

# Trends and projections in Europe 2018

## Tracking progress towards Europe's climate and energy targets

(First release, 26 October 2018)

# 1 Introduction

## 1.1 Objective

This early release of the 2018 edition of the EEA report *Trends and projections in Europe* updates the annual progress assessment of the EU and European countries towards their climate mitigation targets. Information in this report is based on the latest official data for the year 2016, as reported by Member States to the European Commission and the EEA. These are complemented with preliminary ('proxy') estimates for 2017 that have been prepared by the EEA based on Member States' most recent information.

The full report to be published later this year addresses progress towards each of three energy and climate objectives: greenhouse gas (GHG) emissions, renewable energy sources (RES) and energy efficiency, the '20-20-20' targets:

- the EU's unilateral commitment to reduce its GHG emissions by 20 % compared with 1990 levels;
- the binding targets to increase the share of energy from renewable sources in the EU's gross final energy consumption to 20 %, with a minimum of 10 % share of renewables in the transport sector;
- the target of a 20 % reduction in energy consumption compared with baseline projections for 2020.

To help Member States meet the 2020 GHG targets, the EU adopted a climate and energy package in 2009. The package defined a single EU target for GHG emissions covered under the Emission Trading Scheme (ETS) and a set of national target trajectories for 2013-2020 for emissions within the scope of the Effort Sharing Decision (ESD). Regarding renewable energy, the Renewable Energy Directive (RED) set binding targets for each Member State and provided indicative trajectories for 2011-2020. For energy efficiency, Member States set their own non-binding targets according to the Energy Efficiency Directive (EED).

For 2030, the EU has subsequently endorsed targets for at least a 40 % reduction in domestic GHG emissions compared with 1990 levels, a level of renewable energy consumption of minimum 32 % and at least a 32.5 % reduction of energy consumption across the EU (compared with the 2007 EU Reference Scenario).

## 1.2 Data sources

Information in this report is based on the latest data reported by European countries under the Monitoring Mechanism Regulation (MMR). The countries submit their information to the EEA's e-reporting environment, Reportnet<sup>(1)</sup>, after which the EEA, supported by its European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM), performs quality control procedures in consultation with individual countries. The EEA and ETC/ACM then compile the reported data and publish data sets, data viewers and related products on the EEA website.

The following data sets are highlighted in this report:

- GHG emission inventory for the period 1990-2016, reported under the MMR in March 2018;
- Effort Sharing emission data for the period 2013-2016 (2016 data reviewed in 2018);
- ETS emission data for the years 2005-2017, European Union Transaction Log (EUTL), extracted in July 2018;
- GHG emission projection data until 2035, mostly reported in March 2017 and updated by two countries (Ireland and Cyprus) in March 2018;
- approximated ('proxy') GHG emission data, renewable energy shares and energy consumption for the year 2017, partly reported by Member States in August 2018 and gap-filled with estimates by the EEA.

<sup>(1)</sup> <https://www.eionet.europa.eu/reportnet>

## 2 Progress of the European Union towards its greenhouse gas emission targets

- Although the 2020 reduction target is still expected to be met, the policies and measures currently accounted for in national projections will not be enough to deliver the savings needed to achieve the EU's reduction target of at least 40 % by 2030 (compared with 1990 levels).
- The latest official data show that the EU remains on track to exceed its 20 % GHG reduction target set for 2020 (compared with 1990 levels). In 2016, GHG emissions were 22 % lower than 1990 levels, and the new approximated data indicate that this increased again in 2017, although only moderately. National projections available from Member States indicate that EU GHG emissions are expected to remain below the 2020 target.
- The pace of GHG emission reductions is projected to slow after 2020. Continuing at this slower pace will not be sufficient to achieve the EU's target of a 40 % domestic reduction by 2030 (compared with 1990 levels). Even assuming that the 2030 target is met, faster decreases in GHG emissions will be necessary to achieve an 80 %, or even a 95 %, decrease by 2050.
- In 2017, emissions from stationary installations under the EU ETS remained 26 % lower than 2005 levels — about the same reduction level as in 2016. These reductions were mainly the result of lower emissions in the energy industrial sector.
- Emissions covered by the ESD decreased by 11 % in 2016 compared with 2005. Preliminary estimates suggest that emissions increased in 2017, with a net decrease in emissions to 10 % below 2005 levels. This change is mainly attributed to increasing emissions from transport and energy industries and industrial processes not covered under the EU ETS.

### 2.1 Progress in reducing total greenhouse gas emissions in the European Union

In 2016, the EU's total GHG emissions were 4 441 megatonnes (Mt) carbon dioxide equivalent (CO<sub>2</sub> eq.), which is 22 % less than 1990 levels <sup>(2)</sup>. According to preliminary estimates, emissions increased by 0.6 % from 2016 to 2017. Despite this increase, the EU remains on track to achieve its GHG emission reduction target of a 20 % decrease by 2020, compared with 1990 levels. Figure 2.1 illustrates the variability in emission reductions in recent years, and the expected increase between 2016 and 2017, which was preceded by a similar increase between 2014 and 2015.

In 2018, only two Member States reported updates of their national GHG projections (Cyprus and Ireland). Therefore, the aggregated EU emissions did not change significantly compared with the aggregation conducted in 2017. According to these national projections, the EU's GHG emissions are expected to decrease until at least 2035 (see Figure 2.1).

- According to the scenario 'with existing measures' (WEM), which reflects the effects of all adopted and implemented measures at the time the projections were prepared, GHG emissions will be reduced by 26 % by 2020 and by 30 % by 2030 (compared with 1990 levels).

<sup>(2)</sup> The EU's total GHG emissions excludes emissions from land use, land-use change and forestry (LULUCF) and includes all emissions from aviation (including international flights), covered under the EU target.

- According to the scenario ‘with additional measures’ (WAM), which also takes into account the measures that were at planning stage at the time the projections were prepared <sup>(3)</sup>, GHG emissions will decrease by 27 % by 2020 and by 32 % by 2030 (compared with 1990 levels).

Although it is expected that the 2020 reduction target will still be met, the policies and measures currently accounted for in national projections alone will not be sufficient to deliver the savings needed to achieve the EU’s reduction target of at least 40 % by 2030 (compared with 1990 levels). The pace of GHG emission reductions is currently projected to slow after 2020, and achieving the mid- and long-term targets/goals will require much faster reductions.

Assuming that 2020 emission targets will be met and 2020 emissions will be as projected by the current WEM scenario, then, between 2020 and 2030, emissions need to decrease by 786 Mt CO<sub>2</sub> eq. to reach the 2030 target. This means an average emission reduction of -79 Mt CO<sub>2</sub> eq. in every year between 2020 and 2030, an amount comparable to the total emissions of Austria in 2015. The average annual reduction expected to be achieved with currently adopted climate mitigation measures accounts for about one third of the emission savings needed (-23 Mt CO<sub>2</sub> eq. per year). If savings from policies and measures still at the planning stage were included, the average annual reduction would amount to -32 Mt CO<sub>2</sub> eq. per year. This is less than half of the reduction needed to achieve the 2030 target (see Figure 2.1).

The European Commission has developed several policy proposals to achieve the EU’s 2030 targets on climate and energy. Some of these already have been adopted:

- a reform of the EU ETS to include a more stringent cap reduction after 2020 (EU, 2018a);
- new annual binding GHG emission targets for Member States for the period 2021-2030, specifically covering emissions that are not covered by the EU ETS (a new ‘Effort Sharing’ between Member States), as well as new flexibilities to achieve these targets (EU, 2018b);
- the integration of the land use, land use change and forestry (LULUCF) sector into the EU 2030 climate and energy framework (EU, 2018c);
- a revision of the Energy Performance of Buildings Directive (EPBD).

Some proposals were provisionally agreed in June 2018 and their adoption is expected in the coming months:

- a proposal for the governance of the Energy Union that, in particular, requires Member States to submit draft National Energy and Climate Plans (NECPs) by 31 December 2018 (EC, 2016a);
- a revision and extension of the RED in June 2018, with a binding EU-level target to increase the share of renewable energy in the energy mix to 32 %, including an upwards revision clause by 2023 (Council of the European Union, 2018);
- an update of the EED, with an indicative target at EU level of at least 32.5 % by 2030, also with a clause for an upwards revision by 2023 (Council of the European Union, 2018).

In addition, based on the European strategy to cut emissions from the transport sector (EC, 2016b), several transport-related policies have been proposed, including CO<sub>2</sub> emission standards for cars, vans and lorries.

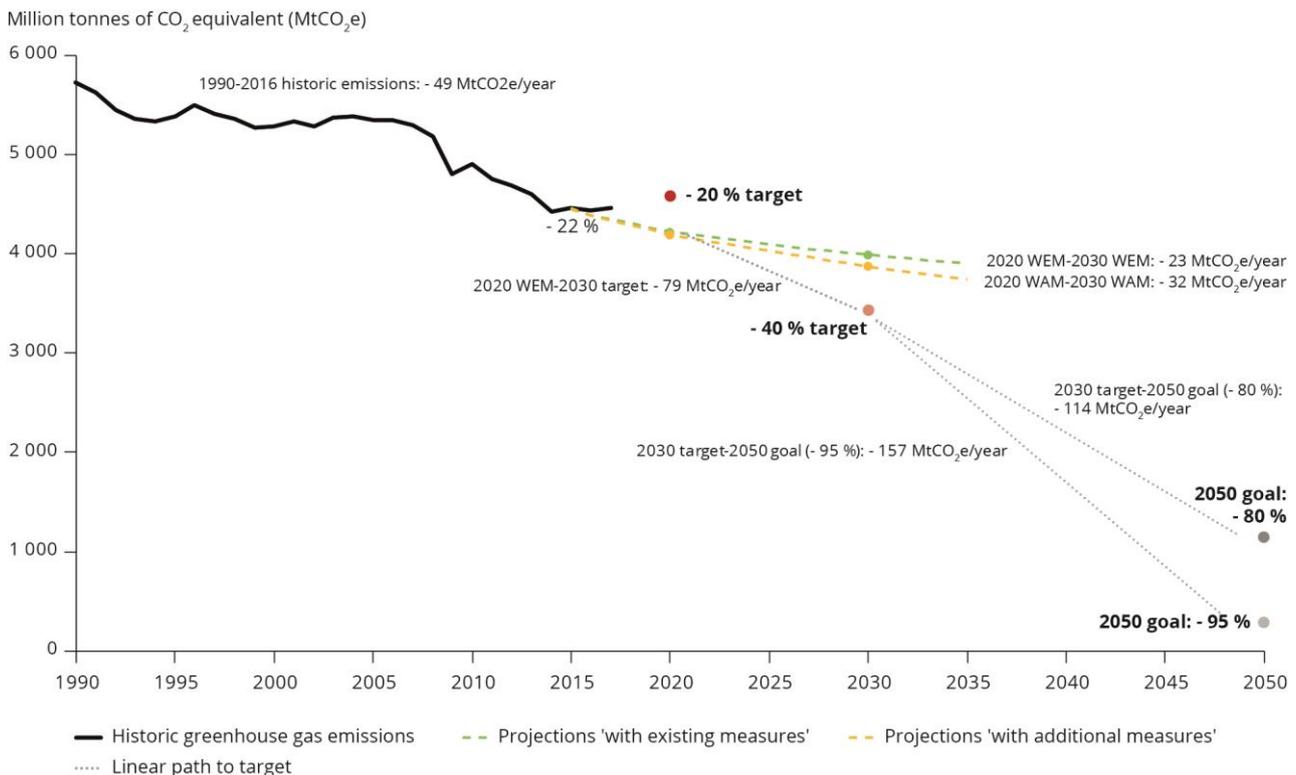
Even if the 2030 GHG target is achieved, a faster pace of reductions in emissions would still be required if the EU is to reach its long-term decarbonisation objective — a reduction of EU GHG emissions by 80-95 % by 2050, compared with 1990 levels. Achieving a reduction of 80 % in 2050 would require a reduction of 2 288 Mt CO<sub>2</sub> eq. in total emissions between 2030 and 2050. This is equivalent to an average annual reduction of 114 Mt CO<sub>2</sub> eq. An emission reduction of 95 % in 2050 would require a total of 3 146 Mt CO<sub>2</sub> eq. to be reduced between 2030 and 2050. This translates to an average annual emission saving between 114 and 157 Mt CO<sub>2</sub> eq. per year between 2030 and 2050 required for the EU’s long-term decarbonisation objective.

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<sup>(3)</sup> Not all Member States reported a WAM scenario. For further information on reporting of projections, please refer to Annex 1, A1.2.8.

Such a reduction can take place only in the context of a major transformation of the EU’s socio-technical systems, such as the energy, food, mobility and urban systems. As the effects of policies and measures often take time to materialise (e.g. increases in energy efficiency in buildings), long-term action should not be delayed, and lock-in effects of investments should be considered. Far-reaching measures with long-term effects are often postponed because of high initial costs or political controversies related to their implementation. However, investing in such measures can make sense in the short term if benefits of avoiding damages are taken into account in mitigation costs (see suggested damage cost rates, e.g. in UBA, 2014).

**Figure 2.1 Greenhouse gas emission trends, projections and targets in the EU, 1990-2050**



**Notes:** The GHG emission trends, projections and target calculations include emissions from international aviation, and exclude emissions and removals from the LULUCF sector. The WEM scenario reflects existing policies and measures, whereas the WAM scenario considers the additional effects of planned measures reported by Member States.

**Sources:** (EEA, 2018a, 2018b, 2018c, 2018d)

## 2.2 Reducing greenhouse gas emissions in key sectors

To achieve short-term GHG emission targets, the emissions covered by the EU ETS are subject to an EU-wide cap, whereas non-ETS emissions are subject to national targets as stated in the Effort Sharing legislation. From 2021 they will be accompanied by national ‘no-debit’ commitments with respect to LULUCF.

- Emissions from large point sources, mostly from power and heat production and industrial installations, are covered by the EU ETS (EU, 2003a). These currently represent about 40 % of EU GHG emissions, of which a large proportion stems from the power generation sector. Other activities covered by the EU ETS include cement production, iron and steel production and oil refining. Since 2012, the EU ETS covers GHG emissions from aviation (EU, 2009b). The mitigation of all ETS emissions is being

addressed at EU level through a single ETS-wide emission cap <sup>(4)</sup> and a ‘carbon market’ through which emission allowances can be traded.

- GHG emissions not covered by the EU ETS are mainly addressed by the ESD (EU, 2009c). These emissions are produced by a more diverse range of sectors and activities, including road transport, energy consumption in buildings, agriculture (cattle and soils), industrial installations and waste management. Since 2013, the ESD has set annual targets for each Member State from 2013 until 2020 that should not be exceeded. Mitigation actions therefore take place at national level through a combination of EU-driven policies and measures, and national initiatives. Member States are responsible for meeting their emission reduction commitments under the ESD.
- GHG emissions and removals from the LULUCF sector are not covered under the EU ETS or the ESD. LULUCF emissions and removals as reported under the GHG inventories for the United Nations Framework Convention on Climate Change (UNFCCC) represent a net carbon sink. These removals can contribute to a certain extent to achieve the Kyoto Protocol commitments but are not included in the EU’s target under the 2020 climate and energy package. With the rules set in the new LULUCF Regulation (EU, 2018c) and the new Effort Sharing Regulation (ESR) (EU, 2018b), this sector will be integrated into the EU 2030 climate and energy framework from 2021 onwards. The ESR establishes a limited flexibility with net removals from the LULUCF sector that can be used to meet Member States’ targets under this regulation. The LULUCF Regulation sets a ‘no-debit’ commitment for each Member State and defines harmonised EU-wide accounting rules to measure anthropogenic influence on emissions and removals in the sector. Higher emission reductions under the ESR can be used to cover LULUCF emissions, and additional sinks from the LULUCF sector can be accounted under the ESR under certain circumstances.

