because of reasons other than non-compliance were rejected in 2018. Both emission reports were issued in the United Kingdom.

### 5.2.3 Waiver of site visits

A verifier may decide not to carry out a physical visit to the site of a small emitter where the verifier has concluded based on its risk analysis that the relevant data can be remotely accessed. Competent Authority's approval for a waiver of site visit is only required for installations emitting more than 25 kt CO<sub>2</sub> per year. For large aircraft operators site visits are required, although the definition of site in the aviation sector provides some flexibility. Site visits for AOs relate to where the monitoring process is defined and managed including where relevant data, information and records are controlled and stored. This means that a site visit does not necessarily entail a visit to each and every aircraft or various aerodromes.<sup>70</sup>

13 countries (Austria, Belgium, Denmark, France, Germany, Ireland, Norway, Poland, Portugal, Spain, Sweden, The Netherlands and United Kingdom) reported a waiver of site visits for small emitters referred to in Article 54(1) of the MRR. Belgium stated in sub-question 6.10 (1) that site visits were waived but did not report one aircraft operator whose site has not been visited by a

<sup>70</sup> Section 3.2.7 of Guidance Document III on verification in EU ETS Aviation.

verifier. A total of 83 site visits have been waived by a verifier for small emitters, most of which were in France with 21, followed by United Kingdom with 20. Compared to 2017 the number of site visits waived by a verifier for small emitters nearly doubled from 48 to 83.

#### **5.2.4 Conservative estimation of emissions**

If aircraft operators fail to report emissions as required, the CAs must make a conservative estimate of the operator's emissions. Conservative estimates were made by CAs for 31 aircraft operators in five countries, by either extracting information from the ETS support facility or using the small emitter tool or by the operator's information. Conservatively estimated aviation emissions totalled 3 267 kt CO<sub>2 (eq)</sub> in 2018. This means a sharp increase compared to 2017 (505 kt CO<sub>2 (eq)</sub>) mainly due to the conservatively estimated emissions reported by the United Kingdom with about 3 126 kt CO<sub>2 (eq)</sub>. The conservatively estimated emissions of all Member States represent a proportion of 4.6% of the total reported aviation emissions in 2018.

## 6 USE OF SIMPLIFIED OR INNOVATIVE MRV APPROACHES

The ETS Directive, the MRR and AVR allow MS to adopt simplified or innovative MRV approaches in certain cases. These approaches do not only apply to installations with low emissions and small emitters in aviation but also to other installations. One of those simplified approaches is the possibility for MS to allow operators or aircraft operators to use standardised or simplified monitoring plans according to Article 13 MRR. The prerequisite for using such plans is that the Competent Authority carries out a simplified risk assessment to assess whether it can be justified that a specific operator or aircraft operator uses a simplified monitoring plan. Alternatively, such a risk assessment is carried out by the operator or aircraft operator itself and subsequently checked by the CA. Other simplified MRV approaches are possible for installations with low emissions according to Article 47 MRR and small emitters according to Article 54 of the MRR. Besides simplified MRV approaches the MRR also promotes Member States to implement future innovations in relation to the capture and storage of CO<sub>2</sub>.

### 6.1 Use of simplified or innovative MRV approaches for installations

The number of countries that allow the use of simplified monitoring plans has increased from seven to eight in 2017 and have not changed in 2018. The Netherlands has developed a template for simplified monitoring plans and since 2017 allows installations whose main fuel is natural gas<sup>71</sup> to use such monitoring plans provided this is justified by the risk assessment carried out by the CA. The template is published on the website of the Dutch Emissions Authority and consists mainly of tick boxes allowing installations to describe their monitoring methodology, their source streams and quality assurance and control measures in a structured and efficient manner.

Other countries that apply Article 13 of the MRR and provide a template for a simplified or standardised monitoring plan are Belgium (Flanders region), Denmark, France, Croatia, Hungary, Liechtenstein and Lithuania.

The situations in which Article 13 MRR is applied by these MS differ from each other. In Belgium Flanders the operator submits a risk assessment to the CA if it wants to use the simplified monitoring plan template. The CA subsequently checks the risk assessment as part of the MP approval process using a checklist.<sup>72</sup> The operator also drafts the risk assessment in Croatia and France. In the other countries the CA carries out the risk assessment itself. In Hungary and Lithuania Article 13 MRR was in general open to installations with low emissions. In Denmark it was applied for installations using natural gas and one or more de-minimis source streams: similar conditions as in the Netherlands.

<sup>71</sup> In addition to natural gas an installation could have de-minimis source streams.

<sup>72</sup> More information can be found in the presentation of Flanders and Denmark at the Compliance Conference held in 2017, [https://ec.europa.eu/clima/events/8th-eu-ets-compliance-conference\\_en](https://ec.europa.eu/clima/events/8th-eu-ets-compliance-conference_en).

The reason why these countries have developed simplified approaches is mostly because of the high number of installations that could be eligible to use these simplified monitoring plans.<sup>73</sup>

Other simplified approaches specifically dedicated to installations with low emissions are applied by five<sup>74</sup> MS. Belgium (Walloon region), the Netherlands, Spain and the United Kingdom have adopted customised guidance for such installations. In some of these countries sector specific examples have been included in the guidance to help installations with low emissions to understand the rules. This guidance is published on the country's Competent Authority's websites. Only in the United Kingdom are workshops delivered dedicated to installations with low emissions. IT systems are another tool to increase the quality of MRV while at the same time simplifying the work and communication processes between operators and CAs. More information is provided in section 3.6.2.

The low number of MS applying simplified approaches can be largely explained by the extensive guidance and examples that have been developed by the Commission. There is not much need for MS to develop additional guidance or organise workshops. However, the number of installations with low emissions and category A installations compared to the total number of installations in MS show that some MS in particular could benefit from using the possibilities that Article 13 of the MRR offer (see section 3.4.1). It should be noted though that Article 13 of the MRR is not open only for installations with low emissions. It could be relevant for more installations provided they are simple. Furthermore, not all installations with low emissions are simple installations.

Recently the Commission has developed an exemplar for a simplified monitoring plan in accordance with Article 13 of the MRR and provided more guidance on Article 13 of the MRR specifically.

Other simplifications are inherent in the monitoring and verification approaches. If the risks to misstatements and non-conformities in an installation are low and the installation is simple, the monitoring, reporting and verification is simpler.

As mentioned before the MRR not only allows for simplification of processes for simple installations and installations with low emissions, it also aims to promote innovative approaches. Recital 13 of the MRR states that the conditions laid down in Article 49 of the MRR should not exclude the possibility of future innovations. Two countries have indicated that they are using technologies to permanently store carbon: Iceland<sup>75</sup> and Norway<sup>76</sup>.

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<sup>73</sup> Hungary has 85 installations with low emissions (out of 169 ETS installations). Lithuania has 87 installations of low emissions out of 91 ETS installations. Denmark and the Netherlands have a high % of installations using natural gas.

<sup>74</sup> France stopped organising workshops for installations with low emissions in 2017.

<sup>75</sup> Further information can be found in <https://www.or.is/en/projects/carbfix>

<sup>76</sup> Article 21 reports show that for two Norwegian CO<sub>2</sub> storages 4-D seismic surveys have been carried out every 2-3 years for monitoring offshore geological storage of CO<sub>2</sub>. 4D seismic (or time-lapse) surveys involves comparing the results of 3D seismic surveys repeated at considerable time intervals. The frequency of the seismic survey is determined for each CO<sub>2</sub> storage by assessing the risk for leakage or unexpected migration based on the previous survey.

