



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

*Analysis of national responses under Article 21  
of the EU ETS Directive in 2020*

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## **EUROPEAN COMMISSION**

*Directorate-General for Climate Action*

*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*

# Application of the European Union Emissions Trading Directive

ANALYSIS OF NATIONAL RESPONSES UNDER ARTICLE 21 OF THE EU ETS DIRECTIVE IN  
2020

Machtelt Oudenes

Sjors van Iersel

Eliska Bystricky

Monique Voogt

Review: Adriana Iliescu and Dinne Smederup Hansen

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## Abbreviations

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
DEHSt	The German Emissions Trading Authority
EEA	European Environment Agency
ETS SF	Eurocontrol Emissions Trading Scheme Support Facility
EU	European Union
EUA	European Union allowance
EUTL	European Union Transaction Log
EU ETS	European Union Emissions Trading System
GHG	Greenhouse gas
ICAO	International Civil Aviation Organization
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
MSR	Market Stability Reserve
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

The EU ETS Directive<sup>1</sup> requires all EU ETS implementing countries to submit an annual report on the application of the Directive in their country (“the Article 21 reports” or “country reports” hereinafter). These reports need to be provided on the basis of a questionnaire adopted by the European Commission – the Article 21 questionnaire.<sup>2</sup> The main focus of the Article 21 reports is the implementation of the requirements on MRVA, permitting and inspection and enforcement. Article 21(2) of the EU ETS Directive requires the European Commission to publish a technical report based on these country reports. The reporting requirement applies to all countries that have implemented the EU ETS; these are the 28<sup>3</sup> EU Member States, as well as Norway, Iceland and Liechtenstein. For practical reasons, this report uses the term EU ETS countries or just countries to refer to all 31 countries that operated the EU ETS in the year 2019. This present technical report takes into account the reports for the reporting year 2019, which were submitted by the EU ETS countries in 2020. Where relevant, trends are shown covering previous years from 2013 (beginning of phase 3 of the EU ETS).

In 2019, 10,569 installations were covered by the EU ETS, with total emissions of 1,527 Mt CO<sub>2</sub> (eq), which is 10.9% lower compared to 2018. The number of aircraft operators was 611, with total emissions of 68 Mt CO<sub>2</sub>, which is 0.7% higher than in 2018.

## Article 21 reporting improved

The consistency and completeness of Article 21 reports have been generally high since the beginning of phase 3 and have improved even further over the course of the period. This is illustrated by a higher level of completeness of the responses and less inconsistencies in responses. Continuing the trend from recent years, most reports were also submitted timely: 27 out of 31 EU ETS countries submitted Article 21 reports by the deadline of 30<sup>th</sup> of June 2020 and 4 countries submitted the report by the end of August 2020, which is the shortest delay since the beginning of phase 3. Possible factors causing the limited delays include the first wave of COVID pandemic and the high workload of Competent Authority’s in preparing the allocation of emission allowances for phase 4, which overlapped with the period in which the Article 21 report is normally prepared, before the 30 June deadline.

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<sup>1</sup> Consolidated version of Directive 2003/87/EC of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, 8 April 2018, <https://eur-lex.europa.eu/eli/dir/2003/87>

<sup>2</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. <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014D0166>

<sup>3</sup> In 2019 the United Kingdom was part of the EU and is therefore included in the assessment of the Article 21 reports.

## Emissions decrease 11% in stationary installations but increase with 0.7% in aviation sector

The number of stationary installations has decreased by 0.4% compared to 2018: from 10,609 to 10,569 installations. Since 2013 the total number of stationary installations has decreased 9%: from 11,617 installations in 2013 to 10,569 installations in 2019. The proportion of installations per category remained roughly the same compared to previous years: 72% of installations in category A,<sup>4</sup> 21% in category B,<sup>5</sup> 7% in category C,<sup>6</sup> and a subset of 57% installations with low emissions included in category A.

The total emissions of stationary installations in the EU ETS in 2019 was 1,527 Mt CO<sub>2</sub> (eq), 10.9% lower than in 2018, when the emissions were 1,714 Mt CO<sub>2</sub> (eq). The majority of those emissions came from fossil fuel combustion: combustion emissions decreased from 1,428 Mt CO<sub>2</sub> (eq) in 2018 to 1,260 Mt CO<sub>2</sub> (eq) in 2019, resulting in a decrease of 11.7%. Total process emissions in 2019 was 267 Mt CO<sub>2</sub> (eq), 7.3 % lower than in 2018.

The decrease in fuel combustion emissions was mainly caused by high reductions in the use of hard coal: emissions from combustion of hard coal decreased from 477 Mt CO<sub>2</sub> (eq) in 2013 to 287 Mt CO<sub>2</sub> (eq) in 2018 and 206 Mt CO<sub>2</sub> (eq) in 2019. This is a reduction of 57% between 2013 and 2019. Hard coal represented a share of 29.2% of combustion emissions in 2013, a share which was reduced to 16.2% in 2019. The share of natural gas on the other hand increased from 23.8% in 2013 (397Mt CO<sub>2</sub> (eq)) to 27.8% (398 Mt CO<sub>2</sub> (eq)) in 2018, and 33.7% (428 Mt CO<sub>2</sub> (eq)) in 2019.

As in 2018, the energy-intensive industries emitted the highest share of EU ETS emissions in 2019: 40.7% of the total emissions in the power sector, 9.4% for mineral oil, 12.3% for refineries, 27.6% for iron and steel and 27.4% for cement production.

2,197 out of 10,569 installations (20.8% of all reporting installations under the EU ETS) reported the use of biomass in 2019, which is slightly higher than the 2,187 installations reported in 2018 (20.6% of the total number of installations covered by EU ETS). Only 2 aircraft operators reported the use of biofuels in 2019.

The total number of aircraft operators in 2019 was 611, slightly lower than the number in 2018, which was 619 aircraft operators. 42.9% of the total number of aircraft operators were small emitters, 50.4% of all aircraft operators were operating for commercial purposes, and 49.6% for non-commercial. The total emissions in the current EU ETS aviation scope in 2019 was 68 Mt CO<sub>2</sub>, 0.7% higher than in 2018 (67.5 Mt CO<sub>2</sub>). In the last 5 years, the emissions in the aviation sector have steadily increased: from 55 Mt CO<sub>2</sub> in 2014 to 68 Mt CO<sub>2</sub> in 2019. The increase however, has been decelerating in the last 2 years. In 2019, the emissions from domestic flights have decreased by 13.5% compared to 2018, but this was counter-balanced by a slight increase in international flights (emissions from international flights increased by 0.7% compared to 2018) as international flights represented close to 83% of aviation emissions.

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<sup>4</sup> Installations for which average verified annual emissions of 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>, are equal to or less than 50 000 tonnes of CO<sub>2</sub> (eq).

<sup>5</sup> Installations, for which the average verified annual emissions of 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>, are more than 50 000 tonnes of CO<sub>2</sub> (eq) and equal to or less than 500 000 tonnes of CO<sub>2</sub> (eq).

<sup>6</sup> Installations, for which the average verified annual emissions of 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>, are more than 500 000 tonnes of CO<sub>2</sub> (eq).

In 2019 a total of 7 EU ETS countries have opted out installations from the scope of the EU ETS according to Article 27 of the Directive. The total amount of excluded emissions in 2019 was 3,807 kt CO<sub>2</sub> (eq). This was 3.4% lower than in 2018, and represented 0.35% of total EU ETS emissions in 2019, which is a slight increase compared to the share of 0.25% in 2018.

## The quality of MRV has improved

Analysis of Article 21 reports shows that the quality of MRV has improved since 2013. Over the years more installations applied the most stringent monitoring and reporting requirements. In 2019 this trend continued in most MRV areas:

- > The number of category B and C installations not meeting the highest tier approaches has decreased since 2013: 22.1% of the category B installations and 13.7% of the category C installations respectively in 2019 compared to 28% and 14.7% in 2013. However, there was an increase compared to 2018 levels: the number of category B and C installations not meeting the highest tier in 2019 were 483 category B installations and 102 category C installations, compared to 424 and 97 in 2018, respectively. These differences seem linked to fluctuations in the reported number of one country;
- > The fall-back approach, an exception to the normal tier approaches, has been used by 38 installations in 2019, 4 less than in 2018;
- > Less complications have been reported on the submission and implementation of sampling plans in the Article 21 reports;
- > 10,949 installation operators covered by the EU ETS used default values in 2019, which represents 0.8% more installations compared to 2018. Out of these, 8,295 were literature values agreed with the Competent Authority<sup>7</sup> and 2,654 were type I default values.<sup>8</sup> In 2018, these numbers were 8,251 and 2,607, respectively. Literature values in both years were mostly used in relation to natural gas and fuel oil that are often applied by category A installations, which are allowed to use these values;
- > The number of installations using measurement-based methodologies in 2019 was 144 covering 23 countries, 20.4% fewer installations than in 2018. The predominant monitoring methodology applied by installations in the EU ETS is thus the calculation-based methodology. The emissions covered by installations using measurement-based methodologies in 2019 were 50 Mt CO<sub>2</sub> (eq) (4% of the total emissions) compared to 56 Mt CO<sub>2</sub> (eq) in 2018;
- > For aviation, the application of the monitoring requirements remained stable. 191 aircraft operators used method B to determine the fuel consumption, 32 used method A, and 1 aircraft operator used both methods. In 2018, this was 211 aircraft operators using method B and 38 using method A. The vast majority of small emitters used the Small Emitter Tool (SET) and Eurocontrol ETS Support Facility (ETS SF).

Two issues should be monitored more closely: the frequency of analysis and submission of improvement reports. In 2019, the Competent Authority allowed in 160 cases the operator to use a different frequency of analysis than the required analysis frequency in Annex VII of the MRR, because of unreasonable costs. These represented 44 more cases than in 2018. However, this increase can be explained because one country changed reporting systems and more accurate data could be obtained on the number of installations for which a different frequency of analysis was applied. In practice no significant increase took place. Nevertheless, it is important to continue

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<sup>7</sup> These is based upon point (c) of Article 31(1) of the MRR.

<sup>8</sup> These are constant values in accordance with points (d) or (e) of Article 31(1) of the MRR.

to analyse to what extent countries use the possibility to deviate from the analysis frequencies required by Annex VII because of unreasonable costs.

Compliance in submitting an improvement report according to Article 69 of the MRR has been high from the start of phase 3. However, in 2019 the proportion of required improvement reports and submitted improvement reports decreased for stationary installations from 95% to 83%, and for aviation from 79% to 60%.

## Supervision of the quality of MRV has improved

Verification is an effective means to ensure the quality of monitoring and reporting. The number of outstanding issues in verification reports for stationary installations was 4,330 in 2019, 11 % more issues than reported in 2018. Most of those issues were non-conformities (1,257 in 2019 and 1,180 in 2018), non-compliance issues (912 in 2019 and 763 in 2018) and recommendations of improvement (1,890 in 2019 and 1,678 in 2018). In aviation, 150 outstanding issues were reported by verifiers in 2019, 13.6% more issues than in 2018. Most issues were non-conformities (21 issues in 2019) and recommendations for improvement (94 issues in 2018). This shows on the one hand that verifiers have been monitoring these issues closely, and on the other hand that the quality of reporting by operators can probably be improved.

Article 21 reports show that there are no significant capacity problems in the number of verifiers available for verification. Where a country has a limited number of verifiers, this is usually complemented by foreign verifiers. In 2019, the number of sanctions imposed on verifiers remained low: 7 reductions of scope in 2019, compared to 1 suspension and 6 reductions of scope in 2018.

Additional checks by Competent Authorities on the verified emission reports are effective instruments to improve the quality of reporting and to follow-up on issues identified by verifiers. In 2019, 28 countries checked all reports for consistency and completeness, and 22 countries reviewed all reports against the monitoring plan. In 2018, this was 1 country less. Detailed checks on the emissions reports were carried out by 17 countries, 4 countries more than in 2018. Furthermore, 10 other countries checked a share of emission reports in detail. The level of detail of these checks and the share of emission reports checked in detail varies between countries and is mostly dependent on the resources available in a country and the approaches for reviewing reports. In the aviation sector, in 2019, 25 countries checked all emission and verification reports on completeness and internal consistency, and 18 countries checked the reports in detail. The approaches for checking emission reports and verification reports generally differ between installations and aircraft operators.

A steady growth in the number of inspections illustrates the growing attention to ensure operator compliance. 27 countries carried out spot checks and inspection on installations. The number of inspection visits has varied significantly from year to year, ranging from 258 inspection visits in 2014, to 439 inspections in 2017 and 141 in 2019. One of the reasons for the low number of inspection visits in 2019 could be due to resources focusing on the preparation of allocation of allowances for phase 4. Differences in approaches to inspection between countries were still large, but a growing number of countries either conducted dedicated EU ETS inspections, or included EU ETS specific inspections as part of the inspections under the Industrial Emissions Directive.

The last resort option of imposing sanctions is only used to a limited extent. In 2019, 12 new fines were imposed by 6 countries on stationary installations. The sum of all 2019 fines for stationary installations was about €726,000, which is lower than in the preceding years. In the aviation sector, the number of fines was also smaller. In 2019, 2 countries imposed fines on aircraft

operators, covering 9 varying types of infringement, including operating without an approved monitoring plan, and not submitting an emission report.

## Areas for improvement

Article 21 reports are an important instrument in bringing more transparency on how countries implemented EU ETS requirements. This report shows that the emission trading system is functioning effectively and continues to improve over the years. On some areas, recommendations can be made to improve EU ETS implementation and harmonisation even further:

- > Increased use of IT systems (including the Commission e-reporting tool DECLARE) can support the efficiency of procedures, and ultimately improve the quality of MRV processes
- > It is important to continue to raise countries' awareness of guidance, templates and tools published by the Commission
- > The coordination and information exchange channels are an important element when multiple competent authorities are involved
- > Aviation emissions are still increasing yearly. More action is needed to reduce emissions in the aviation sector
- > Compliance with highest tier approaches need to be closely monitored. The same applies to submission of improvement reports.
- > The high number of installations with low emissions, and the high percentage of installations using just natural gas imply that an increased use of Article 13 of the MRR could be beneficial for EU ETS countries and could reduce the administrative burden of operators and competent authorities.

Updating the Article 21 questionnaire would be useful to improve interpretation of country level responses, conduct more in-depth analyses for the technical report, and improve the overall quality of the reporting on the application of the EU ETS Directive. Improvement is in particular needed for questions that can cover multiple years such as conservative estimates and imposition of penalties. Further improvements can be reached in the consistency of countries' interpretations in questions on biomass, improvement reports, outstanding issues reported in the verification report, simplified monitoring approaches, default values, and fuel consumption and emissions, as these questions were not always completed consistently. An update of the Article 21 questionnaire is planned in the coming months, in order to accommodate new requirements in phase 4 and to provide clarification or streamlining where relevant.

# 1 Introduction

## 1.1 The European Union Emissions Trading System

The European Union Emissions Trading System (EU ETS) is a cap-and-trade system for greenhouse gas (GHG) emissions that aims to reduce GHG emissions in a cost-effective way. The system is applicable to stationary installations that produce activities listed in Annex I of the EU ETS Directive and aircraft operators administered by EU ETS countries. The cap in the EU ETS on the total amount of carbon oxide (CO<sub>2</sub>) and other GHG<sup>9</sup> decreases annually in a linear fashion and creates scarcity in the market where companies can trade in emission allowances. Each emission allowance is the equivalent of 1 tonne 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). Each year operators and aircraft operators have to submit a verified emission report to the Competent Authority (CA) and before the 1st of May they have to surrender sufficient allowances to cover the verified emissions. Otherwise, the CA can take enforcement action and impose penalties. Until that time the operator and aircraft operators can decide to reduce emissions and sell or save the surplus of emission allowances. In the case of a shortage the operator or aircraft operators will have to buy emission allowances to meet their surrender obligations.

## 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) and has had 3 trading periods: phase 1 (2005-2007), phase 2 (2008-2012) and phase 3 (2013-2020). Phase 4 started in January 2021 and will run to 2030. During these trading periods the system has evolved: MRV requirements were strengthened, allocation procedures were harmonised, there was a progressive shift towards auctioning of allowances instead of free allocation of allowances and the scope was extended. The Monitoring and Reporting Regulation<sup>10</sup> and the Accreditation and Verification Regulation<sup>11</sup> were adopted in 2011 and subsequently updated in 2018.<sup>12</sup>

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<sup>9</sup> Nitrous oxide (N<sub>2</sub>O) and perfluorocarbons (PFCs), but also other GHGs under Annex II of the EU ETS Directive.

<sup>10</sup> Commission Regulation (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council, OJ EU, 12 July 2012, L181/30.

<sup>11</sup> Commission Regulation (EU) No 600/2012 of 21 June 2012 on the verification of greenhouse gas emissions reports and tonne-kilometre reports and the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council, OJ EU, L 181/1.

<sup>12</sup> Commission Implementing Regulation (EU) 2018/2067 of 19 December 2018 on the verification of data and on the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council, OJ 31 December 2018, L 334/94. In 2020 it was revised for phase 4.

In 2018 the EU ETS was further strengthened, following the formulation of the 2030 climate and energy framework<sup>13</sup> and its adoption by the European Council in 2014.<sup>14</sup> The revised EU ETS Directive<sup>15</sup> 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%). The revised Directive also amended the market stability reserve (MSR) that was adopted in 2015 to make the EU ETS more resilient to supply-demand imbalances.<sup>16</sup> The MSR started operating in January 2019.

On 1 January 2012 aviation was included in the EU ETS.<sup>17</sup> At that time the scope covered all flights departing and/or arriving at airports within the EU which meant that flights from third country aircraft operators to and from the EU were included as well. To support the development of a global measure by the International Civil Aviation Organisation (ICAO) to reduce aviation emissions, the scope of EU ETS aviation was temporarily limited to intra EEA flights. Once the Resolution on Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) was adopted in 2016, the EU ETS Directive was amended in 2017 to maintain the limited intra EEA scope until 2023.<sup>18</sup> Furthermore an agreement<sup>19</sup> for linking the Swiss and EU emission trading systems was reached in 2017 which was ratified in December 2019.<sup>20</sup>

The proposal to raise the EU's ambition on reducing GHG emissions to at least 55% below 1990 levels by 2030 implements the commitment made in the European Green Deal<sup>21</sup> and are included in the 2030 Climate Target Plan.<sup>22</sup> The EU ETS will play an important role in meeting the 2050 goals and the commitments under the Paris agreement. Revisions in the EU ETS Directive are foreseen by June 2021. One of the considerations for amending the EU ETS Directive will be the extension of EU ETS to the building, road transport and maritime sector.

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

The Article 21 reports give participants and observers a good overview of how countries implemented the requirements in the EU ETS Directive, in particular the rules on MRVA and inspection and enforcement. In addition, the reports support the Commission in assessing the effective and consistent implementation of EU ETS across countries. It allows the Commission to

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<sup>13</sup> 2030 Climate and Energy Framework, COM/2014/015.

<sup>14</sup> EUCO 169/14.

<sup>15</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

<sup>16</sup> Decision 2015/1814

<sup>17</sup> The aviation sector was included by Directive 2008/101/EC.

<sup>18</sup> Regulation (EU) 2017/2392 of the European Parliament and Council of 13 December 2017 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, OJ of 29 December 2017, L 350/7

<sup>19</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>20</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A22017A1207%2801%29>

<sup>21</sup> [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

<sup>22</sup> [https://ec.europa.eu/clima/policies/eu-climate-action/2030\\_ctp\\_en](https://ec.europa.eu/clima/policies/eu-climate-action/2030_ctp_en)

understand whether the installations and aircraft operators are treated fairly and equally across the EU. This avoids distortions in the carbon market and creates a level playing field.

According to Article 21(1) of the EU ETS Directive each EU ETS implementing country has to submit an annual report to the European Commission on how the EU ETS Directive and underlying regulations have been implemented in the countries. The reports are based on a questionnaire that is set out in Commission Implementing Decision 2014/166/EU.<sup>23</sup> The Article 21 questionnaire was specifically updated for use in phase 3 of the EU ETS. Furthermore, an electronic reporting system (hosted by the EEA<sup>24</sup>) was introduced, which translates the questionnaire into a web-based form.<sup>25</sup> The Commission provided an explanatory note<sup>26</sup> to aid better understanding of the background and interpretation of questions. Following the submission of Article 21 country reports, the Commission has to compile a technical report according to Article 21 (2) of the EU ETS Directive. In the past the European Environment Agency (EEA) drafted these technical reports.<sup>27</sup> Since 2017 the Commission is fulfilling the requirement with support from consultants. In 2020 the Commission commissioned COWI and SQ Consult B.V. to analyse the national responses to Article 21 of the EU ETS Directive submitted in 2020 and to draw up the current technical report on implementation of EU ETS across the implementing countries.

This report covers submissions for the reporting year 2019 by the 31 countries that participate in the EU ETS.<sup>28</sup> 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 phase 3, the “Carbon Market Reports” (CMRs)<sup>29</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 EU ETS countries to increase their wider understanding of the European carbon market and, where needed, learn lessons on specific implementation choices in other EU ETS implementing countries.

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<sup>23</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>24</sup> All Article 21 reports are available from <http://rod.eionet.europa.eu/obligations/556/deliveries>

<sup>25</sup> With an XML file generator for transparent long-term data storage.

<sup>26</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>27</sup> Such reports exist for phase 1 of the EU ETS as well as for phase 3 (country reporting years 2014 to 2016). During phase 2 the Article 21 questionnaire was not adjusted to the new requirements of the MRG 2007, and consequently Article 21 in general received little attention.

<sup>28</sup> In 2019 the UK was still part of the EU and is included in the assessment of the 2019 Article 21 reports.

<sup>29</sup> All Carbon Market Reports: [https://ec.europa.eu/clima/policies/ets\\_en#Carbon](https://ec.europa.eu/clima/policies/ets_en#Carbon)

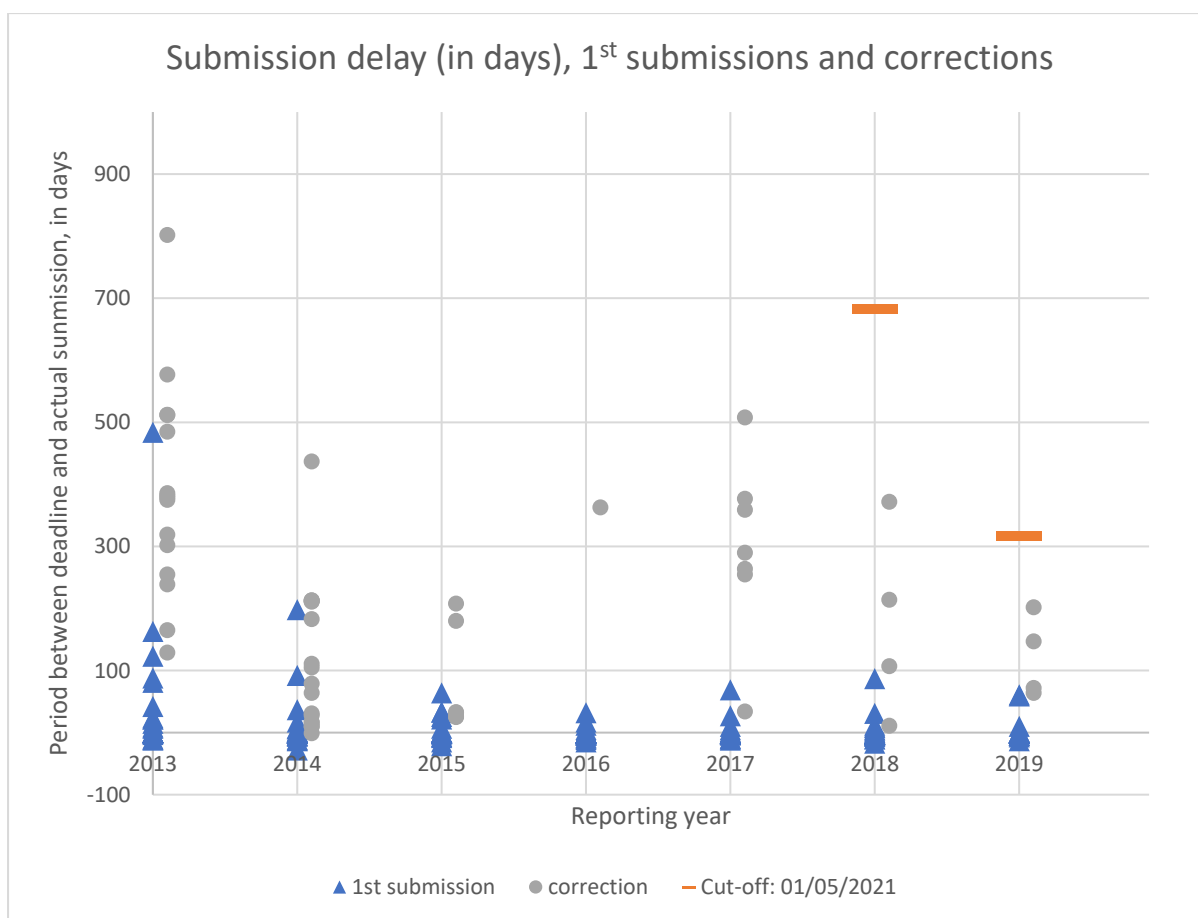


## 2 National Article 21 reporting

The EU ETS Directive requires countries to submit their Article 21 reports by 30 June of the subsequent year. This year, for the reports covering 2019 data, 27 of the 31 countries delivered their report on time. All 4 remaining countries submitted their reports by 31 August 2020. The overall improvement of submission timeliness since the start of phase 3 of the EU ETS is shown in Figure 1.3-1.

In each year since 2013, the majority of countries submitted on time, and Figure 1.3-1 shows that since 2015 the remaining countries submit within 100 days of the deadline. The reporting year 2019 is the year with both the highest number of countries that submitted by the deadline and the year with the shortest delay of the last country to submit: 61 days. This further increase in already good timeliness was achieved despite the fact that the first wave of the COVID-19 pandemic peaked shortly before the delivery deadline and the preparations for the allocation of emissions allowances for phase 4 made 2019 and 2020 increase the workload for EU ETS CAs significantly compared to earlier years.

Figure 1.3-1 also shows that both the number and submission delay of corrections were significantly higher in the first 2 years of phase 3 (15 and 17 resubmissions). Since 2015 the number of corrections has ranged between 1 and 7 per year only. There were 4 so far for the 2019 reporting year, further corrections for this latest or for earlier years may be received in the future. At least a part of the corrections was triggered by bilateral discussions between the countries and the authors of the technical reports, in which the correctness and interpretation of the submitted Article 21 data to the questions were discussed. Therefore, the observed increase in corrections should be seen as a progressive improvement of data quality of the Article 21 submissions.



*Figure 1.3-1 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 from 2013 – 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 1 March 2021 and all corrections made by this date have been taken into account in this report,<sup>30</sup> this cut-off date has been indicated in the figure as orange lines. If any future corrections were to be submitted and added to this chart, these would be shown above the orange lines.*

The completeness of country Article 21 reports have improved significantly compared to the first years of phase 3. In the 2019 Article 21 reports only a few questions were not completely filled in but in those cases countries indicated a specific reason for not completing the question (e.g., there are no changes or additions compared to last year, question not applicable because no biomass is used, etc.). Discussions with country experts have helped improve the completeness of the reports.

<sup>30</sup> If there were any corrections to 2013-2019 Article 21 responses with a delivery date after 1 March 2021 on the [EEA website](#), these were not taken into account in this report, but will be processed in next year's technical report.

## 3 Country information on EU ETS implementation

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

The EU ETS distinguishes 4 types of players, each with its own role and responsibility. These are the operators, the verifiers, the Competent Authorities and the National Accreditation Bodies. Competent Authorities are designated by an EU ETS implementing country according to Article 18 of the EU ETS Directive for the implementation of the rules of the EU ETS Directive. The legal basis for accreditation is defined in Article 15 of the EU ETS Directive and the National Accreditation Bodies (NABs) are established under Accreditation Regulation 765/2008. The NABs are members of the European Cooperation for Accreditation.

The organisation of Competent Authorities varies across countries and choices to this end strongly depend on the legal and administrative set-up in each country.

The degree of centralisation also varies between countries, ranging from highly centralised systems to regionally organised systems and including different choices to split responsibilities among different authorities. Denmark, Ireland, Iceland, Liechtenstein and Germany<sup>31</sup> currently have implemented a highly centralised system in which 1 CA deals with all activities related to EU ETS: the allocation of emission allowances, auctioning, policy making, the wide range of MRV activities<sup>32</sup> as well as inspection and enforcement. For aviation such a centralised system is in place for Denmark, Estonia, Finland, Germany, Ireland, Iceland and Spain. More countries have centralised the organisations of the CA for aviation.

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

Germany has assigned the responsibility for permitting to local and regional authorities while 1 centralised CA has the responsibility for approving the monitoring plans, for dealing with changes to the monitoring plan, reviewing emission reports and approving improvement reports. In Lithuania, Czechia 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 established 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. In most of these countries the choice for decentralisation of MRV activities is 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. Whereas each of these ten countries have a decentralised system, the specific choice for decentralisation differs. Table 3.1-1 below shows how many local or regional authorities are involved for those countries and their MRV responsibilities.

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<sup>31</sup> Although permitting is carried out by regional authorities.

<sup>32</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.

*Table 3.1-1 Decentral competent authorities and their MRV responsibilities*

<b>Country</b>	<b>Number of local or regional CA</b>	<b>MRV responsibilities</b>
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
Slovakia	50 regional authorities	All MRV activities
Spain	19 regional authorities	All MRV activities
UK	5 regional authorities	All MRV activities

A total of 9 countries has chosen to assign different CAs for MRV activities for installations than for aviation. These countries are Austria, Spain, Finland, France, Greece, Latvia, Poland, Portugal and Slovakia. Such choices are often decided on the basis of administrative or political reasons. For example, in some countries the administration of activities related to air transport is assigned to the Ministry of Transport or to an air traffic organisation, which led these countries to also assign the EU ETS MRV activities to that organisation.

Article 54(1) of the Accreditation and Verification Regulation (AVR) requires that accreditation of verifiers is carried out by a National Accreditation Body established pursuant to Accreditation Regulation 765/2008. Most countries have implemented this article by appointing 1 National Accreditation Body (NAB). 2 countries - Cyprus and Liechtenstein - do not have a NAB and 5 further countries - Malta, Iceland, Ireland, Luxembourg and Lithuania – do have an NAB but this NAB does not carry out accreditation of ETS verifiers. All these countries decided to use foreign accredited verifiers for the verification of emission reports instead of using services of a NAB in another country in accordance with Article 56 of the AVR.

## 3.2 Impact of national level EU ETS organisation on coordination and cooperation between authorities

### 3.2.1 Coordination between multiple Competent Authorities

Countries that have chosen to assign responsibilities to multiple Competent Authorities, are required to coordinate the work of those authorities, in line with Article 10 of the MRR. Such coordination of course is vital to ensure consistency of approach between CAs and for information exchange. The EU ETS countries use different approaches to organising such coordination, including formal and informal approaches. The type of coordination largely depends on the legal and political system, the extent of decentralisation and the number of Competent Authorities involved. The coordination measures reported in relation to 2019 changed only slightly compared to those reported for the 2013-2018 period. It should be noted that the data reported under Article 21 do not enable an assessment of the effectiveness of the coordination and cooperation.

Countries that have appointed 1 single CA for assessing monitoring plans, reviewing emission reports and approving improvement reports and that have appointed a different authority for permitting or inspection and enforcement benefit from good information exchange channels between these authorities. Some countries facilitate such information exchange by a requirement in the national legislation to exchange information between authorities in the form of reports or other documentation. Countries that have chosen such approach include Bulgaria, Czechia 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.

When countries have decided to involve multiple Competent Authorities in tasks such as assessing monitoring plans, dealing with updates of the monitoring plans, reviewing emission reports or approving improvement reports, a central CA is required to facilitate coordination, including providing (binding) instructions on monitoring plans and emission reports and central review of the work. Such centralised coordination enables the CA to have a clear view of the quality of assessments made by the local authorities. This promotes harmonisation across regions and ensures that similar companies within a country are treated equally. Latvia, Poland, the United Kingdom and Spain have implemented such centralised procedures, be it with differences in approaches between countries. The Polish 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. The UK and Spain have developed general guidelines which regional authorities are required to follow. In addition, binding instructions can be provided on the evaluation of monitoring plans.

Other countries follow less formalised processes for coordinating between multiple CAs that are involved in assessment of monitoring plans, emission reports and improvement reports. For example, the central authority in France and Slovakia has formulated guidelines for local authorities, but usage of these guidelines is not mandatory. Other countries including Austria have established a dedicated helpdesk to support local authorities in their interpretations. Nearly all countries that have multiple local or regional authorities organise structural working groups and meetings between authorities. Austria and Slovakia are the exception to this rule as both countries hold such meetings on an ad hoc basis and rely on other coordination measures such as training or helpdesks. Structural and common trainings for local or regional authorities were organised by

Austria, France, Latvia, Portugal<sup>33</sup> and the UK, though the type and frequency of training differs between countries.

Popular coordination measures in countries that have 1 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>34</sup> and coordination groups.<sup>35</sup> Unlike in some of the previous years, Poland did not organise workshops in 2019 and Portugal organised trainings in preparation for phase 4.