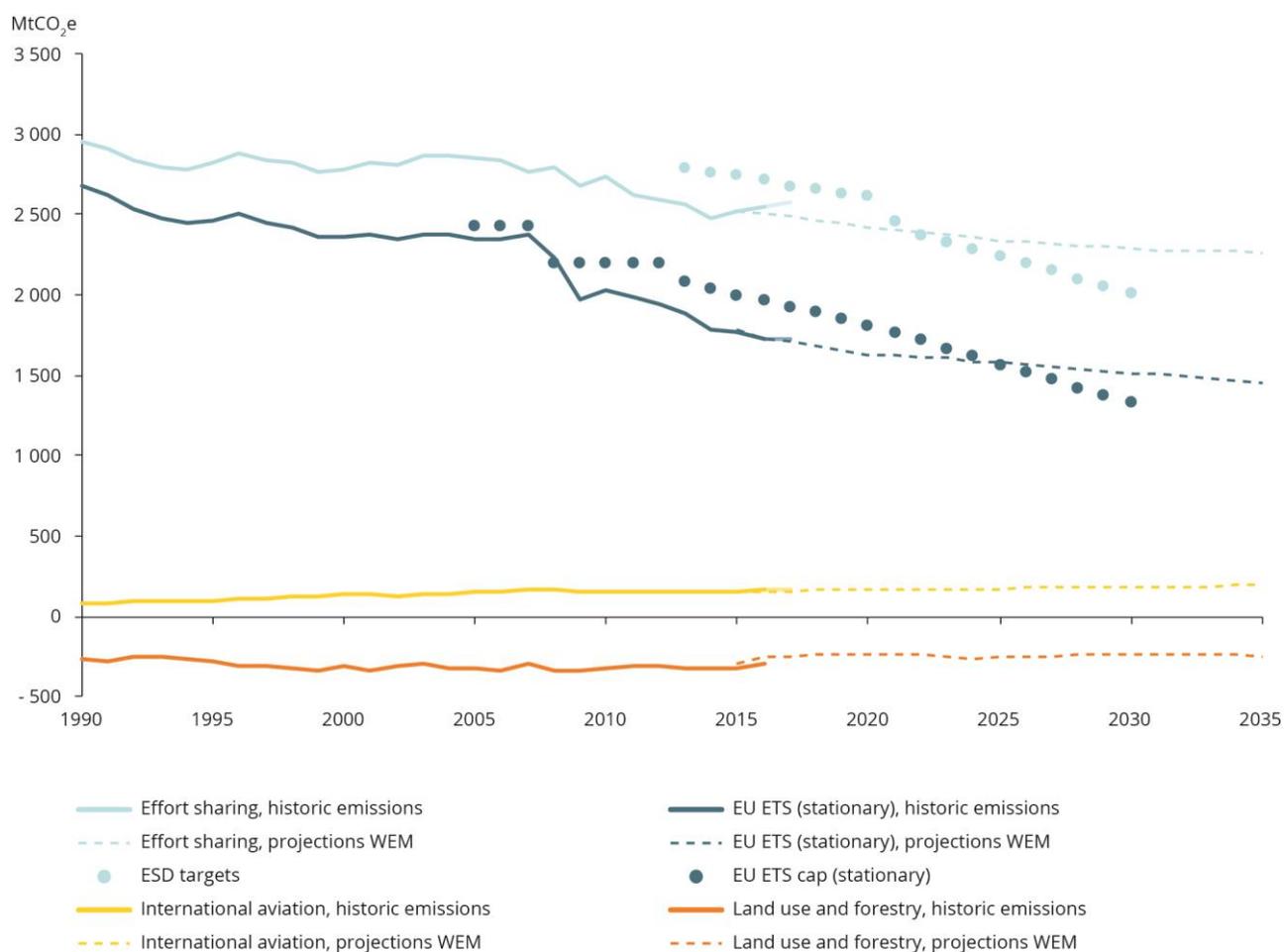
In EU ETS sectors and Effort Sharing sectors GHG emissions have been following different trends since 1990 <sup>(5)</sup>. The projections reported by Member States also show differences between the two sectors (see Figure 2.2). Emission trends in the ETS, ESD and LULUCF sectors are described and analysed in the following three sections.

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<sup>(4)</sup> The cap has been set for all participants in the EU ETS, including the EU as well as Iceland, Liechtenstein and Norway. These three countries participate in the EU ETS as members of the European Economic Area.

<sup>(5)</sup> Although the ETS was introduced in 2005 and the ESD in 2013 (i.e. no ETS or ESD emissions existed before 2005), it is possible to reconstruct a time series dating back to 1990 by drawing up a correlation between ETS/ESD emissions and the source categories used to officially report national GHG inventories under the UNFCCC.

**Figure 2.2 Effort Sharing, ETS, LULUCF and aviation emission trends and projections, 1990-2035**



**Notes:** Net removals from LULUCF correspond to reported values to the UNFCCC, which differ from values relevant to Kyoto Protocol and LULUCF Regulation commitments. The aggregated Effort Sharing targets for the period 2021-2030 are based on adopted legislation and absolute values are estimated based on latest available data.

The WEM scenario reflects existing policies and measures, whereas the WAM scenario considers the additional effects of planned measures reported by Member States.

**Sources:** (EC, 2013a, 2015a, 2017a; EEA, 2018b, 2018c, 2018e, 2018f, 2018d; EU, 2009a)

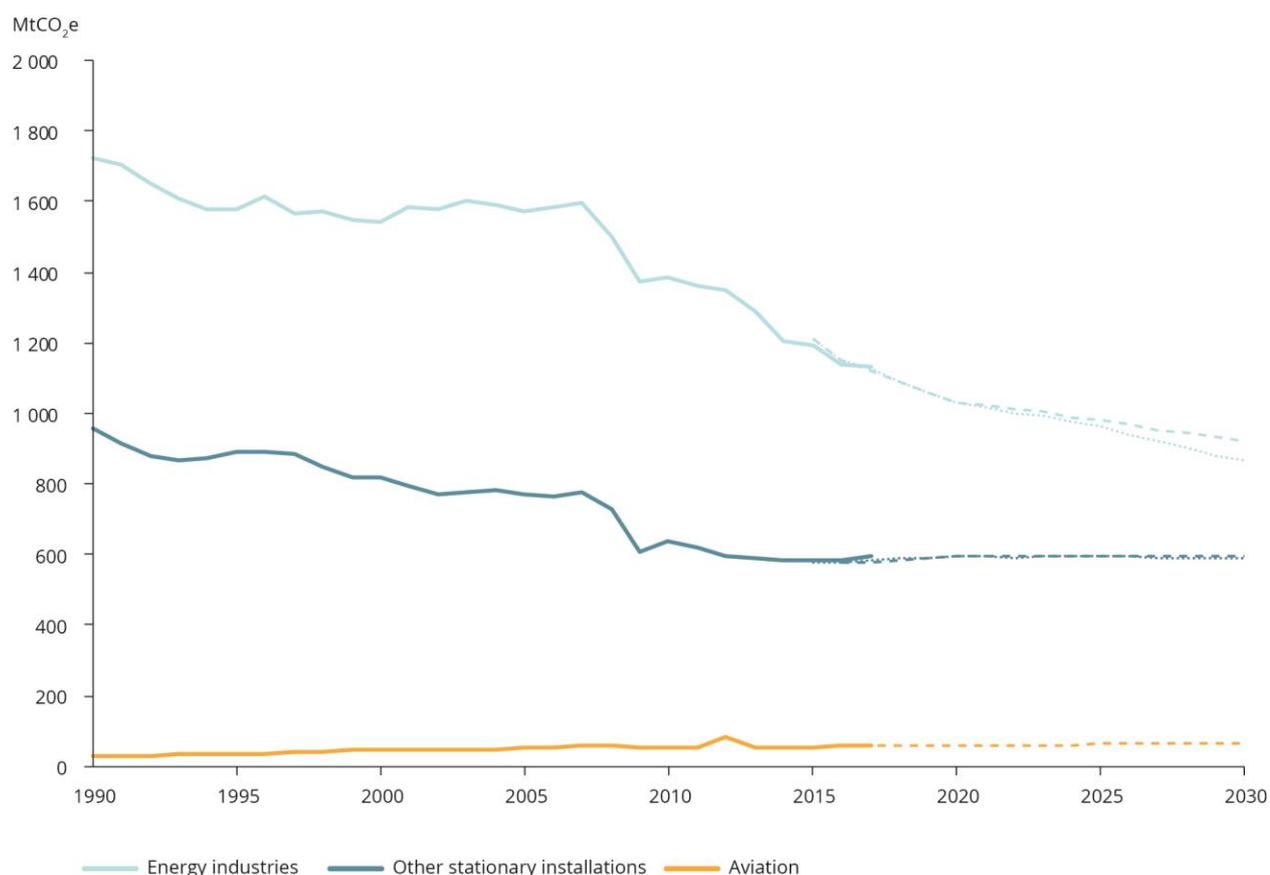
### 2.3 Emission trends under the European Union Emissions Trading System

Total GHG emissions from the sectors covered by the EU ETS have decreased significantly since 1990 (see Figure 2.3). The EU ETS target was defined to reduce emissions by 21 % between 2005 and 2020. In 2017, EU ETS emissions from Member States' stationary installations had already decreased by 26 % since 2005<sup>(6)</sup>. The decrease since 2005 was mostly driven by reductions in emissions related to power generation. *Ex post* evaluation of climate policies shows that the reduction in emissions was largely the result of changes in the combination of fuels used to produce heat and electricity. In particular, the fuels combination entailed a decrease in the use of hard coal and lignite fuels, better and more efficient installations, and a substantial increase in electricity generation from renewables, which almost doubled over the period. In addition, the reduced production volumes led to reductions in emissions in this sector, too. Emissions from the other industrial activities covered by the EU ETS have also decreased since 2005, but they remained stable in the current trading period (2013-2017) (see Figure 2.3).

<sup>(6)</sup> These values were derived to include an estimate to reflect the current scope of the EU ETS.

According to the projections submitted by Member States in 2017, future cuts in national GHG emissions will take place mainly under the EU ETS. With existing measures in place at the time of the calculation of GHG projections, emissions from stationary installations under the EU ETS are projected to decrease by 5 % between 2017 and 2020, and by 7 % between 2020 and 2030. According to scenarios that consider planned measures, reductions of an additional three percentage points are projected for 2020 and 2030, compared with the reductions predicted by the WEM scenario. Most of the projected reductions between 2020 and 2030 are expected to occur in the energy industries sector, whereas emissions from other activities are envisaged to remain stable during this period. Recent agreement on reforms to the EU ETS for the fourth trading period such as the strengthening of the Market Stability Reserve have not been considered in these projections. The emissions from international aviation, however, nearly doubled between 1990 and 2014 and are expected to increase further by 2030.

**Figure 2.3 Greenhouse gas emission trends and projections under the scope of the EU ETS, 1990-2030**



**Notes:** Solid lines represent historical GHG emissions (available for the period 1990-2017). Dashed lines represent projections for the WEM scenario. Dotted lines represent projections for the WAM scenario. The EU ETS GHG emissions presented were estimated based on the attribution of GHG emissions, reported by source categories in national GHG inventories and national projections, to EU ETS sectors and/or Effort Sharing sectors.

**Sources:** (EEA, 2018f, 2018d, 2018b, 2018c)

### 2.4 Emission trends under the Effort Sharing Decision

Total GHG emissions from sectors covered by the ESD have decreased since 1990, albeit at a slower rate than those covered under the EU ETS. This reflects the diversity of the sectors covered by the ESD and their mitigation potentials. In 2016, Effort Sharing emissions were 11.5 % below 2005 levels <sup>(7)</sup>, which is a

<sup>(7)</sup> This is equivalent to a reduction of 10.5 % compared with estimated scope-corrected ESD emissions 2005. See Annex A.1.2.7

greater reduction than the 9.3 % needed to reach national targets for Effort Sharing emissions by 2020. However, 2017 is the third year in a row in which Effort Sharing emissions have increased. According to preliminary estimates, emissions increased from 2016 to 2017 at a lower rate of 0.8 % compared with previous years. Figure 2.4 illustrates the Effort Sharing emission trends in recent years and demonstrates that emissions in the transport sector have risen in recent years after previous downward development.

According to national projections based on the WEM scenario, Effort Sharing emissions could be 193 Mt CO<sub>2</sub> eq. below the Effort Sharing target for 2020, and cumulative Effort Sharing emissions in the EU for the whole period 2013-2020 could be lower than the overall emission budget for all Member States under the ESD by 1 600 Mt CO<sub>2</sub> eq. <sup>(8)</sup>. In addition, if planned measures are considered, this cumulative surplus could increase to over 1 659 Mt CO<sub>2</sub> eq. Despite the overall decrease in emissions at EU level, certain Member States have more difficulties than others do in achieving their Effort Sharing targets (see Chapter 3).

For 2030, aggregated Member State projections result in a 21 % reduction of Effort Sharing emissions compared with 2005 base year emissions in the WEM scenario, and a 23 % reduction in the WAM scenario. These reductions remain insufficient compared with the 30 % reduction that non-ETS sectors should achieve by 2030, as a contribution to delivering the EU target of at least a 40 % domestic reduction in GHG emissions by 2030 compared with 1990 (see Figure 2.4). The 2030 targets thus require efforts from Member States that go beyond the measures currently implemented or planned.

Since 1990, the building sector has contributed most to absolute emission reductions in the sectors covered by the ESD. However, emissions slightly increased in 2015 and in 2016 and remained stable in 2017.

Emissions from the transport sector, which is the largest contributor to GHG emissions under the ESD, increased continuously between 1990 and 2007. After a decrease between 2007 and 2013, emissions from this sector have been increasing continuously since 2014.

Member States have projected only limited decreases in Effort Sharing emissions between 2017 and 2030, particularly after 2020. The largest decreases are expected to take place in the building sector, justified by the availability of marketable technologies that reduce energy demand and for the integration of renewables. In the agricultural sector, emissions are projected to remain relatively stable. Emissions in the transport sector are also expected to remain stable despite CO<sub>2</sub> emission standards for new cars and vans that are expected to reduce emissions by gradually diffusing into the vehicle stock. The largest reductions in relative terms are projected to be achieved in emissions from energy supply, manufacturing and industrial processes and product use not covered under the EU ETS (mostly fluorinated gases (F-gases), aggregated as ‘industry and other’) and waste between 2017 and 2030. Implementing additional measures (i.e. at the planning stage up to early 2017) would lead to further minor decreases in emissions, especially in the transport sector (see Figure 2.4)

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<sup>(8)</sup> According to Decision 2017/1471 of 10 August 2017 (EC, 2017a) annual emission allocations (AEAs) for the years 2017-2020 were recalculated to adapt to updated GHG inventory methodologies and figures.