## 6.2 Use of simplified or innovative MRV approaches for aviation

In the case of aircraft operators, only 3 countries have indicated that they allow aircraft operators to use a simplified monitoring plan according to Article 13 of the MRR. Belgium (Flanders region) provided a checklist that operators have to complete to check if they are entitled to use a simplified monitoring plan. A completed check list has to be submitted together with the simplified monitoring plan. Iceland indicated that the aircraft operator has to submit a risk assessment to justify using the simplified monitoring plan. In Iceland a tool has been developed to support aircraft operators in making this risk assessment. In Poland the Competent Authority carries out the risk assessment for the aircraft operator wanting to use the simplified monitoring plan.

Other simplified approaches in aviation are facilitated by the use of the small emitter tool and the ETS Support Facility (ETS SF)<sup>77</sup>. Section 4.1.3 provides more information on the number of aircraft operators using such approaches. Where the emission report is automatically generated from the ETS Support Facility without any input from the small emitter, the emissions are considered verified and a verifier does not have to be involved<sup>78</sup>. Due to this general simplification and the extensive Commission guidance for small emitters, further simplification initiatives by MS are not of great importance.

Only 5 countries have adopted other simplified approaches for small emitters by either:

- having customised guidance for small emitters: Belgium (Flanders region), Italy and the United Kingdom;
- having simplified templates: In the template for monitoring plans that is applicable to all aircraft operators, small emitters are exempted from filling out a number of fields in Germany;
- organising workshops: United Kingdom. France did report organising workshops in 2017 but did not hold such workshops in 2018.

The United Kingdom reported additional approaches: having an e-mail helpdesk, quarterly "Aviation" newsletter and a comprehensive IT system (ETSWAP). These approaches are however not solely for small emitters. It also allows Eurocontrol Support Facility data files to be uploaded on to the emission report template. The high number of small emitters explains why Germany, Italy and the UK adopted simplified approaches.<sup>79</sup>

<sup>77</sup> The small emitter can arrange with EUROCONTROL that the emission report will be automatically generated by the ETS Support Facility and sent directly to the verifier.

<sup>78</sup> This simplification was introduced by an amendment of the EU ETS Directive by Regulation (EU) 421/2014.

<sup>79</sup> 27 out of 73 aircraft operators are small emitters in Germany. In France there are 51 small emitters out of 81 aircraft operators; in Italy 15 out of 25 and in the United Kingdom 93 out of 151.

## 7 COMPLIANCE RELATED ISSUES

This chapter focuses on compliance related issues analysing the extent to which countries have complied with the EU ETS legislation and where improvements can be made. Another objective of this section is to assess which measures countries have implemented to ensure that operators and aircraft operators comply with the legislation and how countries have followed-up on non-compliance issues.

### 7.1 Improvement of implementation and compliance by stakeholders

The monitoring and reporting of greenhouse gas emissions must be robust, transparent, consistent and accurate for the EU ETS to operate effectively. As a consequence, compliance within the MRV system is essential to create trust in emissions trading. The analysis in chapter 5 showed that the EU ETS MRV system across countries continues to improve. The number of category B and C installations not meeting the highest tier because of unreasonable costs or technical infeasibility has declined significantly since 2013. The application of literature values and default values seems to be in line with MRR, being mostly used for natural gas and fuel oil in category A installations. Most MS have indicated that sampling plans are complete and in conformance with the requirements of Articles 33 and 34 of the MRR. Like in 2017 article 21 reports show that operators are less inclined to apply lower frequencies of analysis and that fewer problems have been encountered by Competent Authorities. As mentioned in section 5 improvements were also made in the share of improvement reports that were submitted in relation to the reports that were required in accordance with Article 69 of the MRR. The high number of outstanding issues in the verification reports indicates that misstatements, non-conformities and non-compliance issues are being picked up by verifiers. In general similar type of issues can be found: e.g. missed source streams and emission sources, exceedance of thresholds, data gaps, tiers not being met, calibration not being carried, frequency of analysis not met or measurement equipment omitted. A high number of non-conformities, non-compliance issues and recommendations for improvement identified by the verifier in several countries concerned procedures and quality control measures. This is area where further improvement can be realised by operators. All countries perform additional checks to evaluate the verified emission reports and verification reports, in particular on completeness and consistency. The type and the extent of these checks differ between countries. The very low rate of rejected emission reports in relation to the total number of reports implies that verification with additional control measures by Competent Authorities are effective instruments to assess the accurateness of emissions and compliance with the requirements and to follow-up on these issues. However, it should be noted that not all MS review the emission report in detail. There is a risk for these countries that some issues are not identified in the review of those reports. In general, the analysis of the Article 21 reports suggests that there seems to be a high level of compliance with the MRR and AVR and that the verification process supervised by the National Accreditation Bodies appears to be working satisfactorily.



## 7.2 Measures taken to ensure compliance

### 7.2.1 Compliance of installations

CAs can take different measures to ensure operator's compliance with the EU ETS requirements. One of these measures is the CA's assessment of the verified emission reports and verification report that the operators submit to the CA. There are different approaches between countries on how the Competent Authority checks these reports. Section 5.1.7 provides more information on the type of checks countries carry out on emission reports and verification reports. Information in that section shows that the detail of Competent Authority checks varies between countries.

Other measures that a Competent Authority can take to check operator's compliance are carrying out spot checks and inspection of operator's implementation of MRV requirements. Inspection has evolved over the years. Although the number of countries<sup>80</sup> carrying out spot checks and inspection on installations has changed only once in the last three years, the EU ETS-wide number of inspections through site visits has increased yearly from 258 in 2014 to a total of 439 inspections in 2017, but in 2018 only 225 such inspections were reported. Spain, France and Croatia had relatively many inspections in 2017 and 70%-90% fewer in 2018. Furthermore because of the EU Commission guidance on inspection more countries have implemented or are planning to implement ETS specific elements in their on-site inspections. The way inspection on installations is carried out, varies between MS. Some of those MS have inspections that are tailored to EU ETS compliance issues. In other MS inspections are carried out under the normal inspection regime of the IED Directive<sup>81</sup> in which IED inspectors look at compliance of several environmental permits including the IED permit and ETS permit. These inspections are not always specifically focused on EU ETS compliance issues. Other Member States have IED inspection but IED inspectors also check on compliance with the EU ETS monitoring plan. The type of inspection depends mostly on the administrative structures within a country and how they have set-up their permitting regime and CA organisation. Countries that reported not carrying out onsite inspection in previous years such as Italy and Sweden are currently in the process of setting-up tailored EU ETS inspection on installations. Other countries such as Malta and Luxembourg have limited resources and for that reason do not carry out EU ETS specific inspection. In these countries the competent authority relies mostly on verification to identify non-compliance issue.

In addition to inspection most countries<sup>82</sup> also take preventive measures to ensure operator's compliance by organising regular meetings with industry and/or verifiers. These meetings are intended to inform operators and verifiers on the requirements and ensure they fully understand the rules. The frequency of these meetings differs between MS. In some MS these meetings are

<sup>80</sup> All countries except Greece, Italy, Luxembourg and Malta. Sweden started in 2018

<sup>81</sup> Directive 2010/75/EU of the European Parliament and the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).