### 3.2.2 Coordination between CA and NAB

Effective cooperation and information exchange can enable appropriate oversight on the quality of verification as well as on the overall EU ETS implementation. The AVR includes several formal information exchange reports to be submitted: 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. In addition, Article 70 of the AVR requires the countries to establish an effective exchange of information and cooperation between the NAB and the CA in their country.

Of the 25 countries of the countries that have established a NAB for the accreditation of ETS verifiers, 13<sup>36</sup> have set-up a working group where the CA and verifiers discuss accreditation and verification issues. Usually, the NAB is present at the working group meetings. In some countries these working groups convene on an annual or bi-annual basis, whereas in other countries these working groups meetings are organised more frequently. The majority of those countries has organised meetings with the NAB and verifiers<sup>37</sup> since 2013 and 4 countries started in the following 2 years.<sup>38</sup> Since 2019 Hungary also started organising such meetings.

The most common coordination measures are regular meetings between the NAB and the CA responsible for coordination (18 countries)<sup>39</sup> as well as the possibility to accompany the NAB delivering accreditation activities as an observer (24 countries).<sup>40</sup> The list of 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

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<sup>33</sup> Portugal did not organise trainings in previous years but has done so in 2019 in preparation for phase 4.

<sup>34</sup> Belgium, Bulgaria, Denmark, Croatia, Germany, Greece, Lithuania, Netherlands, Portugal and Sweden.

<sup>35</sup> Bulgaria, Croatia, Denmark, France, Greece, Netherlands, Portugal and since 2018 Sweden.

<sup>36</sup> Bulgaria, Croatia, Czechia, Denmark, France, Germany, Hungary (since 2019), Netherlands, Portugal, Romania, Slovakia, Spain, United Kingdom

<sup>37</sup> Croatia, Czechia, Germany, Portugal, Romania, Slovakia, Spain, United Kingdom.

<sup>38</sup> Bulgaria, Denmark, France, Netherlands.

<sup>39</sup> Austria (since 2016), Belgium, Germany, Denmark, Spain, Finland, France, Croatia, Ireland, Malta, the Netherlands, Norway, Portugal (since 2015), Romania, Sweden, Slovenia, Slovakia and the United Kingdom. Czechia and Estonia reported irregular meetings

<sup>40</sup> Austria, Belgium, Czechia, Germany, Denmark, Estonia, Spain, Finland, France (since 2016), Croatia, Hungary, Ireland, Lithuania, Latvia, Malta, Norway, Poland (since 2016), Portugal, Romania, Sweden, Slovenia, Slovakia and the United Kingdom. This includes Greece. However, in 2016 they did not carry out such activities because of a conflict of interest.

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.

Following the requirements in chapter 6 of the AVR the countries that have no NAB or no NAB accrediting EU ETS verifiers, carry out information exchange across borders, between the CA of those countries and the NAB that accredited the verifiers carrying out verification in those countries. 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 an information exchange report to the NAB with issues identified as a result of 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 EU ETS country level organisation on other steps of the compliance chain

The way of organisation of the Competent Authorities and the relevant accreditation system can impact choices on the set-up of steps in the compliance chain. Often there is a link between competences of CAs required by the EU ETS and the Industrial Emissions Directive (IED), specifically when it comes to knowledge of the specific installations. Several countries have thus decided to include the ETS permit as part of the IED permit. This is the case in some cases in Austria,<sup>41</sup> Belgium, France, Germany, Lithuania<sup>42</sup> and Portugal. France for this matter has decided to appoint the IED authorities as the responsible authorities for the assessment of monitoring plans and emission reports.<sup>43</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>44</sup> Some countries have dedicated inspectorates separate from the permitting authorities. These may carry out ETS inspections together or separate from IED inspections.

Harmonising approaches between local authorities can be challenging and central authorities in some instances have concluded that more control on the quality of the compliance processes is needed. For that reason, more countries have over time made changes in the organisation of the Competent Authorities. Such transfer of responsibilities from regional authorities to the central authority led to the development of new procedures on the approval of monitoring plans, review of emission reports and approval of improvement reports.

When responsibilities for MRV and inspection lie with different authorities, information sharing between these authorities is required so that results of inspections are passed on to the authorities that are responsible for approving MPs and improvement reports, and for assessing emission reports. These authorities can then take further action, e.g., by imposing sanctions or re-

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<sup>41</sup> In Austria the ETS permit could be part of the IED permit or other permits (where the IED or other permitting procedures and ETS permitting procedures are in parallel). However, this differs per region.

<sup>42</sup> For combustion installations the Integrated Pollution Prevention and Control permit only combines IED and ETS permits if the installation is more than 50 MW.

<sup>43</sup> For France the local authorities are involved in the approval of monitoring plans, the review of emission and verification reports and inspection.

<sup>44</sup> Belgium, France, Latvia, Lithuania, Slovakia.

assessing/updating MPs. 11 EU ETS countries<sup>45</sup> report use of structured inspection reports to inform other authorities. Other countries reports use less structured mechanisms.

The type of and level of decentralisation does not seem to be a key influencing factor on the share of emission reports being checked or on the number of inspections carried out. Information provided in the Article 21 reports shows that the share of reports being checked in detail varies across countries, regardless of whether they have assigned responsibilities to multiple authorities or to 1 central CA. Factors that do influence the share of reports being checked or the number of inspections include available resources within the CA, the number of installations and how the review of the emission reports and inspection approach is set-up. No conclusions can be drawn from the Article 21 reports on the quality of the checks and of inspections nor on the impact that decentralisation has on the quality of the system overall. Other sources indicate that the overall quality of inspection has increased over the years.<sup>46</sup>

## 3.4 Scope of EU ETS

### 3.4.1 Number of installations reported

Article 19 of the MRR 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</sub> (eq) (installations with emissions below 25,000 tonnes of CO<sub>2</sub> (eq), 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</sub> (eq)
- > Category C includes installations with emissions higher than 500,000 tonnes of CO<sub>2</sub> (eq).

The total number of installations included in the EU ETS has consistently decreased over the years, as is illustrated in the table below. Also, in 2019 the small annual decrease continued: a total of 10,569 installations were reported, which is a 0.4% decrease from the number of installations in 2018.

*Table 3.4-1 Annual change in number of installations compared to the number reported in the previous year*

Evolution	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Evolution of number of installations	-3.7%	-2.2%	-1.4%	-0.9%	-0.7%	-0.4%

The relative shares of category A, B and C installations is quite stable over time. In 2019 72% of installations are classified as category A including a subset of 57% installations with low emissions, 21% as category B, 7% as category C.

<sup>45</sup> Results of 5th Compliance Cycle Evaluation of EU ETS MRVA implementation, Technical report, 2020.

<sup>46</sup> Section 4.10.1 Results of 5th Compliance Cycle Evaluation of EU ETS MRVA implementation, Technical report, 2020.



Figure 3.4 1 and Figure 3.4 2 show the number of installations per category across countries, and the overall changes in the number of installations included in the EU ETS since 2013.

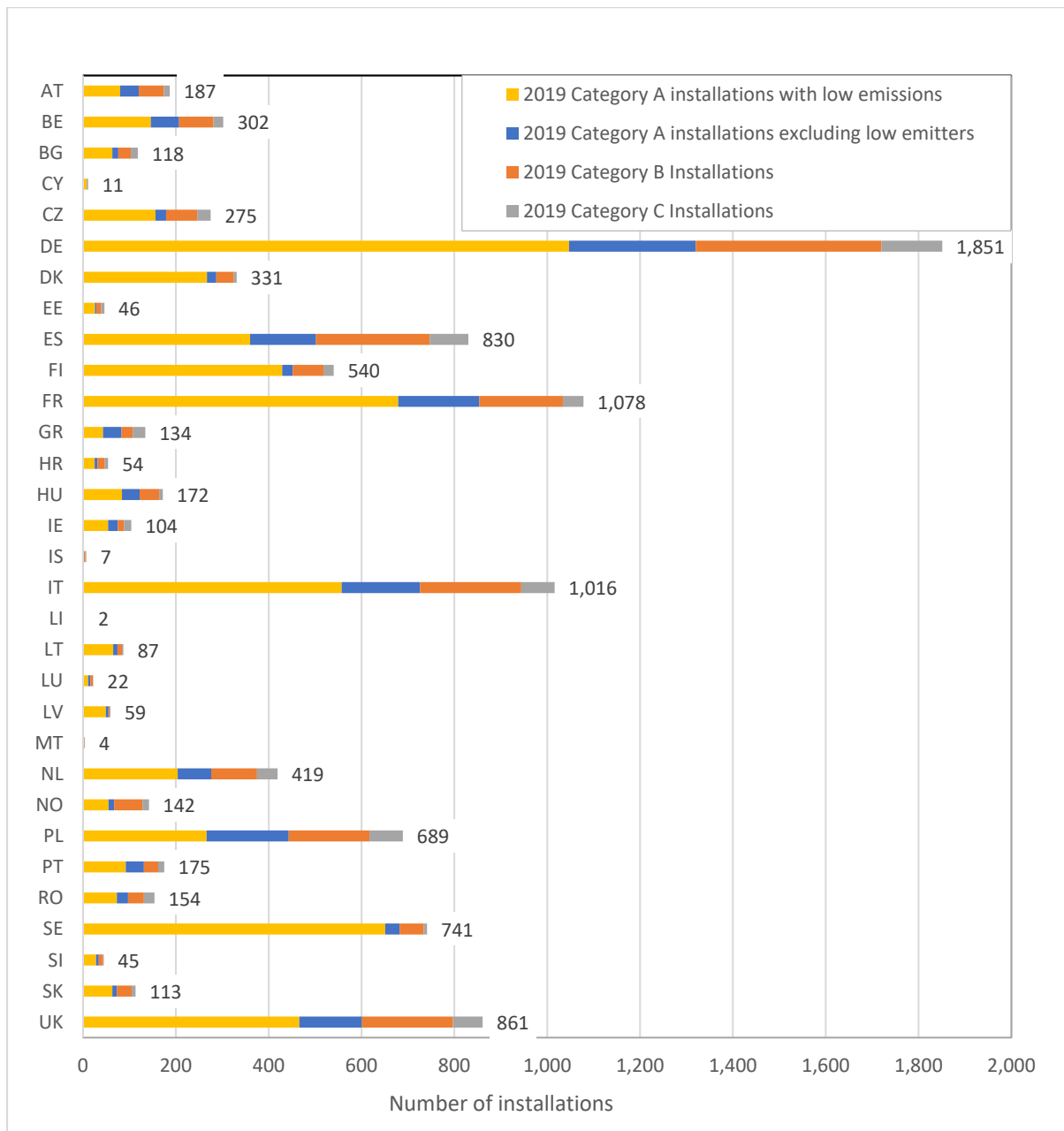


Figure 3.4-1 Number of installations per emission category in 2019 per country. The country codes used are defined in the section 'Country codes' in the Annex.

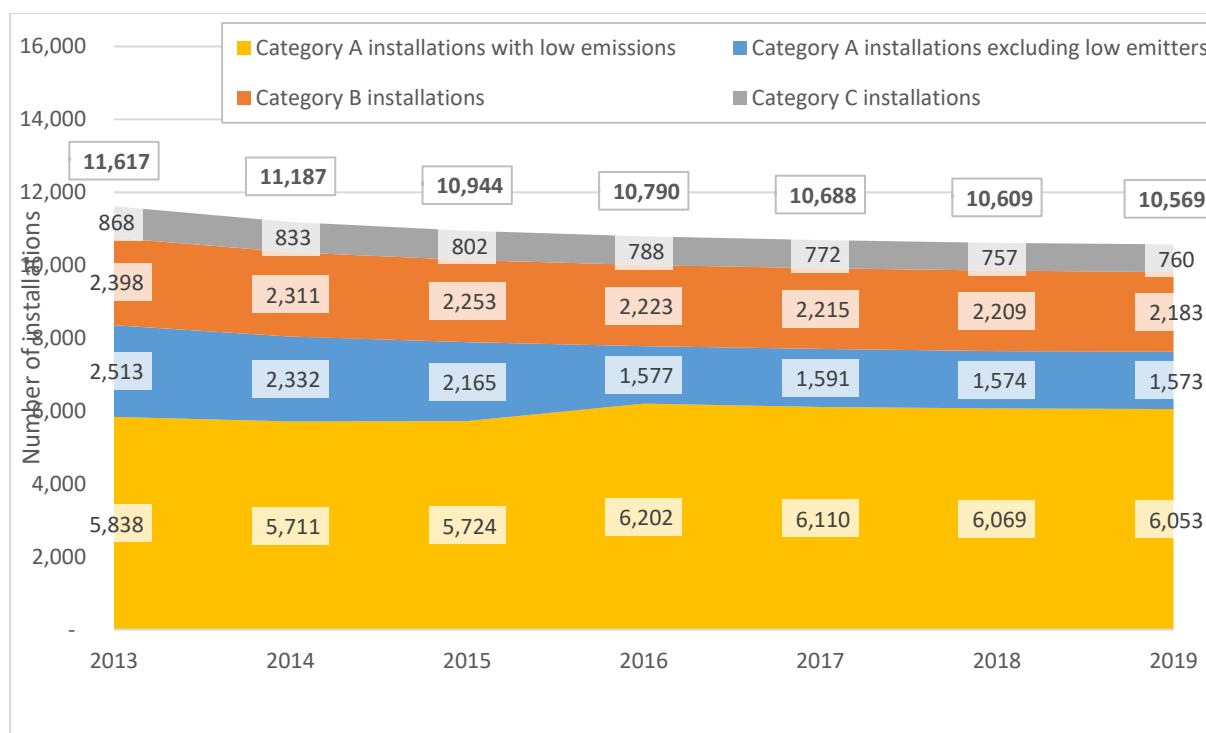
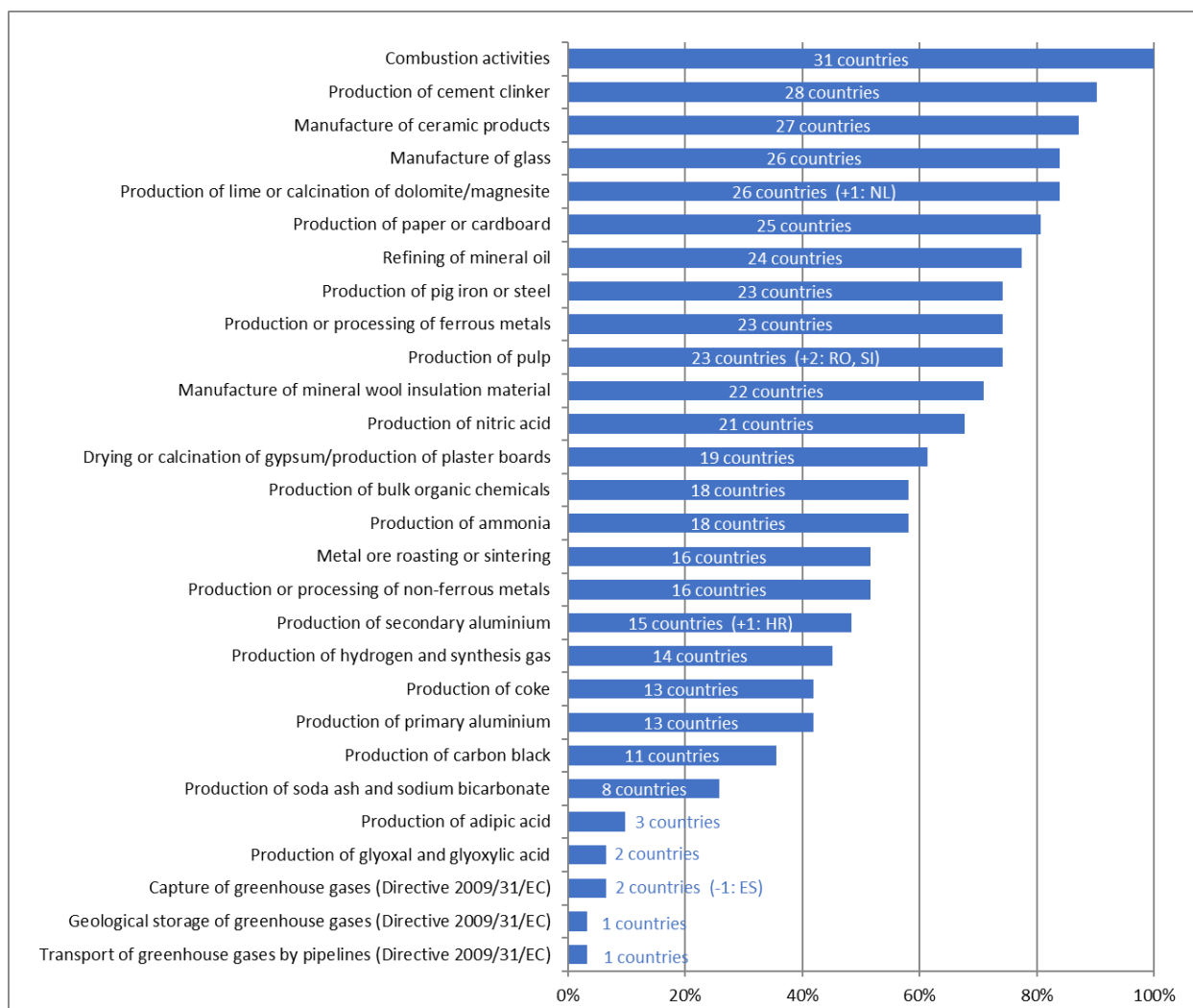


Figure 3.4-2 Evolution of number of EU ETS installations from 2013 to 2019

### 3.4.2 Evolution of number of sectors and sector emissions per country

Annex I of the EU ETS Directive lists the industrial activities that are covered by the system, also referred to as EU ETS sectors. Countries indicate every year in their Article 21 submissions for which activities one or more permits have been granted in their country. An installation may have multiple activities as defined in Annex I of the EU ETS Directive but lists the main activity first.

Figure 3.4-3 provides an overview of the number of countries in which permits have been issued for each of the Annex I activities. It also indicates how this has evolved compared to 2018: the parentheses in the bars indicate when additional countries have issued permits for that sector and if so which ones; and similarly the number and names of countries that no longer issued permits for a sector (when no indication is given, then the number of countries is the same as in 2018). As expected, few changes in sectors per country occurred in 2019 compared to the previous year: only 4 new sectors were introduced in total across the EU, and 1 sector in total is no longer included in 1 country (Spain).



**Figure 3.4-3** Number of countries that have issued one or more permits for each of the Annex I activities by 2019 in EU ETS, and share of total numbers that this represents.

The length of the bars represents the number of countries that issued permit(s) expressed as percentage of the total number of EU ETS implementing countries, the numbers on the bars indicate the number of countries, and in parentheses the changes in these numbers compared to 2018 (e.g. 2 additional countries issued one or more permits in 2019 for Annex I activity "Production of pulp"), and the countries in which this change took place.

When assigning each installation to the sector that describes its main activity, an indication of the average emissions per main activity can be obtained. The resulting estimates show that the highest average emissions per installation are in the sectors refining of mineral oil (sector 21) and in production of ammonia (sector 41). Other sectors with relatively high average emissions per installation are production of coke (sector 22), pig iron and steel (sector 24) and the production of cement clinker (sector 29) (see Figure 3.4-3). Data from EUTL<sup>47</sup> shows that the number of installations is the highest for combustion activities, ceramics, paper, glass and bulk organic chemicals. This confirms that the highest emissions are in the most energy intensive industries.

<sup>47</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](#).

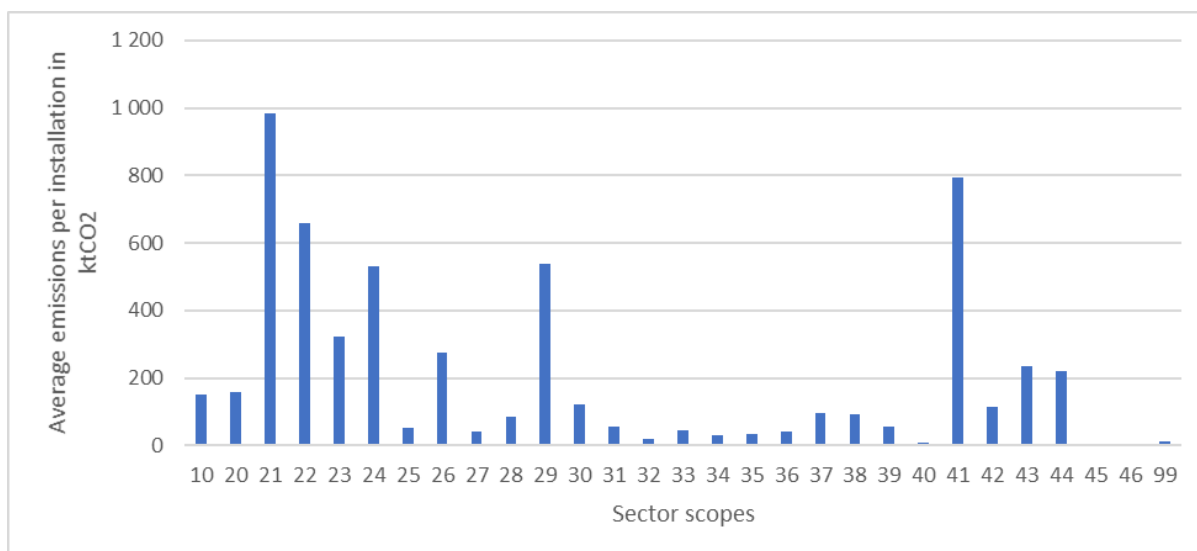


Figure 3.4-4 Average emissions per installation across sector scopes, based on the main activity. The activity codes used are listed in the section 'EU ETS activity codes' in the Annex.

### 3.4.3 Excluded installations

Article 27 of the EU ETS Directive 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. If installations are excluded from the EU ETS, then equivalent measures for achieving emission reductions must apply to these installations. As in previous years,<sup>48</sup> 7 countries used the option for exclusion under Article 27 during 2019: Croatia, France, Iceland, Italy, Slovenia, Spain and the United Kingdom.

Table 3.4 2 presents the amount of emissions that are excluded for each of the 3 countries that excluded the largest amounts, and provides an indication of the amount of emissions excluded for the other 4 countries together. The amounts are compared to the total emissions of each country.<sup>49</sup> The table also provides the values summed up for all EU ETS countries. The total amount of emissions excluded from the EU ETS has decreased by 3.4% compared to 2018,<sup>50</sup> but the share that it represents compared to the total emissions has increased a bit (the share was 0.25% in 2018).

<sup>48</sup> This is expected, since as such an exclusion can only take place at the beginning of an EU-ETS phase.

<sup>49</sup> Total annual emissions based on data reported in the operator's emissions reports for the reporting year.

<sup>50</sup> This is an estimate based on the declared total emissions in answer to question 5.6.

Table 3.4-2 Emissions in 2019 from installations excluded from EU ETS under Article 27

Countries	Italy	United Kingdom	Spain	Other countries	All EU ETS countries
Amount of excluded emissions in kt CO <sub>2</sub> (eq)	1,007	1,978	644	< 150 each	3,807
Share of total emissions of the country	0.78%	1.85%	0.76%	Up to 2.7%	0.35%

Figure 3.4-5 provides a graphical overview of the emissions that are excluded under Article 27, per country and per sector. This illustrates that emissions are most often excluded in combustion activities (2,102 kt CO<sub>2</sub> (eq) excluded, spread over 7 countries), and manufacture of ceramic products (1,252 kt CO<sub>2</sub> (eq), and that this is mainly in Italy, UK and Spain, with smaller quantities in Slovenia and Croatia, as in 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 20MW threshold.

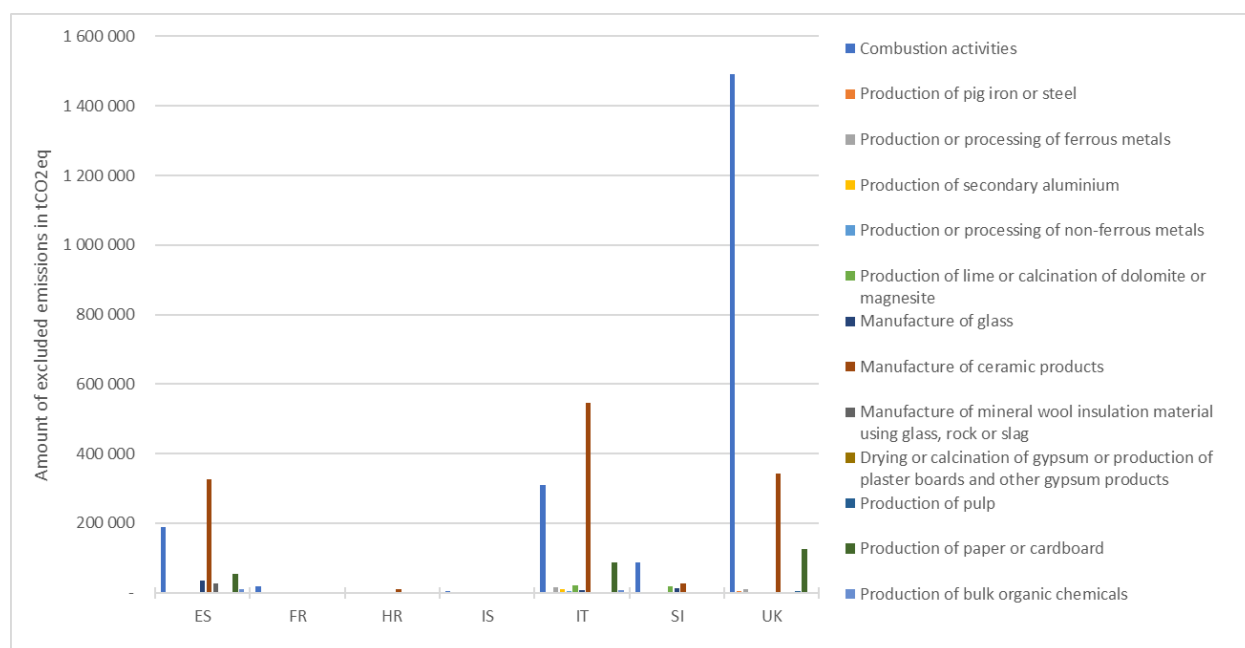


Figure 3.4-5 Amount of emissions (in t CO<sub>2</sub> (eq)) excluded under Article 27 in 2019, split per activity as listed in Annex I of the EU ETS Directive

### 3.4.4 Aircraft operators

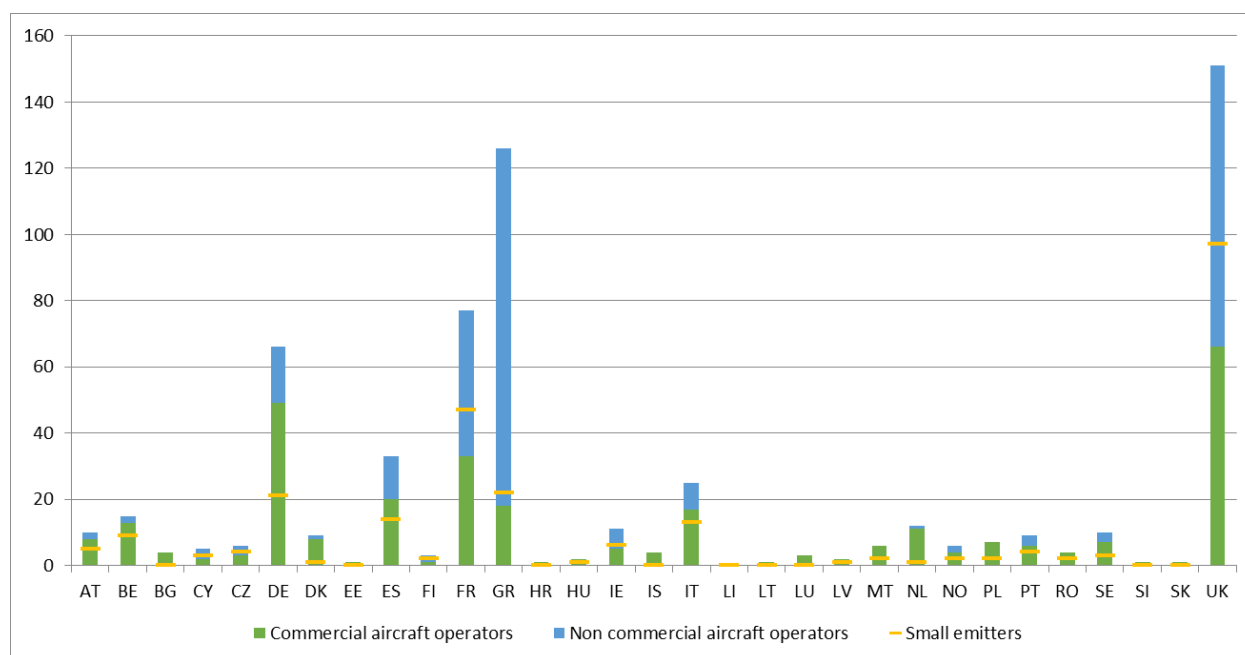
Each year countries report on the number of aircraft operators carrying out activities in their country, distinguishing between commercial and non-commercial ones. The reporting includes indication of which of these operators are small emitters, which is defined as air transport operators whose flights, in aggregate, emit less than 25,000 t CO<sub>2</sub> /year (full scope), or which operated fewer than 243 flights per period for 3 consecutive 4-month periods.

Figure 3.4-6 illustrates the number of aircraft operators in 2019, per country and per type of operator. The total number of aircraft operators remained fairly constant compared to 2018. This is illustrated in the following table, which presents the number of aircraft operators per type in the 4 countries with the highest number of operators.

*Table 3.4-3 2018 and 2019 number of aircraft operators per type in the 4 countries with the highest number of operators*

Country			United Kingdom	Greece	France	Germany
Number of aircraft operators	Total in 2018		142	122	86	71
	2019	Total	151	126	77	66
		Commercial	66	18	33	49
		Non-commercial	85	108	44	17

Across all countries, more than 40% of the 611 operators are small emitters (262 operators, i.e., 42.9% of all operators). Little over half of the operators are operating for commercial purposes (50.4%, 308 operators), and the smaller half concerns non-commercial operators (49.6%, 303 operators). The share of non-commercial operators decreased in the period 2014-2016, from 48% to 41%, but increased in the years thereafter to 49% in 2018 and 50% in 2019. In parallel, the share of small emitters has seen a relative decrease, as can be seen in Figure 3.4-7. These changes seem to be directly linked to the evolution of the number of non-commercial operators reported by Greece, which has increased considerably in 2018.



*Figure 3.4-6 Number of aircraft operators in 2019 per country and per type*

Aircraft operators are obliged to submit a monitoring plan to the CA of the administering country when they are performing aviation activities covered by the EU ETS for the first time.<sup>51</sup> In case monitoring plans were not submitted the operators are not included in the data presented in the above figure. In 2019, a total of 13 countries indicated that additional aircraft operators for which they are responsible as the administering country should have submitted a monitoring plan, and should have complied with other requirements under Directive 2003/87/EC. This number of countries with lacking monitoring plans from airline operators has fluctuated somewhat over the years but now is back at the level from the start of Phase 3 (there were 14 in 2013, and this number has been between 9 and 11 since then). The estimated number of additional aircraft operators that should have submitted a monitoring plan is 42 for 2019 (a value which has been oscillating between 34 and 62 since 2014, with an average at 45).



Figure 3.4-7 Evolution of the share of aircraft operators per type since 2014.<sup>52</sup>

### 3.5 Verifiers

Verifiers, also called verification bodies, are responsible for verification of the operator's emission reports and therewith an important element in the EU ETS compliance chain. In a verification, the verifier checks the implementation of the monitoring plan and whether the emission report is free

<sup>51</sup> According to Article 18a EU ETS Directive each aircraft operator is assigned to 1 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.

<sup>52</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.

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. The AVR requires the verifier to be a legal body or legal person accredited by a NAB. Article 54(2) of the AVR also allows EU ETS countries to certify verifiers that are natural persons, if they comply with the relevant AVR requirements. Since 2015 no such natural person verifiers have been certified.

The 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 AVR requirements apply to all EU ETS verifiers, irrespective of where they are based.

The emission reports of operators from those countries where there is no NAB or no NAB that is active in EU ETS accreditation are verified by “foreign verifiers”, i.e., verifiers accredited by a NAB in another EU ETS implementing country.<sup>53</sup> 24 countries have at least 1 verifier accredited by their NAB. In 17 of those countries, verifiers accredited in other countries (foreign verifiers) are carrying out verification. The other 7 countries (Austria, Finland, France, Greece, Italy, Latvia and Slovenia) only have national verifiers that are accredited by their own NAB and that are verifying installation’s emission reports in their country. For aviation, Czechia, Greece, Latvia, Romania and Slovenia have only national verifiers.

Figure 3.5-1 and Figure 3.5 2 respectively show the number of verifiers by scope and by country. 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>54</sup> show that in some countries such as Slovenia<sup>55</sup> and Bulgaria<sup>56</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.

In 2019; the highest coverage of verifiers was reported for scope 1 (combustion) followed by scope 6 (production of cement clinker), scope 7 (manufacture of glass), scope 4 (metal ore), scope 8 (ceramics) and scope 3 (coke ovens). These numbers correlate well with the high number of installations carrying out these activities. A high number of accredited verifiers was also reported for scope 98.<sup>57</sup> For the allocation for phase 4 verified baseline data reports had to be submitted by May or June 2019. Following the allocation of allowances operators have to submit annual activity level reports to identify whether allowances have to be adjusted. As both the baseline data report and the annual activity level report have to be verified by verifiers that are accredited against scope 98 and the sector specific scope, the number of accreditations against scope 98 increased compared to earlier years. The lowest numbers were observed for scope 11 (geological storage of greenhouse gases), scope 99 (installations opted in the EU ETS scheme) and scope 10 (capture and transport of greenhouse gases). This is not surprising because only 2 countries carry out these

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<sup>53</sup> As earlier mentioned this concerns Cyprus, Iceland, Ireland, Liechtenstein, Lithuania, Luxembourg and Malta.