**Figure 2.4 Greenhouse gas emission trends and projections under the scope of the ESD, 1990-2030**



**Notes:** Solid lines represent historical GHG emissions (available for the period 1990-2016). Dashed lines represent projections for the WEM scenario. Dotted lines represent projections for the WAM scenario. The Effort Sharing sector emissions presented are estimated based on the attribution of GHG emissions, reported by source categories in national GHG inventories and national projections, to EU ETS sectors and/or Effort Sharing sectors. The sector here summarised as 'industry and other' aggregates emissions of energy supply, manufacturing, industrial processes and product use (GHG inventory source categories 1.A.1, 1.A.2, 1.B, 1.C and 2), which are not covered under the EU ETS.

**Sources:** (EEA, 2018f, 2018d, 2018e, 2018c, 2018b), based on Member States' submissions.

## 2.5 Emissions from land use, land-use change and forestry

LULUCF activities, which include the management of soils, trees, plants, biomass and timber, can result in both emissions (source) and removals (sink) of CO<sub>2</sub>. In 2016, the EU's LULUCF sector<sup>(9)</sup> represented a net reported carbon sink of about 302 Mt CO<sub>2</sub> eq. This was despite reports from Cyprus, Denmark, Ireland, Malta and the Netherlands on net positive emissions from their LULUCF sectors. Over the past decade, the relatively large proportion of young forests and moderate harvest rates have led to an increased net carbon accumulation in European forests, which means that more carbon is removed from the atmosphere than is released.

While being a net sink, the sector was also a source of CO<sub>2</sub> emissions for some sub-categories. The largest source was land conversion, especially from deforestation, emissions from organic soils converted to cropland and land converted to settlements. Since 2000, the net reported annual LULUCF sink has been on average 320 Mt CO<sub>2</sub> eq., with an unfavourable declining trend over the past 6 years. According to the EU Reference Scenario 2016 (EC, 2016c), the net reported LULUCF sink in the EU is expected to shrink by

<sup>(9)</sup> As reported under the UNFCCC, without any accounting rules applied.

about 10 % between 2010 and 2020. This is attributed partly to increased harvest rates and partly to forests getting older, with associated reduced growth rates in some forest types.

The main component of the LULUCF sink is the carbon sink in managed forestland (-376 Mt CO<sub>2</sub> eq. in 2016). The managed forestland sink is mainly driven by the balance of forest harvest and forest increment rates (accumulation of carbon in forest biomass as a result of tree growth). In 2030, forest harvest is projected to increase over time from 516 million m<sup>3</sup> in 2005 to 565 million m<sup>3</sup>, owing to growing demand for wood for material uses and energy production. Along with the ageing of EU forests (which reduces the capacity of forests to sequester carbon), the forest increments are projected to decrease from 751 million m<sup>3</sup> in 2005 to 725 million m<sup>3</sup> in 2030. Consequently, the rate of accumulation of carbon and therefore the main component of the EU's reported LULUCF carbon sink in managed forestland will decline by 32 % until 2030. This is expected to be partially compensated for by the continuation of increasing carbon removals from afforestation, and a decreasing trend in emissions from deforestation, which are projected to decline from 63 Mt CO<sub>2</sub> eq. in 2005 to 20 Mt CO<sub>2</sub> eq. in 2030 (EC, 2016c) <sup>(10)</sup>.

To address the unfavourable projected decrease in the EU's LULUCF net sink and to account properly for anthropogenic emissions and removals within the LULUCF sector, the new LULUCF Regulation implements a binding no-debit rule for each Member State. It also provides updated accounting rules to identify anthropogenic changes in the carbon balance of forests and soils, which are used to determine compliance with this commitment (EU, 2018c). In particular, debits and credits for managed forestland are accounted against so-called forest reference levels, which makes it possible to isolate the impact of management-induced changes. Therefore, the above-reported sink value of -376 Mt CO<sub>2</sub> eq should not be confused with a possible credit volume generated through managed forestland.

The LULUCF Regulation requires each Member State to ensure that accounted GHG emissions from land use are entirely compensated for by an equivalent accounted removal of CO<sub>2</sub> from the atmosphere in other land use sectors, by credits from other Member States or by corresponding lower emissions in Effort Sharing sectors (the no-debit rule). For instance, if a Member State converts forests to other land uses (deforestation) or increases emissions from cropland, it must compensate for the resulting emissions by planting new forests (afforestation), enhancing removals and decreasing emissions for managed forests, croplands and grassland, covering with unused ESR allocations or agreeing to buy credits from other Member States.

The LULUCF Regulation is expected to improve the identification of additional mitigation action, and to thereby enhance the contribution of the sector to climate action. Stronger incentives for action are also provided by enabling trade between Member States within the LULUCF sector and by creating a limited flexibility for the use of certain, robust LULUCF credits in other non-ETS sectors.

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<sup>(10)</sup> To evaluate the overall carbon effect of forest and wood, it has to be considered that when wood is used — e.g. as construction material for buildings — the carbon remains stored over the use phase of the resulting products (carbon stock in harvested wood products). Therefore, the UN accounting rules and the new LULUCF Regulation also consider the change in carbon stock in harvested wood products. In addition to these storage effects, using wood can avoid or reduce the release of GHGs by replacing fossil fuels (energy substitution) and energy-intensive materials with an unfavourable environmental impact assessment and carbon footprint (material substitution).

### 3 Progress towards Member States' greenhouse gas emission targets

- In 2016, 22 Member States met their annual Effort Sharing targets. In Belgium, Finland, Germany, Ireland, Malta and Poland, Effort Sharing emissions were higher than the national Effort Sharing targets. While Malta has been missing its targets every year since 2013, 2016 was the first time that Belgium, Finland, Germany, Ireland and Poland missed their Effort Sharing targets.
- According to preliminary estimates, 10 Member States (Austria, Bulgaria, Cyprus, Estonia, Finland, Germany, Ireland, Lithuania, Malta and Poland) exhibited emissions higher than their Effort Sharing targets in 2017.
- According to GHG projections available from Member States, with existing national policies and measures in place, 2020 Effort Sharing emissions are expected to be lower than the 2020 targets in 20 Member States. In eight Member States (Austria, Belgium, Cyprus, Finland, Germany, Ireland, Luxembourg and Malta), existing measures will not be enough to meet their 2020 Effort Sharing targets. Currently reported additional measures do not change this prospect.
- If no domestic measures are implemented beyond those already included in projections, six Member States (Austria, Belgium, Cyprus, Finland, Germany and Luxembourg) could close the projected gap between the emission target in 2020 and their actual emissions by transferring surplus annual emission allocations (AEAs) from earlier years to the later years of the period 2013-2020. Ireland and Malta would need to rely on additional flexibilities to close their gaps, such as buying AEAs from other Member States.
- With the continuation of existing measures and the implementation of additional measures as reported in 2017, current projections indicate that only six Member States (Croatia, Greece, Hungary Portugal, Sweden and Slovakia) would keep their Effort Sharing emissions below their emission targets until 2030.

#### 3.1 *Current progress towards annual targets under the Effort Sharing Decision*

To achieve the EU's objective of a 20 % reduction in total GHG emissions by 2020 compared with 1990 levels, the ESD (EU, 2009c) sets national targets for each Member State for GHG emissions not covered by the ETS (EU, 2003a) <sup>(11)</sup>. National Effort Sharing targets cover sectors such as transport, buildings, agriculture and waste management. Together, these sectors account for 60 % of total EU GHG emissions. Mitigation actions take place at national level through a mix of EU-driven policies and measures and national initiatives. Effort Sharing targets range from 20 % reductions (Denmark, Ireland and Luxembourg) to 20 % allowed increases (Bulgaria) compared with 2005 base year levels. Taken together, the aggregated Effort Sharing targets for 2020 represent a 9.3 % reduction at EU level compared with 2005 base year levels. The ESD also sets annual targets for the period 2013-2020 to monitor progress across the EU, allow for corrective action and ultimately ensure that the EU

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<sup>(11)</sup> Consequently, there are no national targets on GHG emissions set at EU level that cover total (economy-wide) emissions. LULUCF emissions are not covered by the ESD.

## Progress of the EU towards its greenhouse gas emission targets

attains its GHG emission target by 2020. This section reviews the status of Member States' achievement of 2016 Effort Sharing emission targets.

In 2016, nine Member States (Croatia, Cyprus, Greece, Hungary, the Netherlands, Portugal, Romania, Slovakia and Sweden) overachieved their 2016 Effort Sharing target by more than 10 percentage points. The largest overachievements in absolute terms for the period 2013-2016 were made in Italy (138 Mt CO<sub>2</sub> eq.), France (123 Mt CO<sub>2</sub> eq.) and Spain (104 Mt CO<sub>2</sub> eq.).

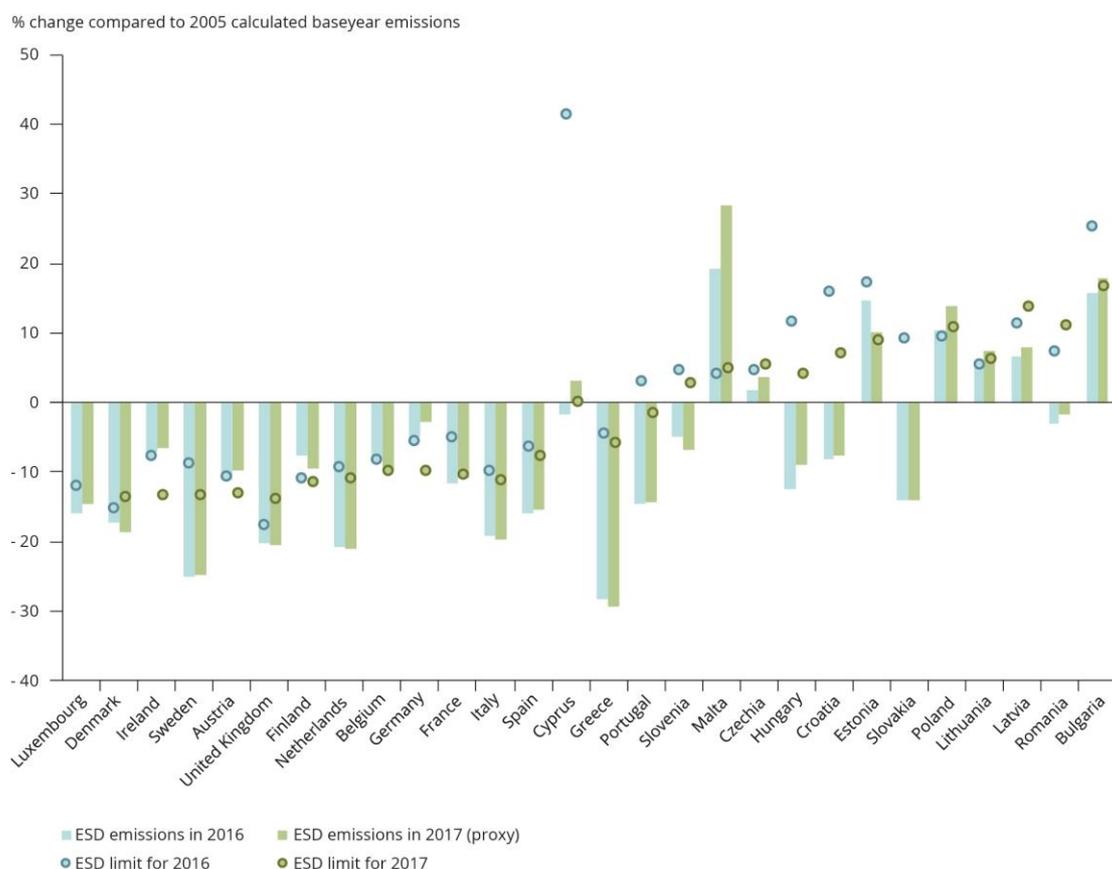
Six Member States (Belgium, Finland, Germany, Ireland, Malta and Poland) had their 2016 Effort Sharing emissions above their respective Effort Sharing emission targets (see Figure 3.1).

Malta is the only country for which emissions have remained above its Effort Sharing targets since 2013. In 2016, emissions were higher than annual allocations by 0.2 million AEAs, which is equal to a gap of 15 %. For the other Member States with 2016 emissions higher than their Effort Sharing targets, the gaps are less than 3.1 %. In absolute numbers, the gaps sum up to less than 5 million AEAs compared with a cumulative overachievement by other Member States by 178 million AEAs.

Based on approximated estimates for 2017, the number of Member States meeting their Effort Sharing targets decreased from 22 in 2016 to 18 in 2017. For the remaining 10 Member States (Austria, Bulgaria, Cyprus, Estonia, Finland, Germany, Ireland, Lithuania, Malta and Poland), Effort Sharing emissions were above their 2017 targets.

To comply with the ESD, Malta has been balancing its surplus emissions with AEA purchases from Bulgaria, which had overachieved with respect to its targets. While Malta will again need to pay for its surplus emissions, the other Member States can comply with the ESD by using their banked AEAs from their own overachievements in the period 2013-2015.

**Figure 3.1** Current progress of Member States towards their Effort Sharing targets



**Notes:** Member States are ranked according to their 2020 Effort Sharing targets, from the largest required reduction (Luxembourg, which has a target of -20 %) to the largest allowed increase (Bulgaria, which has a target of +20 %) compared with 2005 base year levels. Following the 2016 comprehensive review of Member States’ historical GHG inventory estimates, the AEAs for the period 2017-2020 were recalculated to reflect updates in methodologies for reporting of GHG inventories (EC, 2017a). This recalculation ensures that the originally intended level of effort (as a percentage) is maintained for each Member State in the ESD (see also the Annex A1.2.6).

Sources: (EC, 2013a, 2013b, 2017a; EEA, 2018g, 2018d) (EC, 2013a, 2013b, 2017a; EEA, 2018d)

### 3.2 Insights into Effort Sharing sectors and their current development

At Member State level the importance and the development of Effort Sharing sectors’ emissions varies. Six Member States (Germany, the United Kingdom, France, Italy, Spain and Poland) are estimated to have contributed 71 % to total EU Effort Sharing emissions in 2017. The following information relates to emission estimates for 2017 in line with an EEA report (EEA, 2018h) in which further details are laid out.

At EU level the transport sector showed only negligible emission reductions compared with 2005 (-3 %): despite important reductions between 2007 and 2013, transport emissions have been rising again in recent years. Between Member States, the changes in this sector vary from a 68 % increase (Poland) to a 21 % decrease (Luxembourg). Altogether 12 Member States exhibit increased transport emissions compared with 2005.

In the buildings sector, Effort Sharing emissions at EU level decreased by 16 % compared with 2005. Only four Member States (Malta, Estonia, Lithuania and Poland) increased buildings emissions compared with 2005. The other Member States decreased their Effort Sharing emissions in this sector by up to 59 % (Greece).