<sup>82</sup> All countries except: Austria (helpdesk only), Luxembourg, Latvia and Romania.

organised on an ad hoc basis. In other countries these meetings are structural on an annual or more frequent basis. There are also countries that do not organise these meetings every year but only when there is a need to. The frequency of meetings often depends on the resources within MS. Other preventive measures include close cooperation and communication with operators and stringent procedures for the review of emission reports and verification reports.

### 7.2.2 Compliance of aircraft operators

As for installations the Competent Authority can take different measures to check and promote the aircraft operator's compliance. As aviation is a different sector from stationary installations and aircraft operators assigned to the administering MS are often not located within the MS itself Competent Authority's activities are mostly focused on the assessment of the emission reports and verification reports. Carrying out spot checks and inspection of the aircraft operator's implementation and compliance is done in a limited number of Member States. As shown in section 5.2.2 the detail and type of checks on emission reports and verification reports differ between MS.

In 2018 12 countries<sup>83</sup> carried out spot checks and inspection of aircraft operator's implementation and compliance. The number of countries remains consistent over the years: though the frequency of spot checks can differ between MS: e.g. some countries do not carry out inspection and spot checks every year. In 2018 in total 5 inspections were carried out in 3 countries<sup>84</sup>, which is 3 fewer inspection and 1 fewer country than in 2017.

As for installations the Competent Authority can take preventive measures by organising regular meetings with airlines and/or verifiers. Compared to installations fewer countries<sup>85</sup> are organising such meetings. This is because the MRV requirements for aircraft operators are more straightforward than the requirements for installations. Furthermore, it is not always possible to invite airlines to meetings if the relevant person of these airlines are based in other countries. The frequency of meetings with airlines and/or verifiers varies between MS with some countries not organising these meetings every year.<sup>86</sup>

## 7.3 Sanctions and infringements for installations

According to Article 16 of the EU ETS Directive, MS shall lay down rules on penalties applicable to infringements and shall take all measures necessary to ensure that such rules are implemented. The penalties provided for must be effective, proportionate and dissuasive. Such penalties are a key compliance instrument in EU ETS.

According to Article 21 reports, all countries have some form of penalties in place for different types of infringements. Most often these are fines with a

<sup>83</sup> Austria, Belgium, Croatia, Denmark, Germany, Iceland (2018 first time), Ireland, Netherlands, Norway (first time since 2014), Poland, Slovakia, Slovenia. Latvia has stopped in 2018.

<sup>84</sup> 1 in Germany, 2 in Norway, 2 in Romania.

<sup>85</sup> Belgium, Bulgaria, Croatia, Czech Republic, Denmark, France, Ireland, Lithuania, Malta, Portugal, Spain, Sweden, United Kingdom. Austria has a helpdesk functionality instead of meetings

<sup>86</sup> Finland held meetings in previous years but did not organise them in 2017.

defined financial minimum and/or maximum. In some cases fines are defined by a calculation formula, e.g. taking into account the number of days the issue is not resolved, the number of free allowances involved, the market price for EU allowances, the tonnes of CO<sub>2</sub> equivalents emitted or the company's turnover. In some cases, the size of fines is left for the courts to decide (e.g. Denmark, Finland). In countries that have reported a defined minimum or maximum larger than zero the size of the minimum and maximum fine differs per country, ranging from a minimum of 63 Euro (Hungary, per day) to 75,000 Euro (France) per infringement to a maximum ranging from 102 Euro plus the allowance price (Liechtenstein, per tonne CO<sub>2</sub>) to 16,000,000 Euro (Estonia). In some countries the size of fines also differs between the 14 types of infringements reported under Article 21.

6 countries<sup>87</sup> provide for the possibility of a jail sentence of up to 120<sup>88</sup> months for some or all types of infringements. A minimum jail sentence has only been indicated in France; a period of 12 months for operating without a permit or failure to comply with the conditions of the permit. In some countries other penalties besides fines and jail sentences can be imposed: for instance, in Greece a shutdown of the installation of 5 to 20 days can be applied.

Having a defined penalty in place is common in all countries for some infringements, such as for not having a permit or not complying with permit conditions, not submitting an emission report and not monitoring in line with the approved monitoring plan. Penalties for some other infringements are relatively specific to a country. Except in Cyprus, Denmark, Greece, Iceland, Ireland, Luxembourg, Netherlands and Norway a distinction is made between the type of infringements. In these countries the fine for not having a permit is for example higher than not notifying a change to the monitoring plans. See Table 7.3-1 for the types of infringements and the number of countries that report minimum or maximum fines or prison sentences. The highest fine is in general reserved for not having a permit or not complying with the permit conditions or not complying with the approved monitoring plan.

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<sup>87</sup> Cyprus, Denmark, Estonia (for some infringements), Ireland, Luxembourg, Norway

<sup>88</sup> Ireland

Table 7.3-1 The number of countries that have defined minimum and/or maximum penalties for each type of infringement by installations

Number of countries that report a type of penalty in 2018				
Types of infringement applicable to installations	Fine		Months prison	
	Min	Max	Min	Max
Operation without a permit	15	17	2	6
Failure to comply with the conditions of the permit	12	15	2	6
Failure to hold a monitoring plan approved by the Competent Authority	12	16	1	5
Failure to submit supporting documentation in accordance with Article 12(1) of Regulation (EU) No 601/2012	9	12	1	5
Failure to hold a required sampling plan(s) approved by the Competent Authority	9	13	1	5
Failure to monitor in accordance with the approved monitoring plan and Regulation (EU) No 601/2012	11	16	1	5
The quality assurance of measurement equipment is not in line with Regulation (EU) No 601/2012	8	11	1	5
Failure to implement the procedures required by Regulation (EU) No 601/2012	9	13	1	5
Failure to notify changes to the monitoring plan and to update the monitoring plan in accordance with Articles 14 to 16 of Regulation (EU) No 601/2012	11	16	1	5
Failure to submit a verified emission report in due time	11	15	1	5
Failure to submit an improvement report(s) in accordance with Article 69 of Regulation (EU) No 601/2012	8	12	1	5
Failure to provide the verifier information in accordance with Article 10 of Regulation (EU) No 600/2012	8	10	1	5
The verified emission report is found not to be in line with Regulation (EU) No 601/2012	8	12	1	5
Failure to notify planned or effective changes to capacity, activity levels and operation of an installation by 31 December of the reporting period in accordance with Article 24 of Decision 2011/278/EU	14	17	1	5
Other infringements (country-specific)	15	17	2	6

20 countries have not imposed any fines so far in the third phase. The remaining 11 countries have imposed a total of 184 fines in phase 3, of which

18 were imposed in the reporting year 2018 (7 countries). Furthermore in 2018 2 cases of formal notice were reported in France and Spain reported 4 cases which were dismissed or no action taken.

The United Kingdom imposed the most fines, 81 in total, of which 6 were in 2018. There appears to be a trend of slow growth in imposed fines. The sum of all 2018 fines is about €1 million, significantly lower than the about €36 million in the preceding year (which had 72 fines). The 19 fines reported in 2018 range from about €85 to €375 000, the United Kingdom imposed the most fines (8 fines, €82 000), the Netherlands imposed the largest amount (€418 000, 4 fines). No actual imprisonment has been reported in any of the countries in any of the phase 3 years.

From 2013 to 2018 13 countries did not impose excess emission penalties<sup>89</sup> on operators. The remaining 18 countries<sup>90</sup> have reported 134 such cases in the third trading period.