<sup>54</sup> Data can be retrieved on the websites of National Accreditation Bodies through the European Cooperation for Accreditation list of access points to NABs accrediting verifiers for EU ETS: <https://european-accreditation.org/ea-members/directory-of-ea-members-and-mla-signatories/>

<sup>55</sup> 2 national verifiers

<sup>56</sup> 3 national verifiers

<sup>57</sup> The accreditation scope for other activities pursuant to Article 10a of Directive 2003/87/EC: verification of allocation data.



sector activities (see section 3.4.3), hence the limited number of verifiers for the accreditation scope of these activities.

Continuing the trend identified previously, the number of verifiers accredited against specific scopes has further decreased. The number of verifiers increased mainly for sector scope 98<sup>58</sup> (from 88 to 107 verifiers overall); it has also increased but only by 1 more verifier for each of the following scopes: scope 5 (pig iron and steel production), scope 8 and scope 12 (aviation). In most countries the number of verifiers accredited against the scopes is relatively stable and only changing marginally over the years: 17 countries had no change at all, 9 others had a change by up to 10%. In 5 countries more important changes are reported, although for most of them these are not major: the number of verifiers was reduced by 27% in Slovakia (from 62 to 45), by 15% in Belgium (from 20 to 17) and increased by 19% in Poland (from 47 to 56), by 21% in Finland (from 19 to 23), and by 11% in Bulgaria (from 71 to 79).

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<sup>58</sup> Activities pursuant to Article 10a ETS Directive (verification of allocation data).

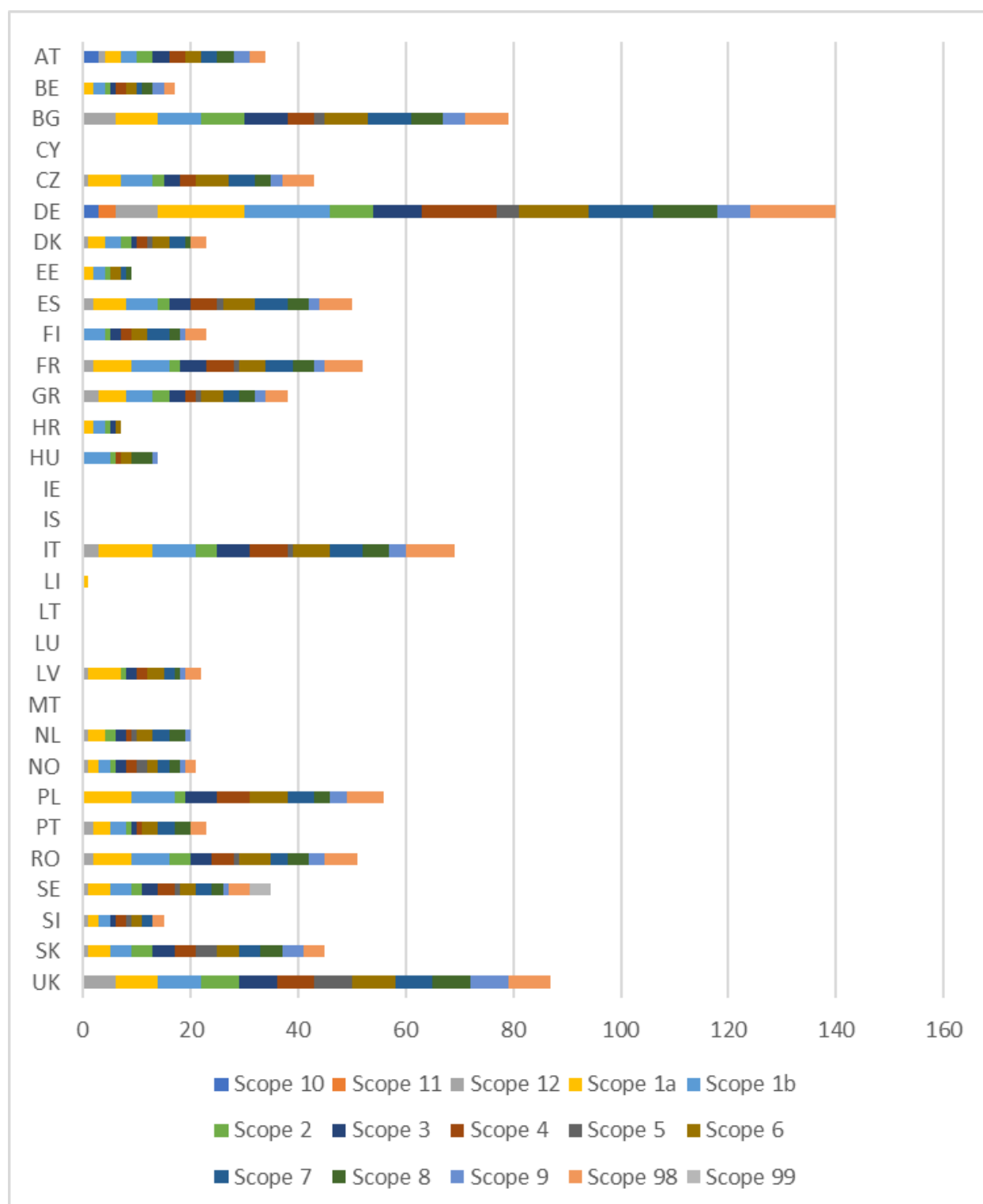


Figure 3.5-1 Number of verifiers per scope and per country in 2019. The scope of accreditation codes and country codes used are listed in the Annex

Figure 3.5-2 and Figure 3.5-3 further compare the number of verifiers to the number of installations that operate within each scope (based on the installations' annex I activities). In theory this provides an indication on the average number of installations per verifier, although as verifiers are often accredited for several scopes, these numbers are over-estimated. The results

show that in 2019 for scope 1 (combustion activities) there were probably less than 200 verifiers<sup>59</sup> for 6,292 installations, for scope 12 (aviation activities) there were 43 verifiers for 445 aircraft operators, and for scope 99 (activities that are opted-in the EU ETS) there were only 4 verifiers for 138 installations, all of which are located 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 as well as the specific sector scope relevant for the installation.<sup>60</sup> In

Figure 3.5-2 the number of verifiers is not offset against the number of installations for sector scope 98.

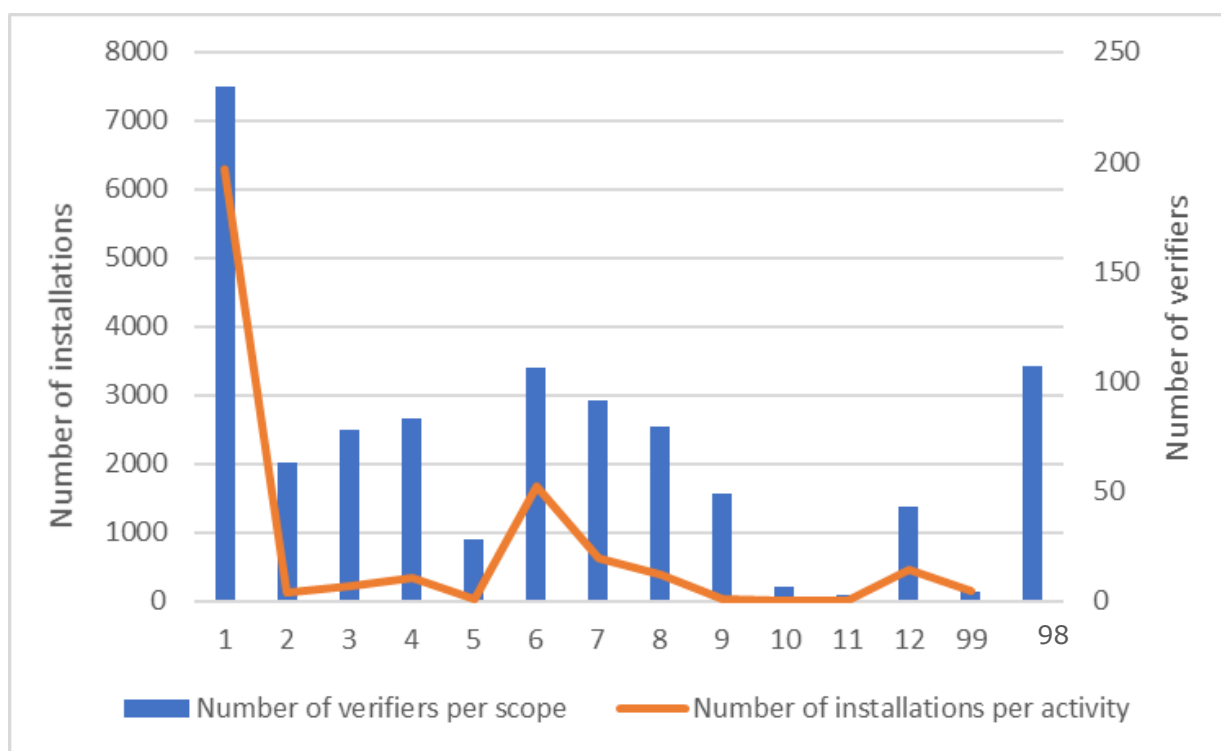


Figure 3.5-2 Number of Verifiers per scope across the EU ETS countries in 2019, compared to the number of installations with the main activity for the corresponding scope. The scope of accreditation codes are listed in the section 'Scope of accreditation' in the Annex.

<sup>59</sup> There were, in 2019, 119 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.

<sup>60</sup> The scope of sector activities that an operator carries out within its installation.

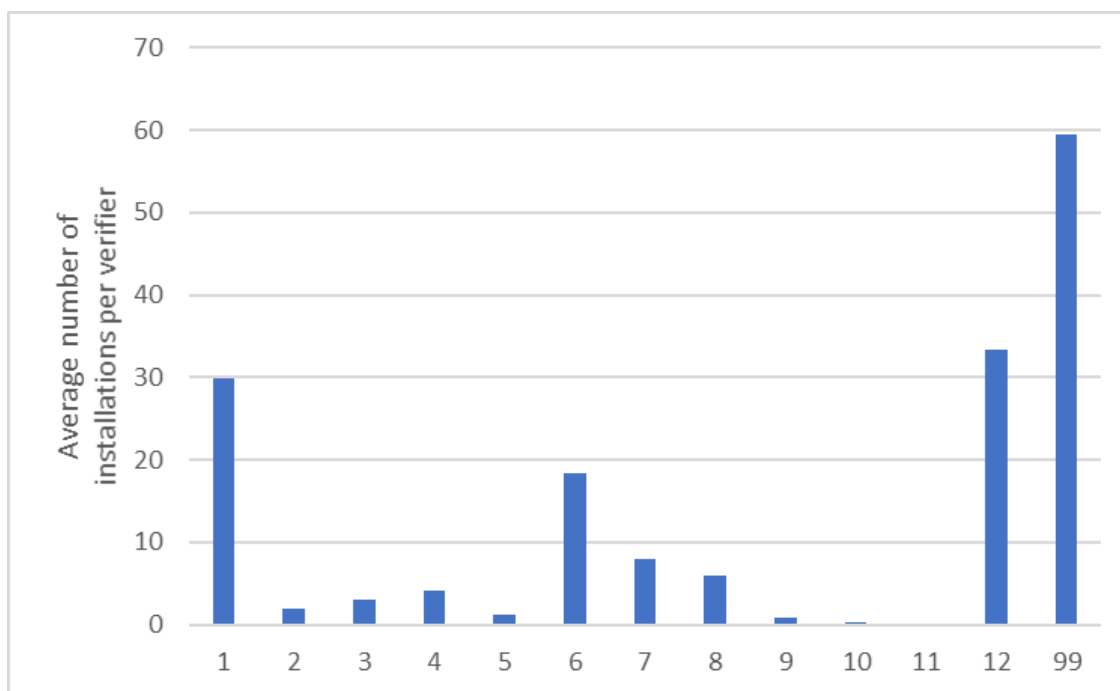


Figure 3.5-3 Average number of installations per verifier and per scope in 2019. The scope of accreditation codes are listed in the section 'Scope of accreditation' in the Annex.

## 3.6 Effective approaches for implementation

A range of procedures and tools is in place to support effective implementation of the EU ETS. This includes procedures for issuing and changing permits, approving monitoring plans, dealing with changes to the monitoring plans, reviewing emission reports and verification reports, and for approving improvement reports. The choice and specifics of these procedures often depends on country specific factors and structures. In addition, a range of (automated) tools is in place aiming to facilitate implementation, including further explanation of the rules, automated data reporting systems and tools to help managing the workflow between Competent Authorities and operators or aircraft operators.

### 3.6.1 Procedures for effective implementation

Installations in the EU ETS require a greenhouse gas emission permit, issued by their CA in accordance with Articles 5 and 6 of the EU ETS Directive. In case of changes in the operation of the installation the permit must be updated. Permitting procedures can differ between countries: 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 countries organised monitoring plan processes and notification of changes to the monitoring plan and permitting. In 2019 1,679 permit updates were reported, a number that is lower but comparable to the number of reported changes in previous years (1,969 in 2018 and 1,886 in 2017).

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 this section, the number of permit updates is expressed as percentage of the total number of changes, in order to better compare between larger and smaller countries. A number of countries do not necessarily require an update to the

permit when the monitoring plan is changed. This is in particular the case for France, the Netherlands and Germany, which contributes<sup>61</sup> to the low number of permit changes in these countries compared to their relatively high number of installations, as illustrated in Figure 3.6-1. In most of these countries permit updating is more time-consuming as it requires official stakeholder consultations. In Germany the federal state authorities are responsible for permitting and permit updates, whereas the central German Emissions Trading 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 to monitor. The DEHSt has the opportunity to provide comments when permits or permit updates are issued; vice versa the state authorities are allowed to comment before monitoring plans are approved.

As updates to the monitoring plan often need to be realised more quickly than the normal timeframe of completing the permitting procedure, the procedures for updating permits and monitoring plans have been separated in several countries. Consequently, these countries often have years with few or no updates. In 7 countries<sup>62</sup> 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 over 15% of the countries permits can be updated whenever the monitoring plan is changed (e.g., based on Article 69 of the MRR) as well as anytime the operator requests such a change. In such cases the number of updates can be several hundred (458 for the UK in 2019, representing 53% of the total number of installations, 42 for Croatia in 2019 representing 78% 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 5 years with the number of installations included in the EU ETS per country. The most frequent permit updates<sup>63</sup> relative to the number of installations are reported in Norway, Croatia, Poland and the UK. These are the countries where changes to monitoring plans 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). Poland also had a high number of over 200 permit updates (204 permit updates in relation to 689 installations) as well as Spain (211 permit updates in relation to 830 installations). Both countries require updating of the permit in the case of a significant change to the monitoring plan. This requirement to update the permit in the case of (significant) changes to the monitoring plan, however, does not always lead to many permit updates. This is illustrated by the relatively low number of permit updates in Finland (51 permit updates in relation to 540 installations), Czechia (68 permit updates in relation to 275 installations), and Slovakia (19 permit updates in relation to 113 installations). It can be concluded that in those countries not many (significant) changes occurred in the monitoring plan.

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<sup>61</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>62</sup> Germany, France, Greece, Italy, Lithuania, Malta, Netherlands.

<sup>63</sup> In 2015, Liechtenstein also had a very high relative 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 noteworthy.

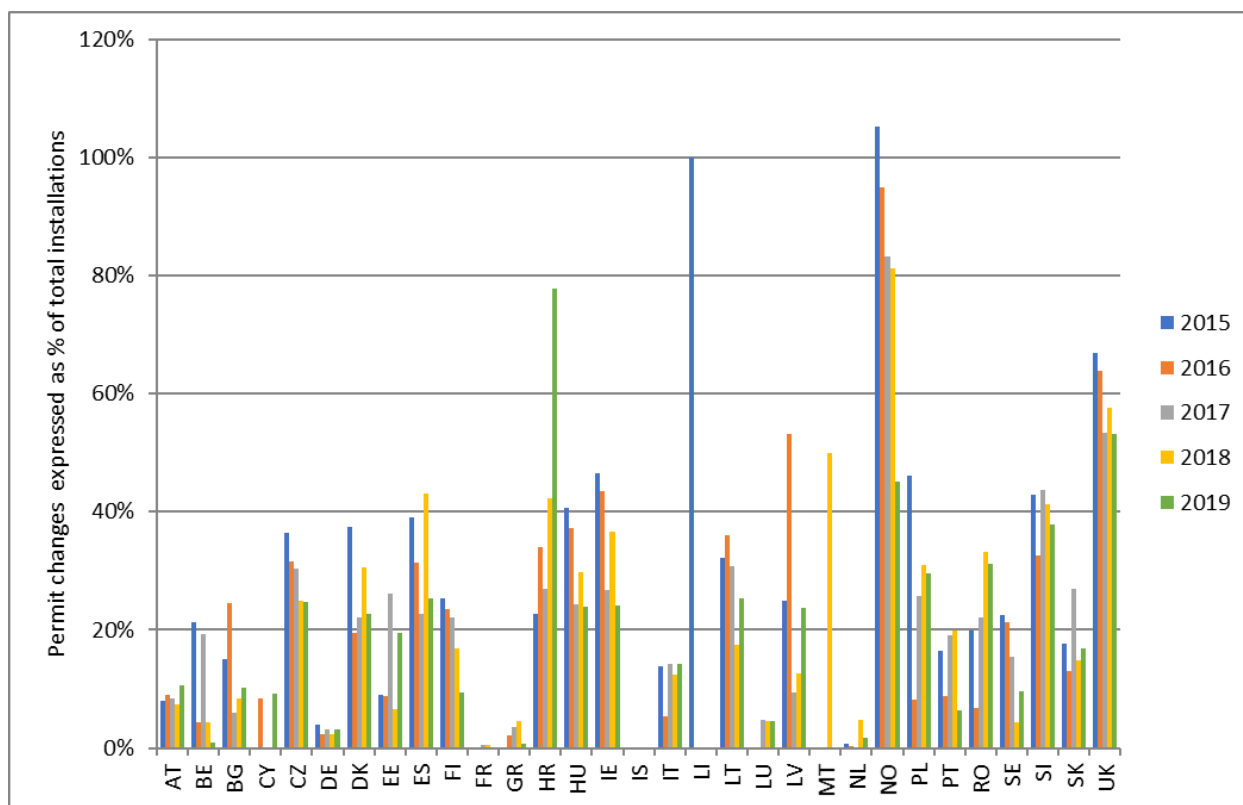


Figure 3.6-1 Evolution of the number of permit changes, expressed as a percentage of the total number of installations per country, from 2015 to 2019

The differences in procedures can impact the effectiveness of implementation. Monitoring of improvement can be complicated by lengthy procedures in addressing notification of changes or updates of monitoring plan. However, the effectiveness of procedures does not necessarily impact the quality of assessment of monitoring plans, supporting documentation, emission reports and improvement reports. This is particularly the case if tools such as IT systems have been set-up to facilitate the implementation. Limited resources can evidently impact the organisation of CA internal procedures and on their choice of tools for effective implementation.

### 3.6.2 Tools for effective implementation

Several tools are used to facilitate implementation of MRV requirements. For example, guidance documents explain how the requirements in the MRR and the AVR must be interpreted. The Commission has developed an extensive set of guidance material and tools, including translation of some of them in national languages.<sup>64</sup> A total of 15 countries<sup>65</sup> has developed additional guidance to explain national specific issues or procedures. Some of this national guidance is to explain operators and aircraft operator on how monitoring plans are addressed by the CA and on national specific procedures for notification of changes in the monitoring plan. Other national guidance addresses specific and complicated monitoring issues, such as uncertainty assessment, monitoring specific issues related to waste tires, sustainability of biofuels and bioliquids or other frequently

<sup>64</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>65</sup> Austria, Belgium, Czechia, Denmark, Finland, France, Germany, Ireland, Latvia, Netherlands, Norway, Romania, Spain, Sweden, United Kingdom

asked questions. In addition, countries have often developed specific instructions on how to complete templates or how to use an IT system in a country.

Templates for monitoring plans, emission reports, verification reports and improvement reports are another important tool to promote harmonisation of EU ETS implementation across countries, operators and aircraft operators. Article 74 of the MRR allows countries to require the operator to use electronic templates or specific file formats<sup>66</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>67</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 the verifier.

Table 3.6-1 shows how many countries used electronic templates or specific file formats in the year 2019.

*Table 3.6-1 IT templates and file format usage in 2019*

<b>National reporting usage in 2019</b> (changes from 2018 have been indicated between square brackets [ ], other values are unchanged from 2018)		<b>Customised electronic templates</b>	<b>Specific file formats</b>
<b>Installations</b>	Monitoring plans (MP)	10	4 [+1] <sup>68</sup>
	Emission reports (AER)	12	4 [-1] <sup>68</sup>
	Verification reports (VR)	8	4 [+1] <sup>68</sup>
	Improvement reports (IR)	7	2
<b>Aircraft operators</b>	Monitoring plans	3	2
	Emission reports	3	2
	Verification reports	3	2
	Improvement reports	4	1

In most cases the national templates or file formats are versions of the Commission templates, with varying levels of adaption to country-specific needs. Some countries have implemented minor adjustments while other countries require more significant elements to be added to the documents, such as elements to ensure compliance with Article 24 of the CIMS.<sup>69</sup>

<sup>66</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>67</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)

<sup>68</sup> Operators in France are allowed to choose whether they want to use the Commission template or a template of their own for the MP and the VR. For the AER France requires the operators and aircraft operators to use the Commission template. In the fourth phase the use of Commission templates will be mandatory for all documents.

<sup>69</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.

The number of EU ETS countries that have customised templates or 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 for that reason use national specific file formats do not require aircraft operators to apply these. In some cases, this is because different authorities are involved in the management of MRV and the regular IT systems are not available to these authorities. 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.

Although the number of countries using an IT system in 2019 is the same as in 2018, the number of countries using an automated system for electronic data exchange steadily increased since 2013. 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 countries are expected to either implement their own IT system or make use of the Commission's IT reporting system DECLARE.<sup>70</sup> Further development of DECLARE in EU ETS countries would be recommended and use of DECLARE is recommended for countries currently not using an IT system. A large variation exists in both the type and the scope of the IT systems across countries. Some countries use an automated system that covers the whole MRV compliance chain and that provides access to all stakeholders. Other countries use an online tool only for reporting, permitting or monitoring plans. A final group of countries can be distinguished that only use IT systems to facilitate the workflow within the CA and that do not allow operators to submit data through the IT system. In some countries such as Spain, in which some CA 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.

### 3.7 Changes in free allocation

In 2019 all countries except Iceland, Liechtenstein and Malta reported changes to free allocations (pursuant to Article 10a of the EU ETS Directive). This is unchanged compared to the previous year. The cumulative change in allowances due to allocation changes, including all types of changes, decreased from 52,093 kEUA in 2018 to 50,766 kEUA in 2019. In previous years the totals were significantly higher: 113,189 kEUA in 2017; 70,618 kEUA in 2016; 168,068 kEUA in 2015 and 279,667 kEUA in 2014. The net allocation change<sup>71</sup> in 2019 was -21,280 kEUA (compared to -26,281 kEUA in 2018; -82,919 kEUA in 2017; and -44,689 kEUA in 2016).

Figure 3.7-1 shows the quantity of allocation changed in 2019 per type of change and per country. As in 2018, partial cessations are the type of change with the highest impact (39% of all changed allowances; 19,965 kEUA). This share has notably decreased compared to the previous year where partial cessations represented 49% of all changed allowances (25,740 kEUA).

Figure 3.7-2 compares the number of changes to the total number of installations for each type of change and each country. As in previous years partial cessations are the most frequent type of change in 2019: 590 partial cessations, representing 47% of all changes (1,254 changes in total).

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<sup>70</sup> Web-based application to manage submission and reporting on EU ETS.

<sup>71</sup> The absolute values include all allocation changes in terms of number 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. It should be noted that recovery after partial cessation is not included in the Article 21 questionnaire.



This share is lower than the 50.5% in 2018 (653 allocation changes due to partial cessations and an overall total of 1,294 changes). The total share of partial cessations represented 5.3% of the total number of installations (compared to 6.2% in 2018), while the total number of allocation changes represented 11.9% of the total number of installations (down from 12.2% in 2018).

In total 4 countries indicated that possible allocation changes have been identified by the CA, which have not been notified by the operator, which is the same number as in 2018 (3 of the countries are the same as in 2018). The total number of cases decreased notably from 20 in 2018 to 12 in 2019. These cases were generally identified either from the analysis of the annual emission reports (by CAs or by verifiers), when comparing emission data with those of the previous year, or from activity level data if those are collected by the CA.<sup>72</sup>

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<sup>72</sup> Reporting of activity levels is not mandatory in all countries.

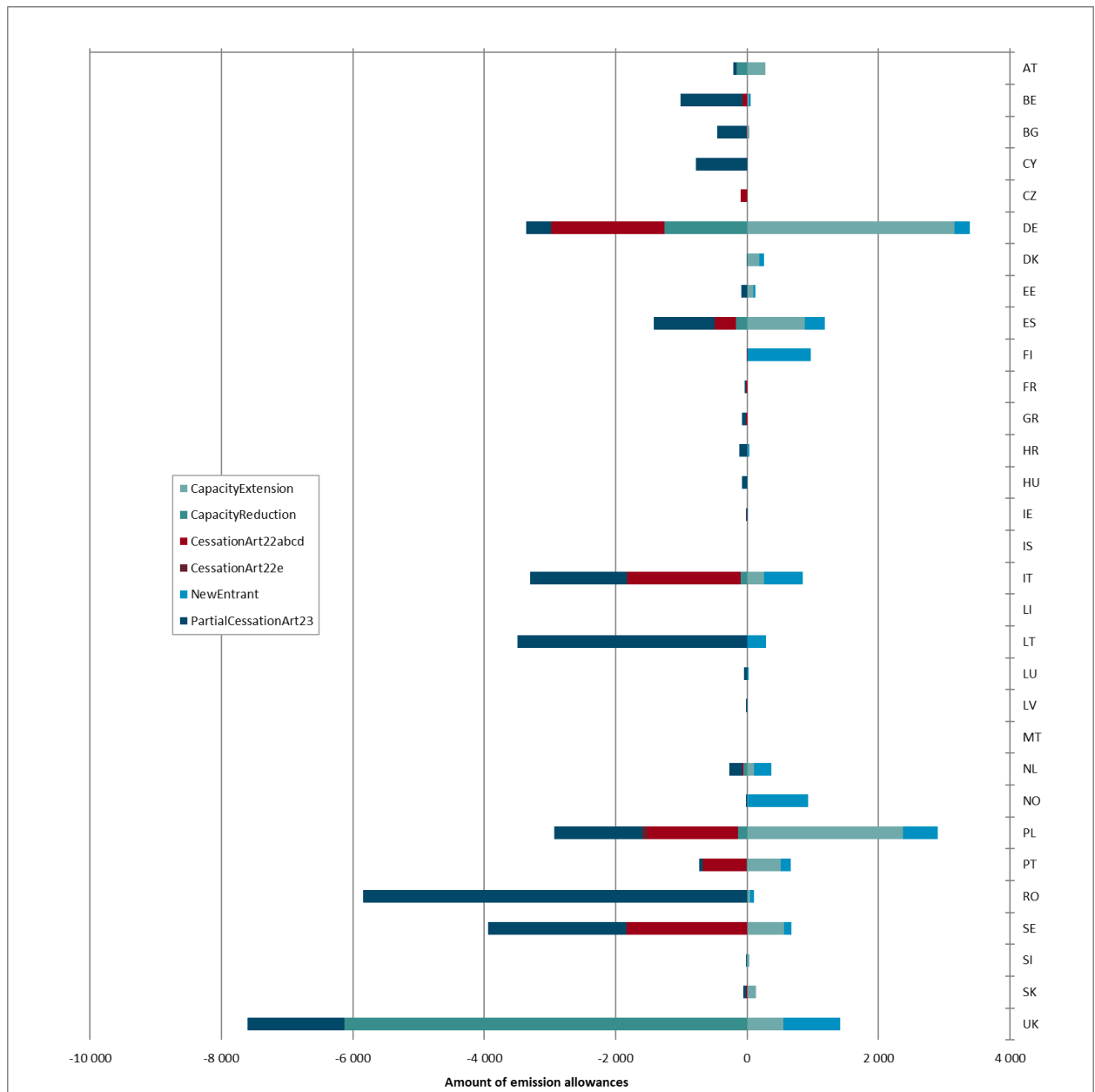


Figure 3.7-1 Quantity of emission allowances corresponding to allocation changes in 2019 (in 1,000 EUAs), per type of change and per country. Negative changes correspond to allocation reductions (i.e., capacity reductions, cessations and partial cessations), and positive changes correspond to additional 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., Latvia), the allocation changes are too small to be visible in this chart, although allocation changes did happen, as is illustrated by Figure 3.7-2.

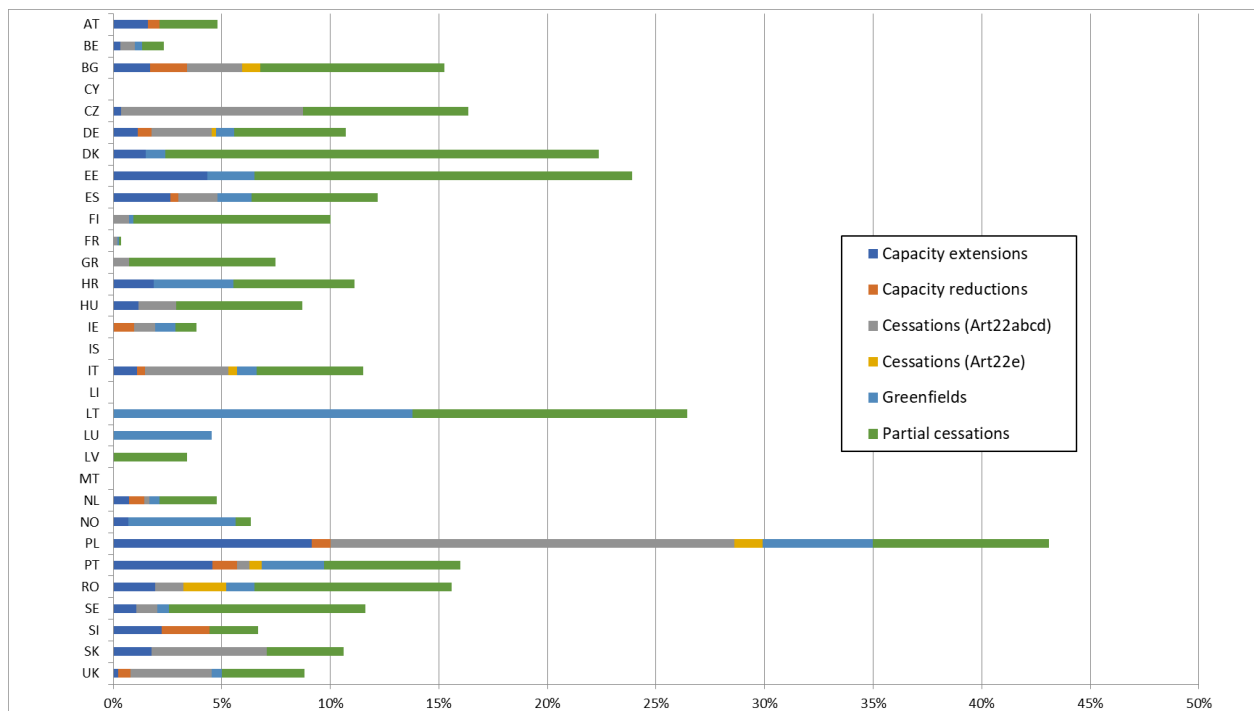


Figure 3.7-2 Number of allocation changes compared to total number of installations, per type of change and per country in 2019 (e.g. the number of allocation changes in Lithuania corresponds to 26.4% of the total number of EU ETS installations in the country, split mainly between greenfields and partial cessations). 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 chapter analyses the most important fuel types and changes over time. The analysis compares the aggregated total emissions for each category in the Common Reporting Format (CRF category)<sup>73</sup> for combustion and process emissions. An overview of inherent and transferred CO<sub>2</sub> as defined under Article 48 and 49 of the MRR is provided in section 4.2. This is followed by an analysis of the use of continuous emissions measurement (CEMS) in accordance with Article 40 of the MRR provided in section 4.3. 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, section 4.5 covers how much emissions come from waste used as fuel or input material.

In 2019, 10,569 installations were covered by the EU ETS, with total emissions of 1,527 Mt CO<sub>2</sub> (eq), which is 10.9% lower compared to 2018. The number of aircraft operators was 611, with total emissions of 68 Mt CO<sub>2</sub>, which is 0.7% higher than in 2018.