Agriculture emissions at EU level have slightly decreased since 2005 (by 1 %). At Member State level the emission changes since 2005 have ranged from a 27 % increase (Bulgaria) to a 16 % decrease (Greece). Half of the Member States have increased/decreased their emissions since 2005.

The waste sector is the smallest Effort Sharing sector. At EU level, emissions are estimated to have decreased by around 32 % since 2005. While six Member States exhibit increased emissions since 2005 (Croatia, Czechia, Cyprus, Slovakia, Spain and Romania), the other Member States have decreased their emissions up to nearly 59 % (United Kingdom).

The remaining Effort Sharing emissions, grouped in the 'industry and other' sector, have declined at EU level (by 12 % since 2005). However, this sector shows very different developments across Member States. A total of 13 Member States are estimated to have increased their emissions compared with 2005. Three Member States (Lithuania, Malta and Cyprus) increased their emissions by more than 50 %. Most emission decreases since 2005 have been below 50 %.

### **3.3 Projected progress towards 2020 Effort Sharing targets**

National GHG projections submitted by Member States in 2017 and updated submissions from Cyprus and Ireland in 2018 show diverse expectations regarding Effort Sharing emission trends for the period 2017-2020. For many Member States, projections are consistent with past trends and show decreases in Effort Sharing emissions between 2017 and 2020.

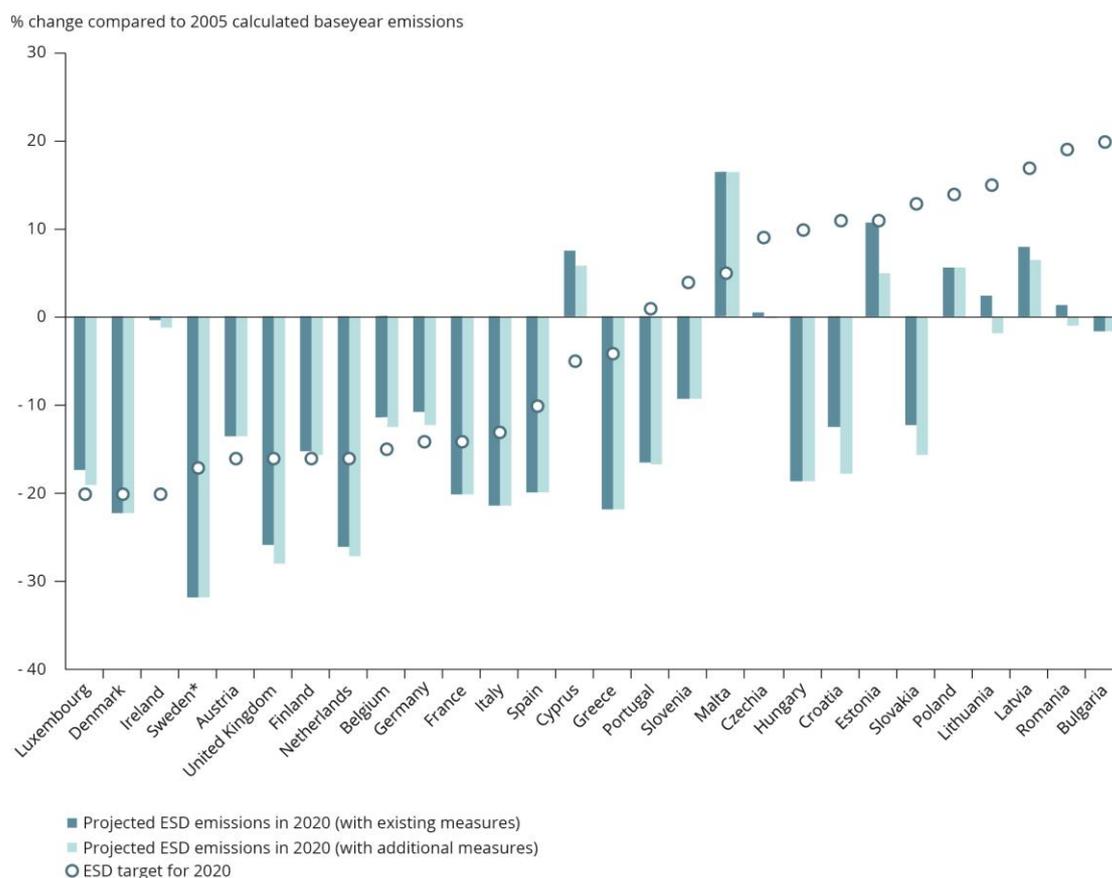
- A total of 16 Member States project a decrease in their Effort Sharing emissions until 2020 (Austria, Belgium, Bulgaria, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, the Netherlands, Portugal, Slovenia, Spain, Sweden and the United Kingdom).
- Nine Member States projected an increase in their Effort Sharing emissions until 2020 (Croatia, Cyprus, Czechia, Greece, Ireland, Latvia, Poland, Romania and Slovakia).
- Projected emissions in Lithuania, Luxembourg and Malta remain nearly constant.

Based on these national projections, 20 Member States expect their Effort Sharing emissions to stay below their annual targets under the ESD in 2020, based on the WEM scenario (see Figure 3.2).

Conversely, for eight Member States (Austria, Belgium, Cyprus, Finland, Germany, Ireland, Luxembourg and Malta), national projections submitted under the MMR suggest that emissions could exceed their AEAs (i.e. annual emission allocations under the ESD) by 2020 (see Table A1.4).

In 21 Member States, approximated ESD emissions in 2017 are higher than projected emissions. In four MS (Bulgaria, Estonia, Lithuania and Poland), approximated emissions in 2017 show levels that exceed the trajectory required to meet 2020 targets. However, projections for the years up to 2020 show a fall in expected emissions levels that bring these four MS back on track toward their Effort Sharing targets. (see Table A.1.4 in Annex 1).

**Figure 3.2** Projected progress of Member States towards their 2020 ESD targets



**Notes:** 17 Member States submitted a WAM scenario. For the other Member States (Austria, Bulgaria, Denmark, France, Greece, Italy, Malta, Poland, Slovenia, Spain and Sweden), the WEM scenario is shown instead. Denmark submitted a WAM scenario that was identical to its WEM scenario.

\* Sweden has cancelled its AEA surpluses for the period 2013-2015. This is not reflected in the graph and would reduce Sweden's surplus by around 19 million AEAs.

**Sources:** (EC, 2013a, 2013b, 2017a; EEA, 2018c). Based on Member States' submissions.

Effort Sharing emission targets, expressed in quantities of AEAs, can be considered as annual emission budgets that can be partly transferred from one year to another, as well as between Member States, under certain rules defined in the ESD. It is therefore possible to define an overall emission budget under the ESD for the whole period 2013-2020 for each Member State and at EU level. As historical and projected Effort Sharing emissions at EU level are below Effort Sharing targets, an overall surplus between about 1 600 and 1 700 million AEAs is expected by 2020 at EU level (see Annex 1, Section A1.5).

At Member State level, the size of the expected cumulative AEA surpluses or deficits by 2020 differ greatly (see Figure 3.3). The largest cumulative surpluses are projected for Italy, the United Kingdom, Spain and France. Only two Member States (Ireland and Malta) expect a deficit of AEAs over the whole period. For Ireland, this is so even in the case of a WAM scenario that considers additional measures. Currently planned or further additional measures will have to be implemented in due course or these Member States will need to purchase AEAs from other Member States or international project credits.

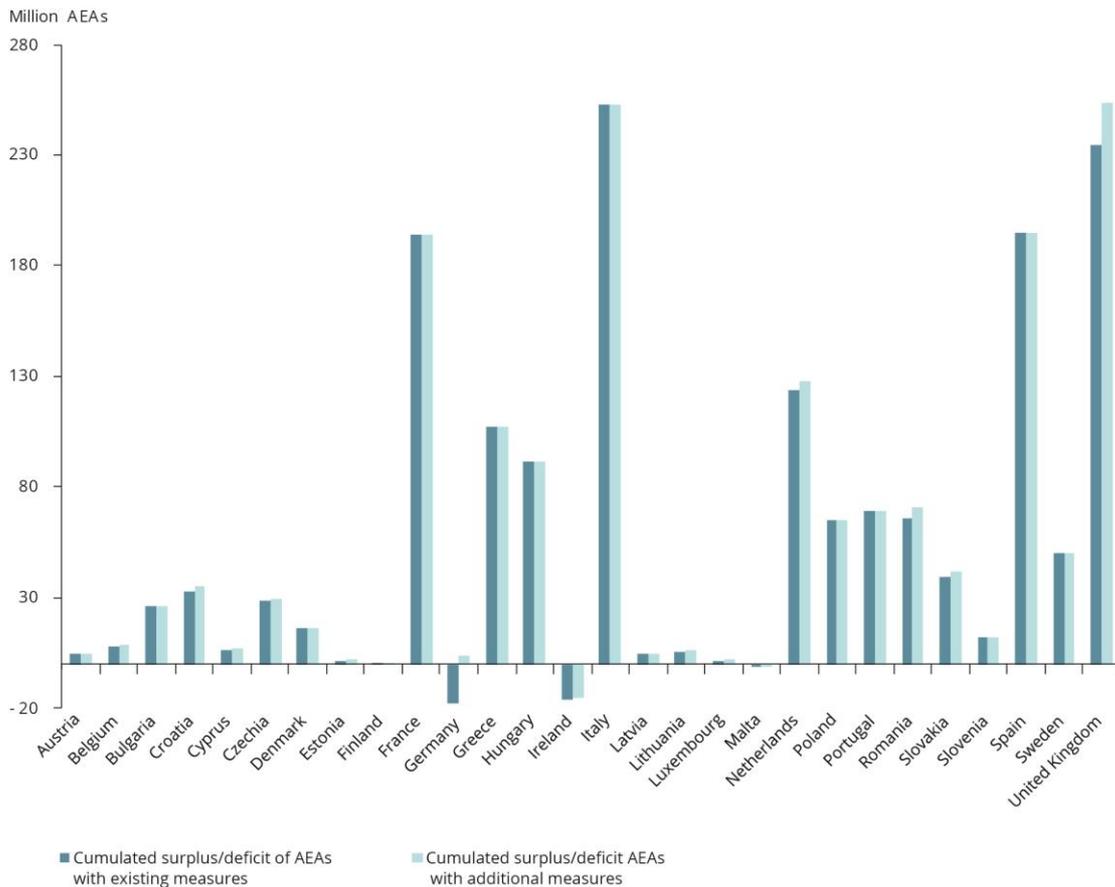
Overall, based on historical emissions, including approximated Effort Sharing emissions for 2017 and the latest national GHG projections submitted under the MMR until 2020, a net surplus of between 1 600 and 1 659 million AEAs (depending on the scenario considered)

could accumulate by 2020 if all unused AEAs were carried over to subsequent years within the compliance period from 2013 to 2020. This projected surplus is slightly lower than that calculated in the 2017 assessment (1 700 to 1 800 million AEAs) (EEA, 2017a). The quantity of surplus AEAs would be more than enough to cover the potential deficits observed or expected in a limited number of Member States.

So far, the European Commission has performed compliance checks for the period 2013-2015. Malta balanced its respective surplus emissions of 0.08, 0.12 and 0.14 Mt CO<sub>2</sub> eq. with AEA purchases from Bulgaria, which had overachieved its targets. Bulgaria declared that it would disburse the financial revenues from these AEA transfers solely to subsidise and administer activities aimed at climate change mitigation or adaptation. All other Member States except Sweden transferred surplus AEAs to subsequent years. Sweden invited Member States to follow its example by increasing ambitions under the ESD through annual cancellation of surplus AEAs. For the period 2013-2015, Sweden has cancelled its annual surpluses. For these years they add up to 19.4 million AEAs (see EC, 2018a).

No additional use of flexible mechanisms (transfer of AEAs between Member States or additional flexibility through the purchase of emission credits outside the EU) has been reported.

**Figure 3.3** Projected cumulative differences between emission ESD targets, 2013-2020



**Notes:** A positive value represents a surplus of AEAs. A negative value represents a shortfall of AEAs. A total of 17 Member States submitted a WAM scenario. For the other Member States (Austria, Bulgaria, Denmark, France, Greece, Italy, Malta, Poland, Slovenia, Spain and Sweden), the WEM scenario is shown instead. Denmark submitted a WAM scenario that was identical to its WEM scenario.

**Sources:** (EC, 2013a, 2013b, 2016d, 2017a, 2017b, 2017c; EEA, 2018f, 2018b, 2018c, 2018d, 2018g), based on Member States' submissions.

### Situations of eight Member States at risk of missing their 2020 Effort Sharing targets

National projections suggest that Effort Sharing emissions will exceed Effort Sharing targets by 2020 in Austria, Belgium, Cyprus, Finland, Germany, Ireland, Luxembourg and Malta. These Member States can still meet their obligations under the ESD by enhancing national efforts to reduce their domestic emissions to levels below Effort Sharing target levels by 2020, as well as by using the flexibilities provided for under the ESD (see Table A3.4), as described in the following paragraphs.

For **Austria**, a deficit of AEAs is projected for 2020 in the WEM scenario. A WAM scenario has not been submitted. Several policies that were reported under the WAM scenario in 2015 are now included in the WEM scenario, as they have been implemented. With no additional measures, Austria could achieve its Effort Sharing targets by using AEAs accumulated between 2013 and 2016. According to projection for the period 2018-2020, this would be enough to close the gap in Effort Sharing targets by 2020. Proxy emissions in 2017 are higher than projected numbers by nearly 2 Mt CO<sub>2</sub> eq., mainly because of higher emissions from transport. If this difference in projections remains, the surplus accumulated until 2016 might not be sufficient to comply with the ESD without the purchase of surplus AEAs from other Member States.

For **Belgium**, projections indicate that, in addition to deficits in 2016 (which may be due in part to a colder than average winter), deficits in AEAs could occur between 2018 and 2020 in the WEM scenario, with an estimated gap of 2.8 million AEAs in 2020. WAM scenario projections show that this deficit could be reduced to 2.0 million AEAs in 2020 by implementing additional measures. Belgium could achieve its Effort Sharing targets for the whole period by using surplus AEAs already accumulated between 2013 and 2015. Effort Sharing emissions turned out to be higher than expected in 2016. This also holds true for approximated 2017 Effort Sharing emissions compared with projected 2017 Effort Sharing emissions but to a lesser extent. Therefore, the projected Effort Sharing emissions until 2020 might also be higher than expected and gaps in later years might be greater than projected.

For **Cyprus**, a deficit of AEAs is estimated for 2017 and projected every year from 2018 to 2020 under both the WEM and WAM scenarios. The flexibilities of carrying forward AEAs from previous years, however, seem to be sufficient for Cyprus to stay within its given budget for the period 2013-2020.

**Finland** projects its emissions to slightly exceed allocated AEAs in the period 2019-2020 (WEM scenario) or 2020 (WAM scenario). According to the most recent projections, surplus AEAs from previous years are sufficient to compensate for this deficit under both scenarios. However, Effort Sharing emissions turned out to be higher than projected in 2017, especially in the transport sector. This also holds true for approximated 2017 Effort Sharing emissions compared with projected 2017 Effort Sharing emissions, which are higher by more than 1 Mt CO<sub>2</sub> eq.. Therefore, the projected Effort Sharing emissions until 2020 might also be higher than previously expected and gaps in later years might be higher than suggested in projections submitted in 2017.