## 7.4 Sanctions and infringements for aircraft operators

For aircraft operators most countries have some form of penalties in place<sup>91</sup>. As for installations, these are usually fines with a defined financial minimum and/or maximum, sometimes calculated by a formula. In most countries the size of penalties is similar for aircraft operators as for installations. However in Greece the maximum fine for each common type of infringements for installations is 30% of the minimum fine for aircraft operators (€50 000). Furthermore in Spain installations can be fined 200 times more for failure to hold a monitoring plan approved than aircraft operators (10,000 €), in Croatia and Hungary a failure to notify changes to the monitoring plan can cost aircraft operators 5 times more than installation and in Portugal aircraft operators may pay up to 54 times more for failure to submit a verified emission report in due time. In all other countries the difference between the reported maximum is 3 times higher or less.

Six countries<sup>92</sup> also provide for the possibility of a jail sentence for some infringements. As for installations, the size of the penalty can vary for particular types of infringements. The infringement type with the highest penalty differs between countries. A limited number of countries have formulated specific infringements in their legislation for which sanctions can be imposed: e.g. breaching confidentiality of information, crimes related to the Registry Regulation, failure to surrender allowances, failure of various monitoring, verification and reporting requirements or failure to comply with an operating ban.

<sup>89</sup> This is the € 100 per t CO<sub>2</sub> emitted without surrendering the related allowances. This penalty is defined by Article 16(3) of the EU ETS Directive and applies therefore in all Member States.

<sup>90</sup> Belgium, Bulgaria, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Romania, Slovakia, Spain, United Kingdom

<sup>91</sup> Only France does report any penalties and Liechtenstein has no aircraft operators assigned to it.

<sup>92</sup> Sweden, Norway, Luxembourg, Ireland, Denmark, Cyprus

Table 7.4-1 The number of countries that have defined minimum and/or maximum penalties for each type of infringement by aircraft operators

Number of countries that report a type of penalty in 2018				
Types of infringement applicable to aircraft operators	Fine		Months prison	
	Min	Max	Min	Max
Failure to hold a monitoring plan approved by the Competent Authority	13	21	1	6
Failure to submit supporting documentation in accordance with Article 12(1) of Regulation (EU) No 601/2012	11	15	1	5
Failure to monitor in accordance with the approved monitoring plan and Regulation (EU) No 601/2012	10	15	1	5
Failure to implement the procedures required by Regulation (EU) No 601/2012	8	12	1	5
Failure to notify changes to the monitoring plan and to update the monitoring plan in accordance with Articles 14 to 16 of Regulation (EU) No 601/2012	9	14	1	5
Failure to correct discrepancies in the reported completeness of flights	7	10	1	5
Failure to submit a verified emissions report in due time	9	13	1	5
Failure to submit an improvement report(s) in accordance with Article 69 of Regulation (EU) No 601/2012	7	11	1	5
Failure to provide the verifier information in accordance with Article 10 of Regulation (EU) No 600/2012	8	10	1	5
The verified emissions report is found not to be in line with Regulation (EU) No 601/2012	6	10	1	5
The verified tonne-kilometre report is found not to be in line with Regulation (EU) No 601/2012	7	10	1	5
Other infringements (country-specific)	4	7	0	1

Only six countries<sup>93</sup> have actually imposed fines on aircraft operators so far. Italy and Portugal imposed fines in 2018. In total 17 cases were reported (15 by Italy), covering various infringements including operating without an approved monitoring plan, not submitting an emission report in time and having errors in the verified emissions report. In eight cases the penalties were not executed yet and two cases were archived. The fines ranged from €600 to €305 600, totalling over €821 000<sup>94</sup>. In earlier years the range for fines was from €100 to over

<sup>93</sup> 2018: Italy, Portugal. 2017 and earlier: Spain, Iceland, Poland, Sweden

<sup>94</sup> This total was all imposed in Italy because it excludes fines imposed in Portugal as the fine values were not yet determined due to ongoing sanctioning processes.

€12 000 000. No actual imprisonment has been reported in any of the countries in the current trading period.

From 2013 to 2017 12 countries did not impose excess emission penalties on aircraft operators. The remaining 19 countries<sup>95</sup> have reported such cases in the third trading period, of which 12 countries also in 2018.

## 7.5 Fraud

Information on fraud and other activities related to market abuse is essential to improve transparency and thereby increase confidence in the carbon market. Procedures in place concerning fraudulent activities related to the free allocation of allowances remain unchanged in 2018 compared to 2017. In all countries general legislation on fraud or criminal law is used to deal with possible fraud cases. In principle no EU ETS specific arrangements are in place to raise awareness on fraud. In most cases fraud is investigated or prosecuted following the national procedures that normally apply to fraud cases. If there are concerns about fraud related to ETS activities they are communicated through the normal channels that apply to all fraud cases (e.g. raising fraud issues with the authority responsible for addressing fraud cases, voicing concerns to the registry helpdesk, approaching the Competent Authority who in turn will inform the prosecutor or other responsible authority). A few countries (France, Ireland, the Netherlands) mention regular cooperation between the Competent Authority and the entity in charge of fraud investigation (e.g. the national financial intelligence unit). In most MS communication occurs through official channels, involving the relevant ETS Competent Authority only if that Competent Authority's involvement is necessary for the investigation or court procedures.

The level of penalties also remains unchanged, with in most cases a risk of prison for between 6 months and 10 years, and in some cases financial penalties between a few hundred and €2 million. Two convictions for fraud have been reported in 2018, one in Luxemburg (the convicted installation had ceased activity in 2011 but hadn't reported it and received undue allocation in 2012) and one in the Netherlands (the conviction which took place in 2018 was related to VAT fraud with emission allowances, leading a criminal organization and forgery, which took place between January and October 2009). Only one other conviction has been reported in phase 3 prior to 2018<sup>96</sup>.

## 7.6 Sanctions on verifiers

According to Article 54 of the AVR a National Accreditation Body can impose administrative measures on verifiers. Such administrative measures include the suspension or withdrawal of the accreditation or a reduction of scope. Suspension of accreditation means that the verifier cannot carry out verification until suspension has been lifted. Withdrawing the accreditation leads to the verifier not being able to carry out verification permanently. The verifier has to

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<sup>95</sup> 2018: Germany, France, Italy, Lithuania, Netherlands, Portugal, Slovenia, United Kingdom. Prior to 2018: Belgium, Bulgaria, Cyprus, Denmark, Spain, Hungary, Iceland, Luxembourg, Poland, Sweden, Slovakia

<sup>96</sup> Austria, reporting year 2016, VAT fraud and money laundering

re-apply for accreditation. When the scope of accreditation is reduced, the verifier can no longer verify in the scope for which the accreditation is reduced. However they are still free to operate in the other scopes for which they are accredited.

The number of administrative measures imposed on verifiers was very low with one suspension (of 6 in phase 3), zero withdrawals of accreditation (of 8 in phase 3) and six reductions of scope (of 21 in phase 3). 23 countries haven't reported any measures imposed on verifiers in any phase 3 year<sup>97</sup> and there is no clear trend over time.

The number of complaints against verifiers has decreased by 10% to 15% every year since 2014. Out of the 71 complaints reported in 2018, 93% were resolved by the time of Article 21 report submission. The number of detected and reported verifier non-conformities in 2018 was 92, which is the higher end of the range of 54-94 annual non-conformities in phase 3. 77 non-conformities were resolved in 2018, which may include some non-conformities that were outstanding from the previous year.