### 4.1 Emissions and source streams

Information on fuel consumption and related fossil fuel emissions in the EU ETS is collected for stationary installations and aircraft operators. Fuel used for non-combustion purposes (i.e., fuel used as process raw material) is not included.<sup>74</sup> The largest proportion of emissions from stationary installations come from fuel combustion. Key fuel types used in the EU ETS are natural gas, lignite and hard coal. Cumulatively, these contribute to approximately 74% of all combustion emissions. The following section analyses the changes that have occurred for the most important fuels used and evaluates how the emissions originating from fuel combustion have developed over the years. Furthermore, the section also includes an analysis of the distribution of fuel over the different categories and shows if the consumption of fuels with a lower emission factor has increased with time (e.g., decline of hard coal and increase of the use of natural gas). The section provides an overview of the extent to which the total emissions reported have increased or decreased by country or by fuel type. The process emissions (which have gone up to approximately 23% 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 described.

#### 4.1.1 Fuel consumption and emissions of stationary installations

In 2019 the total emissions from fossil fuel combustion in installations were 1,270 Mt CO<sub>2</sub> (eq) and the total fossil fuel consumption was 17,116 PJ for all EU ETS countries. Compared to the reported data in 2018, this is respectively 161 Mt CO<sub>2</sub> (eq) and 1,224 PJ less. Compared to 2013, emissions were reduced by 398 Mt CO<sub>2</sub> (eq) (24%).

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<sup>73</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>74</sup> Germany includes fuels used as process input as a change in reporting would result in an inconsistent timeline.

Figure 4.1-1 shows that throughout phase 3 the most important source streams were hard coal, lignite (and sub-bituminous coal) and natural gas. These three groups together represent about 75% of the fossil fuel emissions in each year, but a clear trend of diminishing hard coal and a similar increase in natural gas share can be observed. This is more pronounced in 2019: emissions from hard coal represented a share of only 16% of the total emissions (decrease compared to 21% in 2018), emissions from natural gas amounted to 34% (increase compared to 28% in 2018), whereas emissions from lignite experienced a small decrease (24% of the total emissions, compared to 25% in 2018). Similar to 2018, other important source streams included mainly refinery gas (and other process derived gases) and other fossil fuel types representing respectively 8.7% and 5.8% of the total emissions (see Figure 4.1-1).

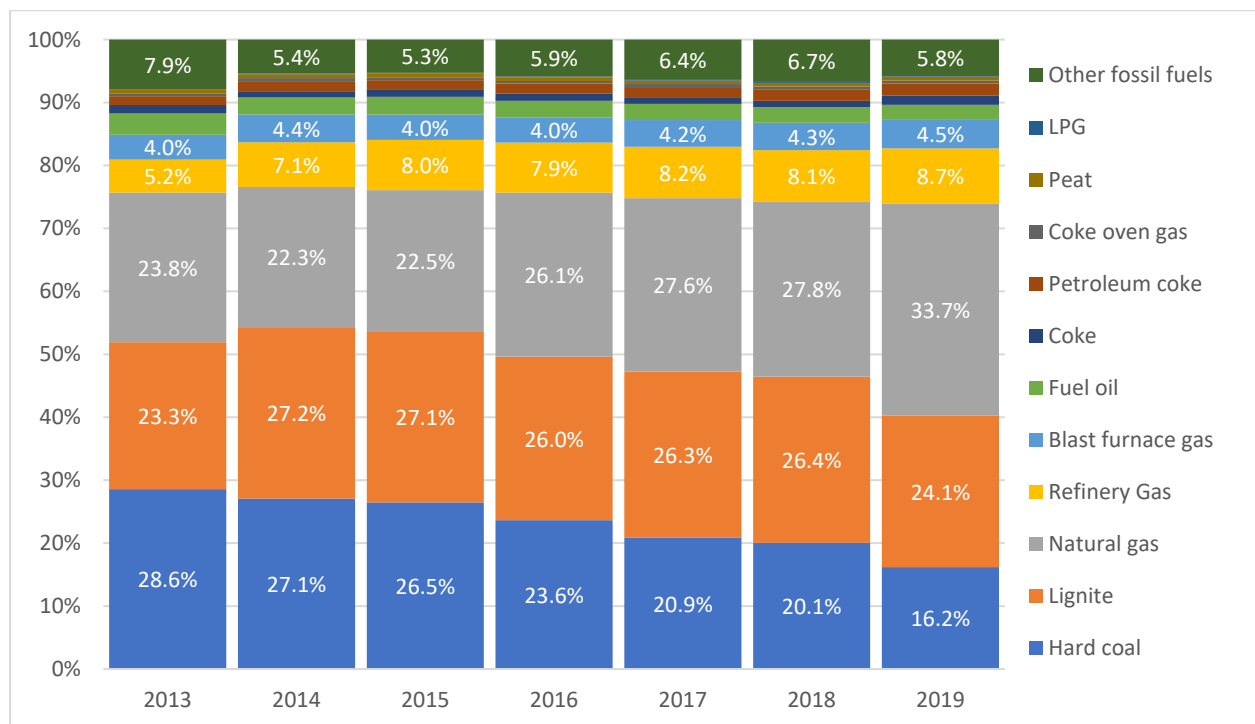


Figure 4.1-1 Evolution of the share of emissions of each fuel type (% of total fuel emissions in EU ETS, labels not shown if fuel never reaches a share above 3% of total) [\*]not covered by the other specified fuels.

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

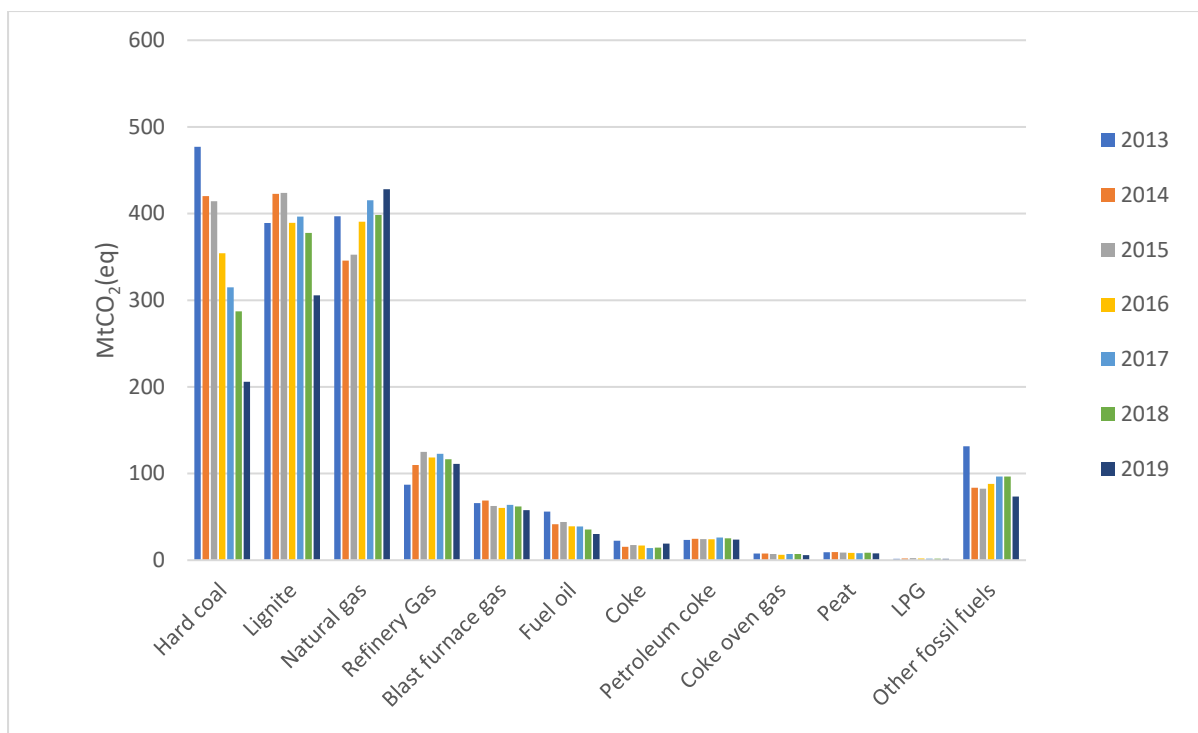
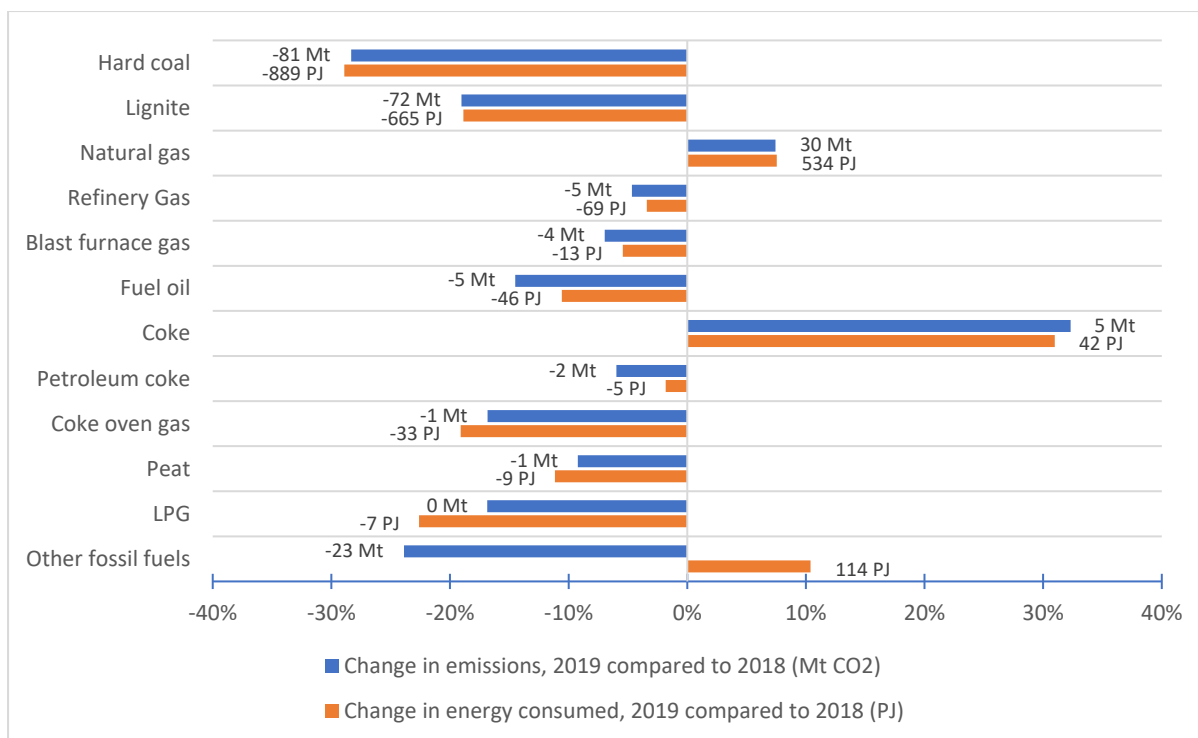


Figure 4.1-2 Total emissions from combustion in Mt CO<sub>2</sub> (eq), per fossil fuel and per year

The total emissions of fossil fuels decreased from 1,669 Mt CO<sub>2</sub> (eq) in the year 2013 to 1,270 Mt CO<sub>2</sub> (eq) in 2019. The most significant reduction in emissions is noted in the case of hard coal, with a reduction of close to 57% since 2013. Emissions from combustion of hard coal decreased from 477 Mt CO<sub>2</sub> (eq) in 2013 to 206 Mt CO<sub>2</sub> (eq) in 2019. As presented in Figure 4.1-1, the share of hard coal decreased from 29% in 2013 to just over 16% in 2019. On the other hand, the share of natural gas increased from 23.7% in 2013 (386 Mt CO<sub>2</sub> (eq)) to 33.7% (428 Mt CO<sub>2</sub> (eq)) in 2019.

The consumption of peat, coke, refinery gas, liquefied petroleum gas, petroleum coke and blast furnace gas remains more or less constant whereas the consumption of lignite, and fuel oil is decreasing. The use of other fossil fuel types which had been rising during the last years has reduced slightly in 2019.

Natural gas remained the most significantly consumed fuel (7,618 PJ) in 2019 in terms of energy content. This is followed by lignite with 2,857 PJ and hard coal with 2,186 PJ. An overview of the changes in fuel consumption as well as fuel emissions (as percentages) between the years 2018 and 2019 is presented in Figure 4.1-3. The graph indicates the corresponding absolute change (2019) of consumption (in PJ) and emissions (in Mt CO<sub>2</sub> (eq)) for each fuel type.



*Figure 4.1-3 Difference [in %] in fuel consumption [in PJ] and emissions [in Mt CO<sub>2</sub>] in the EU ETS, by fuel type, between 2018 and 2019. Negative values indicate a decrease in 2019 compared to 2018. The size of the bars represents the percentage of change, the values displayed represent the absolute change.*

The change in consumption and emission are much more consistent in 2018 and 2019 compared to previous years. Only small deviations are noted. As is to be expected, the percent change in emissions is similar to the percent change in energy consumed of the same fuel. Consistency between consumption and emission is better than in previous years. Only small deviations can be observed, except in the Other fossil fuels category, which is primarily explained by a change in reporting system in France, which led to fuels being categorised in a different way compared to preceding years. Therefore, more fuels were categorised as Other, while the emissions of this category decreased.

The total reported 2019 fossil energy consumption is 17,116 PJ (6% less than in 2018), resulting in 1,270 Mt CO<sub>2</sub> (11% less than in 2018) emissions. Germany reported the highest fuel consumption (3,676 PJ) of all countries, followed by Italy (1,991 PJ) and Poland (1,890 PJ). The most significant CO<sub>2</sub> emitters are Germany (317 Mt CO<sub>2</sub> (eq)), Poland (170 Mt CO<sub>2</sub> (eq)) and Italy (129 Mt CO<sub>2</sub> (eq)). Total fuel consumption and total CO<sub>2</sub> emissions under EU ETS were reduced between 2018 and 2019 by about -6% and -11% respectively. Figure 4.1-4 illustrates the development of fuel consumption (in PJ) and emissions (in Mt CO<sub>2</sub> (eq)) per country between 2018 and 2019. For most countries, the percentage of change in emissions is lower (or more negative) than the percentage of change in energy consumption, which indicates a shift to fuels that have lower emissions per PJ. The unusual pattern shown for France is related to the change in reporting system as explained above. Even when excluding France, the average emissions per unit of energy consumed have lowered by 4%: from an average of 78.6 t CO<sub>2</sub>/MJ in 2018 to 75.6 t CO<sub>2</sub>/MJ in 2019. In other words, if the total EU ETS fossil energy consumption in 2019 had remained the same, an estimated 4% in emission reduction would have been achieved due to a “cleaner” fossil fuel.

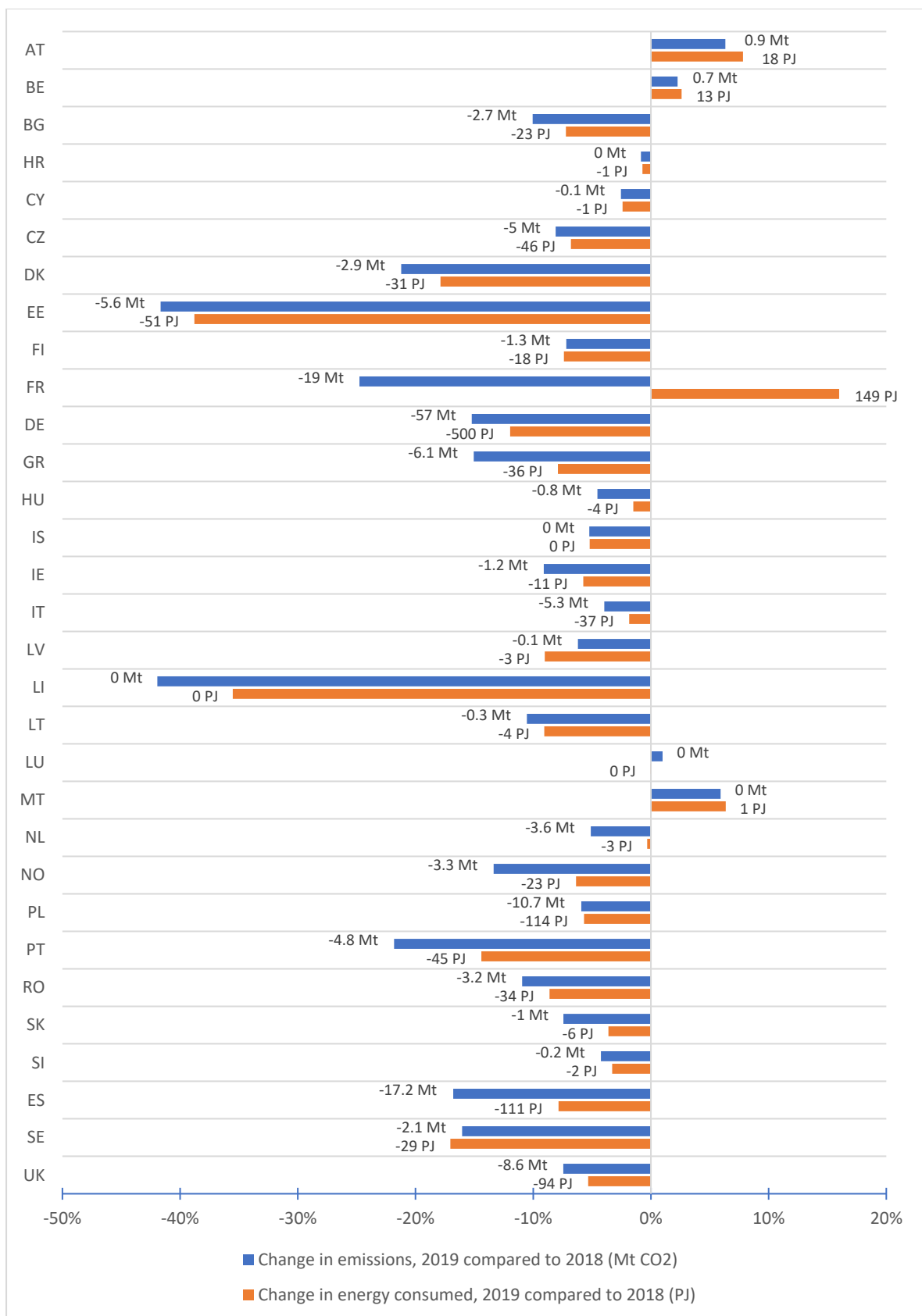


Figure 4.1-4 Difference [in %] in fuel consumption [in PJ] and emissions [in Mt CO<sub>2</sub> (eq)] in the EU ETS, by country, in 2019 compared to 2018.



### 4.1.2 Combustion and process emissions

As per Article 73 of the MRR, operators are required to report emissions from their Annex I activities in accordance with Codes from the CRF<sup>75</sup> for national greenhouse gas inventory systems. The reporting of emissions has a dual purpose. First, the reporting of emissions against CRF category codes in the Article 21 questionnaire is done in order to assist EU ETS countries and the EU as a whole to improve the quality of data relevant for the national inventories. Second, the reporting is intended to enable the Commission to assess the data consistency between the EU ETS and the national inventories reported to the UNFCCC.

In 2019, all 31 countries reported aggregations of their operator data, distinguishing between process or combustion CRF categories (Figure 4.1-5).<sup>76</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 was very similar to those presented in section 4.1.1 and can therefore be considered consistent.

The sum of process and combustion emissions was checked against the total verified emissions. The total process emissions are estimated at approximately 267 Mt CO<sub>2</sub> (eq) and overall emissions from fossil fuel combustion are 1,270 Mt CO<sub>2</sub> (see chapter 4.1.1) summing up to 1,532 Mt CO<sub>2</sub> (eq) for all countries in 2019. These estimations are in line with the EUTL 2019 verified emissions of 1,576 Mt CO<sub>2</sub> (eq).

The share of combustion and process emissions per country in 2019 is presented in Figure 4.1-5. Combustion emissions have a share of over 50% in almost all EU ETS countries with the exception of Iceland where emissions are predominantly stemming from processes.

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<sup>75</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>76</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.

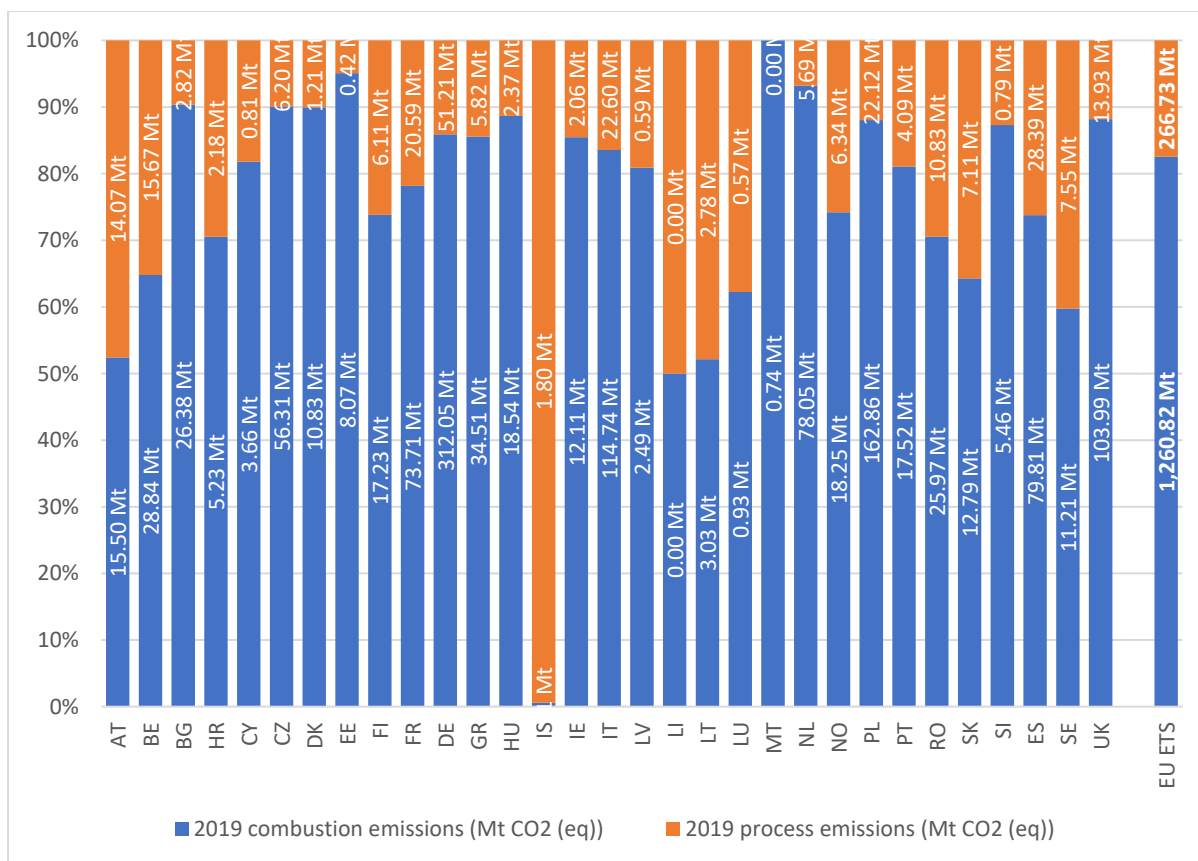


Figure 4.1-5 Share of combustion and process emissions per country in 2019

The total emissions from processes have decreased from 287.8 Mt in 2018 to 266.7 Mt CO<sub>2</sub> (eq) in 2019 (see Figure 4.1-6).

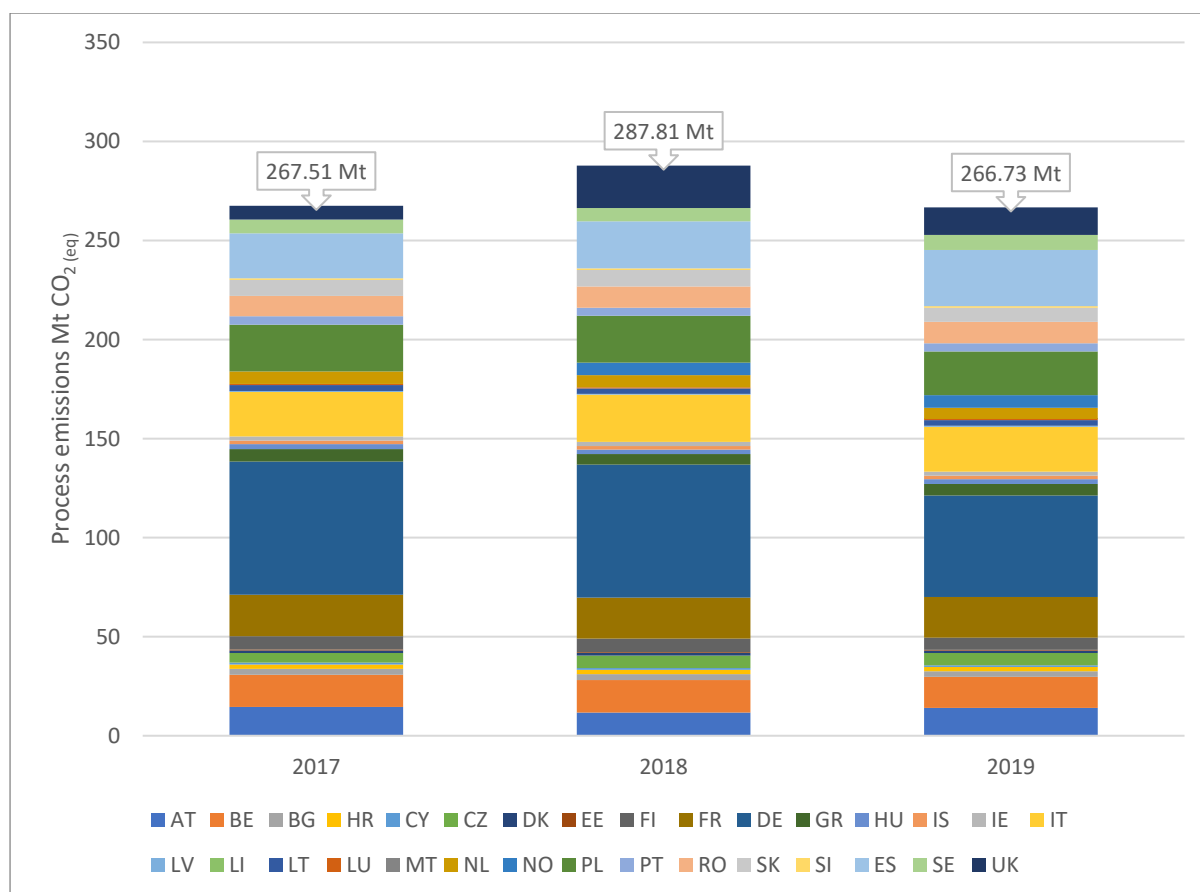


Figure 4.1-6 Total process emissions under EU ETS and contribution per country, in Mt CO<sub>2</sub> (eq)

In 2019, the CRF combustion category 1A1a (public electricity and heat production) accounted for 50.5% of the total reported emissions<sup>77</sup>. The next largest category was 1A1b (petroleum refining) with 7.5%. Among the process emissions, the leading categories are 2C1 (iron and steel production) and 2A1 (cement production), each accounted for 5.1% of the total emissions, which is 28.7% and 28.5% respectively of the total process emissions reported in 2019 (see Figure 4.1-7).

<sup>77</sup> Where possible, combustion emissions are attributed to a CRF1 category and process emissions to CRF2. Process emissions are only attributed to a CRF1 category if no CRF2 was reported and vice versa.

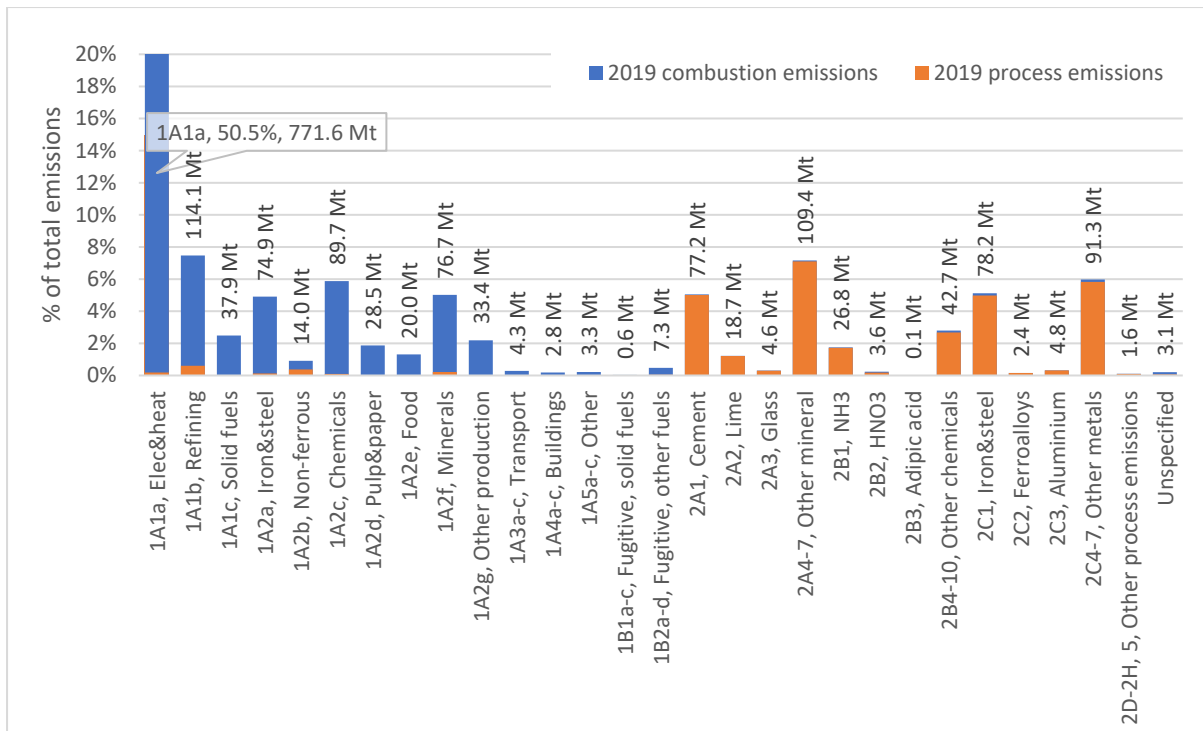


Figure 4.1-7 Proportions of the CRF categories in % of total 2019 emissions

#### 4.1.3 Fuel consumption and emissions of aircraft operators

Annual CO<sub>2</sub> emissions from aviation activities must be determined and reported by each aircraft operator that falls under the scope of the EU ETS. 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 2 main methods for determining the fuel consumption: method A and method B. The main difference between the methods is the time at which the 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.

The majority of aircraft operators (191) use method B, whereas only a limited number of operators (32) use method A. Only 1 operator uses both methods. In 2019, 611 aircraft operators reported their emissions under the EU ETS, 8 fewer than in 2018. Small emitters are allowed to use the specific reporting tools as specified by Article 54 of the MRR.

These tools include the Small Emitters Tool (SET) and the Eurocontrol EU ETS Support Facility (ETS SF). A draft Annual Emission Report can be downloaded from these tools on the basis of the associated flight data information and the small emitter tool. Small emitters can also choose to apply 1 of the standard methods to determine their fuel consumption instead of the simplified methodology allowed under Article 54(2) of the MRR.

The most common way of determining the fuel consumption by small emitters is through the use of SET and ETS SF. These methods were reported to be used by the majority of small emitters. According to the Article 21 reports, SET was used by 171 aircraft operators and additionally 170 small emitters generated their emission reports based upon the ETS SF. However, the interpretation of countries with regard to the use of methods for small emitters differs. The Article 21 questionnaire asks for the number of small emitters using SET to determine the fuel consumption. Certain countries (e.g., France and the United Kingdom explained this in a

comment) may have summed up both aircraft operators using SET as well as ETS SF for reporting aircraft operators employing SET. Thus, depending on the interpretation of this question, the numbers of aircraft operators are partially inconsistent across different questions.

In the 2019 reports method A was chosen by 5 and method B was chosen by 20 small emitters. These numbers are precisely matching the ones from 2018 and are similar to those from 2017 (only 1 small emitter less chose method B in 2018 compared to 2017).

SET was also used by 104 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 small increase compared to the numbers presented in 2018 (97 aircraft operators). The monitoring plans of 65 aircraft operators specify the use of surrogate data for flights for which data was not available compared to 66 aircraft operators in 2018.

Based on the evaluation of answers to Article 21 questionnaire, the total aggregate emissions of all EU ETS flights were 68 Mt CO<sub>2</sub> in 2019. This represents an increase of 0.7% (4.8 Mt CO<sub>2</sub>) compared to the data reported in 2018 (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, 11.7 Mt CO<sub>2</sub> (17%) resulted from domestic flights<sup>78</sup> representing a decrease of 13.5% (-1.82 Mt CO<sub>2</sub>) compared to 2018. Emissions from domestic flights decreased whereas a slight increase was recorded on emissions from international flights. There is a large variation across countries in terms of the proportion of emissions from domestic aviation, ranging from 0% (Slovakia) to 56.4% (Italy). This level of emissions from domestic aviation largely depends on how aircraft operators are assigned to administering countries and has no relation to domestic emissions in national GHG inventories.