**Germany's** WEM projections indicate a deficit of 15.6 million AEAs in 2020. Considering additional measures of the WAM scenario, this deficit reduces to 8.1 million AEAs in 2020. With GHG projections submitted in 2017 for the period 2017-2020, gaps from 2016 onwards could be compensated for by using accumulated surplus AEAs from the period 2013-2015. However, Effort Sharing emissions turned out to be higher than expected in 2016. This also holds true for approximated 2017 Effort Sharing emissions compared with projected 2017 Effort Sharing emissions. Approximated emissions are more than 20 Mt CO<sub>2</sub> eq. higher than the projected emissions. The increasing trend in Effort Sharing emissions since 2014 may imply that projected Effort Sharing emissions until 2020 might also be higher than expected,

so that gaps in later years will be higher too. The most important Effort Sharing sectors are transport, 'industry and other' and buildings. The transport, 'industry and other' and agriculture sectors are encountering increasing emissions since 2005, the main emission reductions since 2005 have been achieved in the buildings sector. For buildings, marketable technologies that reduce energy demand as well as enabling integration of renewables in buildings are already available and already economically advantageous. Considering the importance of the building sector in energy consumption, efforts to reduce emissions in the building sector should be further intensified.

For **Ireland**, projections show deficits under both scenarios until 2020. With updated projections in 2018, the deficit increased. Transferring surplus AEAs accumulated between 2013 and 2015 would not be enough for Ireland to comply each year until 2020. Most Effort Sharing emissions arise from agriculture and transport. In both sectors, emissions are projected to increase in coming years if only existing policies and measures are considered. Ireland will therefore need to successfully implement measures additional to those reported in its WAM scenario, or purchase AEAs or international credits. As reported by Ireland in 2018, additional measures that would contribute to closing the gap in Effort Sharing sectors include a further increase in the deployment of electric vehicles compared with the WEM scenario and efficiency gains in the use of fertilisers in the agricultural sector. The residential sector measures include the extension of several existing schemes laid out in Ireland's National Mitigation Plan. Additional measures in the commercial sector include the extension of several measures, including the Accelerated Capital Allowance Scheme, the Excellence in Energy Efficiency Design (EXCEED) Programme, the Energy Supplier Obligation Scheme, the Sustainable Energy Authority of Ireland's Small to Medium-sized Enterprise (SME) Programme, the Public Sector Building Demonstration and Public Sector Programmes and the Better Energy Scheme.

For **Luxembourg**, deficits are projected for the year 2020, with a gap of 0.3 million AEAs (WEM scenario) and 0.1 million AEAs (WAM scenario) in 2020. This gap could be filled with the use of surplus AEAs from preceding years. The main source of Effort Sharing emissions in Luxembourg is transport, in which emissions are projected to stay about constant in coming years. Submitted projections in 2017 match quite closely the latest emissions developments.

For **Malta**, deficits are projected for every year until 2020, with an annual gap of 0.1 million AEAs (WEM scenario). Malta has not submitted a WAM scenario. Malta already complied with its legal obligations in relation to 2013, 2014 and 2015 by purchasing surplus AEAs from Bulgaria. According to the inventory for 2016, approximated Effort Sharing emissions for 2017 and the national projections up to 2020, each year Malta will further need additional flexibility mechanisms such as purchasing AEAs from Member States that have overachieved their targets. Malta has exhibited emission increases since 2005 in all three main Effort Sharing sectors (transport, 'industry and other' and buildings). These trends might partly result from increasing tourism, which can have a large impact on such a small country (Eurostat, 2018b). This increase goes along with an increase in buildings, transport, waste and also air conditioning systems. While air conditioning systems lead to emission increases in the electricity sector, they also influence the consumption of F-gases, which is included in the 'industry and other' sector.

### **3.4 Projected progress towards 2030 targets under the Effort Sharing Regulation**

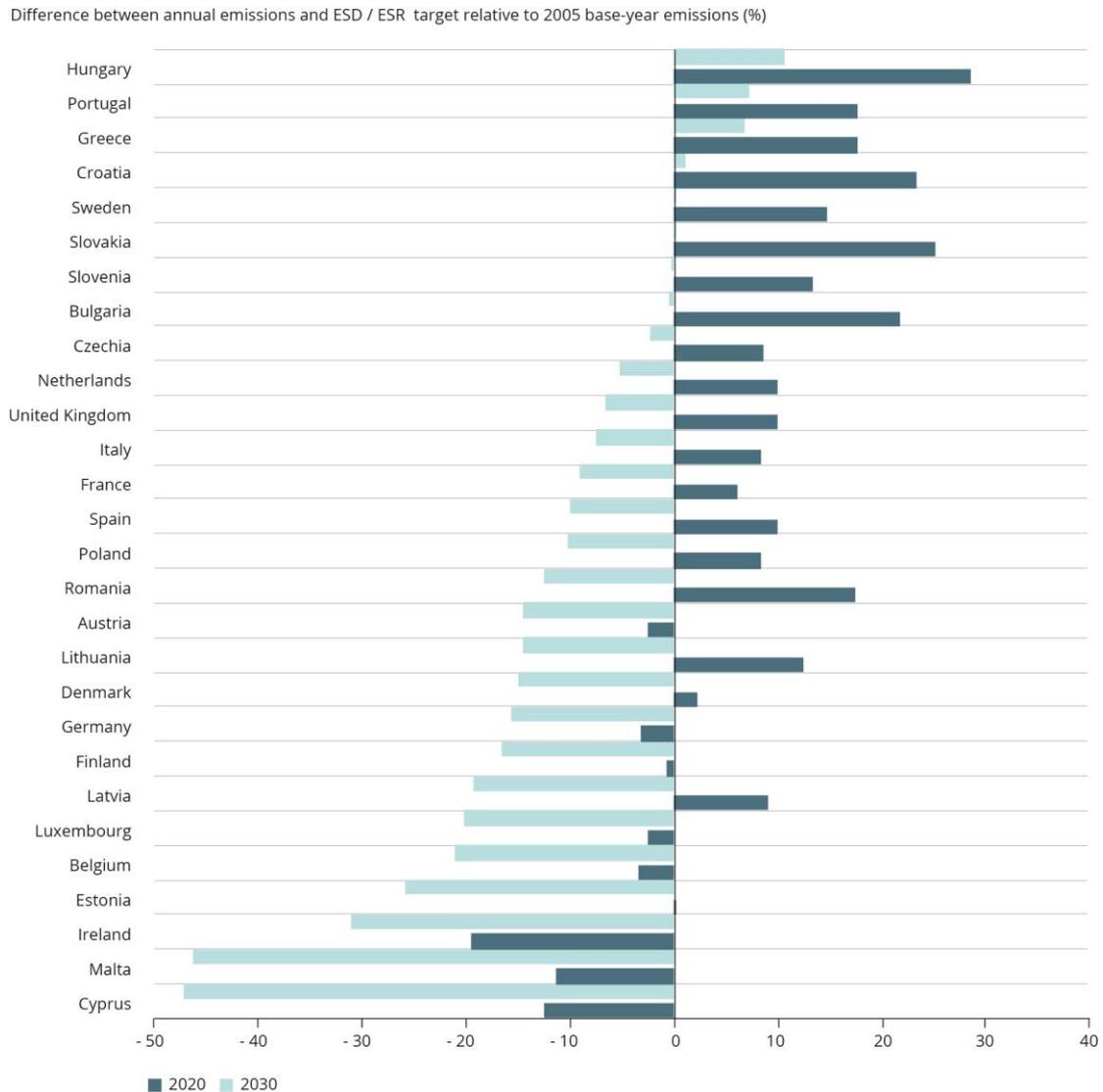
In the WEM scenario, 20 Member States are projected to stay below their annual emission allocations for 2020. Extending the perspective until 2030, this holds true for only six Member States (Croatia, Greece, Hungary Portugal, Sweden and Slovakia). Figure 3. shows

## Progress of the EU towards its greenhouse gas emission targets

projected progress of Member States towards their 2020 and 2030 Effort Sharing targets based on existing measures.

Additional policies and measures are expected to assist Member States to better meet their 2030 targets. In particular, Cyprus and Estonia expect additional measures to reduce the gap between their emissions and 2030 targets by 30 and 24 percentage points, respectively. In 2018, Member States will submit their draft NECPs, in which they will detail which policies and measures they expect to implement to achieve their 2030 targets. The current analysis of Member States' prospects towards reaching their 2030 targets is based on existing and additional policies and measures in place or anticipated in 2016.

**Figure 3.4 Projected progress of Member States towards their 2020 and 2030 ESD/ESR targets with WEM scenarios**



**Sources:** (EC, 2013a, 2013b, 2017a; EEA, 2018c; EU, 2018b) based on Member States' submissions.

# Annex 1 Progress towards greenhouse gas emission targets: data and methodology

## ***A1.1 Reporting requirements for greenhouse gas emissions***

The assessments of progress towards GHG emission targets presented in this report are based, for the most part, on information submitted by Member States under Regulation (EU) No 525/2013, the Monitoring Mechanism Regulation (EU, 2013a).

The purposes of the reporting requirements stipulated in the MMR are to enable the EU to complete its reporting commitments under the UNFCCC, and to evaluate the projected progress of the EU and its Member States towards fulfilling their GHG mitigation commitments under the Kyoto Protocol, in annual reports prepared by the European Commission and the EEA.

Implementing provisions (EU, 2014a) provide a structure and format for the reporting of GHG inventories and approximated GHG inventories, information on policies and measures, GHG projections and the use of auctioning revenue and project credits, and they are used for the purposes of the LULUCF Decision (EU, 2013b). Furthermore, a delegated act (EU, 2014b) defines the substantive requirements for an EU inventory system to fulfil the obligations pursuant to Decision 19/CMP.1.

## ***A1.2 Data sources for greenhouse gas emissions***

The analysis presented in this report is based on several sets of GHG emission data.

### ***A1.2.1 Historical trends in greenhouse gas emissions***

GHG emission data for the period 1990-2016 are official data reported by the EU and Member States under the UNFCCC in their corresponding GHG inventory reports (EEA, 2018f, 2018b)(EEA, 2018a, 2018b)(EEA, 2018a, 2018b)(EEA, 2018a, 2018b)(EEA, 2018a, 2018b)(EEA, 2018a, 2018b). The EEA is responsible for the compilation of the EU GHG inventory. Together with the European Topic Centre for Air Pollution and Climate Change Mitigation <sup>(12)</sup>, the EEA implements a quality assurance and quality control (QA/QC) procedure (EC, 2013c) to ensure the timeliness, completeness, consistency, comparability, accuracy and transparency of the inventories reported by Member States that are used in this report. In 2016, a comprehensive review of GHG emission data took place under Article 19 of the MMR, in the context of the annual compliance cycle under the ESD. This concerned the years 2005, 2008-2010, 2013 and 2014. The years 2015 and 2016 were reviewed in 2017 and 2018 during the annual review cycle under Article 19 of the MMR.

From 2015 onwards, Member States' GHG inventories are based on the use of global warming potentials (GWPs) from the Intergovernmental Panel on Climate Change (IPCC)'s Fourth Assessment Report (AR4) (UNFCCC, 2013). Thus, all the emission estimates used in this report were calculated using GWPs from the IPCC's AR4.

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<sup>(12)</sup> The ETC/ACM is a consortium of European institutes contracted by the EEA to carry out specific tasks in the fields of air pollution and climate change mitigation.

### **A1.2.2 Approximated greenhouse gas emissions for 2017**

Early ‘approximated’ (proxy) estimates of 2017 GHG emissions were reported by Member States to the European Commission under the MMR by 31 July 2018. These estimates were aggregated to EU level by the EEA (EEA, 2018d). Bulgaria, Cyprus and Romania did not submit proxy GHG inventories. For those countries, proxies have been calculated by the EEA and the ETC/ACM. The methodology and data sources are laid out in detail in (EEA, 2018d).

### **A1.2.3 Greenhouse gas emissions in the European Union Emissions Trading System since 2005**

Data in the EU ETS are used to analyse emission trends and to determine the level of emissions covered under the ESD. For the years 2005-2012, ETS emissions include estimates to reflect the scope of the EU ETS for the third trading period. These data are publicly available from the EUTL <sup>(13)</sup> and the EEA ETS data viewer (EEA, 2018e). The data considered in the analysis were extracted from the EUTL on 10 July 2018.

### **A1.2.4 Emissions covered under the Effort Sharing Decision**

For analysing emission trends in the ESD, historical Effort Sharing emissions are calculated using the latest GHG inventory data, from which ETS emissions, CO<sub>2</sub> emissions from domestic aviation and nitrogen trifluoride (NF<sub>3</sub>) emissions are subtracted. ETS emissions include EEA estimates to reflect the scope of the EU ETS for the third trading period for the years 2005-2012.

The Effort Sharing GHG emission data for the years 2013 and 2016 are consistent with the outcome of the 2016, 2017 and 2018 reviews of national GHG inventory data pursuant to Article 19 of the MMR. The data used by the European Commission to determine Member States’ compliance under the ESD for 2013, 2014 and 2015 are publicly available (EC, 2016d, 2017b, 2017c); the data for 2016 are expected to be published in autumn 2018.

### **A1.2.5 Long-term historical trends in Emissions Trading System and Effort Sharing Decision emissions**

For Figures 2.3 and 2.4, GHG emissions for the years 1990-2016 are split into those covered by the EU ETS and those covered by the ESD. These splits are based on the application of a percentage for each of the main source categories defined by the IPCC for the reporting of national GHG inventories, based on Member States’ projections submitted in 2017 and 2018. Projections for ETS and ESD are reported by source categories in Member States’ submissions.

The ‘industry and other’ sector in Figure 2.4 aggregates Effort Sharing emissions of energy supply, manufacturing and industrial processes and product use, i.e. inventory source categories 1.A.1, 1.A.2, 1.B and 2.

### **A1.2.6 Annual emission targets (annual emission allocations) under the Effort Sharing Legislation**

The AEA values for the period from 2013 to 2020 were defined in Commission Decision No 2013/162/EU (EC, 2013a) and adjusted in accordance with Commission Implementing Decision No 2013/634/EU (EC, 2013b) to reflect the change in scope of the EU ETS in 2013.

Following the 2016 comprehensive review of Member States’ historical GHG inventory estimates, the AEAs for the years 2017-2020 were recalculated to reflect updates in

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<sup>(13)</sup> The EUTL automatically checks, records and authorises all transactions in the EU ETS.

methodologies for reporting of GHG inventories (EC, 2017a). This recalculation ensures that the originally intended level of effort (as a percentage) is maintained for each Member State in the ESD. The recalculation also ensures consistency between the targets and the emissions reported by the Member States for compliance with the ESD, as the current reported emissions already consider the methodological updates.

Effort Sharing base year emissions for 2005 and AEA values for 2017-2020 used throughout this report follow Commission Decision (EU) 2017/1471 (EC, 2017a) and Decision No 2013/634/EU (EC, 2013b).