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<sup>97</sup> Austria , Belgium , Bulgaria , Cyprus , Finland , Greece , Croatia , Hungary , Ireland , Iceland , Italy , Liechtenstein , Lithuania , Luxembourg , Latvia , Malta , Netherlands , Norway , Portugal , Romania , Slovenia , Slovakia , United Kingdom



## 8 CONCLUSIONS AND OUTLOOK

This report analyses the national responses to the Article 21 questionnaire submitted in 2019 to provide an overview on the implementation of the EU ETS Directive in the MS. It informs about the emissions of stationary installations and aircraft operators, depicts trends of the last years of reporting and gives an overview about the implementation and compliance of the EU ETS in the MS states.

### 8.1 Competent Authorities

How Competent Authorities are organised depend very much on the legal and administrative set-up in an individual MS. The majority of countries have a centralised system for all MRVA activities. The degree of centralisation varies between countries. Whereas some countries have a highly centralised system in which all EU ETS activities are carried out by one central Competent Authority, in other Member States only the MRVA activities are designated to the central Competent Authority whereas other authorities are responsible for permitting, inspection, allocation or policy matters. In these situations it is important to have good communication and information exchange channels between the different authorities. In most cases working groups, meetings or guidelines are also used to coordinate between those authorities.

In nine countries, the MRVA responsibilities are allocated to various local or regional authorities. The degree of decentralisation varies between those countries depending on the administrative and legal structures available. For five countries, the number of local or regional authorities is quite high requiring extensive coordination measures. In some cases, a central Competent Authority played a pivotal role in the coordination thereby increasing the harmonisation between the different authorities. Such coordination is carried out in Latvia, Poland and United Kingdom albeit in different forms ranging from parallel assessments by the central authority to mandatory instructions. Coordination measures are also taken in less formalised procedures in the form of guidance, helpdesks, structural working groups, IT systems and trainings. Although the type of coordination differs between the nine countries, it is clear that coordination plays an essential role in ensuring equal treatment between installations in the different regions.

Because of the challenges in coordination and harmonisation, various countries such as Germany, Lithuania and Sweden have transformed from a decentralised to a more centralised system. These countries mentioned that the transfer caused the MRV activities to run more smoothly.

For aviation, the decentralisation of the Competent Authorities is less than for installations. Some MS have chosen to allocate the responsibilities for aviation to different authorities than for installations. This means that in some countries with multiple local or regional authorities responsible for MRV activities of installations, the responsibilities for aviation MRV have been assigned to a central authority that is managing air transport and other aviation activities.

Regardless of the degree of decentralisation or centralisation, effective procedures for the approval of monitoring plans, permitting, notification of

changes to the monitoring plan, the review of emission reports and verification reports as well as the approval of improvement reports are necessary for the MRV system to function properly. These procedures often depend on country specific factors and structures causing differences between Member States. It is evident though that limited resources can have an impact on how the CA has organised its internal procedures and on what tools they use for effective implementation. Certain tools can significantly facilitate the implementation: either by making operators and aircraft operators aware of the rules or by managing the workflow between Competent Authorities and operators or aircraft operators.

## 8.2 Coverage of the EU ETS

Since 2013, the number of stationary installations continues to decrease. According to the national responses under Article 21, 10 609 installations took part in the EU ETS and had an EU ETS permit in 2018, compared to 10 687 in 2017 and 11 617 at the start of the trading period. This represents a decrease of 0.7% between 2018 and 2017. Since 2013, the number of installations participating in the EU ETS has been reduced by approximately 9%. This in particular concerns the number of category C installation, which has declined even more: in 2018, there were 13% fewer installations than in 2013. Nevertheless, the proportion of installations per category remained roughly the same as in previous years, with 72% of installations falling under category A, 21% under category B, and 7% under category C. The number of installations with low emissions decreased slightly to 6 069, which still represents 57% of all installations.

The total combustion fuel consumption and emissions, according to Article 21 reports were 18 158 PJ and 1 431 Mt CO<sub>2 (eq)</sub> respectively in 2018. This is 50 Mt CO<sub>2 (eq)</sub> and 699 PJ less than the reported data in 2017. Compared to 2013, emissions were reduced by 244 Mt CO<sub>2 (eq)</sub> (17%), mostly because hard coal has been used less over the years. As a result of a reduction of 40% in the use of hard coal since 2013, emissions from combustion of hard coal decreased from 480 Mt CO<sub>2 (eq)</sub> in 2013 to 287 Mt CO<sub>2 (eq)</sub> in 2018. Overall, the reporting on emissions and especially consumption of fuel has improved substantially, because fewer discrepancies between consumption and emission data were found.

The aggregated ETS activities that are reported under the codes from the CRF for 2018 show that the total process emissions can be estimated at approximately 296 Mt CO<sub>2 (eq)</sub>, an increase of more than 30 Mt CO<sub>2 (eq)</sub>. These estimations that consists of combined fuel combustion and process emissions sum up to 1 727 Mt CO<sub>2 (eq)</sub> and correspond to the total verified emissions of 1 682 Mt CO<sub>2 (eq)</sub>. The CRF combustion category 1A1a (public electricity and heat production) accounted for 63% of combustion emissions reported in 2018. The largest category for process emissions was 2C1 (iron and steel production) that accounted for 32% of the process emissions in 2018.

The number of aircraft operators in the EU ETS in 2018 increased to 619 (compared to 541 reported for 2017, and 504 for 2016) due to the higher number of especially non-commercial operators reported for Greece. Across all countries, 51% of aircraft operators are commercial air transport operators, and

49% non-commercial ones, less than half of all operators are small emitters (42% of all aircraft operators).

Total emissions from aviation in the current EU ETS scope amounted to 67.5 Mt CO<sub>2</sub>(eq) in 2018. This represents an increase of 4.2% (2.8 Mt CO<sub>2</sub>(eq)) compared to the data reported in 2017. It is the fifth consecutive year where an increase of emissions could be observed. This increase was caused by a growth in both international and domestic aviation activities leading to 10 and 2 Mt CO<sub>2</sub>(eq) respectively more emission between 2014 and 2018. Aviation emissions have contributed approximately 4.0% to the total emissions in the EU ETS (including stationary installations and aviation) for the reporting year 2018, compared to 3.8% in 2017.

In 2018, 1 969 permit updates were reported, a number comparable to changes in previous years (1 886 in 2017 and 1 840 in 2016). As in previous years requirements for permit updates vary considerably across countries. France, the Netherlands and Germany reported a relatively low number of permit changes despite their high numbers of installations. The situation in Germany is special case.<sup>98</sup> In these countries, it takes more time to update permits requiring official stakeholder consultations. United Kingdom, Norway and Spain, where a (significant) change in the monitoring plan leads to an automatic change of permit, are countries with frequent permit updates. Article 27 of the EU ETS Directive allows MS to exclude certain installations provided they meet the requirements laid down in Article 27 of the EU ETS Directive. As in previous years, Croatia, France, Iceland, Italy, Slovenia, Spain and the United Kingdom excluded installations from the scope of EU ETS. The total amount of excluded emissions reported by the 7 countries in 2018 was 3 940 kt CO<sub>2</sub>(eq). This amount was 0.4% less than in 2017, and represented, just as in previous years, 0.25% of ETS emissions in 2018. There is no evidence that exclusion of these installations affected the environmental integrity of the EU ETS.