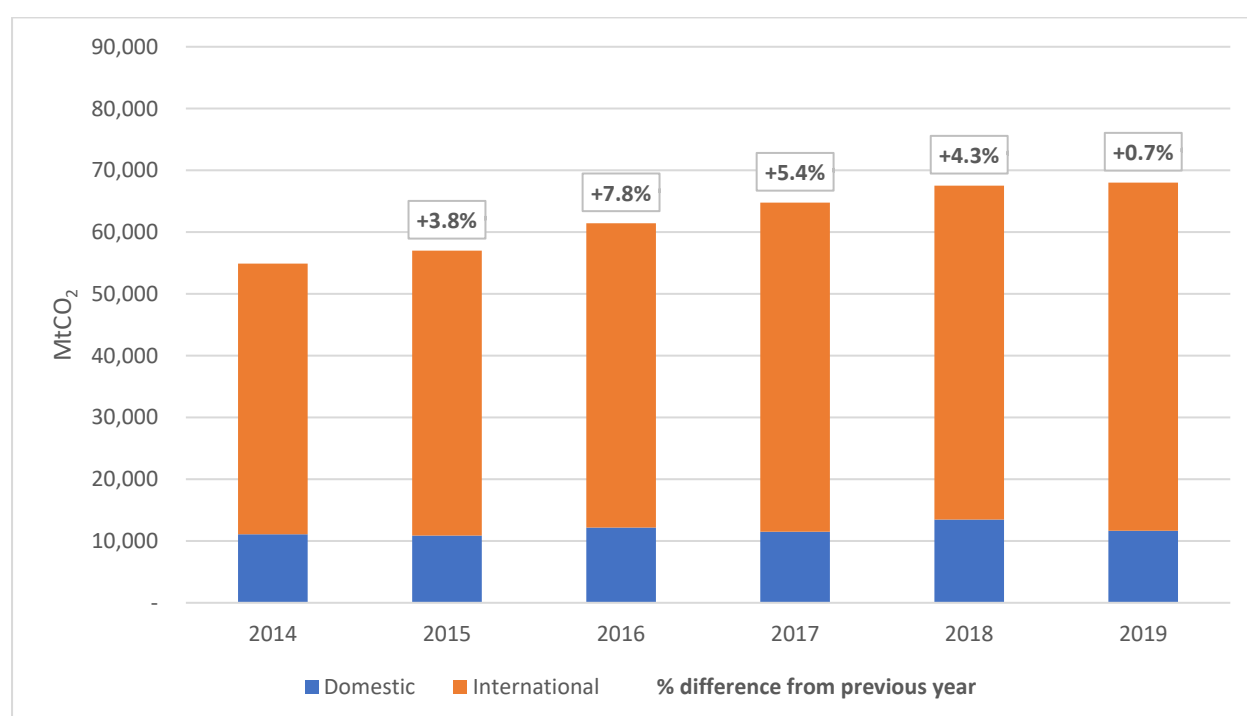


Figure 4.1-8 Fuel emissions for aircraft operators of all countries, distinguishing domestic and international flights within the EEA.

<sup>78</sup> The emissions of a flight are defined as domestic if the departure country is the same as the arrival country.

As presented in Figure 4.1-8, a gradual growth in emissions from aviation was recorded from 2014 (54.9 Mt CO<sub>2</sub>) up to 2018 (67.5 Mt CO<sub>2</sub>). In contrast, the total level of emissions remained fairly constant between 2018 and 2019 (at 68.0 Mt CO<sub>2</sub>). The overall increase between 2014 and 2019 can be explained by international activities as total emissions have increased by 24% overall over the 6 years, while domestic emissions increased only by 5%. Although emissions from the aviation sector have increased in all years, the rate of growth in emissions has been decelerating since 2016 (see Figure 4.1-9).

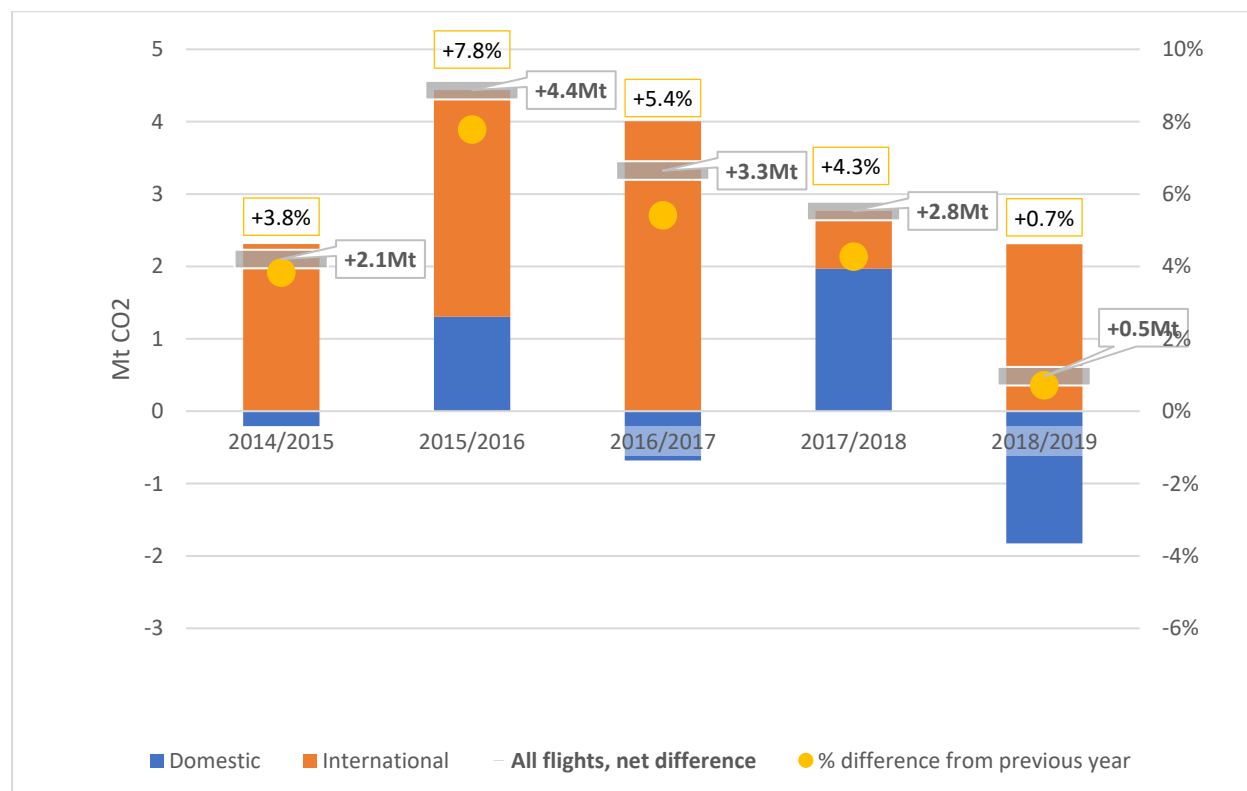


Figure 4.1-9 Differences (growth) of emissions in Mt CO<sub>2</sub> and [%] between 2 consecutive years.

In 2019, aviation emissions have contributed approximately 5.3% to the total emissions in the EU ETS (including stationary installations and aviation). This is in contrast to the 4.7% contribution in 2018.

As can be seen in Figure 4.1-10, the highest proportion of emissions came from airlines administered by Ireland, followed by the United Kingdom and Germany. The majority of domestic flights have been reported by operators administered by Germany, Spain, France, the United Kingdom, Ireland, Italy, Sweden and Norway.<sup>79</sup>

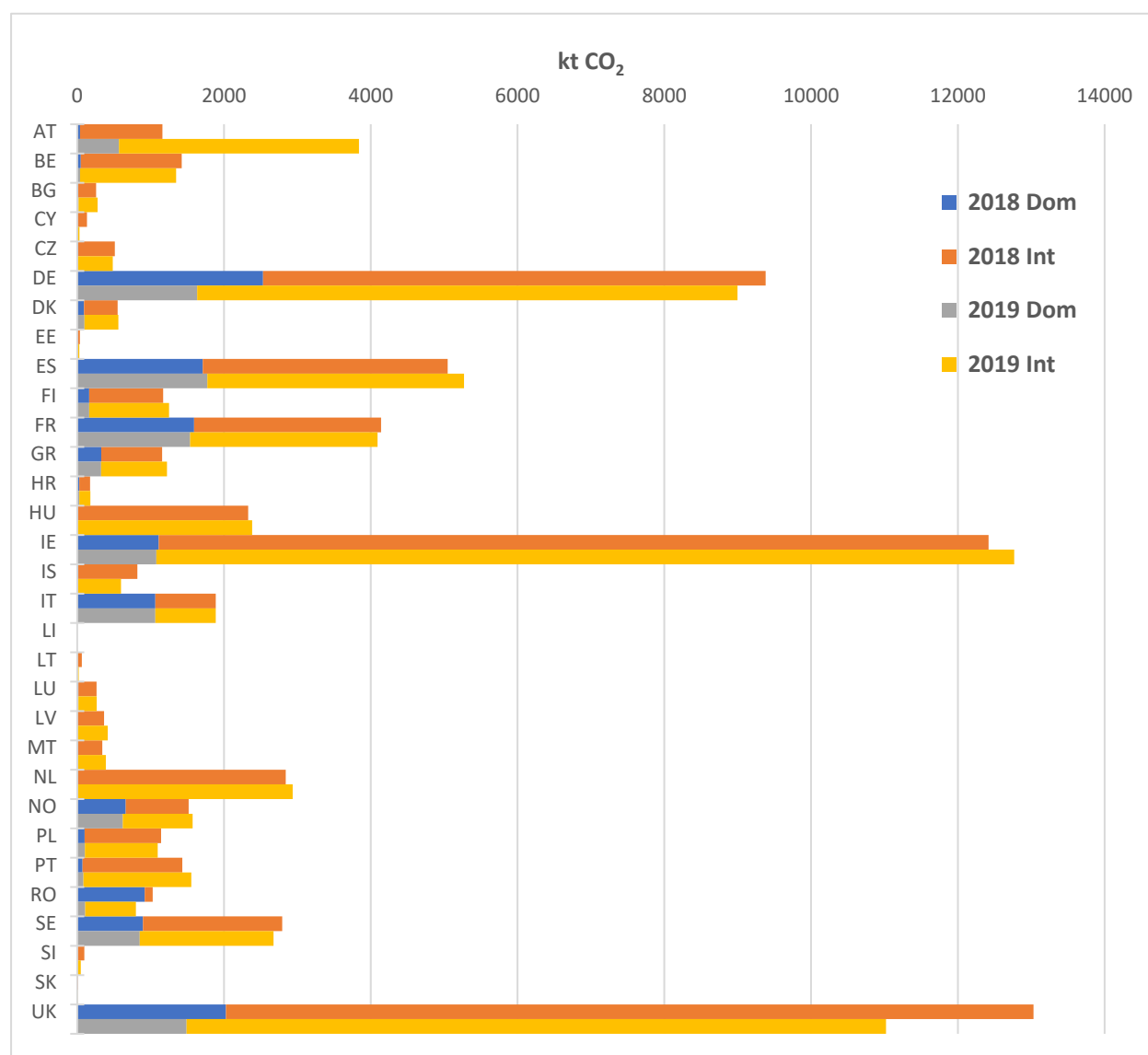


Figure 4.1-10 Emissions [kt CO<sub>2</sub>] from domestic and international flights reported for 2018 and 2019 by all countries.

## 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). Compared to the rules for accounting the transfer of other types of transferred CO<sub>2</sub>, the rules for monitoring transferred inherent CO<sub>2</sub> are different. Inherent CO<sub>2</sub> that is subsequently transferred out of the installation as part of a fuel to another EU ETS installation<sup>80</sup> shall not be counted as emissions of the installation

<sup>79</sup> This does not mean that the domestic flights were internal flights within the reporting country.

<sup>80</sup> Installation falling under the scope of EU ETS.

of origin but taken into account by the EU ETS installation from which it is finally emitted (According to Article 48 of the MRR). However, if the transfer of inherent CO<sub>2</sub> occurs to an installation outside the scope of the EU ETS, it shall be counted as emissions of the installation where it originates.

The rules for the treatment of all other types of transferred CO<sub>2</sub> are established in Article 49 of the MRR. If the CO<sub>2</sub> is transferred to a capture installation, transport network or storage facility with the aim of long-term geological storage in accordance with the CCS Directive,<sup>81</sup> the installation transferring must subtract that transferred CO<sub>2</sub>. The emissions from that CO<sub>2</sub> would be attributed to the installation emitting that CO<sub>2</sub>.

The Article 21 questionnaire (question number 5.14) requests an overview of the types of transfers that occurred in the reporting period and for the magnitude of inherent and transferred CO<sub>2</sub> transferred out of an ETS installation. In 2019 a limited number of countries reported the transfer of pure CO<sub>2</sub> under Article 49 of the MRR.<sup>82</sup>

In 2019, 10 countries reported a transfer of inherent CO<sub>2</sub>, which is 1 fewer country than in the previous year (the UK). An increase in the number of installations involved in such transfers was recorded (i.e., from 132 in 2018 to 135 in 2019). More than half of the installations (i.e., 71 installations) are located in Germany, followed by 35 Polish installations (similar to 2018). The highest amounts of received and transferred inherent CO<sub>2</sub> are calculated for Germany (56% of the received amounts and close to 60% of the transferred amounts) followed by Belgium (respectively 19% and 20%) and France (respectively 8.5% and 9%).

The highest total amount of inherent CO<sub>2</sub> transferred was reported by Germany, 25.2 Mt CO<sub>2</sub> (eq) in 2019) and received (25.4 Mt CO<sub>2</sub> (eq) in 2019). The second highest amount of inherent CO<sub>2</sub> transferred and received was reported by Belgium (8.3 Mt CO<sub>2</sub> (eq) each way in 2019). Figure 4.2-1 shows the total amounts of inherent CO<sub>2</sub> transferred.

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<sup>81</sup> Directive 2009/31/EC.

<sup>82</sup> Transfer of CO<sub>2</sub> that is chemically bound in precipitated calcium carbonate was generally not included in the amount of pure CO<sub>2</sub> transferred.



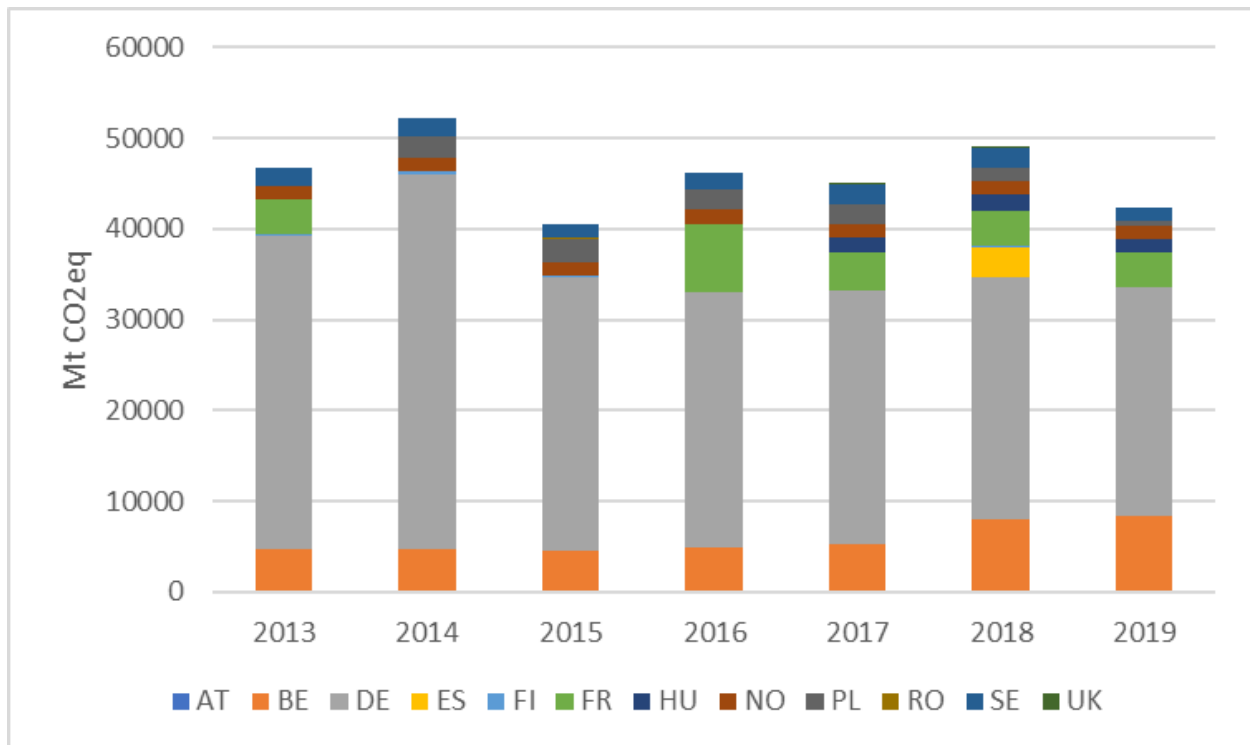


Figure 4.2-1 Total amounts of inherent CO<sub>2</sub> (eq) (in Mt) transferred to EU ETS installations per country since 2013.

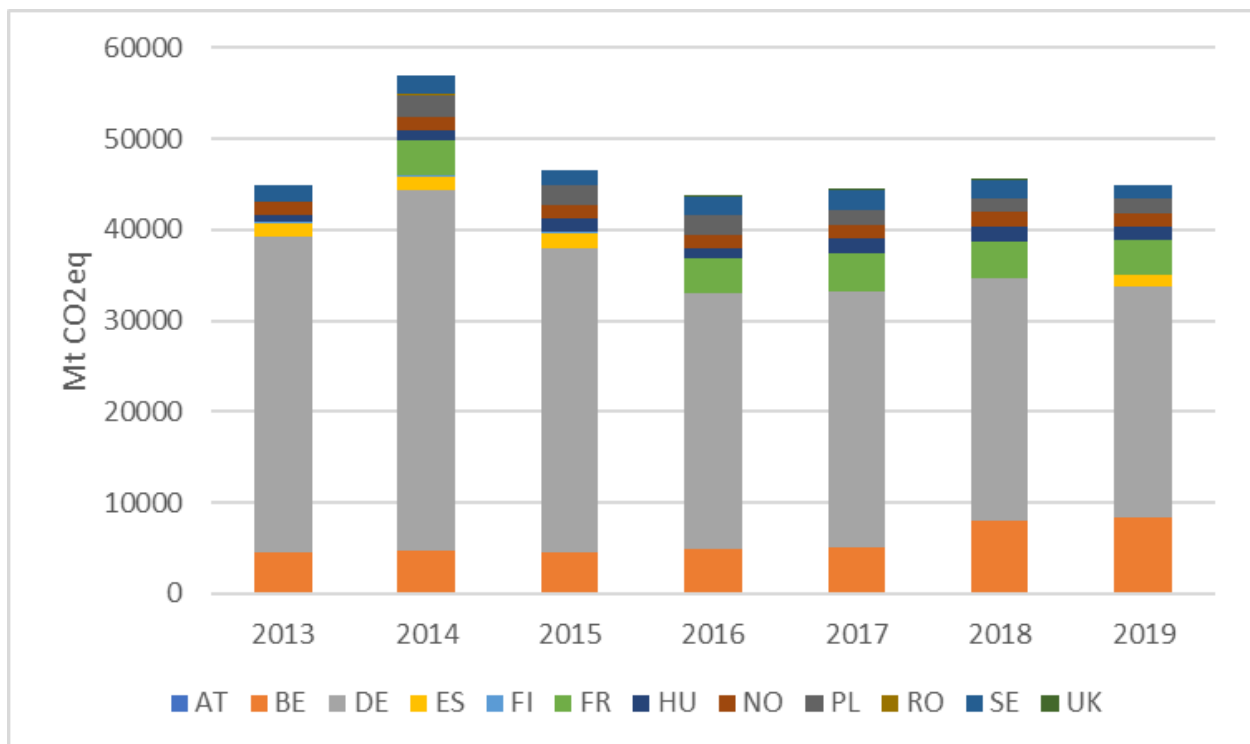


Figure 4.2-2 Total amounts of inherent CO<sub>2</sub> (eq) (in Mt) received by EU ETS installations per country since 2013.

### 4.3 Analysis of the use of CEMS

Two main monitoring approaches are foreseen under the MMR: calculation-based methods (as used by the vast majority of installations) and measurement-based methods (using Continuous Emission Measurement Systems (CEMS)). Measurement-based monitoring methodology is used for installations with emissions of nitrous oxide (N<sub>2</sub>O) in line with the rules stipulated in section 16 of Annex IV of the MRR. Pursuant to Article 49 of the MMR, CEMS also have to be applied for the quantification of CO<sub>2</sub> transferred. The operators can choose in other cases either the calculation-based method or the measurement-based methodologies. 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. Further to this, several other general requirements need to be fulfilled. The measurements must be carried out applying methods based on international and specified standards. Furthermore, the operator must ensure that laboratories carrying out measurements, calibrations, and relevant equipment assessments for CEMS are accredited in accordance with ISO standard 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. In 2019, 144 installations in 23 EU ETS countries have been reported to use measurement-based technologies for monitoring GHG emissions. 93 of the 144 installations (64%) used CEMS to measure CO<sub>2</sub> only, 4 to measure N<sub>2</sub>O only, and 10 to measure both CO<sub>2</sub> and N<sub>2</sub>O. The number of installations using CEMS is approximately 1.4% of all installations in the scheme. Installations applying CEMS are most frequently found in Germany (26 representing 18% of installations using CEMS), Czechia (20 representing 14% of installations using CEMS), France (14 representing 10%), Sweden (13 representing 9%) and Denmark (11 representing 7.6%). In 2019, an estimated 50 Mt CO<sub>2 (eq)</sub> were monitored by a measurement-based monitoring methodology, which corresponds to 4% of the total verified emissions. The emissions of CO<sub>2 (eq)</sub> monitored by CEMS for the last 7 years are presented in Figure 4.3-1.

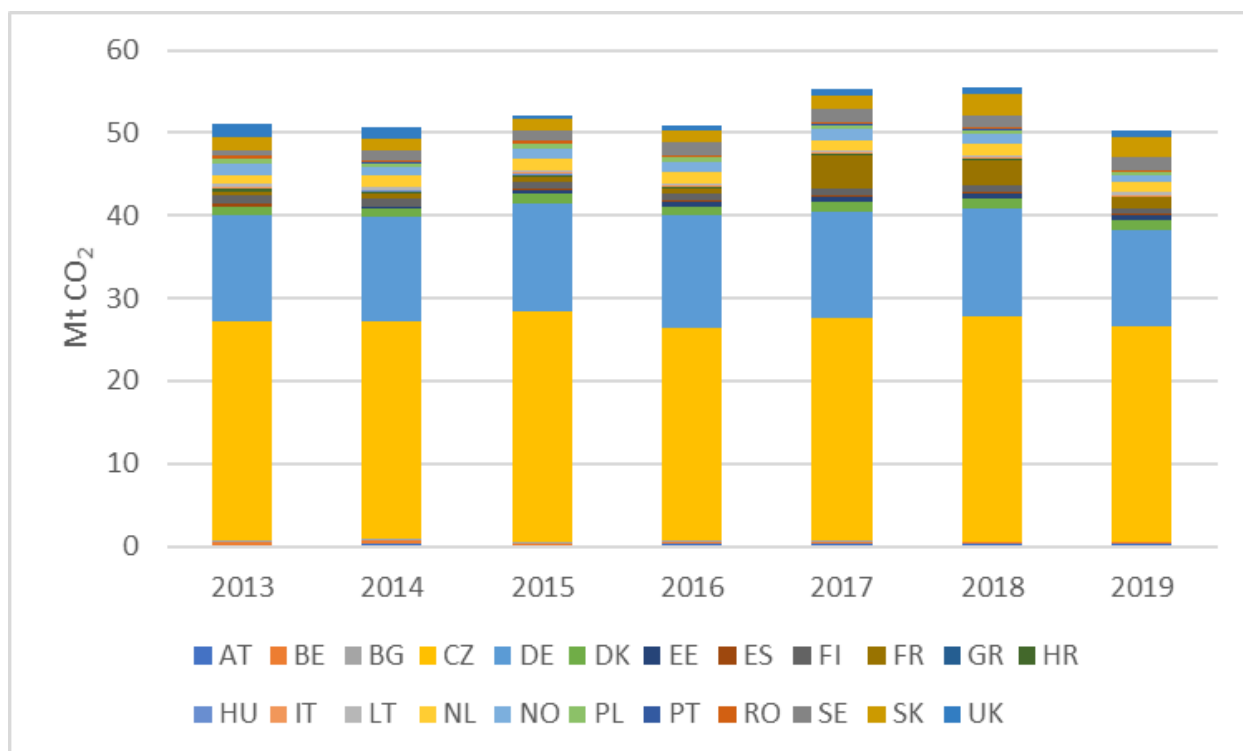


Figure 4.3-1 Emissions monitored by CEMS in Mt CO<sub>2</sub> (eq) for the years from 2013 to 2019.

Since 2013 until present, the amount of emissions covered by CEMS remained relatively constant (see Figure 4.3-1). An increase of 5 Mt CO<sub>2</sub> (about 9% of the total amount) was observed in the years 2017 and 2018. The rationale behind this increase is an increase in the use of CEMS in France in the respective years. The level of emissions monitored by CEMS in 2019 was equivalent to the levels before 2017. Czechia is still the highest contributor with a share of approximately 52% followed by Germany with a share of 23%.

Determination of the fossil CO<sub>2</sub> emissions can be complicated when the measured flue gas contained biomass. 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. This complication arises in 14 out of the 144 installations (9.7%). Most of these installations originate from Sweden (9 installations). The other 6 installations are situated in Czechia (2), Germany (1), Lithuania (1) and Slovakia (1).

## 4.4 Biomass use by installations and aircraft operators

Biomass is an important renewable energy source that can reduce greenhouse gas emissions of energy production. Biomass is defined in the MRR following the Directive 2009/28/EC on the promotion of the use of energy from renewable sources. Biomass is defined 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 mean 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.<sup>83</sup>

The use of biomass by stationary installations and biofuels by aircraft operators respectively has a positive effect on the environment and plays an important role in reducing fossil CO<sub>2</sub> emissions. Thus, it is essential to have an insight into how the requirements on the use of bio-liquids and biofuels and of biomass overall are being applied, the effectiveness of the requirements, trends over the years, and the amounts of sustainable (and non-sustainable) bio-liquids and biofuels that are used by installation and aircraft operators obligated under EU ETS. Data on the use of sustainable and non-sustainable biomass used in installations covered by the EU ETS is central to the Article 21 questionnaire. The data for the Article 21 responses are retrieved from the emission reports.

#### 4.4.1 The use of biomass in installations

In 2019, the largest share of fuels combusted within the EU ETS is of fossil origin. However, 29 countries (the same as in previous years) report the use of biomass in installations. The only countries that report no use of biomass are Liechtenstein and Malta. A significant improvement in the quality of the information reported by the EU ETS countries is noted as compared to the past few years. Therefore, the accuracy of the analysis performed is higher. In 2019, the zero-rated emissions from biomass rose from 161 Mt in 2018 to 169 Mt. These emissions correspond to an energy consumption of 1,864 PJ (2018) and 1,975 PJ (2019) resulting in a similar increase in consumption and emission (respectively 6% and 5%).

In 2019, 2,197 out of 10,569 installations (20.8% of all reporting installations under the EU ETS) reported the use of biomass. 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). 28.0% of category C installations combust biomass whereas the percentage of category B and A installations are 23.1% and 19.4%, respectively.

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<sup>83</sup> In 2019 this was still the sustainability requirements from the RED I Directive.

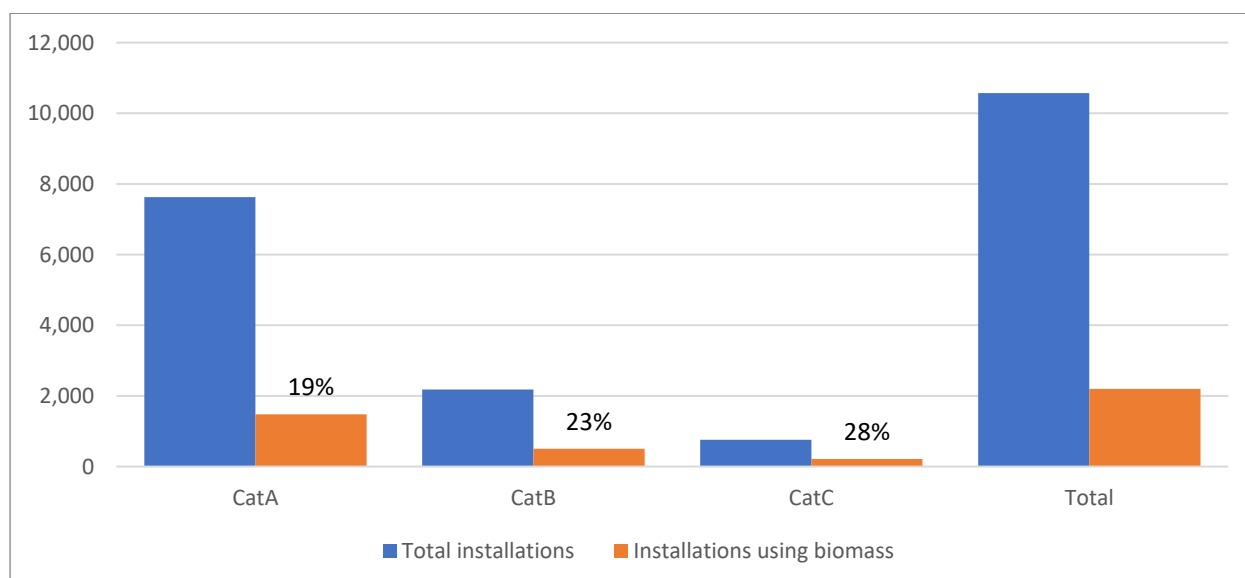


Figure 4.4-1 Number and percentage of category A, B and C installations using biomass

These figures translate into 1,479 category A (67%), 505 category B (23%) and 213 category C (10%) installations. These installations jointly emitted approximately 169 Mt biogenic CO<sub>2</sub>. The emissions of biomass which are zero-rated correspond to 13% of the total fossil combustion emissions of 1,270 Mt CO<sub>2</sub> (eq). The emissions of non-zero-rated biomass are still minimal with about 1.4 Mt CO<sub>2</sub> (eq) accounting for about 0.1% 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 50% with 84 Mt zero rated CO<sub>2</sub> whereas Category B and C installations emitted 52 and 33 Mt CO<sub>2</sub> (31% and 19%), respectively.

In the last two years the reported emissions from biomass have significantly increased, in particular in 2018 (by 17 Mt CO<sub>2</sub>, representing an increase of 12%). In 2019 biomass emissions again increased, albeit to a lesser extent (by 8 Mt CO<sub>2</sub>, representing an increase of 5%), as illustrated by Figure 4.4-2. In the years 2013 to 2017 the amount of emissions was relatively stable. Whereas increase in the use of biomass seems the main reason for this growth in emissions, such conclusion should be treated with care, since in the previous years the data submitted in response to this question was incomplete and contained errors, which caused some data gaps.

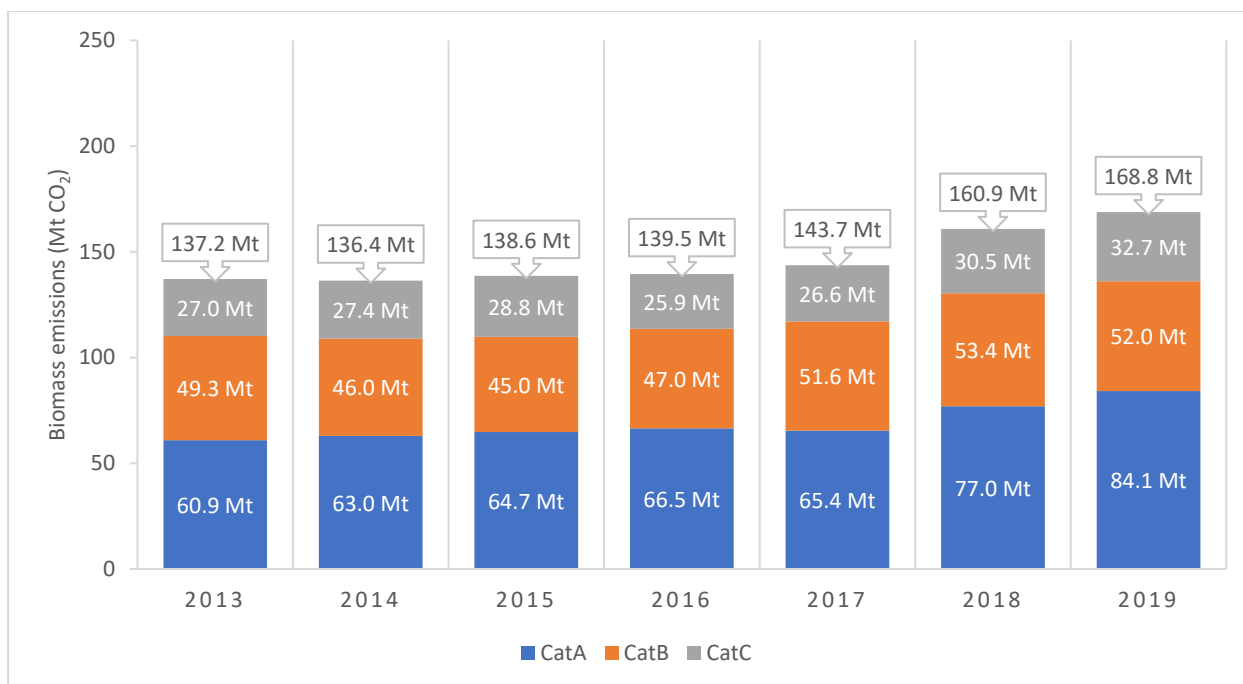


Figure 4.4-2 Emissions in Mt CO<sub>2</sub> (eq) originating from biomass between 2013 and 2019.