The Effort Sharing Regulation (ESR) (EEA, 2018b) defines Member States' minimum contributions to achieve the EU's 2030 target of a 30 % emission reduction compared with 2005 in ESR sectors (see Figure A4.1). Absolute AEA values for the period from 2021 to 2030 will be published in the year 2020, when final Effort Sharing emissions for the period 2016 to 2018 are available. Average Effort Sharing emissions for these years are necessary to define the starting point for the calculation of AEAs in the period from 2021 to 2030.

The best currently available Effort Sharing emission data have been used for an estimation of future AEAs, as follows.

- 2005: base year emissions from 2016 comprehensive ESD review (EEA, 2017b).
- 2016: final ESD review reports sent to each Member State on 29 June 2018 (EEA, 2018i).
- 2017: proxy inventory (submitted under MMR by 31 July 2018) and verified ETS emissions (EEA, 2018d).
- 2018: Member State's own projections (EEA, 2018c).

To estimate AEA for this period, reviewed Effort Sharing emissions for the years 2005 and 2016, proxy Effort Sharing emissions for 2017 and Effort Sharing emissions of the latest WEM scenarios for 2018 have been used. The adjustments pursuant to Article 10(2) listed under Annex IV of the ESR are already considered in the AEA amounts for 2021 for the eligible Member States.

Other flexibilities that might have increasing effects on the total amount of AEAs have not been considered:

- a maximum of 100 million AEAs resulting from voluntary cancellation of ETS allowances (ESR Article 6)
- the use of land mitigation units (LMUs) from net removals from afforested land, managed cropland and managed grassland corresponding to a maximum of 280 million AEAs (ESR Article 7)

In total, these sum to 380 million AEAs and LMUs that might be used under certain conditions by Member States to comply under the ESR. Additional allocations might be available under Article 10(1b) owing to credits from projects under ETS Directive Articles 24 and 24a, but the relevant legislative setting is not yet in place. Conversely, if a Member State incurred LULUCF debits, ESR allocations would be a means of compensating for them.

### **A1.2.7 The 2005 Effort Sharing Decision base year emissions**

The 2005 'Effort Sharing base year emissions' are calculated by the EEA, to be consistent with both:

- the relative 2020 Effort Sharing target (as a percentage of 2005 emissions) defined in the ESD (EU, 2009c);

- the absolute 2020 Effort Sharing target determined by the European Commission (EC, 2013a, 2013b, 2017a).

The EEA calculates 2005 Effort Sharing base year emissions as follows:

Effort Sharing base year emissions = 2020 absolute target/(1 + % of 2020 Effort Sharing target).

These calculated Effort Sharing base year emissions can also be used, for example, to compare relative changes in Effort Sharing emissions with 2020 Effort Sharing targets expressed as percentages.

In this report, calculated 2005 Effort Sharing base year emissions are used to express the distance between Effort Sharing emissions and Effort Sharing targets in a normalised way (see, for example, Figures 3.1 and 3.2). The distance, calculated as the absolute difference between emissions and targets divided by 2005 base year emissions, is expressed in percentage points (a proportion of 2005 base year emissions). It is then directly comparable with targets and reductions as percentages of 2005 levels and allows relevant comparisons between Member States.

These calculated 2005 Effort Sharing base year emissions reflect the current scope of the EU ETS (EC, 2013b) and the outcome of the comprehensive ESD review in 2016 and may therefore differ, sometimes significantly, from actual historical 2005 emissions, today falling under the scope of the ESD based on the latest GHG inventories.

### **A1.2.8 Projections of greenhouse gas emissions**

This report uses GHG projection data that are reported by Member States under the MMR (EEA, 2018c). Mandatory reporting of WEM scenarios takes place every 2 years (2015, 2017, etc.). Member States must also report substantial changes to projections every other year (2014, 2016, 2018, etc.). In 2017, all 28 Member States and Norway submitted projections under the MMR. In 2018, Cyprus and Ireland submitted updates to their previous projections.

Under the MMR, Member States report projections in two scenarios:

- A WEM scenario, which considers the implementation of existing (already implemented) measures.
- If available, a WAM scenario is reported too. It considers the implementation of additional measures (at planning stage). In 2017, 18 Member States reported projections based on such WAM scenarios: Belgium, Croatia, Cyprus, Czechia, Denmark<sup>14</sup>, Estonia, Finland, Germany, Hungary, Ireland, Latvia, Lithuania, Luxembourg, the Netherlands, Portugal, Romania, Slovakia and the United Kingdom. For the aggregation of a WAM scenario at EU level, Member States that have not reported a WAM scenario have been gap-filled using the WEM scenario. In 2018, the two Member States that submitted updates to their projections also submitted a WAM scenario.

An overview of projected emissions for both scenarios is published by the EEA (EEA, 2018i).

Member States reported projections for total and sectoral GHG emissions by source categories as well as a split of these projections between those covered by the EU ETS and those covered by the ESD. Total GHG projections are used to assess the progress towards the

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<sup>14</sup> Denmark submitted a WAM scenario that is equal to its WEM scenario.

EU's 20 % reduction target by 2020, and 'Effort Sharing projections' are used to assess the Member States' progress towards their national 2020 targets, set under the ESD.

The EEA, together with its ETC/ACM, implements a QA/QC procedure to ensure timeliness, completeness, consistency, comparability, accuracy and transparency of the projections reported by Member States and used in this report. This procedure is described in *Elements of the Union system for policies and measures and projections and the quality assurance and control (QA/QC) programme as required under Regulation (EU) No 525/2013* (EC, 2015b). If significant discrepancies can be observed between the inventory value for the reference year and that for the projected year, an alignment of the level of projections is performed. Such calibration is performed to match national projections with a common reference year for aggregated EU projections, which is the year 2015. In 2017 and 2018, for both projection updates, no such calibration took place.

### **A1.3 Historical and projected total GHG, ETS and Effort Sharing emissions by sector for 2005-2030 and annual AEA targets 2013-2030**

Member States report historical Effort Sharing emissions on an aggregated level. To better understand the overall developments of emission trends, it is helpful to split Effort Sharing emissions into source sectors. This has been accomplished by the EEA and its ETC/ACM.

Total Effort Sharing and ETS emissions, and projected shares of ETS emissions by source categories as reported in GHG projections, have been considered to disaggregate ETS and Effort Sharing emissions by source categories according to the Common Reporting Format (CRF) of the IPCC. The shares of ETS emissions are mostly negligible for the agriculture, waste, transport and buildings sectors, which leads to robust assumptions on Effort Sharing emissions for these sectors. For the sectors of energy industries, manufacturing (CRF 1.A.1, 1.A.2, 1B) and process emissions and product use (CRF 2), the shares are considerably higher, specifically in some Member States. Therefore, these sectors were aggregated to a sector called 'industry and other'. The sum of Effort Sharing emissions from energy industries, manufacturing and process emissions and product use provides a more robust number. CRF sectors 1.A.4 and 1.A.5 are summed under the category 'buildings'. The following tables provide an overview for all 28 Member States of the EU (EU-28) and each Member State on emissions developments and annual Effort Sharing targets.

## Progress of the EU towards its greenhouse gas emission targets

**Table A1.1 Projected total GHG, ETS and Effort Sharing emissions by sector, 2005-2030**

GHG emissions (Mt CO <sub>2</sub> -eq.)	Historic emissions including proxy 2017										WEM												
	2005	2010	2011	2012	2013	2014	2015	2016	2017		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>EU-28</b>	<b>5,220</b>	<b>4,777</b>	<b>4,620</b>	<b>4,557</b>	<b>4,462</b>	<b>4,291</b>	<b>4,319</b>	<b>4,293</b>	<b>4,317</b>		<b>4,161</b>	<b>4,119</b>	<b>4,071</b>	<b>4,048</b>	<b>4,019</b>	<b>3,999</b>	<b>3,965</b>	<b>3,937</b>	<b>3,914</b>	<b>3,888</b>	<b>3,867</b>	<b>3,849</b>	<b>3,824</b>
Total GHG emissions	5,220	4,777	4,620	4,557	4,462	4,291	4,319	4,293	4,317		4,161	4,119	4,071	4,048	4,019	3,999	3,965	3,937	3,914	3,888	3,867	3,849	3,824
Emissions Trading System (stationary installations)	2,345	2,024	1,984	1,943	1,882	1,787	1,776	1,724	1,727		1,680	1,656	1,630	1,623	1,608	1,605	1,588	1,580	1,565	1,549	1,539	1,527	1,516
Energy Industries	1,574	1,386	1,363	1,349	1,290	1,203	1,191	1,141	1,132		1,090	1,062	1,032	1,026	1,011	1,008	990	983	967	952	943	933	923
Other stationary installations	771	638	621	594	592	585	585	583	595		590	594	598	597	597	597	597	598	597	597	595	594	593
Effort Sharing Decision and Regulation	2,856	2,735	2,618	2,597	2,567	2,478	2,519	2,555	2,574		2,466	2,447	2,425	2,408	2,394	2,377	2,360	2,340	2,333	2,322	2,311	2,305	2,291
Transport	953	914	902	874	869	872	888	912	927		878	875	872	870	869	867	865	862	863	864	864	865	866
Buildings	790	778	684	699	704	610	640	663	660		625	617	606	601	593	586	581	570	568	563	559	558	551
Agriculture	435	420	420	418	422	427	427	430	432		432	432	431	431	431	431	431	432	432	432	432	432	432
Waste	200	166	160	156	149	143	140	138	136		126	122	118	115	112	110	108	106	104	103	101	100	99
Industry and other	479	458	451	450	423	426	424	412	420		405	402	398	391	388	382	376	370	366	361	355	350	343
AEA under Effort Sharing Decision and Regulation					2,791	2,770	2,749	2,728	2,679		2,659	2,639	2,618	2,496	2,406	2,358	2,309	2,261	2,213	2,164	2,116	2,067	2,019
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>	<b>Historic emissions including proxy 2017</b>										<b>WEM</b>												
<b>Austria</b>	<b>2005</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>		<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
<b>Total GHG emissions</b>	<b>92.7</b>	<b>84.9</b>	<b>82.4</b>	<b>79.9</b>	<b>80.2</b>	<b>76.4</b>	<b>78.9</b>	<b>79.7</b>	<b>81.9</b>		<b>77.0</b>	<b>76.4</b>	<b>75.4</b>	<b>74.4</b>	<b>74.1</b>	<b>73.8</b>	<b>73.5</b>	<b>72.7</b>	<b>72.1</b>	<b>71.6</b>	<b>71.0</b>	<b>70.4</b>	<b>69.8</b>
Emissions Trading System (stationary installations)	36.1	32.8	32.5	30.2	29.8	28.1	29.5	29.0	30.6		27.5	27.0	26.2	25.7	25.7	25.7	25.5	25.2	25.2	25.2	25.1	25.0	25.0
Energy Industries	13.6	11.4	11.2	9.9	9.1	7.7	8.6	8.5	8.8		7.5	7.2	6.5	6.1	6.1	6.1	6.1	5.9	5.7	5.7	5.6	5.6	5.5
Other stationary installations	22.5	21.4	21.2	20.3	20.7	20.3	20.9	20.5	21.8		20.0	19.8	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.5	19.5	19.5
Effort Sharing Decision and Regulation	56.5	52.0	49.9	49.6	50.1	48.2	49.3	50.6	51.3		49.4	49.3	49.1	48.6	48.4	48.1	47.7	47.2	46.7	46.3	45.7	45.2	44.6
Transport	24.2	21.9	21.2	21.0	22.1	21.5	21.9	23.0	23.5		22.0	22.2	22.3	22.3	22.3	22.3	22.2	22.0	21.9	21.7	21.5	21.3	21.0
Buildings	13.6	11.3	9.8	9.4	9.5	8.5	8.8	9.0	9.1		8.9	8.6	8.4	8.1	7.9	7.7	7.5	7.3	7.1	6.9	6.7	6.5	6.3
Agriculture	7.1	7.1	7.1	7.1	7.0	7.2	7.2	7.3	7.2		7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.4	7.4	7.4	7.4
Waste	2.8	2.2	2.0	1.9	1.8	1.7	1.7	1.6	1.5		1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.0	1.0	1.0	1.0	0.9	0.9
Industry and other	8.9	9.7	9.7	10.2	9.7	9.3	9.7	9.8	10.0		9.8	9.8	9.9	9.6	9.6	9.6	9.6	9.4	9.4	9.3	9.2	9.1	9.0
AEA under Effort Sharing Decision and Regulation					52.6	52.1	51.5	51.0	49.5		48.9	48.3	47.8	48.3	47.0	45.7	44.4	43.0	41.7	40.4	39.0	37.7	36.4
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>	<b>Historic emissions including proxy 2017</b>										<b>WEM</b>												
<b>Belgium</b>	<b>2005</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>		<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
<b>Total GHG emissions</b>	<b>145.4</b>	<b>132.7</b>	<b>122.1</b>	<b>119.3</b>	<b>119.7</b>	<b>114.0</b>	<b>117.6</b>	<b>117.7</b>	<b>116.2</b>		<b>115.9</b>	<b>115.3</b>	<b>114.7</b>	<b>114.1</b>	<b>113.5</b>	<b>113.0</b>	<b>112.4</b>	<b>111.9</b>	<b>114.7</b>	<b>114.5</b>	<b>114.3</b>	<b>114.2</b>	<b>114.1</b>
Emissions Trading System (stationary installations)	66.6	54.7	49.6	46.4	45.2	43.9	44.7	43.7	43.8		44.1	43.9	43.6	43.3	43.0	42.8	42.5	42.2	45.0	45.0	45.0	45.0	45.0
Energy Industries	28.8	24.8	21.3	20.7	19.3	18.4	19.2	17.8	17.8		17.6	17.1	16.5	16.3	16.1	15.9	15.6	15.4	18.3	18.2	18.2	18.2	18.2
Other stationary installations	37.8	29.9	28.3	25.7	25.9	25.5	25.5	25.9	26.0		26.5	26.8	27.1	27.0	27.0	26.9	26.8	26.8	26.8	26.8	26.8	26.8	26.8
Effort Sharing Decision and Regulation	78.8	78.0	72.4	72.9	74.3	70.1	72.7	74.1	72.4		71.7	71.5	71.0	70.8	70.5	70.2	69.9	69.7	69.6	69.4	69.3	69.2	69.2
Transport	26.5	26.4	26.0	25.2	24.6	24.9	26.5	26.2	26.4		26.7	26.9	27.1	27.3	27.5	27.7	27.9	28.1	28.3	28.5	28.7	28.9	29.1
Buildings	30.0	28.9	23.7	24.7	27.1	22.4	23.8	25.4	23.4		23.9	23.8	23.6	23.5	23.3	23.2	23.1	23.0	22.9	22.7	22.6	22.5	22.3
Agriculture	10.3	10.2	10.1	9.9	9.9	10.1	10.0	9.9	9.9		9.7	9.7	9.6	9.5	9.5	9.4	9.3	9.2	9.2	9.2	9.1	9.1	9.1
Waste	2.7	2.2	2.0	1.9	1.6	1.5	1.6	1.5	1.3		1.3	1.2	1.1	1.1	1.0	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.7
Industry and other	9.3	10.3	10.7	11.1	11.0	11.1	10.8	11.1	11.4		10.1	9.9	9.5	9.3	9.1	8.9	8.8	8.6	8.4	8.3	8.1	8.0	7.9
AEA under Effort Sharing Decision and Regulation					78.4	76.9	75.3	73.8	72.5		71.1	69.7	68.2	69.7	67.7	65.8	63.8	61.9	60.0	58.0	56.1	54.1	52.2