### 8.3 Implementation of the Monitoring and Reporting Regulation

The analysis of the Article 21 responses showed that the implementation of the MRR has improved over the years and the degree of compliance was maintained in 2018. The application of default and literature values seems to have been applied in accordance to MRR requirements. Literature values agreed with the CA dominate the type of default values used by installations. In over 75% cases, such values were used. In Germany for example, the country with the highest number of default values used, the literature values agreed with the CA were applied for four input materials (i.e. natural gas, fuel oil, diesel and liquefied gas). Considering the high number of category A installations using commercial standard fuel, the high number of default values in the form of literature values seems therefore reasonable. 24 countries reported 2 423 standard factors listed in the MRR Annex VI. This is 100 cases less than the year before.

<sup>98</sup> For Germany the federal state authorities are responsible for permitting and permit updates whereas a central authority, DEHSt is responsible for the approval of monitoring plans. The DEHSt has the opportunity to provide comments when permits or permit updates are issued; vice versa the state authorities is allowed to comment before monitoring plans are approved.

According to Article 21 data, in 26 countries sampling plans were drawn up in all cases required under Article 33 of the MRR, the same number of countries as in 2017. In 116 cases, the Competent Authority allowed the operator to use a different frequency of analysis than the required analysis frequency in Annex VII. Fewer MS (4) encountered problems with sampling plans. Since 2013, the number of category B and C installations not meeting the highest tiers because of unreasonable costs or technical infeasibility has steadily diminished. The number of category C installations that did not apply the highest tier methodology decreased from 128 to 97 between 2013 and 2018. The number of category B installations not apply the highest tier methodology also significantly decreased from 666 in 2013 to 424 in 2018. In 2018, 11 countries (no changes from the previous year) reported using the fall-back approach but the number of installations applying this approach has slightly increased since 2016 from 34 to 38. Contrary to the increase in number of installations, the estimated emissions covered by fall-back approaches amounted to 2.8 Mt CO<sub>2 (eq)</sub>, which means a reduction of 45% or 2.3 Mt CO<sub>2 (eq)</sub> compared to the data for 2016. The compliance in submitting an improvement report has been high from the start: approximately 90% of the improvement reports required under Article 69 of the MRR were actually submitted by the operator. The proportion between submitted and required reports increased during the last four years from 86 to 95%. The absolute number of improvement reports required and submitted by operators decreased once again in 2018.

The situation in the aviation sector seems to be different, because less improvement reports are required on a percentage basis, as improvement reports for aviation are only required in response to non-conformities and recommendations for improvement reported by the verifier in the verification report. The ratio between submitted and required improvement reports has not increased since 2015 and is still significantly lower than for operators of stationary installations with just 76% in 2018.

Conservatively estimated aviation emissions (e.g. as a result of data gaps) totalled 3 267 kt CO<sub>2 (eq)</sub> in 2018 and represented 4.6% of the total reported aviation emissions. This means a sharp increase compared to 2017 (505 kt CO<sub>2 (eq)</sub>), mainly due to the conservatively estimated emissions reported by the United Kingdom amounting to 3 126 kt CO<sub>2 (eq)</sub>. The use of the Small Emitter Tool (SET) and Eurocontrol ETS Support Facility (SF) are still the most common way of determining fuel consumption by small emitters. Countries reported that these methods were used by the large majority of small emitters (more than 90%). 116 aircraft operators used SET whereas an additional 151 small emitters generated their emission reports from the ETS SF.

## 8.4 Verification and penalties

An important stakeholder in the EU ETS compliance chain is the verifier. Key principles of verification are embedded in Article 7 AVR: e.g. the requirement to carry out the verification with a reasonable level of assurance and to be independent from operators and Competent Authorities. The data reported by countries and additional data available on the websites of national accreditation bodies show that in some countries, the number of verifiers is limited, whereas in other countries such as Germany, the number is significantly greater. Countries with a limited number of verifiers usually have foreign verifiers

operating the market. The highest coverage of verifiers was detected for scope 1 (combustion) followed by scope 6 (the production of cement clinker, lime or calcination of dolomite or magnesite, the manufacture of glass, ceramic products, mineral wool and the drying or calcination of gypsum). These numbers correlate well with the high number of installations carrying out these activities. The lowest numbers were observed for scope 10 (capture and transport of greenhouse gases), scope 11 (geological storage of greenhouse gases) and scope 99 (installations opted in the EU ETS). Continuing the trend identified in previous years, the number of verifiers accredited against specific scopes has further decreased with the exception of scope 98 (Other activities pursuant to Article 10a of Directive 2003/87/EC). There have not been any changes in how MS have established National Accreditation Bodies. The same number of MS still use only foreign verifier because these have no specific National Accreditation Body or the National Accreditation Body is not carrying out accreditation for ETS. The national cooperation and information exchange between National Accreditation Bodies and the Competent Authority according to Article 70 of the AVR has strengthened over the years, ranging from ad hoc meetings to the organisation of structured annual or more frequent meetings between verifiers, Competent Authorities and National Accreditation Bodies. Cooperation and information exchange between these parties have a positive impact on the quality and robustness of verification and accreditation.

The number of outstanding issues in verification reports amounted to 3 900 for installations and 132 for aircraft operators in 2018. These numbers significantly decreased compared to 2017. Across MS similar types of non-conformities, non-compliance issues and recommendations of improvement could be identified. The most common issues included for example omitted source streams or sources, recommendations to update procedures, missing data gaps, tiers not met, thresholds exceeded.

All MS reported that they perform additional checks to evaluate emission and verification reports. These checks include checking for completeness and internal consistency. A number of MS also cross check the emission report with the corresponding monitoring plan and allocation data, and perform detailed analyses of emission and verification reports. The percentage of reports being checked in detail and on consistency differs between countries and is dependent on the resources available in a country and the approaches for reviewing reports, rather than the type of decentralisation in a country. As a result of the checks carried out on emission reports, 112 of those reports were rejected, compared to 120 in the previous year. Lithuania was again the country with the highest reported number of rejections (71 compared to 69 in 2017). Those results show that in relation to the total number of emission reports, the number of rejections and incidents is quite low. However, the variations in how MS reported the data was high. It is assumed that diverse interpretation of the MRR and AVR in the individual MS might have led to the differences in results, as they cannot be explained by the fact that some MS perform more additional checks than others.

In addition to the review of reports, there are other measures to ensure operator's compliance, such as inspection and preventive measures consisting of organising regular meetings and communication with the operator. Article 21 reports show that the number of inspections has grown yearly, implying that inspection approaches have strengthened despite the differences between

countries on how inspection is set-up. As a last resort, Competent Authorities impose sanctions to ensure compliance of the operator.

20 countries have not imposed any fines on installations so far in the third phase. The remaining 11 countries have imposed a total of 184 fines in phase 3, of which 18 were imposed in the reporting year 2018 (7 countries). Furthermore, in 2018, 2 cases of formal notice were reported in France and Spain reported 4 cases which were dismissed or no action taken. For aviation, only six countries have imposed fines on aircraft operators so far.

The sum of all 2018 fines is about €1 million for installations, significantly lower than the about €36 million in the preceding year (which had 72 fines). The 18 fines reported in 2018 range from about €85 to €375 000. For aviation, the fines ranged from €600 to €305 600, totalling over €821 000<sup>99</sup>. In earlier years the range for fines was from €100 to over €12 000 000. No actual imprisonment has been reported for installations and aircraft operators in any of the countries in any of the phase 3 years. Although all MS have some form of penalties for different types of infringements in place, the size of penalties and the infringements for which these penalties can be imposed vary. For most countries, these are fines with a defined financial minimum and/or maximum. Not submitting an emission report and not monitoring in line with the approved monitoring plan are the most common infringements among MS.