In 2019, in the EU ETS, the combustion sector accounted for 55% of the zero-rated biomass emissions across all reporting countries followed by the production of pulp with 22% and the production of paper or cardboard with 17%. This is similar to the situation in 2018.

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

Despite the potential that biofuels have in terms of reducing aviation emissions, until presently they have not been widely used. In 2019, only 2 aircraft operators have reported as having used biofuels, 1 in Germany and 1 in Sweden. Since the beginning of Phase 3, the use of biofuels has only been reported in these 2 countries (and not in all years). The total amount of emissions from zero-rated biofuels reported by the aviation sector amount only to 6,562 tCO<sub>2</sub>. 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 2019, 26 countries (the same number as in 2018) reported CO<sub>2</sub> emissions from waste used as a fuel or input material. Iceland, Liechtenstein and Malta reported zero emissions from waste. The Netherlands and Norway did not provide information on emissions from waste as the information available to them was not available or incomplete. This was largely due to operators not having reported those emissions in their emission reports. Belgium could also only report partial data on waste emissions. 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 operators' reports.

Overall, emissions from waste as a fuel or input material have decreased by 3.9% compared to 2018, for the reporting countries. The total EU ETS emissions from waste as a fuel or input

material were approximately 27 Mt CO<sub>2</sub> (eq) in 2019. Amongst the 26 countries that reported their emissions from waste, 11 reported a decrease and 15 reported an increase in waste emissions from 2018 to 2019. However, this data should be treated carefully due to the above-mentioned reporting limitations and the new reporting system in France (see section 4.1.1 leading to a significant decrease of reported emissions from waste).

The largest emissions from waste use in 2019 were reported by Italy amounting to 8 Mt CO<sub>2</sub> (eq). In relative terms the highest shares of emissions from waste use compared to total verified emissions are found in Sweden and Denmark. Sweden reported a share of 14.6% in 2019, which is an increase compared to the 13.1% in 2018. Denmark reported the second highest share, i.e., 12.3%, an increase compared to 11.0% in 2018.

Total emissions from the use of waste have been relatively constant since 2016, around 28 Mt CO<sub>2</sub> (eq), decreasing to 27 Mt CO<sub>2</sub> in 2019. When the emissions from waste use in absolute numbers are compared, besides the decrease in values for France mentioned above, 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 14.6% of their EU ETS totals. In other countries these emissions were less than 2.5% of their total emissions. Figure 4.5-1 provides the aggregated emissions for each reporting country between 2013 and 2019.

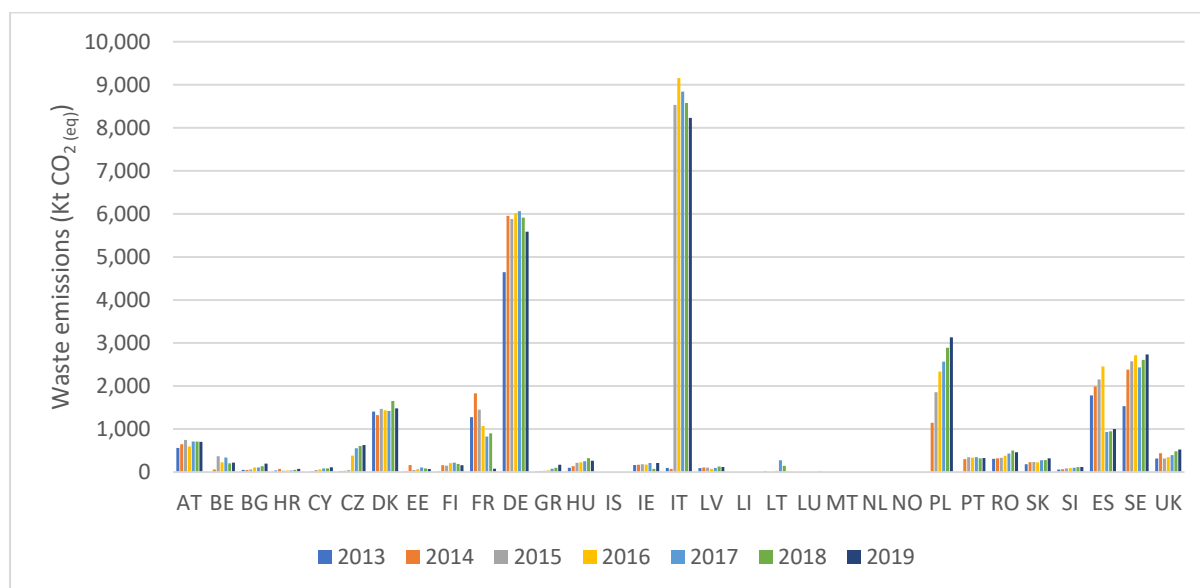


Figure 4.5-1 Emissions from waste as fuel or input material in kt CO<sub>2</sub> (eq), by country.

## 5 Information on robustness of the MRV system

This chapter assesses the robustness of the MRV system for both stationary installations and the aviation sector and provides an overview of the extent to which the MRV system is implemented satisfactorily. First, the chapter addresses monitoring aspects such as the application of default values, alternative monitoring approaches and the extent to which the highest tier approaches are applied. Second, the chapter provides information on how the quality of emission reports is monitored at country level, the number of issues identified in the verification and the quality of reporting. Furthermore, the chapter investigates whether an improvement over time can be identified in the monitoring and reporting in EU ETS countries and what recommendations can be made to improve shortcomings.

### 5.1 Stationary Installations

Stricter monitoring requirements are applied for larger installations and depending on the size of the source stream. More simple approaches, such as the application of default values, can be applied only in specific cases and under strict conditions which are specified in the MRR. Therefore, the extent to which EU ETS countries deviate from the more accurate approaches and whether this is justified according to the MRR requirements is a key aspect in assessing the quality of the monitoring.

Concerning monitoring, the information contained in the Article 21 reports show that the quality of monitoring has improved over the years. Default 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 countries reported that these plans are for most part complete and in accordance with the requirements of the MRR. Less complications with the submission of sampling plans were identified and 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. Furthermore, the number of category B and C installations derogating from the highest tier has been steadily decreasing over time, except for a small increase from 2018 to 2019. This means that over time more installations are applying the strictest monitoring requirements with the more stringent uncertainty requirements. The same development is seen in the application of the fall-back approach, an exception of the normal tier approach. This approach is used only by a very small number of installations.

Concerning reporting, a similar improvement can be observed. On the one hand there was a slight increase in the checks carried out on emission reports and the emission reports rejected. This means that CAs are keeping a closer eye on the quality of reporting. On the other hand, the high number of outstanding issues reported by verifiers in the verification report shows that these issues are identified in the verification and followed-up. All this shows that verification combined with additional control measures by CAs are effective instruments to assess the accuracy 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. In principle, sampling and analysing site-specific emission factors and other parameters are more accurate than applying default values. 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. In the first part of question 5.7, the Article 21 questionnaires asks for “type I default values”<sup>84</sup> and literature values agreed with the CA (which includes country specific inventory factors).

29 countries<sup>85</sup> reported using literature or default values. Similar to previous years, Liechtenstein and Lithuania did not report the use of any default or literature values for calculation factors. 10,949 installation operators covered by the EU ETS used default values in 2019 (8,295 literature values agreed with the CA<sup>86</sup> and 2,654 type I default values<sup>87</sup>). Compared to 2018 the number of default values according to Article 31(1) (c) (d) and (e) are fairly constant (the total number of default values used in 2018 was 10,858, 0.8% lower). Because it is possible for multiple installations to use the same default value, the number of different default values is lower than the number of installations using them: countries listed a total of 519 different literature values and 1,560 type I default values.

An explanatory factor for the high number of default values used is 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 5,552 installations. The second and third highest number were reported by Poland (2,061 cases) and the United Kingdom (736 cases). 15 of the 29 countries reported fewer than 50 installations.

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<sup>84</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>85</sup> This includes Belgium, which did not report any literature values in recent years, but Belgium commented that only new default values are reported each year, and that no new values were approved by the Competent Authorities compared to previous years. The calculations in this chapter use the phase 3 cumulated numbers for Belgium.

<sup>86</sup> based upon point (c) of Article 31(1) of the MRR.

<sup>87</sup> constant values in accordance with points (d) or (e) of Article 31(1) of the MRR.

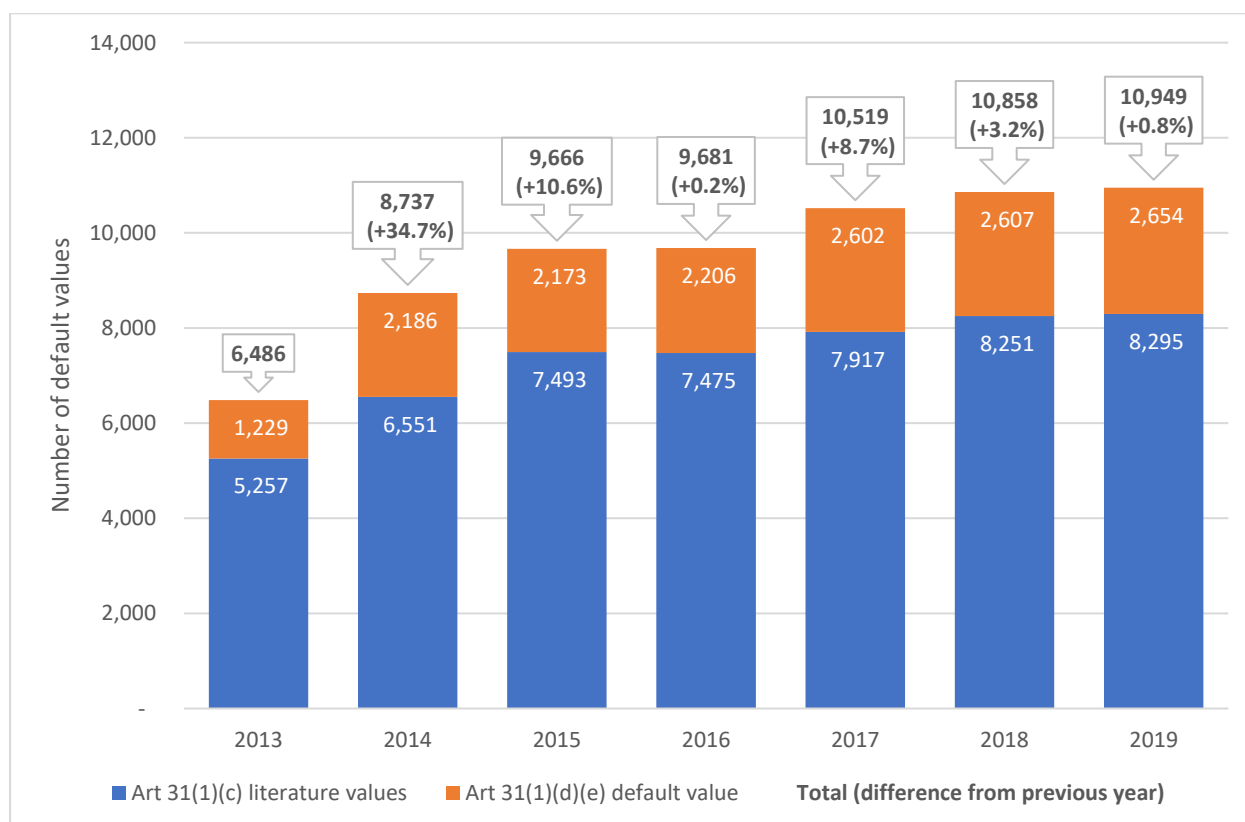
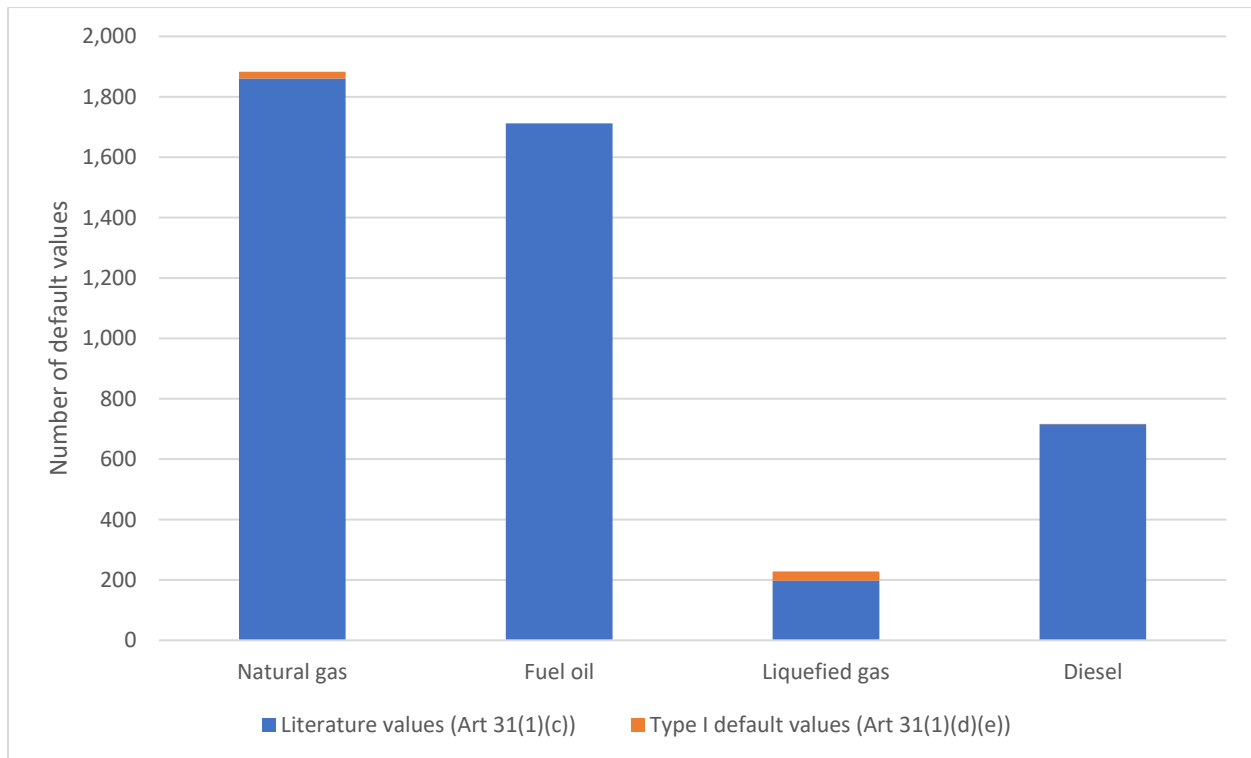


Figure 5.1-1 Number of reported literature values (Article 31(1) (c)) and default values (Article 31(1) (d) and (e))

Amongst the countries analysed, Germany was the main contributor to default values in 2019 which is similar to previous years. German installations applied 4,721 literature values and 831 Article 31(1) (d) and (e) default values. The literature and default values came basically from 4 input materials (i.e., natural gas, fuel oil, diesel and liquefied gas) summing up to a total of 4,541 cases (see Figure 5.1-2). The high number of installations using literature and default values used in Germany is consistent with the characteristics of the installations and type of source streams. First, Germany has a high number of category A installations (1,320) with a high share of minor and de-minimis source streams which means that the use of literature and default values is permitted. Second, for the category B and C installations a large part of major source streams concerns fuel oil, diesel and liquefied gas. As these are commercial standard fuels the use of literature and default values is permitted. It should be noted that the literature values are part of a national list of standard factors<sup>88</sup> under Article 31(1) (c) MRR that are established by the DEHSt in Germany. A very low number is an individually agreed literature value.

<sup>88</sup> The standard factors on the national list are derived from ETS analysis data. For tier 2a a standard factor on that national list must be applied.



*Figure 5.1-2 Number of reported literature values for the 4 most abundant fuel types in Germany as the main contributor of standard values (Article 31(1) (c)) and Type I default values (Article 31(1) (d) and (e))*

As minimum requirements for category A installations and for commercial standard fuels a tier 2a/2b approach for the calculation factors are defined in the MRR. 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 fuel oil is therefore eligible to apply such literature values. Germany reported more than 71% of their installations as Category A installation (i.e., 1,320) (see section 3.4.1). The high share of de-minimis and minor source streams in category A installations and the use of commercial standard fuels therefore explain the use of such default values.

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. In 2019, 24 countries reported 2,404 cases, which is 19 cases less than the year before. As presented in Figure 5.1-3, the highest number of occurrences was reported by France (910); the second highest was reported by Netherlands (429) and the third highest was reported by Italy (279). Notably, France has reported the exact same numbers for the last 6 years, and Italy for the last 4 years.

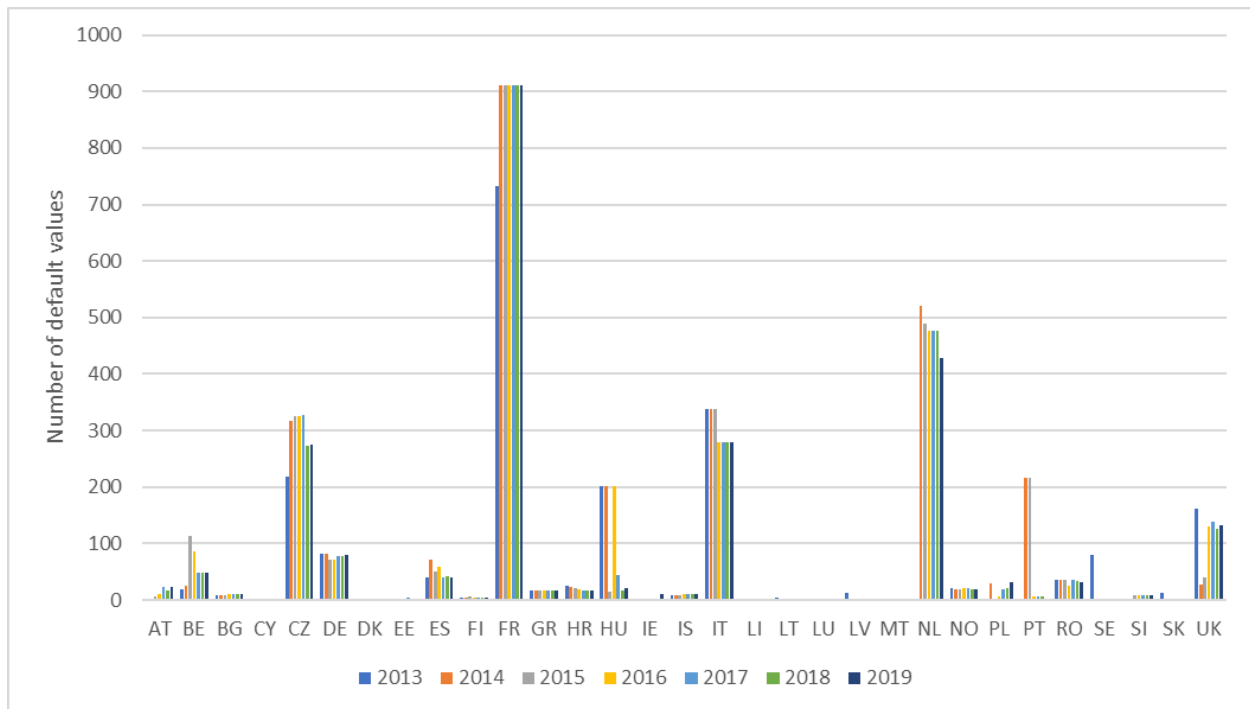
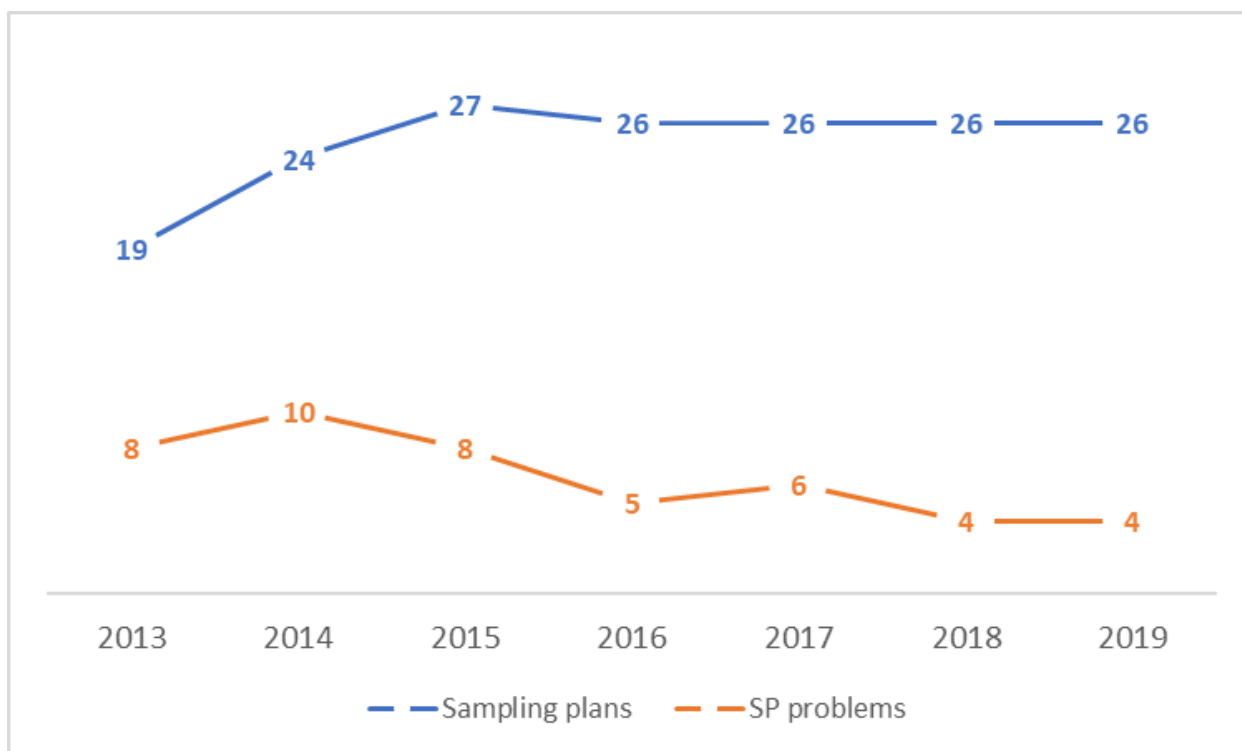


Figure 5.1-3 Number of Annex VI default values from 2013 to 2019 reported by countries.

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

The determination of activity data and the determination of calculation factors are key elements in monitoring. 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.

In 2019, sampling plans were drawn up in 26 countries in all cases required under Article 33 of the MRR. This was similar to the number of countries reported in 2017 and 2018 (see Figure 5.1-4). Similar to 2018, 5 countries provided the same additional feedback: Spain reported 4 installations, 2 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; finally, Sweden could not answer this question, as it could not automatically extract the information from the monitoring plans.



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

In 2019, there were 160 cases in which the CA 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 constitutes a significant increase compared to 2018, i.e., 44 additional cases<sup>89</sup> or 38% increase. The increase can be explained in large part by the 33 additional cases in France, 6 in the UK and 5 in Poland.

In general, based on the data presented it can be concluded that sampling plans across all EU ETS countries are complete and comply with the requirements of Articles 33 and 34 of the MRR. Although the number of installations for which the CA has allowed a different frequency of analysis than the ones listed in Annex VII of the MRR, has increased, the number is still relatively low given the total number of installations.

### 5.1.3 Derogation from highest tiers

According to Articles 26 and 41 of the MRR, operators of category B and C installations 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 must apply at least the tiers specified in Annex V of the MRR for major source streams. Regardless of the installation category, the tiers listed in Annex V are applicable to the calculation factors for commercial standard fuels. 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 2 tiers lower for small and medium installations (categories A and B).

<sup>89</sup> The significant increase in France can be explained because it introduced a new reporting platform. More accurate data could be obtained on the number of installations for which a different frequency of analysis was applied. In practice no significant increase took place.

A decline can be noted 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 (see Figure 5.1-5). The figure also shows the number of affected source streams (of category C installations) for the years 2013 to 2019. The number of category C installations not applying the highest tier methodology decreased from 128 to 102 between 2013 and 2019. Those 102 category C installations applied lower tiers than required to 226 affected source streams (an increase by 15 compared to 2018). The number of category B installations with at least 1 derogation from the highest tier each increased from 424 in 2018 to 483 in 2019 (which is still considerably lower than the 666 in 2013).

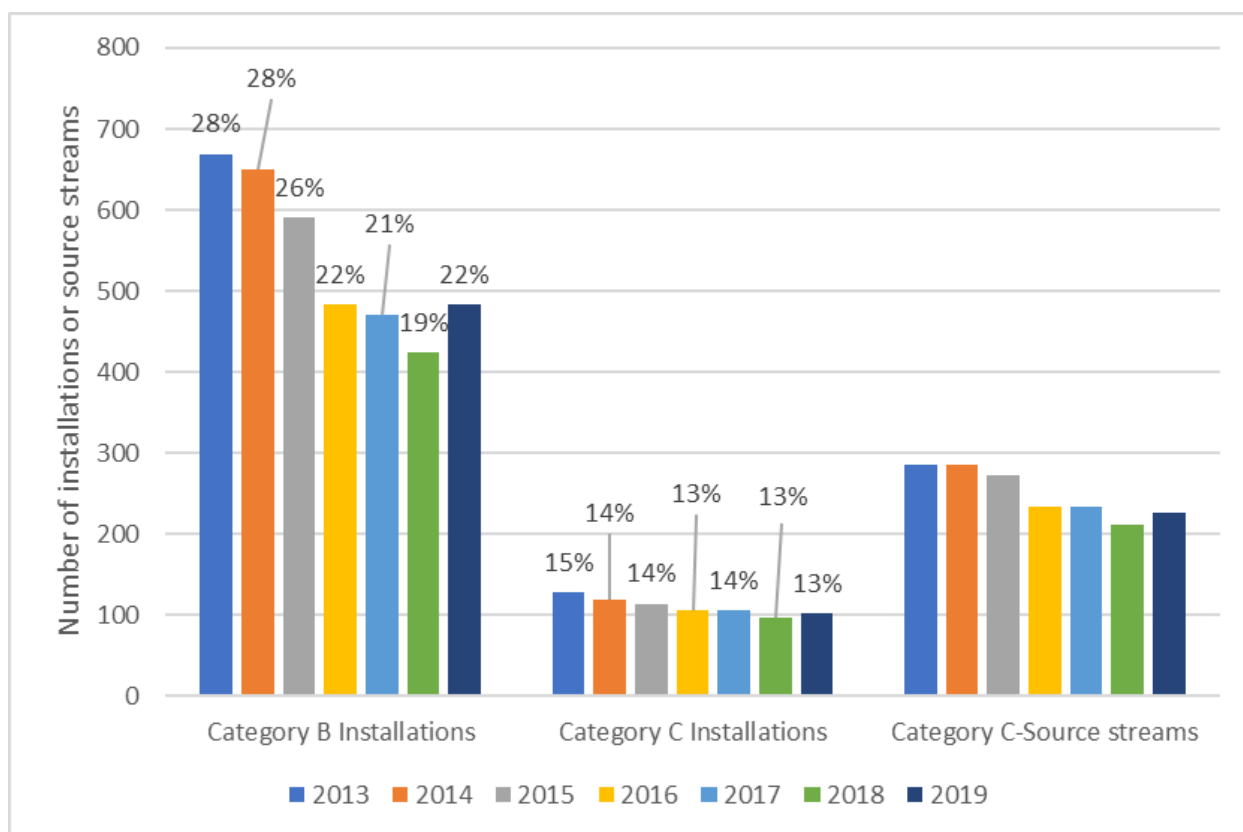


Figure 5.1-5 Number of installations (category C and B) including the percentage of total category B and C installations and affected major source streams (category C) derogating from the highest tiers approach for the years 2013 to 2019

The total number of installations has decreased as well (as explained in section 3.4). To be able to assess possible improvements in the MR systems, it is important to check the proportion between installations derogating from the highest tier approach and the total number of installations. In 2019, 13.4% of category C installations did not apply the highest tier in 1 of their source streams compared to 14.7% in the year 2013 and 12.8% in the year 2018.<sup>90</sup> For category B installations not meeting the highest tier, the relative reduction was even more notable, i.e., a decrease was identified from 28% in 2013 to 22.1% in 2019 (almost 3% more than in 2018<sup>91</sup>).

<sup>90</sup> To be noted that the values for Category B and Category C have been mixed up by mistake in the previous year's report.

<sup>91</sup> A decrease of 19.2% in the number of category B installations not meeting the highest tier.

There is a clear indication of continued improvement in the quality of monitoring. An increasing number of installations are meeting the highest tier and are monitoring according to more accurate and strict monitoring requirements than at the start of phase 3. However, compliance with the highest tier should continue to be monitored as in 2019 the installations not meeting the highest tier seem to have increased slightly.

#### 5.1.4 The fall-back approach

According to Article 22 of the MRR, operators may, under strict conditions, apply a non-tier methodology (known as the “fall-back methodology”) to selected source streams or emission sources provided certain conditions have been met. Conditions include the impossibility to apply at least tier 1<sup>92</sup> for one of the major or minor source streams because of technical infeasibility or unreasonable costs, the application of an uncertainty assessment in accordance with ISO guide to the expression of uncertainty in measurement and the application of an overall uncertainty threshold that is prescribed in Article 22 of the MRR.<sup>92</sup>

In 2019, 13 countries reported using the fall-back approach; this is 2 countries more than in the previous year (Croatia and Ireland). Despite these additional countries, the number of installations has decreased compared to 2018, from 38 to 34. However, the estimated emissions covered by fall-back approaches slightly increased, from 2.8 Mt CO<sub>2</sub> (eq) in 2018 to 3 Mt CO<sub>2</sub> (eq) in 2019. In the Netherlands, although the number of installations reported reduced from 9 to 5 installations applying the fall-back approach, the amount of emissions arising from a fall-back approach increased considerably. As a consequence, the emissions arising from a fall-back approach in the Netherlands represented close to 54% of the total EU ETS emissions arising from a fall-back approach in 2019.

In total only 0.32% of the installations under the EU ETS use a fall-back approach, representing 0.24% of the total verified emissions. This shows that the fall-back methodology is an exception that can only be applied in certain specific circumstances permitted under Article 22 of the MRR.

#### 5.1.5 Improvement reports

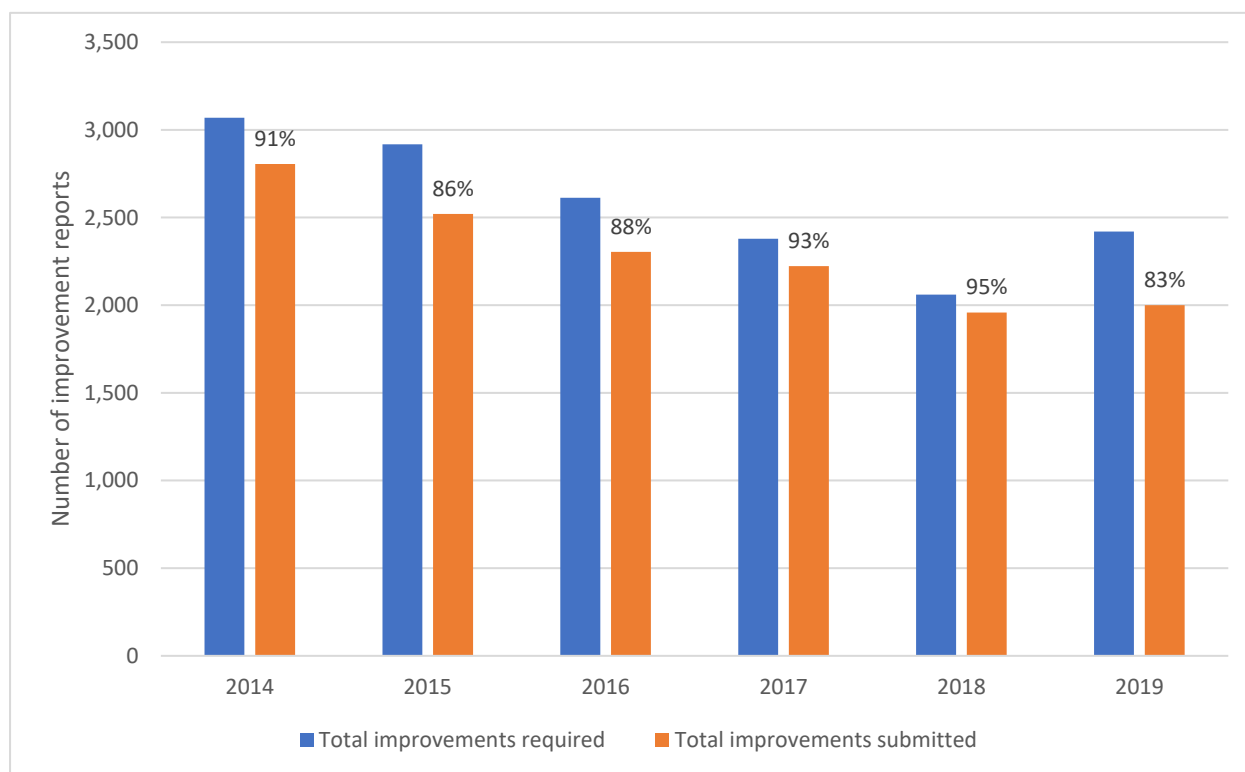
According to Article 69 of the MRR operators are required to explore possibilities to improve the monitoring methodology. An operator must submit for the CA’s approval a report containing information about improvements for achieving higher tiers, if the “required” tiers are not yet applied, and to provide justification if the operator applies a fall-back methodology. The report must also contain information on each non-conformity identified and/or possible improvement and recommendation by the verifier in the verification report.