## Progress of the EU towards its greenhouse gas emission targets

GHG emissions (Mt CO <sub>2</sub> -eq.)	Historic emissions including proxy 2017										WEM											
	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>Bulgaria</b>																						
<b>Total GHG emissions</b>	<b>63.9</b>	<b>60.5</b>	<b>65.8</b>	<b>60.8</b>	<b>55.5</b>	<b>58.6</b>	<b>61.7</b>	<b>59.1</b>	<b>61.0</b>	<b>59.1</b>	<b>59.1</b>	<b>59.0</b>	<b>58.4</b>	<b>57.7</b>	<b>57.0</b>	<b>56.3</b>	<b>55.7</b>	<b>55.6</b>	<b>55.6</b>	<b>55.6</b>	<b>55.5</b>	<b>55.5</b>
Emissions Trading System (stationary installations)	37.9	35.0	41.5	36.4	32.7	34.3	36.3	33.4	34.9	36.9	37.1	37.3	36.6	35.9	35.2	34.5	33.8	33.7	33.6	33.5	33.3	33.2
Energy Industries	27.5	30.0	36.2	31.4	27.6	29.1	30.5	27.3	28.7	31.1	31.3	31.5	30.7	30.0	29.3	28.5	27.8	27.6	27.4	27.3	27.1	26.9
Other stationary installations	10.4	5.0	5.3	5.0	5.1	5.2	5.8	6.1	6.2	5.8	5.8	5.8	5.9	5.9	5.9	6.0	6.0	6.1	6.1	6.2	6.2	6.3
Effort Sharing Decision and Regulation	26.0	25.5	24.3	24.4	22.2	22.9	25.4	25.6	26.1	22.2	22.0	21.7	21.8	21.8	21.8	21.8	21.8	21.9	22.0	22.1	22.2	22.2
Transport	7.8	8.0	8.1	8.5	7.2	7.9	9.1	9.2	9.8	7.4	7.2	7.1	7.0	6.9	6.8	6.7	6.6	6.5	6.4	6.4	6.3	6.2
Buildings	2.2	1.8	2.1	2.0	1.7	1.4	1.9	1.9	1.4	1.9	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.7	2.8	3.0	3.1	3.3
Agriculture	5.2	5.5	5.1	5.2	5.6	5.9	6.2	6.5	6.5	5.0	5.0	5.0	5.1	5.1	5.2	5.2	5.2	5.3	5.3	5.3	5.4	5.4
Waste	5.4	4.6	4.6	4.4	4.4	4.1	4.2	4.0	4.1	4.0	4.0	4.0	4.0	3.9	3.9	3.9	3.8	3.8	3.8	3.7	3.7	3.7
Industry and other	5.5	5.6	4.5	4.2	3.3	3.6	4.1	4.0	4.2	3.8	3.7	3.7	3.7	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
AEA under Effort Sharing Decision and Regulation					26.9	27.2	27.5	27.7	25.9	26.1	26.3	26.5	25.8	24.0	23.8	23.5	23.3	23.1	22.8	22.6	22.4	22.1
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>																						
<b>Croatia</b>																						
<b>Total GHG emissions</b>	<b>29.9</b>	<b>28.0</b>	<b>27.6</b>	<b>25.8</b>	<b>24.6</b>	<b>23.7</b>	<b>24.2</b>	<b>24.3</b>	<b>24.5</b>	<b>23.9</b>	<b>23.9</b>	<b>24.0</b>	<b>24.0</b>	<b>24.1</b>	<b>24.1</b>	<b>24.1</b>	<b>24.2</b>	<b>24.3</b>	<b>24.4</b>	<b>24.5</b>	<b>24.6</b>	<b>24.7</b>
Emissions Trading System (stationary installations)	12.4	10.5	10.4	9.5	8.8	8.4	8.4	8.3	8.4	8.7	8.7	8.7	8.7	8.6	8.6	8.6	8.5	8.5	8.6	8.6	8.6	8.6
Energy Industries	6.4	5.4	5.7	5.3	4.7	4.3	4.3	4.4	4.1	4.3	4.3	4.2	4.1	4.1	4.0	4.0	3.9	3.9	3.9	3.9	3.9	3.9
Other stationary installations	6.0	5.2	4.8	4.3	4.0	4.1	4.1	3.9	4.2	4.4	4.5	4.5	4.5	4.6	4.6	4.6	4.6	4.6	4.6	4.7	4.7	4.7
Effort Sharing Decision and Regulation	17.5	17.4	17.2	16.2	15.1	14.7	15.6	16.0	16.1	15.2	15.2	15.2	15.3	15.4	15.5	15.5	15.6	15.7	15.8	15.8	15.9	16.0
Transport	5.5	5.9	5.8	5.6	5.4	5.3	5.8	6.1	6.3	5.5	5.4	5.4	5.4	5.4	5.4	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Buildings	4.4	4.0	3.8	3.4	3.1	2.8	3.2	3.3	3.2	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Agriculture	3.3	3.0	3.1	3.0	2.7	2.6	2.8	2.9	2.8	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.7	2.7	2.7
Waste	1.3	1.7	1.7	1.7	1.6	1.7	1.8	1.8	1.9	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.3
Industry and other	2.9	2.8	2.8	2.5	2.2	2.2	1.9	1.8	1.8	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
AEA under Effort Sharing Decision and Regulation					19.6	19.8	20.0	20.2	18.7	18.9	19.1	19.3	18.9	15.8	15.9	15.9	16.0	16.0	16.1	16.1	16.1	16.2
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>																						
<b>Cyprus</b>																						
<b>Total GHG emissions</b>	<b>9.2</b>	<b>9.4</b>	<b>9.1</b>	<b>8.6</b>	<b>7.9</b>	<b>8.3</b>	<b>8.3</b>	<b>8.8</b>	<b>9.0</b>	<b>9.2</b>	<b>9.3</b>	<b>9.4</b>	<b>9.3</b>	<b>9.5</b>	<b>9.6</b>	<b>9.7</b>	<b>9.8</b>	<b>9.0</b>	<b>9.1</b>	<b>9.2</b>	<b>9.3</b>	<b>9.4</b>
Emissions Trading System (stationary installations)	5.1	5.1	4.6	4.4	4.0	4.5	4.4	4.6	4.7	4.9	4.9	4.9	3.9	3.9	4.0	4.0	4.0	4.1	4.1	4.2	4.2	4.2
Energy Industries	3.5	3.9	3.6	3.5	2.8	3.0	3.0	3.3	3.3	3.3	3.3	3.3	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.5
Other stationary installations	1.6	1.2	1.0	0.9	1.2	1.5	1.3	1.3	1.4	1.6	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Effort Sharing Decision and Regulation	4.1	4.4	4.5	4.2	3.9	3.9	4.1	4.1	4.3	4.3	4.4	4.5	4.5	4.6	4.7	4.7	4.8	4.9	4.9	5.0	5.1	5.2
Transport	2.1	2.3	2.2	2.1	1.9	1.9	1.9	2.0	2.0	2.1	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.6	2.6	2.7	2.7	2.8
Buildings	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.5	0.6	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5
Agriculture	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Waste	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Industry and other	0.4	0.4	0.6	0.5	0.5	0.5	0.5	0.5	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
AEA under Effort Sharing Decision and Regulation					5.9	5.9	5.9	5.9	4.2	4.1	4.0	4.0	4.1	4.0	3.9	3.8	3.7	3.6	3.5	3.4	3.3	3.2

## Progress of the EU towards its greenhouse gas emission targets

GHG emissions (Mt CO <sub>2</sub> -eq.)	Historic emissions including proxy 2017										WEM												
	2005	2010	2011	2012	2013	2014	2015	2016	2017		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>Czechia</b>																							
<b>Total GHG emissions</b>	<b>148.0</b>	<b>140.5</b>	<b>138.5</b>	<b>134.4</b>	<b>129.3</b>	<b>127.4</b>	<b>128.4</b>	<b>130.3</b>	<b>131.0</b>		<b>123.4</b>	<b>123.0</b>	<b>122.5</b>	<b>120.7</b>	<b>118.9</b>	<b>117.2</b>	<b>115.4</b>	<b>113.6</b>	<b>112.6</b>	<b>111.7</b>	<b>110.7</b>	<b>109.8</b>	<b>108.8</b>
Emissions Trading System (stationary installations)	86.1	78.5	77.1	72.2	67.7	66.7	66.6	67.5	67.0		63.2	61.9	60.5	59.2	57.8	56.4	55.1	53.7	53.8	54.0	54.1	54.2	54.4
Energy Industries	65.2	61.5	60.6	56.4	52.4	51.0	51.1	51.9	51.5		48.1	47.1	46.1	44.8	43.5	42.1	40.8	39.5	39.4	39.2	39.1	39.0	38.9
Other stationary installations	21.0	17.0	16.5	15.8	15.3	15.7	15.6	15.6	15.5		15.1	14.8	14.4	14.4	14.3	14.3	14.3	14.2	14.5	14.7	15.0	15.3	15.5
Effort Sharing Decision and Regulation	61.9	62.1	61.4	62.2	61.5	57.6	61.3	62.8	64.0		60.2	61.1	61.9	61.5	61.1	60.7	60.3	59.9	58.8	57.7	56.6	55.5	54.4
Transport	17.5	17.4	17.2	16.9	16.7	16.0	17.9	18.8	20.1		17.9	18.2	18.5	18.4	18.3	18.2	18.1	17.6	17.2	16.7	16.3	15.9	
Buildings	15.0	15.8	14.8	14.7	14.8	12.6	13.5	14.1	14.0		11.2	11.2	11.3	11.2	11.2	11.1	11.1	11.0	10.9	10.9	10.8	10.7	10.6
Agriculture	8.0	7.6	7.7	7.7	7.9	7.6	8.2	8.6	8.5		8.5	8.6	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.5	9.6	9.7
Waste	4.4	4.9	5.0	5.2	5.4	5.2	5.5	5.6	5.4		5.0	4.9	4.9	4.8	4.8	4.7	4.7	4.6	4.5	4.4	4.3	4.2	4.1
Industry and other	17.0	16.3	16.7	17.7	16.7	16.1	16.2	15.7	15.9		17.5	18.1	18.6	18.3	18.0	17.7	17.4	17.1	16.5	15.9	15.3	14.8	14.2
AEA under Effort Sharing Decision and Regulation					62.5	63.2	64.0	64.7	65.2		65.9	66.5	67.2	65.4	60.1	59.2	58.3	57.4	56.5	55.7	54.8	53.9	53.0
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>	<b>Historic emissions including proxy 2017</b>										<b>WEM</b>												
<b>Denmark</b>																							
<b>Total GHG emissions</b>	<b>66.3</b>	<b>63.3</b>	<b>58.1</b>	<b>53.4</b>	<b>55.2</b>	<b>51.0</b>	<b>48.5</b>	<b>50.5</b>	<b>47.8</b>		<b>45.3</b>	<b>44.9</b>	<b>44.8</b>	<b>45.4</b>	<b>46.0</b>	<b>46.9</b>	<b>47.4</b>	<b>48.7</b>	<b>49.1</b>	<b>49.6</b>	<b>50.5</b>	<b>51.0</b>	<b>50.9</b>
Emissions Trading System (stationary installations)	26.5	25.3	21.5	18.2	21.6	18.4	15.8	17.2	15.1		13.3	13.3	13.5	14.2	14.9	15.9	16.5	17.8	18.3	18.8	19.7	20.3	20.3
Energy Industries	21.8	21.8	17.9	14.9	18.1	14.9	12.4	13.5	11.6		10.1	9.9	10.1	10.7	11.3	12.2	12.7	14.0	14.4	15.0	15.8	16.3	16.3
Other stationary installations	4.7	3.5	3.5	3.3	3.5	3.5	3.4	3.8	3.5		3.3	3.3	3.4	3.5	3.6	3.7	3.7	3.8	3.8	3.9	3.9	3.9	4.0
Effort Sharing Decision and Regulation	39.7	37.9	36.5	35.1	33.7	32.6	32.5	33.1	32.6		31.8	31.5	31.1	31.0	31.0	30.9	30.8	30.8	30.7	30.6	30.6	30.6	30.5
Transport	13.7	13.4	13.1	12.5	12.4	12.5	12.7	12.9	12.0		12.2	12.2	12.2	12.2	12.1	12.1	12.1	12.1	12.1	12.0	12.0	11.9	11.9
Buildings	7.7	6.8	6.0	5.6	5.6	4.7	4.8	4.9	4.5		4.5	4.4	4.3	4.3	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.1	4.1
Agriculture	11.0	10.6	10.5	10.5	10.5	10.7	10.5	10.6	10.6		10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.7	10.7	10.7	10.7
Waste	1.3	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3		0.8	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Industry and other	5.9	5.9	5.6	5.3	4.0	3.6	3.4	3.4	4.2		3.7	3.7	3.5	3.5	3.5	3.4	3.3	3.3	3.3	3.3	3.3	3.3	3.2
AEA under Effort Sharing Decision and Regulation					36.8	35.9	35.0	34.1	34.8		33.9	33.0	32.1	31.3	30.5	29.8	29.0	28.3	27.5	26.7	26.0	25.2	24.4
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>	<b>Historic emissions including proxy 2017</b>										<b>WEM</b>												
<b>Estonia</b>																							
<b>Total GHG emissions</b>	<b>19.1</b>	<b>21.1</b>	<b>21.2</b>	<b>20.1</b>	<b>21.8</b>	<b>21.1</b>	<b>18.0</b>	<b>19.6</b>	<b>20.6</b>		<b>18.8</b>	<b>19.1</b>	<b>19.3</b>	<b>19.3</b>	<b>19.2</b>	<b>19.1</b>	<b>19.1</b>	<b>19.0</b>	<b>18.6</b>	<b>18.2</b>	<b>17.8</b>	<b>17.4</b>	<b>17.0</b>
Emissions Trading System (stationary installations)	12.9	14.5	14.8	13.5	15.9	15.0	11.9	13.4	14.7		12.8	13.0	13.3	13.2	13.2	13.1	13.0	12.9	12.5	12.1	11.7	11.3	10.9
Energy Industries	12.1	14.0	14.1	12.7	15.0	14.2	11.4	12.9	13.9		11.8	11.9	12.1	12.0	11.9	11.8	11.7	11.6	11.2	10.8	10.3	9.9	9.5
Other stationary installations	0.7	0.5	0.7	0.9	0.9	0.7	0.5	0.6	0.7		0.9	1.1	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4
Effort Sharing Decision and Regulation	6.3	6.6	6.3	6.5	5.8	6.1	6.1	6.2	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.1	6.1	6.1	6.1	6.1	6.1
Transport	2.1	2.3	2.3	2.3	2.2	2.3	2.3	2.4	2.5		2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.6	2.6	2.6
Buildings	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Agriculture	1.1	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3		1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.6
Waste	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3		0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Industry and other	1.8	2.0	1.8	1.9	1.3	1.4	1.4	1.5	1.0		1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9
AEA under Effort Sharing Decision and Regulation					6.3	6.3	6.3	6.4	5.9		6.0	6.0	6.0	6.0	5.7	5.6	5.5	5.4	5.2	5.1	5.0	4.8	4.7