## 8.5 Outlook and areas for improvement

Monitoring, Reporting and Verification of emissions and the related Accreditation of verifiers (MRVA) are core elements of the EU ETS. The Article 21 reports help to ensure transparency in how MS implemented EU ETS requirements, thereby creating more confidence in the functioning of EU ETS for participants as well as observers. This report shows that the emission trading system is functioning effectively and improving continually over the years. In general, MS have implemented robust systems.

Overall, the analysis of the responses showed a positive development in the completeness and quality of the reported data. However, there are some shortcomings in the questionnaire, which make it difficult to analyse and interpret some MS responses. Improving the questionnaire on these points could lead to more clear responses on how the Directive and the requirements in the MRR and AVR are applied, ultimately enabling a more detailed analysis. Some examples are provided below:

- Some processes are time consuming and are often finalised after the deadline of submission for the Article 21 reports. Conservative estimates and penalties are typical examples where final or complete assessments are not possible and only a best estimate can be provided. Some country's reports also included outstanding cases and data from former years (e.g. complaints and non-conformities resolved from last year in question 6.2 and 6.5). Other countries give only information about the specific reporting year leading to incomplete data

<sup>99</sup> This total was all imposed in Italy, because it excludes fines imposed in Portugal as the fine values were not yet determined due to ongoing sanctioning processes.



and possibly to misleading interpretations. This could be more clearly indicated in the questionnaire.

- In cases where the monitoring methodology is based on mass balance, a proxy value for the net caloric value is often not provided and as a consequence, the energy consumption cannot be calculated. Therefore, some countries report under question 5.5 only the emissions with no input for consumption, thus distorting the corresponding emissions factors, whereas other countries do not report these emissions and associated consumptions, leading to an underestimation of values.
- Question 5.24 is interpreted differently by countries with respect to small emitters: some MS may have summed up aircraft operators using the Small Emitter Tool as well as aircraft operators employing Eurocontrol's EU ETS Support Facility for generating the emission reports for sub-question 1. It would be better to clarify question 5.24 and to differentiate between aircraft operators using SET in subsequent verifications and aircraft operators generating their emission reports through the Eurocontrol's Support Facility. This would avoid inconsistencies in the numbers of aircraft operators under questions 5.24, so that they match up with the number of aircraft operators in question 3.3.
- Question 3.3 seeks an overview of the aggregate number of aircraft operators carrying out activities listed in Annex I to Directive 2003/87/EC. A more clear explanation should be given that aircraft operator excluded by Annex I of Directive 2003/87/EC (e.g. aircraft operator with valid monitoring plans, which do not exceed e.g. the threshold limits) are not to be included in this question.
- Question 5.5 lists the total annual emissions based on data reported in the operators' emission reports for the reporting year, whereas question 5.6 differentiates between aggregate total combustion and process emissions. Although most countries reported very similar combustion data for both questions, the reported numbers for fuel combustion in some MS were not consistent. MS are encouraged to compare these data as a possible plausibility check.
- Question 5.17 Use of biomass, some MS reported the total emissions of biomass as zero when the emissions were considered zero-rated (because the sustainability criteria were complied with or were not applicable). However, the question aims to get information about total emissions in t CO<sub>2</sub> from biomass, requesting the total to be broken down into amounts corresponding to different criteria (i.e.: zero rated vs. non-zero rated). It should be clarified how much CO<sub>2</sub> originates from fossil origin and how much CO<sub>2</sub> from biomass origin. The analysis of the sustainability criteria could become more important in the coming years because of the revised Renewable Energy Directive.
- At this point, Article 13 of the MRR is not applied widely by MS. The high number of installations with low emissions and the high percentage of installation using just natural gas imply that an increased use of Article 13 of the MRR could be beneficial for MS and could reduce the administrative burden of operators and competent authorities. It is noted that a limited number of MS changed their procedures, as they did not want to change the MP for these installations. However, for the fourth trading period, Article 13 could be considered by MS. The

Commission has developed guidance and an exemplar for simplified monitoring plans that is published on the Commission's website<sup>100</sup>. Furthermore, good practices can be identified in the countries that are using such simplified templates (see section 6).

- Question 6.4 on material issues reported in the verification report were in some cases not reported by countries, because they had yet to finish the review of emission reports and verification reports. This led to incomplete responses and an accurate analysis could not always be made. This is also true for question 5.13 and 5.24 on the submission of improvement reports. In some cases, this was not clearly indicated in section 14 and the analysis had to be corrected based on information that was retrieved in another project: the Compliance Cycle Evaluation Project. Clarification on how to address these situations could improve the analysis of the responses.

This report is an evaluation of the Article 21 questionnaire covering topics related to countries' implementation of the EU ETS Directive. It shows that MS reports are generally complete and of high quality. However, some of the data is sometimes of poor quality depending on the questions. One way could be to clarify these questions in other cases the questionnaire should slightly enlarge by asking some more specific questions for the above mentioned shortcomings. These measures would lead to a better understanding and the possibility to raise the quality in those areas for improvements to the areas where the data already is complete and of high quality.

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<sup>100</sup> [https://ec.europa.eu/clima/sites/clima/files/simplified\\_monitoring\\_plan\\_exemple\\_en.pdf](https://ec.europa.eu/clima/sites/clima/files/simplified_monitoring_plan_exemple_en.pdf)



## ANNEX

### Country Codes

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

## Glossary

<b>Allocation</b>	Assignment of emission allowances in a specific way, according to predetermined rules.
<b>Annex I activity</b>	Annex I of the European Union Emissions Trading System (EU ETS) Directive lists the activities that installations may carry out, such as the production of paper or cardboard. Installations need permits to perform Annex I activities. Activities are not sector classifications.
<b>Cap</b>	The maximum amount of greenhouse gas (GHG) which the EU ETS allows its participants to emit. A cap is used in combination with a trading element in an emissions trading system to allow the participants to meet their emissions reduction obligations through a least-cost means.
<b>Carbon dioxide equivalent</b>	means any greenhouse gas, other than CO <sub>2</sub> listed in Annex II to Directive 2003/87/EC with an equivalent global-warming potential as CO <sub>2</sub>
<b>Combustion emissions</b>	GHG emissions that result from the exothermic reaction of a fuel with oxygen.
<b>Competent Authority</b>	An organisation (or organisations) within a Member State that is responsible for implementing the EU ETS.
<b>Continuous Emission Measurement</b>	A measurement-based methodology consists of determining emissions from emission sources by means of continuous measurement of the concentration of the relevant greenhouse gas in the flue gas and of the flue gas flow.
<b>CRF</b>	National GHG inventories submitted to the United Nations Framework Convention on Climate Change (UNFCCC) are reported using Common Reporting Format (CRF) tables. These disaggregate national emissions into activity sectors, using a hierarchical code for more detailed sectors.
<b>Emission allowance</b>	The permission to emit one tonne of carbon dioxide equivalent during a specified period, which shall be valid only for the purposes of meeting the requirements of the EU ETS Directive
<b>Emission Factor</b>	Is the average emission rate of a greenhouse gas relative to the activity data of a source stream assuming complete oxidation for combustion and complete conversion for all other chemical reactions
<b>Fall-back approach</b>	An approach for estimating emissions that can be applied to selected source streams or emission sources for which applying at least a tier 1 approach is technically not feasible or would incur unreasonable costs, provided certain conditions regarding uncertainties are met.
<b>Greenhouse gases</b>	Gases that contribute to global warming and climate change. Annex II of the EU ETS Directive list 6 gases.
<b>Inherent CO<sub>2</sub></b>	Inherent CO <sub>2</sub> is CO <sub>2</sub> that results from an Annex I activity and that is part of a gas that is considered a fuel. This could be natural gas, a waste gas (including blast furnace gas) or