In 2019, 29 countries reported on the number of installations that were required to submit and/or that had actually submitted, improvement reports. Overall, installations submitted to the CA 2,000 improvement reports out of the required 2,420 (see Figure 5.1-6). It should be noted that in these figures, the same installation may be counted more than once, if more than one type of improvement report was relevant, or if the installation performs more than one Annex I activity.

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<sup>92</sup> The operator demonstrates to the satisfaction of the competent authority that by applying such a fall-back monitoring methodology, the overall uncertainty thresholds for the annual level of greenhouse gas emissions for the whole installation do not exceed 7,5 % for category A installations, 5,0 % for category B installations and 2,5 % for category C installations.

Latvia and Liechtenstein<sup>93</sup> had either no installation where an improvement report was required or could not report any data. Hungary reported the numbers of required reports but indicated 0 reports received in 2019. The data should be interpreted carefully because Competent Authorities can allow operators to submit the improvement report no later than 30 September. If an operator postpones the submission of the improvement report until that time, it will not be included in the Article 21 report that needs to be submitted by the 30th of June each year.



*Figure 5.1-6 Sum of improvement reports for the years 2014 to 2019 (required and submitted) and percentage of submitted to required.*

The proportion between submitted and required improvements, which had been increasing in the previous 4 years from 86 to 95% has gone down to 83%, with absolute number of required improvement reports showing a clear increase in 2019.

In total 14 countries report that all reports required were actually submitted.

In 2019, the number of outstanding issues in verification reports amounted to 4,330. A direct comparison to submitted improvement reports cannot be made because several issues could be dealt with in 1 improvement report. Table 5.1-1 presents the number of outstanding issues in verification reports by the type of issue between 2013 and 2019.

The total amount of outstanding issues in verification reports recorded a drop from 2013 to 2014. Subsequently, an increase in the number of issues was recorded between 2014-2017, followed by another decrease in 2018 and an increase in 2019 in the range of the previous years. Across the EU ETS countries similar types of non-conformities, non-compliance issues and recommendations

<sup>93</sup> In Liechtenstein there are only 2 small installations that are very simple and have little room for improvement. Furthermore, no issues were reported in the verification report. An improvement report was therefore likely not required.



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. Similar types of issues were found in earlier years.

*Table 5.1-1 Outstanding issues in verification reports, 2013–2019*

Type of Issue	2013	2014	2015	2016	2017	2018	2019
Non-material misstatements	664	383	165	347	284	279	271
Non-conformities that do not lead to a negative VOS	1 691	977	1 165	1 173	1 412	1 180	1 257
Non-compliance with MRR	1 092	652	794	770	957	763	912
Recommendations for improvement	2 728	2 148	2 119	2 199	1 902	1 678	1 890
<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>	<b>4 330</b>

### 5.1.6 Conservative estimation of emissions

According to Article 70 of the MRR the CA 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 presents the number of installations for which Competent Authorities made conservative estimations and the aggregated estimated emissions for those installations. These numbers require careful interpretation. In some cases, the need for a conservative estimate may be discovered a year or more after the reporting period in which the emissions occurred: for example, when the CA has identified later on that an annual emission report is not in line with the MRR. It is therefore difficult to identify clear trends in the conservative estimation of emissions.

Until 2017, the United Kingdom was the highest contributor both in the number of installations for which conservative estimations were made, and in the corresponding estimated emissions. However, in 2018 and 2019 no additional cases were reported by this country. For 2018 and 2019, in each year the vast majority of the conservatively estimated emissions are related to only 2 large installations.

Figure 5.1-7 shows that not in all cases where conservative estimation according to Article 70 of the MRR is applied, is the total amount of the installation’s emissions conservatively estimated. Sometimes only part of the verified emissions is incorrect or missing and in those situations only the relevant share of the total emissions is conservatively estimated by the CA. The CA will then partially rely on emissions that were accurately determined and verified in accordance with the rules and replace the incorrect or missing data with a conservative estimate.

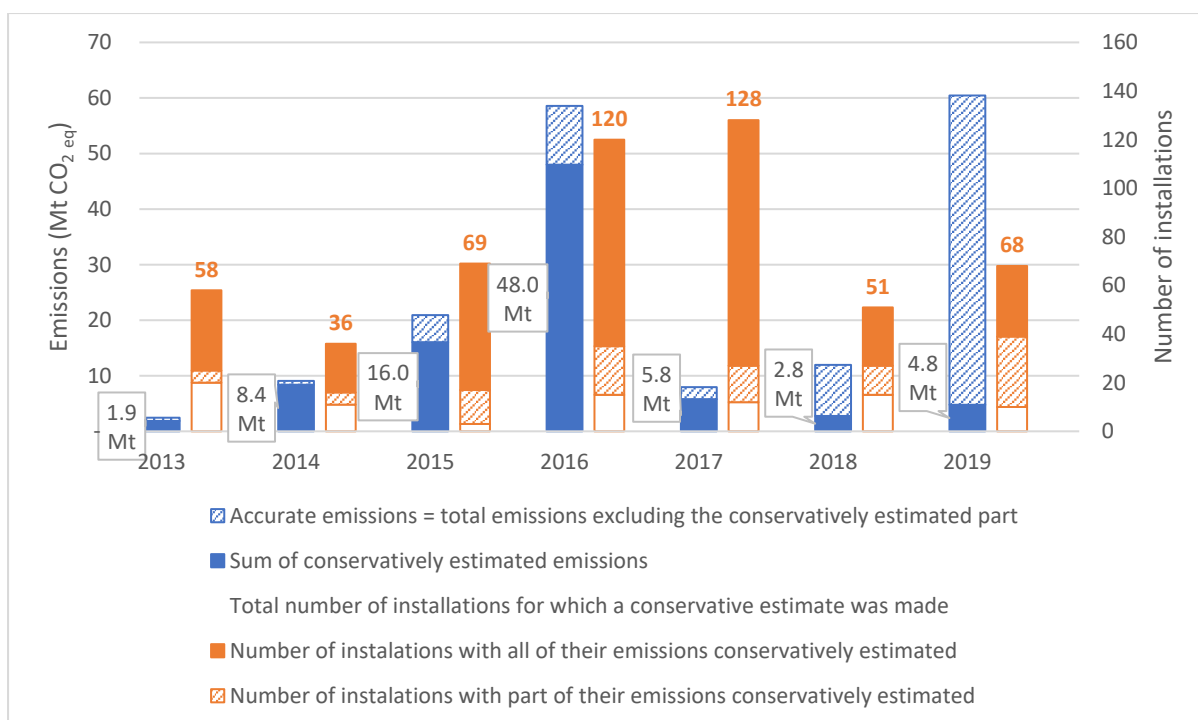


Figure 5.1-7 Number of installations for which the CA made a conservative estimation and the aggregated estimated emissions in Mt CO<sub>2</sub> (eq) for the years 2013 to 2019.

Table 5.1-2 gives an overview of the conservative estimations as a percentage of the total verified emissions. It should be noted that the presented values are for the year in which they were reported, in a small share of the cases this may include emissions from years preceding the reporting year. Although there is no clear trend over time, it is evident that the instrument of conservative estimations remains in use, albeit for a small share of the overall EU ETS emissions.

Table 5.1-2 Conservative Estimations in % of the total verified emissions between 2013 and 2019

2013	2014	2015	2016	2017	2018	2019
0.10%	0.46%	0.89%	2.74%	0.33%	0.16%	0.32%

### 5.1.7 Checks on emission reports/verification reports

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. The compliance cycle refers to the annual process of monitoring, reporting, verification of emissions and the CA's procedure for reviewing emission and verification reports. Verification by competent verifiers that are accredited by a national accreditation body according to the AVR is an essential safeguard in ensuring 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. Checks by the CA 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 countries with the exception of Italy<sup>94</sup> reported that they perform additional checks to evaluate emission and verification reports. In 28 countries Competent Authorities checked all reports for completeness and internal consistency. 22 countries reported that all AERs were reviewed in detail against the corresponding monitoring plan. The other countries reported that they review at least a certain percentage against the corresponding monitoring plan, ranging from 5% to 86%. Approaches include risk-based approaches, random selections, selection based on certain criteria. Information from the Compliance cycle evaluation<sup>95</sup> shows that the way these approaches are implemented in the countries differ. Some countries have IT based selection of emission reports that are checked in detail, other use excel tools or other mechanisms to determine the share of reports to be checked. The type of criteria used in risk-based approaches are usually based on the ones listed in the Commission guidance on assessing emission reports and verification reports.

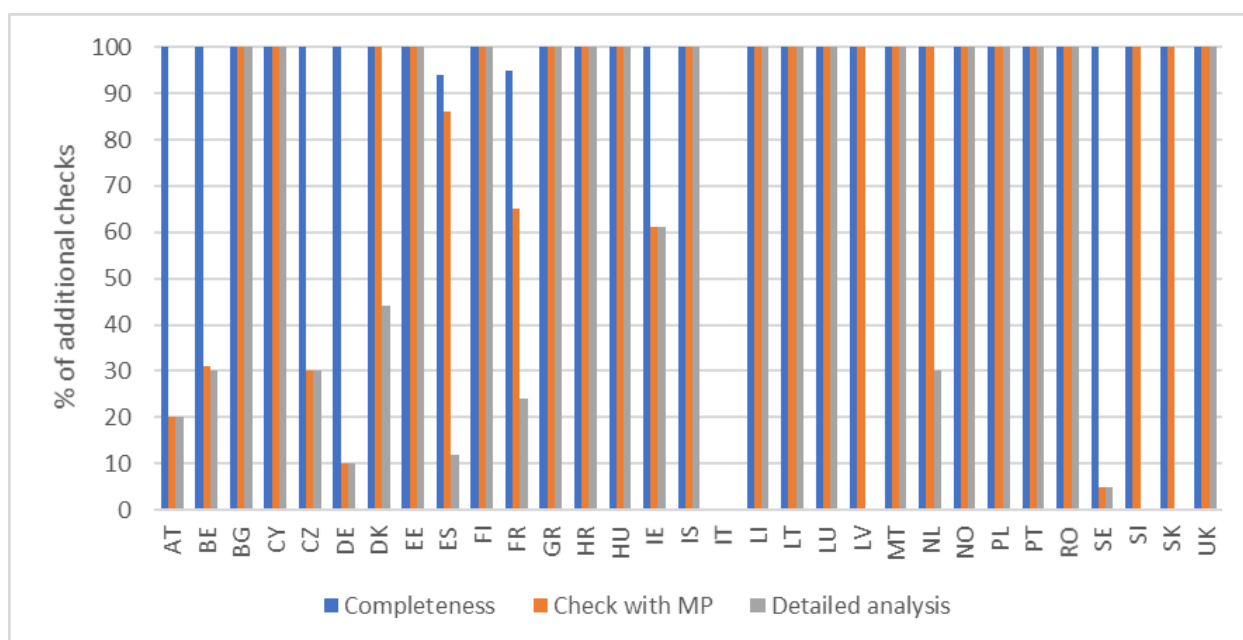


Figure 5.1-8 Additional checks for completeness and internal consistency, for consistency with the monitoring plan and of emission reports that were analysed in detail in [%].

Other performance checks included checking against allocation data (20 countries performed additional checks on all installations and 5 countries on a share of installations), comparing to other data (by 16 countries to 100% and 7 to a certain percentage) and detailed analyses of emission reports (by 17 countries to 100% and 10 to a certain percentage).

18 verified emission reports, across 2 countries (9 in France and 9 in Norway) were rejected as a result of the checks because of non-compliance in 2019. A slight increase compared to the 12

<sup>94</sup> Italy reports to carry out basic checks only because of lack of resources. They rely on verification by verifiers. Although this seems to deviate from the approach of all other countries this information should be treated with caution. Other information sources suggest that additional checks reported by some countries could be seen as basic checks only. Furthermore, it is known that Italy is issuing a significant number of fines, much higher than other countries, which could indicate a high number of errors compared to other countries but could also indicate that the follow-up as a result of verification is functioning.

<sup>95</sup> Results of 5th Compliance Cycle Evaluation of EU ETS MRVA implementation, 2020:  
[https://ec.europa.eu/clima/sites/default/files/ets/monitoring/docs/report\\_5th\\_compliance\\_en.pdf](https://ec.europa.eu/clima/sites/default/files/ets/monitoring/docs/report_5th_compliance_en.pdf)

rejected reports in 2018 was recorded in 2019, which represents less than 0.2% of the total installations. The number of emission reports rejected because of reasons other than non-compliances was equal to 100 in 2019 spread across 4 countries. This was similar to the preceding year.

In 2019, across EU ETS countries, 118 emission reports that had been rejected compared to 112 in the previous year. Lithuania was the country with the highest reported number of rejections (60 compared to 71 in 2018). The reasons for rejection of the reports varied and included empty files, invalid operating capacity or missing permit number or CRF categories. The operators have been requested to correct and resubmit their emission reports.

The total number of rejections and incidents relative to the total number of emission reports is quite low. However, substantive variations in the approach to reporting the data were found across countries. 15 countries had not rejected any of their emission reports during phase 3 and 8 countries had rejected no more than 3 reports. Lithuania and Portugal have been responsible for 71%, 78% and 77% of the rejected reports for 2017, 2018 and 2019, respectively. There are no obvious differences in the additional checks carried out by those 2 countries compared to the others that can explain the high number of rejections. The underlying assumption is that the diverse interpretation of the MRR and AVR in the countries might have been conducive to different levels 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. In line with Article 31(1) and 32 of the AVR, only under specific conditions and exceptional circumstances a site visit can be waived.

In 2019, 10 countries reported waiving site visits for in total 220 installations with emissions of more than 25,000 t CO<sub>2</sub> (eq). This is compared to 102 in 2018 and 93 in 2017. This is 1 more country than in 2018, but the countries that waived site visits were not always the same as in 2018 (only 6 countries waived site visits both in 2018 and in 2019). Furthermore, in 2019, 19 countries waived site visits for installations with low emissions,<sup>96</sup> which is 4 more than in 2018. The conditions under which site visits were waived by verifiers mostly concerned category A or B installations using natural gas and/or 1 or more de-minimis source streams.<sup>97</sup> The other condition that was invoked most often related to offshore installations.<sup>98</sup> These waive of site visits have to be approved by the CA. In 2019, site visits were waived for 638 installations with low emissions compared to 581 in 2018 (corresponding to 10.6% of all installation with low emissions). Sweden, Denmark and Finland waived the highest number of visits (128, 113 and 109 visits, respectively).

## 5.2 Aircraft operators

For aircraft operators, derogations from the highest tier approach are very seldom applied. Given that only commercial fuel types are consumed in the aviation sector for which standard factors are

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<sup>96</sup> As referred to in Article 47(2) of the MRR.

<sup>97</sup> The monitoring of activity data of natural gas must be based on fiscal metering by the gas supplier and default values must be applied for the calculation factors.

<sup>98</sup> when the site is at a remote or inaccessible location and there is a high level of centralisation of data collected from that site and transmitted directly to another location where all this data is processed, managed and stored with good quality assurance. More information is provided in KGN II.5 on site visits.

applicable, sampling plans and frequencies of analysis for the determination of calculation factors are also not relevant. Biofuels are consumed only in exceptional cases which require the application of sampling plans and analysis frequencies. Biofuels were used by only 2 aircraft operators in 2019 (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 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.

### 5.2.1 Improvement reports

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

In 2019, 14 countries reported a number of aircraft operators that were required to submit improvement reports (compared to 17 countries in 2018). 17 EU ETS countries either had no aircraft operator for which an improvement report was required or could not report any data. A lower proportion of improvement reports was submitted by aircraft operators as compared to what was required. More precisely, aircraft operators submitted 47 improvement reports to the CA where there were 78 required (see Figure 5.2-1). Since 2015, there has been a steady decline in both the required and the submitted improvement reports for aircraft operators. Between 2014 and 2015, an increase in the submission of improvement reports relative to required improvement reports was observed, i.e., increase from 27% to 73%; this was due in large part to the fact that at the time, the deadline for sending improvement reports regarding emission reports from 2013 and 2014 had been in many cases postponed to 2015, and therefore only a few of these improvement reports had been received already in 2014. Since then, the share of submitted improvement reports related to required improvement reports has reduced to 60% in 2019. This share is still significantly lower than for operators of stationary installations, but this is likely influenced by the simple and strict monitoring rules for aviation activities, which leaves less room for improvement compared to stationary installations.

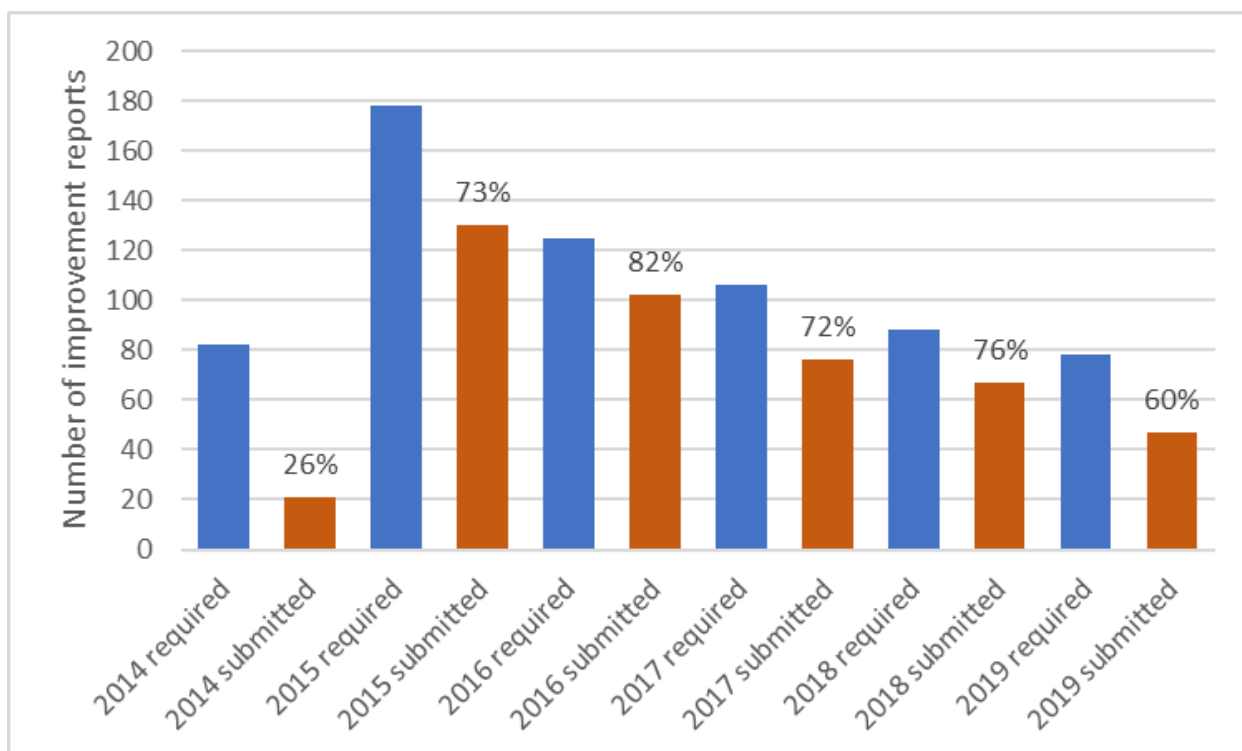


Figure 5.2-1 Sum of improvement reports for the years 2014 to 2019 (required and submitted) and percentage of submitted to required.

In 2019, 19 countries reported 150 outstanding issues in the verification reports. Table 5.2-1 presents the number of outstanding issues in verification reports by the type of issue. No issue related to tonne-kilometre reports was reported since no such reports were required.

Table 5.2-1 Outstanding issues in verification reports, 2013–2019

Type of Issue	2014	2015	2016	2017	2018	2019
Non-material misstatements	43	37	17	23	25	18
Non-conformities that do not lead to a negative VOS	40	36	21	26	20	21
Non-compliance with MRR	25	21	15	17	9	17
Recommendations for improvement	149	137	95	78	78	94
<b>Total</b>	<b>257</b>	<b>231</b>	<b>148</b>	<b>144</b>	<b>132</b>	<b>150</b>

## 5.2.2 Checks on emission reports/verification reports

Emission and verification reports from aircraft operators were checked by CAs as an additional quality control measure. In 27 countries, checks were made on emission and verification reports (with the exception of Hungary, Italy, Latvia and Liechtenstein).<sup>99</sup> Compared to 2018, 1 additional country made checks on emission and verification reports (Italy).

<sup>99</sup> Liechtenstein does not administer any aircraft operators.

Similar to 2018, in 2019, 27 countries checked the emission and verification reports for completeness and internal consistency, of which 25 countries checked all reports. Cyprus assessed 50% of the reports on these aspects whereas Sweden checked 10% of all reports. 24 EU ETS countries reviewed in detail against the corresponding monitoring plan. Checks by Cyprus and France were lower with 50% and 5%, respectively.

Other performance checks included cross checks with other data (by 23 countries) and detailed analysis of emissions reports (by 21 countries). 18 countries analysed 100% of their emission reports in detail, Belgium up to 27%, Lithuania up to 50% and Norway up to 67% of all reports.

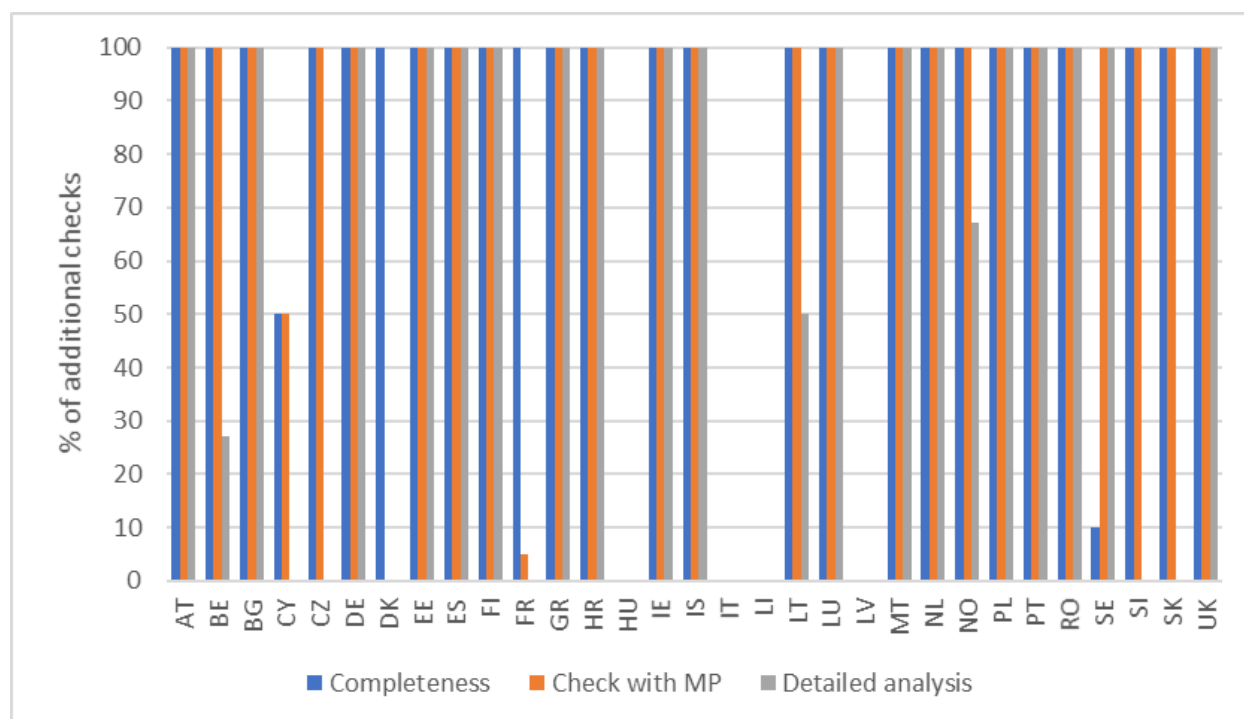


Figure 5.2-2 Additional checks for completeness and internal consistency, for consistency with the monitoring plan and of emission reports that were analysed in detail in [%].

As a result of the checks, no verified emission reports were rejected for non-compliance, but 3 emission reports were rejected because of reasons other than non-compliance in 2019. Those were emission reports issued in Portugal (2 of them) and in Lithuania.

### 5.2.3 Waiver of site visits

In cases where a verifier has concluded based on its risk analysis that the relevant data can be remotely accessed, it may decide not to carry out a physical visit to the site of a small emitter. For installations emitting more than 25 kt CO<sub>2</sub> (eq) per year, CA's approval for a waiver of site visit is required. Site visits for large aircraft operators 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>100</sup>

<sup>100</sup> Section 3.2.7 of Guidance Document III on verification in EU ETS Aviation.

14 countries (Austria, Belgium, Denmark, France, Germany, Iceland, 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. A total of 80 site visits have been waived by a verifier for small emitters, most of which were in France (21), followed by United Kingdom (14). The total number of site visits waived by a verifier for small emitters is similar to the number in 2018, which was at 83.

#### 5.2.4 Conservative estimation of emissions

The CAs must make a conservative estimate of the operator's emissions in cases in which aircraft operators fail to report emissions as required. In 2019, conservative estimates were made by CAs for 31 aircraft operators in 5 countries. This was done either by extracting information from the ETS support facility or using the small emitter tool or by the operator's information. In 2019, conservatively estimated aviation emissions totalled 1,065 kt CO<sub>2</sub>. This represents a sharp decrease compared to 2018 (3,267 kt CO<sub>2</sub>). This was due to a very high conservatively estimated emissions reported by the United Kingdom in 2018 (3,126 kt CO<sub>2</sub> to be compared to 866 kt CO<sub>2</sub> in 2019). The conservatively estimated emissions of all EU ETS countries represent a proportion of 1.6% of the total reported aviation emissions in 2019.



## 6 Use of simplified or innovative MRV approaches

According to the ETS Directive, the MRR and AVR, EU ETS countries are allowed to adopt simplified or innovative MRV approaches in certain cases. One of these simplified MRV approaches is Article 13 of MRR which allows operators or aircraft operators to use standardised or monitoring plans for simple installations. The prerequisite for using such plans is that the CA carries out a risk assessment to check 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. According to Article 47 of the MMR, other simplified MRV approaches are possible for installations with low emissions and, Article 54 of the stipulates other simplified approach for small emitters. Furthermore, the MMR also promotes countries 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

Compared to 2017, the number of countries that allow the use of simplified monitoring plans has increased from 7 to 8. In 2018 and 2019, the number of countries that allowed use of simplified monitoring has not changed. Amongst countries that developed simplified monitoring plans, the Netherlands has developed such a template. Since 2017, the Netherlands allows installations whose main fuel is natural gas<sup>101</sup> to use such monitoring plans provided this is justified by the risk assessment carried out by the CA. The template 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.

Differences are found in terms of the situations in which Article 13 MRR is applied by countries. 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>102</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 1 or more de-minimis source streams. This is similar in the Netherlands. These countries have developed simplified approaches mostly due to the high number of installations that could be eligible to use these simplified monitoring plans.<sup>103</sup>

Other simplified approaches specifically dedicated to installations with low emissions are applied by 4 countries. Belgium (Walloon region only, has specific example of procedures), the Netherlands,

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<sup>101</sup> In addition to natural gas an installation could have de-minimis source streams.

<sup>102</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).

<sup>103</sup> Hungary has 84 installations with low emissions (out of 172 ETS installations). Lithuania has 65 installations of low emissions out of 87 ETS installations. Denmark and the Netherlands have a high % of installations using natural gas.

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. Workshops dedicated to installations with low emissions are carried out only in the United Kingdom. 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 6.2.

Given the extensive guidance and examples provided by the Commission, the number of countries that have developed simplified approaches is low. The need for countries to develop additional guidance or organise workshops is limited. However, the number of installations with low emissions and category A installations compared to the total number of installations in a country show that some countries 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.

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 of misstatements and non-conformities in an installation are low and the installation is simple, the monitoring, reporting and verification is simpler.

The MRR not only allows for simplification of processes for simple installations and installations with low emissions, but 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. In total 2 countries have indicated that they are using technologies to permanently store carbon, Iceland<sup>104</sup> and Norway.<sup>105</sup>

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

Only 2 countries have indicated that they allow aircraft operators to use a simplified monitoring plan according to Article 13 of the MRR in the year 2019. In Belgium (Flanders region), operators are provided with a checklist that they have to complete in order 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. In Iceland, the aircraft operator has to submit a risk assessment to justify using the simplified monitoring plan. Furthermore, Iceland developed a tool to support aircraft operators in performing the risk assessment. The Polish CA used to carry out the risk assessment for the aircraft operator wanting to use the simplified monitoring plan. However, in 2019 Poland reported to no longer use a specific simplified monitoring plan for aircraft operators.

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<sup>104</sup> Further information can be found in <https://www.or.is/en/projects/carbfix>

<sup>105</sup> Article 21 reports show that for 2 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.

Other simplified approaches in aviation are facilitated by the use of the small emitter tool and the ETS Support Facility).<sup>106</sup> More information on the number of aircraft operators using such approaches is provided in section 4.1.3 When 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>107</sup> Due to this general simplification and the extensive Commission guidance for small emitters, further simplification initiatives are not of great importance.

In 2019, only 3 countries (Belgium – Flanders, United Kingdom, Germany) have adopted other simplified approaches for small emitters by either:

- > having customised guidance for small emitters: Belgium (Flanders region) 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/webinars for small emitters that remain accessible online: United Kingdom.

In earlier years Italy also reported use of customised guidance for small emitters but this was no longer reported in 2019. France reported organising workshops in 2017 but did not in 2018 or 2019.

In addition to the approaches mentioned, the United Kingdom also reported having an e-mail helpdesk, issuing a quarterly "Aviation" newsletter and operating a comprehensive IT system (ETSWAP). However, these approaches are not solely for small emitters. This 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 and the UK adopted simplified approaches.<sup>108</sup>

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<sup>106</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>107</sup> This simplification was introduced by an amendment of the EU ETS Directive by Regulation (EU) 421/2014.

<sup>108</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

The combination of a very low share of emission reports rejected – as concluded in sections 5.17 and 5.2.2 – and the high number of issues identified in the verification report implies that the combination of verification and additional control measures by Competent Authorities is effective to assess the accuracy of emissions and to ensure compliance with the requirements. However, detailed review of emission reports is not common practice in all EU ETS countries. There is a risk that in these countries some issues are not identified in the review of those reports. In general, the analysis of the Article 21 reports suggests a high level of compliance with the MRR and AVR and that the verification process supervised by the National Accreditation Bodies is working satisfactorily. This chapter concentrates on what measures have been implemented to ensure that operators and aircraft operators comply with the legislation and on the ways of follow-up on non-compliance issues.

### 7.1 Measures taken to ensure compliance

#### 7.1.1 Compliance of installations

CAs can take different measures to ensure operator's compliance with the EU ETS requirements. This includes the CA's assessment of the verified emission reports and of the verification report that the operators submit to the CA. Between the countries different approaches are used for checking the reports and the level of detail of checks varies. More information on the type of checks carried out is included in Section 5.1.7.

CAs can also check the operator's compliance by carrying out spot checks and by inspection of the operator's implementation of MRV requirements. Whereas the number of countries conducting inspection is quite stable, the level and detail of EU ETS inspection has evolved over the years. A total of 27 countries<sup>109</sup> carries out spot checks and conducts inspections on installations, a number that has changed only once in the last 4 years. The total number of inspections through site visits, however, has varied significantly, ranging from 486 site visits in 2013 to 141 in 2019. The United Kingdom commented that the number of inspections decreased in 2019 due to resources being diverted to preparation of the NIMs. This may also explain the fewer amount of site visits in other countries in 2019. Spain, France, Croatia and the United Kingdom are among the countries with the highest yearly fluctuations. Despite these fluctuations in the number of inspections, an increasing trend is observed in the number of countries that have implemented or are planning to implement ETS specific elements in their on-site inspections. This is partially due to the guidance on inspection that has been developed by the Commission and the attention that was spent to inspection during Compliance Forum meetings and Compliance Conferences.

There is quite some variation in the way inspection on installations is carried out. Roughly three groups of countries can be distinguished. A first group of countries conducts inspections that are tailored to EU ETS compliance issues. A second group of countries carries out inspections in the scope of the IED Directive.<sup>110</sup> Such inspections include checks on correct implementation of several environmental permits, including the EU ETS permit, but do not include detailed EU ETS compliance checks. A third group of countries has IED inspection in which IED inspectors also

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<sup>109</sup> All countries except Greece, Italy, Luxembourg and Malta. Sweden started in 2018

<sup>110</sup> Directive 2010/75/EU of the European Parliament and the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).

check on compliance with the EU ETS monitoring plan. Choices made on the type of inspection mostly depend mostly on the administrative structures within a country and how the permitting regime and CA organisation has been set up. Some countries that reported not carrying out onsite inspection in previous years, such as Italy, 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 CA relies mostly on verification to identify non-compliance issue. Overall, the quality of inspection and communication on inspection has improved over the years.<sup>111</sup>

Most countries<sup>112</sup> also take preventive measures to ensure operator's compliance by organising regular meetings with industry and verifiers. These meetings aim to inform operators and verifiers on the requirements and to ensure they fully understand the rules. The frequency of these meetings differs between countries, some are organised ad-hoc or when necessary, others are held on a more structural and frequent basis. Other preventive measures include close cooperation and communication with operators and stringent procedures for the review of emission reports and verification reports.