	coke oven gas.
<b>National accreditation body (NAB)</b>	An organisation within a Member State that is responsible for accrediting verifiers to the requirements of ISO-Standard EN ISO 14065 and the AVR as well as the guidelines of the European Commission and the European Co-operation for Accreditation.
<b>Process emissions</b>	GHG emissions other than combustion emissions that occur as a result of intentional and/or unintentional reactions between substances or their transformation, including the chemical or electrolytic reduction of metal ores, the thermal decomposition of substances, and the formation of substances for use as product or feedstock.
<b>Registry</b>	A database that shows who owns what emission allowances and performs transactions between accounts. Account balances can be viewed and transactions can be initiated online through a registry. A registry is not a trading platform; it does not support the statement of sale and purchase orders, or prices.
<b>Tiers</b>	Sets of requirements for determining calculation factors, activity data and emissions. Higher tiers have more stringent requirements and produce more accurate data.
<b>Trading period</b>	The period in which EU ETS emissions allowances are issued. Initially, two trading periods were defined: 2005-2007 and 2008-2012. These have been further extended by the addition of a third trading period, from 2013 to 2020, and a fourth trading period has been proposed for 2021-2030.

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## List of Annex I activities

Combustion of fuels in installations with a total rated thermal input exceeding 20 MW (except in installations for the incineration of hazardous or municipal waste)

Refining of mineral oil

Production of coke

Metal ore (including sulphide ore) roasting or sintering, including palletisation

Production of pig iron or steel (primary or secondary fusion) including continuous casting, with a capacity exceeding 2.5 tonnes per hour

Production or processing of ferrous metals (including ferro-alloys) where combustion units with a total rated thermal input exceeding 20 MW are operated. Processing includes, inter alia, rolling mills, re-heaters, annealing furnaces, smitheries, foundries, coating and pickling

Production of primary aluminium

Production of secondary aluminium where combustion units with a total rated thermal input exceeding 20 MW are operated

Production or processing of non-ferrous metals, including production of alloys, refining, foundry casting, etc., where combustion units with a total rated thermal input (including fuels used as reducing agents) exceeding 20 MW are operated

Production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or in other furnaces with a production capacity exceeding 50 tonnes per day

Production of lime or calcination of dolomite or magnesite in rotary kilns or in other furnaces with a production capacity exceeding 50 tonnes per day

Manufacture of glass including glass fibre with a melting capacity exceeding 20 tonnes per day

Manufacture of ceramic products by firing, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain, with a production capacity exceeding 75 tonnes per day

Manufacture of mineral wool insulation material using glass, rock or slag with a melting capacity exceeding 20 tonnes per day

Drying or calcination of gypsum or production of plaster boards and other gypsum products, where combustion units with a total rated thermal input exceeding 20 MW are operated

Production of pulp from timber or other fibrous materials

Production of paper or cardboard with a production capacity exceeding 20 tonnes per day

Production of carbon black involving the carbonisation of organic substances such as oils, tars, cracker and distillation residues, where combustion units with a total rated thermal input exceeding 20 MW are operated

Production of nitric acid

Production of adipic acid

Production of glyoxal and glyoxylic acid

Production of ammonia

Production of bulk organic chemicals by cracking, reforming, partial or full oxidation or by similar processes, with a production capacity exceeding 100 tonnes per day

Production of hydrogen (H<sub>2</sub>) and synthesis gas by reforming or partial oxidation with a production capacity exceeding 25 tonnes per day

Production of soda ash (Na<sub>2</sub>CO<sub>3</sub>) and sodium bicarbonate (NaHCO<sub>3</sub>)

Capture of greenhouse gases from installations covered by this Directive for the purpose of transport and geological storage in a storage site permitted under Directive 2009/31/EC

Transport of greenhouse gases by pipelines for geological storage in a storage site permitted under Directive 2009/31/EC

Geological storage of greenhouse gases in a storage site permitted under Directive 2009/31/EC

### Scope of accreditation for verifiers (Annex I of AVR)

Activity group No	Scopes of accreditation
1a	Combustion of fuels in installations, where only commercial standard fuels as defined in Regulation (EU) No 601/2012 are used, or where natural gas is used in category A or B installations.
1b	Combustion of fuels in installations, without restrictions
2	Refining of mineral oil
3	<ul style="list-style-type: none"> <li>– Production of coke</li> <li>– Metal ore (including sulphide ore) roasting or sintering, including pelletisation</li> <li>– Production of pig iron or steel (primary or secondary fusion) including continuous casting</li> </ul>
4	<ul style="list-style-type: none"> <li>– Production or processing of ferrous metals (including ferro-alloys)</li> <li>– Production of secondary aluminium</li> <li>– Production or processing of non-ferrous metals, including production of alloys</li> </ul>
5	Production of primary aluminium (CO <sub>2</sub> and PFC emissions)
6	<ul style="list-style-type: none"> <li>– Production of cement clinker</li> <li>– Production of lime or calcination of dolomite or magnesite</li> <li>– Manufacture of glass including glass fibre</li> <li>– Manufacture of ceramic products by firing</li> <li>– Manufacture of mineral wool insulation material</li> <li>– Drying or calcination of gypsum or production of plaster boards and other gypsum products</li> </ul>
7	<ul style="list-style-type: none"> <li>– Production of pulp from timber or other fibrous materials</li> <li>– Production of paper or cardboard</li> </ul>
8	<ul style="list-style-type: none"> <li>– Production of carbon black</li> <li>– Production of ammonia</li> <li>– Production of bulk organic chemicals by cracking, reforming, partial or full oxidation or by similar processes</li> <li>– Production of hydrogen (H<sub>2</sub>) and synthesis gas by reforming or partial oxidation</li> <li>– Production of soda ash (Na<sub>2</sub>CO<sub>3</sub>) and sodium bicarbonate (NaHCO<sub>3</sub>)</li> </ul>
9	<ul style="list-style-type: none"> <li>– Production of nitric acid (CO<sub>2</sub> and N<sub>2</sub>O emissions)</li> <li>– Production of adipic acid (CO<sub>2</sub> and N<sub>2</sub>O emissions)</li> <li>– Production of glyoxal and glyoxylic acid (CO<sub>2</sub> and N<sub>2</sub>O emissions)</li> <li>– Production of caprolactam</li> </ul>
10	<ul style="list-style-type: none"> <li>– Capture of greenhouse gases from installations covered by Directive 2003/87/EC for the purpose of transport and geological storage in a storage site permitted under Directive 2009/31/EC</li> <li>– Transport of greenhouse gases by pipelines for geological</li> </ul>



Activity group No	Scopes of accreditation
	storage in a storage site permitted under Directive 2009/31/EC
11	Geological storage of greenhouse gases in a storage site permitted under Directive 2009/31/EC
12	Aviation activities (emissions and tonne-kilometre data)
98	Other activities pursuant to Article 10a of Directive 2003/87/EC
99	Other activities, included by a Member State pursuant to Article 24 of Directive 2003/87/EC, to be specified in detail in the accreditation certificate



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- at the following standard number: +32 22999696, or
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