### 7.1.2 Compliance of aircraft operators

As for installations, the CA can take different measures to check and promote compliance of aircraft operators. A limited number of countries carries out spot checks and inspection of the aircraft operator's implementation and compliance. The involvement of the CA is mostly focused on the review of emissions reports. As shown in section 5.2.2 the detail and type of checks on emission reports and verification reports differs between countries.

The number of countries carrying out spot checks and inspection of aircraft operator's implementation and compliance is relatively stable over the years. In 2019 the total number was 12 countries.<sup>113</sup> The frequency of spot checks can differ between countries. Some countries report not carrying out inspection, while others do not comment on the frequency. In 2019 in total 3 inspections were carried out in 2 countries,<sup>114</sup> which is 2 fewer inspections and 1 fewer country than in 2018.

As for installations the Competent Authority can take preventive measures by organising regular meetings with airlines and verifiers. Compared to installations, fewer countries<sup>115</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 is based in other countries. The frequency of meetings with airlines and/or verifiers is not always known, but varies between countries, with some countries reporting that meetings are organised, but not necessarily every year.

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<sup>111</sup> Results of 5th Compliance Cycle Evaluation of EU ETS MRVA implementation, Technical report, 2020.

<sup>112</sup> All countries except: Austria (helpdesk only), Luxembourg and Latvia. Romania started in 2018.

<sup>113</sup> Austria, Belgium, Denmark, Germany, Iceland (first time 2018), Ireland, Netherlands, Poland, Romania (first time 2019), Slovakia, Slovenia, Sweden (first time 2019). Latvia and Croatia have stopped conducting spot checks and inspections in 2018.

<sup>114</sup> 1 in Germany, 2 in Sweden.

<sup>115</sup> Belgium, Bulgaria, Croatia, Czechia, Denmark, France, Iceland, Ireland, Malta, Portugal, Romania, Spain, Sweden, United Kingdom. Austria has a helpdesk functionality instead of meetings, Lithuania stopped after 2018.

## 7.2 Sanctions and infringements for installations

Article 16 of the EU ETS Directive requires EU ETS countries to lay down rules on penalties applicable to infringements and to 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 the EU ETS.

All countries report to have some form of penalties in place for different types of infringements. The types and level of penalties do not change much over time. The main changes in 2019 compared to earlier years are in Spain and Portugal. In Spain a new law entered into force which lowers the fine for some infringements. Portugal no longer reports a fine for some infringements.

Most penalties concern fines with a defined financial minimum or maximum. Some countries have defined fines 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 ETS 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). The variation in fines among countries is high. Considering only defined minimum or maximum numbers larger than zero, the minimum fines range from €63 (Hungary, per day) to €75,000 (France) per infringement and the maximum ranges from €102 plus the allowance price (Liechtenstein, per tonne CO<sub>2</sub>) to €16 million (Estonia). In some countries the size of fines also differs between the 14 types of infringements reported under Article 21.

7 countries<sup>116</sup> provide for the possibility of a jail sentence of up to 120<sup>117</sup> months for some or all types of infringements. France is the only country that has indicated a minimum jail sentence: a period of 12 months for operating without a permit or failure to comply with the conditions of the permit. Some countries provide the option to impose penalties other than fines and jail sentences. For example, Greece provides the option to shut down an installation for a period between 5 to 20 days.

All countries have a defined penalty for infringements such as 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. The fines for these categories are usually also higher than for other types of infringements. Penalties for other types of infringements are country specific. In most countries, explicit distinction is made between the type of infringements. In these countries the fine for not having a permit is for example higher than for not notifying a change to the monitoring plans. In Cyprus, Denmark, Greece, Iceland, Ireland, Luxembourg, Netherlands and Norway a system for applying sanctions is in place, but specific limits per type of infringements are not set. Table 7.2-1 provides an overview of the number of countries that report minimum or maximum fines or prison sentences for each type of infringement.

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<sup>116</sup> Cyprus, Denmark, Estonia (for some infringements), Ireland, Luxembourg, Norway and Sweden (for some infringements).

<sup>117</sup> Ireland.

**Table 7.2-1** 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 2019				
Types of infringement applicable to installations	Fine		Months prison	
	Min	Max	Min	Max
Operation without a permit	20	23	2	7
Failure to comply with the conditions of the permit	14	18	2	6
Failure to hold a monitoring plan approved by the CA <sup>118</sup>	14	20	1	5
Failure to submit supporting documentation in accordance with Article 12(1) of Regulation (EU) No 601/2012 <sup>118</sup>	9	12	1	5
Failure to hold a required sampling plan(s) approved by the CA <sup>118</sup>	9	13	1	5
Failure to monitor in accordance with the approved monitoring plan and Regulation (EU) No 601/2012	15	21	1	5
The quality assurance of measurement equipment is not in line with Regulation (EU) No 601/2012	10	13	1	5
Failure to implement the procedures required by Regulation (EU) No 601/2012 <sup>118</sup>	10	14	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 <sup>118</sup>	13	19	1	6
Failure to submit a verified emission report in due time	17	21	1	5
Failure to submit an improvement report(s) in accordance with Article 69 of Regulation (EU) No 601/2012	10	14	1	5
Failure to provide the verifier information in accordance with Article 10 of Regulation (EU) No 600/2012	9	11	1	5
The verified emission report is found not to be in line with Regulation (EU) No 601/2012	10	15	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	18	22	1	6
Other infringements (country-specific)	20	23	2	7

The Article 21 reports show that 12 new fines were imposed in the reporting year 2019 (6 countries). The sum of all 2019 fines is about €726,000, which is lower than in the preceding

<sup>118</sup> There are 9 differences in this table between 2018 and 2019: Spain no longer reports a minimum fine for failure to hold a monitoring plan, and Portugal no longer reports minimum and maximum fines for failure to support supporting documentation according to Article 12(1) of the MRR, failure to submit a sampling plan, failure to implement procedures and failure to notify changes to the monitoring plan.

years. The 12 fines reported in 2019 range from about €6,000 to €157,000, of which the Netherlands imposed most fines as well as the highest fines (4 fines; highest €346,000). Furthermore in 2019, France reported 2 cases of formal notice, Romania and the United Kingdom reported issuance of a warning letter and Croatia reports an ongoing case. Spain reported 5 cases which were dismissed or for which no action was taken as well as 3 ongoing cases.

15 countries have not imposed any fines so far in phase 3 of the EU ETS. The remaining 16 countries have imposed a total of 232 fines in phase 3. The United Kingdom imposed the most fines, 81 in total, but none in 2019. No actual imprisonment has been reported in any of the countries in any of the years in phase 3.

From 2013 to 2019 a total of 14 countries did not impose excess emission penalties<sup>119</sup> on operators. The remaining 17 countries<sup>120</sup> have reported 158 such cases in phase 3, of which 26 in 2019 (in 9 countries).

### 7.3 Sanctions and infringements for aircraft operators

Most countries have some form of penalty in place for aircraft operators<sup>121</sup>. As for installations, these are usually fines with a defined financial minimum or maximum level, sometimes calculated by a formula. In most countries the reported possible penalties for aircraft operators are the same as for installations, and if not, the difference for aircraft operators compared to installations is typically not more than 3.3 times. Spain, Portugal, Croatia and Hungary report a bigger difference in maximum fines, but only for a limited number of specific infractions.

The possibility of a jail sentence for some infringements is provided for in 6 countries<sup>122</sup>. As for installations, the size of the penalty can vary between 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.

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<sup>119</sup> This is the €100 per tCO<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 countries.

<sup>120</sup> Belgium, Bulgaria, Czechia, Denmark, Finland, Germany, Greece, Ireland, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Slovakia, Spain, and the United Kingdom.

<sup>121</sup> Only France does report any penalties and Liechtenstein has no aircraft operators assigned to it.

<sup>122</sup> Sweden, Norway, Luxembourg, Ireland, Denmark and Cyprus.



**Table 7.3-1** 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 2019				
Types of infringement applicable to aircraft operators	Fine		Months prison	
	Min	Max	Min	Max
Failure to hold a monitoring plan approved by the CA	13	19	1	6
Failure to submit supporting documentation in accordance with Article 12(1) of Regulation (EU) No 601/2012	10	14	1	5
Failure to monitor in accordance with the approved monitoring plan and Regulation (EU) No 601/2012	13	19	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 <sup>123</sup>	13	19	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	15	19	1	5
Failure to submit an improvement report(s) in accordance with Article 69 of Regulation (EU) No 601/2012	9	13	1	5
Failure to provide the verifier information in accordance with Article 10 of Regulation (EU) No 600/2012	9	11	1	5
The verified emissions report is found not to be in line with Regulation (EU) No 601/2012	8	12	1	6
The verified tonne-kilometre report is found not to be in line with Regulation (EU) No 601/2012	9	12	1	6
Other infringements (country-specific) <sup>123</sup>	7	11	1	2

So far 5 countries<sup>124</sup> have imposed fines on aircraft operators. Italy and Spain imposed fines in 2019. In total 9 cases were reported (3 by Italy), covering various infringements including operating without an approved monitoring plan and not submitting an emission report in time. The fines ranged from about €1,100 to €31,000, totalling over €139,000. In earlier years the range for fines was from €100 to over €12 million. No actual imprisonment has been reported in any of the countries in the current trading period.

<sup>123</sup> Compared to the previous year, Portugal reported an additional fine in this category.

<sup>124</sup> In 2019: Italy (3 fines), Spain (6 fines). Earlier phase 3 years: Iceland, Poland, Sweden. Portugal has also reported ongoing procedures but has not defined the level of a fine.

In the period 2013-2019 a total of 12 countries<sup>125</sup> have reported 245 excess emission penalties on aircraft operators, of which 34 cases in 6 countries in 2019. A total of 19 countries did not impose penalties in the 2013-2019 period.

## 7.4 Fraud

Integrity of the EU ETS is a crucial element system in successful operation of the EU ETS. To support this integrity information on fraud and other activities related to market abuse is made public and procedures have been implemented to address fraudulent activities. In 2019 there were no changes in procedures in place concerning fraudulent activities related to the free allocation of allowances. All EU ETS countries have general legislation on fraud or criminal law in place to deal with possible fraud cases. There are no EU ETS specific arrangements 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 these are communicated through the normal channels that apply to all fraud cases, such as raising fraud issues with the authority responsible for addressing fraud cases, voicing concerns to the registry helpdesk, and 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 countries communication occurs through official channels, involving the relevant ETS Competent Authority only if such 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 6 months to 10 years, and in some cases financial penalties between a few hundred and €2 million. So far in phase 3, in total 3 convictions for fraud have been reported. Austria reported a conviction of VAT fraud and money laundering related to EU ETS in 2016. In 2018 an installation was convicted in Luxembourg because it had ceased activity in 2011 but had not reported it and received undue allocation in 2012. In the Netherlands there was a conviction in 2018 because of VAT fraud with emission allowances, which took place between January and October 2009. No convictions were reported in 2019. An acquittal of the Czech Competent Authority was reported in a court case that was launched because of errors in the emission report that had to be corrected by the CA. The operator surrendered all required allowances, but did not agree with the procedure applied by the CA. No violation of law by the CA was found by the court.

## 7.5 Sanctions on verifiers

Article 54 of the AVR provides a NAB the possibility to impose administrative measures on verifiers. Three types of measures are available: a NAB can suspend or withdraw a verifier's accreditation or can reduce the scope of its accreditation. When the accreditation is suspended the verifier can temporarily not carry out verification until this suspension has been lifted. When the accreditation is withdrawn the verifier can on a more permanent basis no longer carry out verification and would have to 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 but can still do verification in the other scopes for which accreditation is granted.

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<sup>125</sup> 2019: Cyprus, Germany, Italy, Portugal, Spain, United Kingdom. Prior to 2019: Belgium, Iceland, Luxembourg, Poland, Slovenia, Sweden.

In 2019 the number of administrative measures imposed on verifiers was very low. There were no new suspensions,<sup>126</sup> no new withdrawals of accreditation and 7 reductions of scope. The majority of countries – 23 out of 31 – have not reported any measures imposed on verifiers in phase 3<sup>127</sup> and there is no clear trend in reported measures over time.

The number of complaints against verifiers has decreased from 144 complaints in 2014 to 66 in 2019, which is an annual reduction ranging from 7% to 22%. Out of those 66 complaints, 56 (85%) were resolved by the time of submission of the Article 21 report.

The number of detected and reported verifier non-conformities in 2019 was 73, which is nearly halfway the range of 54 to 94 annual non-conformities in phase 3. A total of 51 non-conformities were resolved in 2019, which may include some non-conformities that were outstanding from the previous year.

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<sup>126</sup> There were only 6 suspensions, 8 withdrawals of certificates and 28 reductions of scope in the entire phase 3.

<sup>127</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

The year 2019 continued the trends that were established in previous years. Overall, the quality of monitoring and reporting improved further, the effectiveness of procedures remained stable and there were not many fluctuations in emissions and number of installations and aircraft operators. This year's technical report once again shows how countries implemented and complied with the EU ETS Directive and its underlying regulations. As in previous years the focus is on the MRVA and compliance scheme which is essential for a well-functioning emission trading market.

### 8.1 Organisation of Competent Authorities

A key factor in having a well-functioning emission trading scheme is the role Competent Authorities play in the management of the different compliance cycle processes. How Competent Authorities are organised depends very much on the legal and administrative set-up in an individual country. 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 countries 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.

As last year, 9 countries have multiple local or regional authorities in place managing the approval of monitoring plans, the assessment of emission reports and the approval of improvement reports. In 5 of these countries this includes a high number of local or regional authorities, which consequently requires extensive coordination. In Latvia, Poland and the United Kingdom, the central Competent Authority has a pivotal role in the coordination. Coordination approaches range from parallel assessments by the central authority (Poland) to mandatory instructions (the United Kingdom). Coordination measures are also taken in less formalised procedures in the form of guidance, helpdesks (Austria), structural working groups (Spain), IT systems (United Kingdom) and trainings. All types of coordination play an essential role in ensuring equal treatment between installations in the different regions. In 3 countries the coordination could be improved to more structural procedures and stronger information channels.

For aviation, the decentralisation of the Competent Authorities is less than for installations. In total 9 countries have chosen to allocate the responsibilities for aviation to different authorities than for installations. Less coordination is in those cases needed.

### 8.2 Coverage of the EU ETS

The number of stationary installations has decreased by 0.4% compared to 2018: from 10,609 to 10,569 installations. The decrease of stationary installations since 2013 was 9%: from 11,617 installations in 2013 to 10,569 installations in 2019. The proportion of installations per category remained roughly the same compared to previous years: 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. The total emissions of all installations covered by the EU ETS are 1,527 Mt CO<sub>2</sub> (eq), which is 10.9% lower compared to 2018.

Of those total emissions 1,260 Mt CO<sub>2</sub> (eq) came from fossil fuel combustion. Combustion emissions decreased from 1,428 Mt CO<sub>2</sub> (eq) in 2018, resulting in a decrease of 11.7%. The total process emissions in 2019 was 267 Mt CO<sub>2</sub> (eq), 7.3 % lower than in 2018.

High reductions in the use of hard coal mainly caused the decrease in fuel combustion emissions: emissions from combustion of hard coal decreased from 477 Mt CO<sub>2</sub> (eq) (29% of fuel emissions) in 2013 to 206 Mt CO<sub>2</sub> (eq) (16% of fuel emissions) in 2019. This is a reduction of 57% in emissions and the diminishing share in fuel emissions shows that hard coal is being replaced by other fuels. The share of natural gas on the other hand increased from 23.8% in 2013 (397 Mt CO<sub>2</sub> (eq)) to 33.7% (428 Mt CO<sub>2</sub> (eq)) in 2019, which appears to show that natural gas is the fuel substitution hard coal.

As in 2018 the energy intensive industries emit the highest emissions in 2019: 40.7% of the total emissions in the power sector, 9.4 % for mineral oil, 12.3 % for refineries, 27.6 for iron and steel and 27.4% for cement production.

2,197 out of 10,569 installations (20.8% of all reporting installations under the EU ETS) reported the use of biomass in 2019, which is slightly higher than the 2,187 installations reported in 2018 (20.6% of the total number of installations covered by EU ETS).

In 2019 a total of 7 countries have opted out installations from the scope of EU ETS according to Article 27 of the EU ETS Directive: Croatia, France, Iceland, Italy, Slovenia, Spain and the United Kingdom. The total amount of excluded emissions was 3,807 kt CO<sub>2</sub> (eq). This was 3.4% lower than in 2018 and represented 0.35% of total EU ETS emissions in 2019,<sup>128</sup> which is a slight increase compared to the share of 0.25% in 2018). There is no evidence that exclusion of these installations affected the environmental integrity of the EU ETS.

The total number of aircraft operators in 2019 was 611 aircraft operators, slightly lower than the number of aircraft operators in 2018, 619 aircraft operators. High numbers of aircraft operators are in particular reported in the UK (151 aircraft operators), Greece (126), France (77) and Germany (66). 42.9% of the total number of aircraft operators are small emitters, 50.4% of all aircraft operators are operating for commercial purposes and 49.6% for non-commercial. The total emissions in the current EU ETS aviation scope in 2019 was 68 Mt CO<sub>2</sub>, 0.7% higher than in 2018 (67.5 Mt CO<sub>2</sub>). In the last 5 years the emissions in the aviation sector have steadily increased: from 55 Mt CO<sub>2</sub> in 2014 to 68 Mt CO<sub>2</sub>. The increase however seems to decelerate in the last 2 years. The main factor to the growth in 2019 was the growth in international flights. The number of domestic flights has decreased with 13.5%. The numbers show that the EU ETS does not seem to reduce the emissions in the aviation sector.

## 8.3 Effective implementation measures

Regardless of the degree of decentralisation or centralisation in the country's organisation of responsibilities, 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 countries.

The differences in procedures affect how countries organise monitoring plan processes and notification of changes to the monitoring plan and permitting. In 2019, 1,679 permit updates were reported, a number lower than but comparable to changes in previous years (1,969 in 2018 and

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<sup>128</sup> This is an estimate based on the declared total emissions in answer to question 5.6.

1,886 in 2017). As in previous years, the number of updates largely varies between countries, which is explained by different levels of requirements for such updates. France, the Netherlands and Germany reported a relatively low number of permit changes despite their high numbers of installations whereas countries like the United Kingdom, Poland, Norway, Spain and Croatia reported a high number of permit updates. In those countries a (significant) change in the monitoring plan leads to an automatic change of permit which explains the more frequent permit updates.

Effectiveness of implementation measures and condensed procedures are not the only factors influencing the quality of the assessment of monitoring plans, supporting documentation, emission reports and improvement reports. Another key factor influencing such quality is the availability of IT systems to facilitate implementation. An increasing number of countries are using IT systems to manage the workflow processes between installations, competent authorities and in some cases verifiers. This includes national IT systems and the Commission e-reporting tool DECLARE. Use of such IT systems has lowered the administrative burden in these countries. The use of the Commission templates and guidance have grown as well since 2013, having a positive effect on the implementation of MRVA in the countries (see section 8.4).

## 8.4 Application of MRR requirements

The larger the installation and the size of the source stream the stricter the monitoring requirements. Only in specific cases and under strict conditions specified in the MRR more simple approaches such as the application of default values or lower tiers can be applied. A key aspect in assessing the quality of monitoring is therefore the extent to which countries deviated from the more accurate approaches and whether this was justified according to the MRR requirements. The analysis of the Article 21 responses showed that the implementation of the MRR has improved over the years. An increasing number of installations are applying the most stringent monitoring requirements. The number of category C installations not meeting the highest tier continues to decrease, dropping from 128 to 102 between 2013 and 2019. If this is offset against the total number of installations, it represents 13.7% of the category C installations in 2019 compared to 14.7% in 2013.

Although the number of category B installations with at least 1 derogation from the highest tier each increased from 424 in 2018 to 483 in 2019, this is still considerably lower than the 666 in 2013: 22.1% of category B installations in 2019 compared to 28% in 2013. Furthermore, this apparent increase appears to be linked to fluctuating numbers in one country, reporting fewer than average derogations in 2018 and more than average in 2019. The same development is seen in the application of the fall-back approach, an exception of the normal tier approaches: the number of installations using the fall-back approach decreased from 38 to 34 installations in the EU. However, 2 more countries reported the use of the fall-back approach and the estimated emissions covered by fall-back approaches increased somewhat, from 2.8 Mt CO<sub>2</sub> (eq) in 2018 to 3 Mt CO<sub>2</sub> (eq) in 2019. Still the fall-back approach is used by only 0.32% of the installations under the EU ETS, representing 0.24% of the total verified emissions.

In addition, countries reported fewer problems concerning the submission and the implementation of sampling plans. 10,949 installation operators covered by the EU ETS used default values in 2019, which represents 0.8% more installations compared to 2018. Out of these, 8,295 were literature values agreed with the CA<sup>129</sup> and 2,654 were type I default values.<sup>130</sup> In 2018 these

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<sup>129</sup> based upon point (c) of Article 31(1) of the MRR.

<sup>130</sup> constant values in accordance with points (d) or (e) of Article 31(1) of the MRR.

numbers were 8,251 and 2,607 respectively. Literature values in both years were mostly used in relation to natural gas and fuel oil that are often applied by category A installations which are allowed to use these values. It therefore seems that the application of default values is justified and in line with the MRR.

For aviation the application of the monitoring requirements remains stable. 191 aircraft operators are using method B to determine the fuel consumption, 32 are using method A, and 1 aircraft operator is using both methods. In 2018 this was 211 aircraft operators using method B and 38 using method A. The vast majority of small emitters are using the Small Emitter Tool (SET) and Eurocontrol ETS Support Facility (SF).

On other aspects improvements can still be made:

- > In 2019 the Competent Authority allowed in 160 cases the operator to use a different frequency of analysis than the required analysis frequency in Annex VII of the MRR because of unreasonable costs.<sup>131</sup>
- > The number of category B and C installations not meeting the highest tier increased slightly in 2019 compared to 2018 levels. The number of category C installations not meeting the highest tier in 2019 were 102 category C installation compared to 97 in 2018. The number of category B installations with at least 1 derogation from the highest tier each increased from 424 in 2018 to 483 in 2019, see the second paragraph of this section.
- > Compliance in submitting an improvement report according to Article 69 of the MRR has been high from the start. However, in 2019 the proportion of improvement reports required and improvement reports actually submitted for stationary installations decreased from 95% to 83% and for aviation from 79% to 60%.

## 8.5 Monitoring the quality of monitoring and reporting

Verification by independent and accredited third-party verifiers plays an important role in ensuring that emissions data have been monitored in accordance with the MRR and that reliable and correct emissions data are being reported. The number of outstanding issues in verification reports for stationary installations was 4,330 in 2019, 11% more issues than reported in 2018. Most of those issues were non-conformities (1,257 in 2019 and 1,180 in 2018), non-compliance issues (912 in 2019 and 763 in 2018) and recommendations of improvement (1,890 in 2019 and 1,678 in 2018). The most common issues identified included for example omitted source streams or sources, recommendations to update procedures, missing data gaps, tiers not met, thresholds exceeded. In aviation 150 outstanding issues were reported by verifiers in 2019, which is 13.6% more issues than reported in 2018. Most issues were non-conformities (21 issues in 2019) and recommendations of improvement (94 issues in 2018).

Checks by the Competent Authority on annual emission reports and verification reports are an additional quality control measure to improve the overall quality of the emission and verification reports. In 2019 28 countries checked all reports for consistency and completeness, 22 countries reviewed all reports against the monitoring plan. In 2018 this was 1 country less. Detailed checks on the emissions reports were carried out by 17 countries, 4 countries more than in 2018. 10 other countries checked a share of emission reports in detail. The level of detail of these checks and the share of emission reports checked in detail varies between countries and is mostly dependent on the resources available in a country and the approaches for reviewing reports. In the

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<sup>131</sup> 44 more cases were identified compared to last year. However the increase was explained because one country changed their reporting system and improved the accuracy of the data which led to different data than in 2018. In practice no significant increase took place.

aviation sector 25 countries checked all emission and verification reports on completeness and internal consistency, 18 countries checked the reports in detail in 2019. The approaches for checking emission reports and verification reports generally differ between installations and aircraft operators. This is largely due to the fact that the emission reports of aviation are usually more straightforward than for stationary installation, in particular if it concerns complicated cases. Improvement in checking emission reports and verification reports could be further improved: e.g., more harmonisation in share of emissions reports reviewed.

## 8.6 Verification

An important stakeholder in the EU ETS compliance chain is the verifier that is accredited by a national accreditation body against the AVR and monitored through annual surveillance and regular reassessment. In 2019 no changes were encountered in the number of countries<sup>132</sup> that do not have a national accreditation body that is active in the accreditation of EU ETS verifiers. The emission reports of operators from those countries are verified by “foreign verifiers” (i.e., verifiers accredited by a National Accreditation Body in another country).

Article 21 reports and available data on the website 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 in the EU exists for scope 1 (combustion) followed by scope 6 (production of cement clinker), scope 7 (manufacture of glass), scope 4 (metal ore), scope 8 (ceramics) and scope 3 (coke ovens). These numbers correlate well with the high number of installations carrying out these activities. The lowest numbers were observed for scope 11 (geological storage of greenhouse gases), scope 99 (installations opted in the EU ETS scheme) and scope 10 (capture and transport of greenhouse gases). Only 2 countries had installations carrying out these activities in 2019: hence the limited number of verifiers accredited for those sector activities. Overall, the number of verifiers accredited against most specific scopes, has further decreased. The only sector scopes for which an increase was identified was sector scope 98<sup>133</sup> (from 88 to 107 verifiers overall); scope 5 (pig iron and steel production), scope 8 and scope 12 (aviation). The increase in sector scope 98 is explained because of planned verifications of the baseline data reports in 2019 and annual activity level reports in 2021.

In the countries themselves, the distribution of the verifiers over the sector scopes remained relatively stable and the relation between the number of verifiers per scope versus the number of installations seems reasonable in most sector scopes.<sup>134</sup> The number of verifiers that carried out verification in another country than the country in which they were accredited by the national accreditation body has decreased both for installations, from 70 in 2018 to 66 in 2019, and for aviation, from 57 in 2018 to 56 in 2019. In the entire trading period the number of sanctions imposed on verifiers remained low. In 2019 no new suspensions or withdrawal of the accreditation certificate were imposed and there were only 7 reductions of scope. The number of complaints against verifiers has decreased by 7% to 22% every year since 2014. Out of the 66 complaints reported in 2019, 71% were resolved by the time of Article 21 report submission. The number of detected and reported verifier non-conformities in 2019 remained relatively stable.

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<sup>132</sup> Cyprus, Iceland, Ireland, Liechtenstein, Lithuania, Luxembourg and Malta

<sup>133</sup> Activities pursuant to Article 10a ETS Directive (verification of allocation data).

<sup>134</sup> Only in the sector combustion activities, aviation and opt-in there could be capacity problems. However, these sector activities are relatively simple which can mean a less extensive verification if the risks are low.



## 8.7 Enforcement and penalties

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. In 2019 12 new fines were imposed by 6 countries. The sum of all 2019 fines is about €726,000, which is lower than the preceding years. The 12 fines reported in 2019 range from about €6,000 to €157,000, of which the Netherlands imposed the most and the highest fines (€346,000, 4 fines). 15 countries have not imposed any fines so far in phase 3. The remaining 16 countries have imposed a total of 232 fines in phase 3. No actual imprisonment has been reported in any of the countries in any of the phase 3 years. From 2013 to 2019 14 countries did not impose excess emission penalties<sup>135</sup> on operators. The remaining 17 countries<sup>136</sup> have reported 158 such cases in the phase 3, of which 26 in 2019 (in 9 countries).

In 2019, 2 countries imposed fines on aircraft operators covering 9 varying types of infringement, including operating without an approved monitoring plan and not submitting an emission report. The fines ranged from about €1,100 to €31,000, totalling over €139,000. In earlier years the range for fines was from €100 to over €12 million. No actual imprisonment has been reported in any of the countries in the current trading period. 19 countries did not impose excess emission penalties on aircraft operators from 2013 to 2019. The remaining 12 countries<sup>137</sup> have reported 245 such cases in phase 3, of which 34 cases in 6 countries in 2019.

Although all countries 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.

## 8.8 Areas for improvement

Article 21 reports are an important instrument in bringing more transparency on how countries implemented EU ETS requirements. It provides useful information on the functioning of the EU ETS for participants and observers. This report shows that the emission trading system is functioning effectively and continues to improve over the years. In some areas recommendations can be made to improve country level implementation and harmonisation even further:

- > Increased use of IT systems (including the Commission e-reporting tool DECLARE) can support the effectiveness of procedures and ultimately improve the quality of MRV processes.
- > It is important to continue to raise awareness of guidance, templates and tools published by the Commission.

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<sup>135</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 countries.

<sup>136</sup> Belgium, Bulgaria, Czechia, Denmark, Finland, Germany, Greece, Ireland, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Slovakia, Spain, United Kingdom.

<sup>137</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.

- > The coordination and information exchange channels are an important element when multiple competent authorities are involved. For 3 countries this could be further improved.
- > More action is needed to curb emissions in the aviation sector.
- > Compliance with highest tier approaches need to be closely monitored. The same applies to submission of improvement reports and application of analysis frequency.
- > 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 countries and could reduce the administrative burden of operators and competent authorities.

The quality of Article 21 reports has improved as well, only a few items in the reports were incomplete in 2019 and for those gaps justification was provided by the countries. However, inconsistencies and differing interpretations are identified in country responses. Questions that lead to interpretation problems include for example:

- > Questions in section 11 on sanctions and infringements and question 6.2 on complaints and non-conformities by verifiers as these can range several years. The year when sanctions, complaints or non-conformities occur can be different than when sanctions are imposed or complaints or non-conformities are resolved.
- > Question 5.7: some countries reported all default values whereas others only reported default values under Article 31(1) (c), (d) and (e) MRR values.
- > Questions in section 2 and 5.19 and 5.20, 526/5.27: overlap and inconsistencies in responses which makes it difficult to analyse the responses.

An update of the Article 21 questionnaire is planned in the coming months, in order to improve the effectiveness of Article 21 reporting, accommodate new requirements in phase 4 and provide clarification or streamlining where relevant.

# Annex

## Country Codes

AT	Austria
BE	Belgium
BG	Bulgaria
HR	Croatia
CY	Cyprus
CZ	Czechia
DK	Denmark
EE	Estonia
FI	Finland
FR	France
DE	Germany
GR	Greece
HU	Hungary
IS	Iceland
IE	Ireland
IT	Italy

LV	Latvia
LI	Liechtenstein
LT	Lithuania
LU	Luxembourg
MT	Malta
NL	Netherlands
NO	Norway
PL	Poland
PT	Portugal
RO	Romania
SK	Slovakia
SI	Slovenia
ES	Spain
SE	Sweden
UK	United Kingdom

## Glossary

Allocation	Assignment of emission allowances in a specific way, according to predetermined rules.
Annex I activity	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.
Cap	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.
Carbon dioxide equivalent	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> .
Combustion emissions	GHG emissions that result from the exothermic reaction of a fuel with oxygen.
Competent Authority	An organisation (or organisations) within a country that is responsible for implementing the EU ETS.
Continuous Emission Measurement	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.
CRF	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.
Emission allowance	The permission to emit 1 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
Emission Factor	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.
Fall-back approach	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.
Greenhouse gases	Gases that contribute to global warming and climate change. Annex II of the EU ETS Directive list 6 gases.
Inherent CO <sub>2</sub>	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.
National accreditation body (NAB)	An organisation within a country 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.

Process emissions	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.
Registry	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.
Tiers	Sets of requirements for determining calculation factors, activity data and emissions. Higher tiers have more stringent requirements and produce more accurate data.
Trading period	The period in which EU ETS emissions allowances are issued. Initially, 2 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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## EU ETS activity codes

Activity code	Activity (based on Annex I of the EU ETS Directive)
10	Aircraft operator activities
20	Combustion of fuels
21	Refining of mineral oil
22	Production of coke
23	Metal ore roasting or sintering
24	Production of pig iron or steel
25	Production or processing of ferrous metals
26	Production of primary aluminium
27	Production of secondary aluminium
28	Production or processing of non-ferrous metals
29	Production of cement clinker
30	Production of lime, or calcination of dolomite/magnesite
31	Manufacture of glass
32	Manufacture of ceramics
33	Manufacture of mineral wool
34	Production or processing of gypsum or plasterboard
35	Production of pulp
36	Production of paper or cardboard
37	Production of carbon black
38	Production of nitric acid
39	Production of adipic acid
40	Production of glyoxal and glyoxylic acid
41	Production of ammonia
42	Production of bulk chemicals
43	Production of hydrogen and synthesis gas
44	Production of soda ash and sodium bicarbonate
45	Capture of greenhouse gases under Directive 2009/31/EC
46	Transport of greenhouse gases under Directive 2009/31/EC
47	Storage of greenhouse gases under Directive 2009/31/EC
99	Other activity opted-in pursuant to Article 24 of Directive 2003/87/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 storage in a storage site permitted under Directive 2009/31/EC</li> </ul>

Activity group No	Scopes of accreditation
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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