## Progress of the EU towards its greenhouse gas emission targets

GHG emissions (Mt CO <sub>2</sub> -eq.)	Historic emissions including proxy 2017										WEM											
Finland	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>Total GHG emissions</b>	<b>69.8</b>	<b>75.5</b>	<b>67.8</b>	<b>62.3</b>	<b>63.1</b>	<b>58.9</b>	<b>55.4</b>	<b>58.8</b>	<b>56.1</b>	<b>57.7</b>	<b>57.0</b>	<b>56.3</b>	<b>55.3</b>	<b>54.4</b>	<b>53.4</b>	<b>52.5</b>	<b>49.8</b>	<b>48.6</b>	<b>48.2</b>	<b>49.9</b>	<b>49.4</b>	<b>48.8</b>
Emissions Trading System (stationary installations)	35.6	42.0	35.7	30.2	31.5	28.8	25.5	27.2	25.1	28.0	27.7	27.3	26.6	26.0	25.3	24.8	22.3	21.3	21.1	23.0	22.6	22.2
Energy Industries	21.4	29.3	23.5	19.3	20.6	19.2	16.1	17.5	15.9	18.1	17.8	17.4	16.8	16.1	15.5	14.9	12.4	11.5	11.3	13.2	12.9	12.5
Other stationary installations	14.2	12.7	12.3	10.8	10.9	9.5	9.3	9.8	9.2	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.8	9.8	9.8	9.8	9.7
Effort Sharing Decision and Regulation	33.8	33.3	31.8	32.0	31.6	30.1	29.9	31.4	30.8	29.4	29.1	28.8	28.5	28.2	27.9	27.5	27.4	27.1	26.9	26.7	26.6	26.4
Transport	12.7	12.5	12.3	12.0	12.1	11.0	11.0	12.4	11.6	10.8	10.7	10.6	10.5	10.4	10.3	10.2	10.1	10.0	10.0	9.9	9.9	9.8
Buildings	6.9	6.2	5.3	5.7	5.3	5.2	4.9	5.0	5.2	4.8	4.7	4.6	4.6	4.5	4.5	4.4	4.4	4.4	4.3	4.3	4.2	4.2
Agriculture	6.5	6.6	6.4	6.4	6.5	6.6	6.5	6.5	6.5	6.7	6.7	6.6	6.6	6.6	6.5	6.4	6.4	6.4	6.4	6.4	6.4	6.4
Waste	2.8	2.6	2.5	2.5	2.4	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.6	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.1
Industry and other	5.0	5.4	5.2	5.4	5.3	5.2	5.3	5.3	5.5	5.4	5.4	5.3	5.3	5.2	5.2	5.2	5.1	5.1	5.0	4.9	4.9	4.8
AEA under Effort Sharing Decision and Regulation					31.8	31.3	30.8	30.3	30.2	29.6	29.1	28.5	29.1	28.1	27.2	26.3	25.3	24.4	23.5	22.6	21.6	20.7
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>	<b>Historic emissions including proxy 2017</b>										<b>WEM</b>											
<b>France</b>	<b>2005</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
<b>Total GHG emissions</b>	<b>553</b>	<b>512</b>	<b>484</b>	<b>485</b>	<b>484</b>	<b>454</b>	<b>458</b>	<b>458</b>	<b>466</b>	<b>441</b>	<b>436</b>	<b>430</b>	<b>426</b>	<b>421</b>	<b>417</b>	<b>412</b>	<b>407</b>	<b>405</b>	<b>403</b>	<b>401</b>	<b>398</b>	<b>396</b>
Emissions Trading System (stationary installations)	154	128	117	115	115	100	100	102	107	104	106	107	107	106	106	106	105	105	105	105	105	104
Energy Industries	64	55	48	48	47	36	37	40	43	41	42	43	43	43	43	43	43	43	43	43	43	43
Other stationary installations	90	73	69	67	67	64	62	61	63	63	63	64	64	63	63	63	62	62	62	62	62	62
Effort Sharing Decision and Regulation	394	379	362	365	366	354	353	352	355	332	325	318	314	310	306	302	297	295	293	291	289	287
Transport	135	128	128	127	127	128	127	128	128	118	115	111	111	110	109	108	108	108	108	107	107	107
Buildings	114	109	94	99	102	86	88	90	92	77	74	71	69	68	66	65	64	63	62	61	60	59
Agriculture	78	77	77	76	76	79	78	77	77	77	76	75	75	75	75	74	74	74	74	74	73	73
Waste	22	20	20	19	19	19	17	16	16	16	15	15	15	14	14	13	13	13	13	12	12	12
Industry and other	45	45	43	44	43	42	43	41	42	44	45	46	44	43	42	40	39	38	37	37	36	35
AEA under Effort Sharing Decision and Regulation					394	389	384	379	358	353	348	342	332	323	314	305	296	287	278	269	260	251
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>	<b>Historic emissions including proxy 2017</b>										<b>WEM</b>											
<b>Germany</b>	<b>2005</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
<b>Total GHG emissions</b>	<b>993</b>	<b>943</b>	<b>920</b>	<b>925</b>	<b>942</b>	<b>903</b>	<b>907</b>	<b>909</b>	<b>905</b>	<b>848</b>	<b>832</b>	<b>816</b>	<b>812</b>	<b>807</b>	<b>802</b>	<b>798</b>	<b>793</b>	<b>781</b>	<b>770</b>	<b>758</b>	<b>746</b>	<b>735</b>
Emissions Trading System (stationary installations)	519	479	474	475	481	461	456	453	438	409	398	388	389	390	391	392	394	387	380	374	367	360
Energy Industries	370	341	338	347	349	328	316	313	291	277	266	255	258	260	263	265	267	262	257	252	247	242
Other stationary installations	149	138	135	128	132	133	140	140	146	132	132	132	131	130	129	127	126	125	123	122	120	119
Effort Sharing Decision and Regulation	472	461	444	447	460	437	444	454	465	436	431	426	421	415	409	403	397	392	387	382	377	372
Transport	158	150	152	151	156	156	157	163	167	156	156	156	154	153	152	151	149	149	148	148	147	147
Buildings	160	155	134	136	146	124	130	137	137	125	122	118	115	112	109	106	102	100	98	95	93	91
Agriculture	63	63	64	64	65	66	66	65	65	67	66	66	66	66	66	66	66	66	66	66	65	65
Waste	21	15	14	13	12	12	11	10	10	10	9	9	8	8	8	7	7	7	7	6	6	6
Industry and other	70	79	79	83	80	79	80	79	85	79	78	78	77	76	74	73	72	71	69	67	65	64
AEA under Effort Sharing Decision and Regulation					473	466	459	452	432	425	418	411	428	414	399	384	370	355	340	326	311	296

## Progress of the EU towards its greenhouse gas emission targets

GHG emissions (Mt CO <sub>2</sub> -eq.)	Historic emissions including proxy 2017										WEM											
	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>Greece</b>																						
<b>Total GHG emissions</b>	<b>136.3</b>	<b>118.4</b>	<b>115.4</b>	<b>112.1</b>	<b>102.5</b>	<b>99.1</b>	<b>95.3</b>	<b>91.6</b>	<b>94.2</b>	<b>93.9</b>	<b>92.8</b>	<b>91.5</b>	<b>91.9</b>	<b>92.2</b>	<b>92.7</b>	<b>93.2</b>	<b>93.4</b>	<b>91.9</b>	<b>90.4</b>	<b>88.9</b>	<b>87.5</b>	<b>86.0</b>
Emissions Trading System (stationary installations)	73.7	62.1	61.0	63.4	58.6	55.4	49.9	46.3	49.6	45.1	43.6	42.0	42.5	43.0	43.5	44.0	44.5	43.0	41.6	40.1	38.6	37.2
Energy Industries	59.2	51.9	52.9	54.4	49.4	45.8	40.7	36.9	40.6	35.8	34.1	32.5	32.8	33.2	33.5	33.8	34.1	32.4	30.8	29.1	27.4	25.7
Other stationary installations	14.5	10.2	8.1	9.0	9.3	9.5	9.2	9.4	9.0	9.4	9.4	9.5	9.7	9.9	10.0	10.2	10.4	10.6	10.8	11.0	11.3	11.5
Effort Sharing Decision and Regulation	62.1	55.8	53.8	48.2	44.2	44.4	45.4	44.9	44.3	48.2	48.7	48.9	48.8	48.6	48.6	48.6	48.3	48.2	48.2	48.2	48.2	48.3
Transport	21.4	22.0	19.6	16.3	16.4	16.6	16.9	17.0	17.1	17.9	18.2	18.6	18.5	18.4	18.3	18.2	18.1	18.0	17.9	17.8	17.7	17.6
Buildings	15.2	10.2	11.4	9.7	5.4	5.3	6.7	6.2	6.2	7.4	7.7	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0
Agriculture	9.0	8.8	8.6	8.5	8.5	8.2	7.9	7.8	7.5	8.8	9.0	9.2	9.2	9.3	9.3	9.4	9.4	9.5	9.5	9.5	9.6	9.6
Waste	4.8	4.8	4.6	4.3	4.5	4.6	4.6	4.5	4.6	4.7	4.7	4.7	4.7	4.7	4.6	4.6	4.6	4.6	4.5	4.5	4.6	4.6
Industry and other	11.8	10.0	9.7	9.4	9.3	9.7	9.4	9.3	8.9	9.4	9.0	8.5	8.5	8.4	8.5	8.6	8.4	8.4	8.4	8.4	8.4	8.4
AEA under Effort Sharing Decision and Regulation					59.0	59.3	59.6	59.9	59.1	59.4	59.7	60.0	46.4	47.1	47.8	48.5	49.1	49.8	50.5	51.2	51.9	52.5
<b>Hungary</b>																						
<b>Total GHG emissions</b>	<b>75.8</b>	<b>65.3</b>	<b>63.8</b>	<b>60.1</b>	<b>57.3</b>	<b>57.9</b>	<b>61.0</b>	<b>61.5</b>	<b>64.4</b>	<b>59.3</b>	<b>58.6</b>	<b>58.0</b>	<b>57.7</b>	<b>59.0</b>	<b>59.1</b>	<b>59.0</b>	<b>59.2</b>	<b>59.2</b>	<b>59.3</b>	<b>59.1</b>	<b>59.0</b>	<b>58.8</b>
Emissions Trading System (stationary installations)	29.5	23.0	22.5	21.3	19.1	18.8	19.6	19.4	20.6	19.3	19.1	18.9	19.0	19.2	19.3	19.4	19.6	19.5	19.5	19.4	19.4	19.3
Energy Industries	20.9	17.3	16.7	16.0	13.7	12.9	13.2	13.1	13.4	12.3	12.0	11.7	11.8	11.8	11.8	11.9	11.9	11.7	11.6	11.4	11.3	11.1
Other stationary installations	8.7	5.7	5.8	5.3	5.4	6.0	6.4	6.3	7.3	6.9	7.0	7.1	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2
Effort Sharing Decision and Regulation	46.2	42.3	41.3	38.8	38.4	38.4	41.4	42.1	43.8	40.0	39.5	39.1	38.7	39.9	39.8	39.6	39.6	39.7	39.8	39.7	39.6	39.5
Transport	11.9	11.6	11.0	10.7	10.1	10.9	12.2	12.4	12.9	12.0	11.8	11.7	11.6	13.1	13.3	13.4	13.8	14.1	14.5	14.6	14.7	14.8
Buildings	18.1	14.6	14.1	12.4	12.5	11.2	12.3	13.0	13.6	11.2	11.0	10.7	10.5	10.3	10.1	9.9	9.7	9.5	9.3	9.1	9.0	8.8
Agriculture	6.1	5.6	5.9	5.9	6.4	6.4	6.7	6.9	7.1	7.0	7.1	7.4	7.5	7.5	7.6	7.6	7.7	7.7	7.8	7.8	7.8	7.9
Waste	4.4	4.2	4.1	4.1	3.9	3.7	3.6	3.5	3.5	4.1	4.1	4.0	3.9	3.9	3.8	3.7	3.6	3.6	3.5	3.4	3.3	3.3
Industry and other	5.7	6.3	6.2	5.7	5.6	6.3	6.7	6.3	6.8	5.7	5.5	5.3	5.2	5.1	5.0	4.9	4.9	4.8	4.8	4.7	4.7	4.7
AEA under Effort Sharing Decision and Regulation					50.4	51.5	52.6	53.8	50.1	51.0	51.9	52.8	48.9	42.5	42.7	43.0	43.3	43.6	43.8	44.1	44.4	44.7
<b>Ireland</b>																						
<b>Total GHG emissions</b>	<b>69.5</b>	<b>61.2</b>	<b>57.1</b>	<b>57.7</b>	<b>57.6</b>	<b>57.3</b>	<b>59.4</b>	<b>61.5</b>	<b>60.9</b>	<b>62.4</b>	<b>63.1</b>	<b>62.4</b>	<b>63.3</b>	<b>64.0</b>	<b>64.7</b>	<b>65.4</b>	<b>65.5</b>	<b>65.5</b>	<b>65.4</b>	<b>63.8</b>	<b>63.8</b>	<b>63.9</b>
Emissions Trading System (stationary installations)	22.8	17.7	16.1	17.2	15.7	16.0	16.8	17.7	16.9	16.5	16.7	15.6	15.9	16.3	16.8	17.3	17.4	17.5	17.4	15.9	16.0	16.2
Energy Industries	15.9	13.0	11.6	12.6	11.0	10.9	11.6	12.3	11.3	10.9	11.0	9.8	10.0	10.4	10.7	11.1	11.1	11.1	10.9	9.3	9.3	9.4
Other stationary installations	6.9	4.8	4.5	4.7	4.7	5.0	5.2	5.4	5.6	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8
Effort Sharing Decision and Regulation	46.7	43.5	41.0	40.5	42.2	41.7	43.0	43.8	44.0	45.9	46.4	46.8	47.3	47.7	47.9	48.0	48.1	48.0	47.9	47.8	47.7	47.6
Transport	13.0	11.5	11.2	10.8	11.1	11.4	11.9	12.3	12.0	13.7	14.1	14.5	14.9	15.2	15.3	15.4	15.4	15.3	15.1	15.0	14.8	14.7
Buildings	10.8	10.9	9.5	9.1	9.0	8.2	8.5	8.5	8.4	8.8	8.9	8.9	8.9	9.0	9.0	9.1	9.1	9.1	9.2	9.2	9.2	9.3
Agriculture	18.7	17.9	17.3	17.7	18.7	18.6	18.9	19.2	19.8	19.7	19.9	20.1	20.1	20.2	20.3	20.3	20.3	20.4	20.4	20.4	20.5	20.5
Waste	1.3	0.5	0.6	0.5	0.7	0.9	1.0	1.0	0.9	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
Industry and other	2.8	2.7	2.4	2.4	2.6	2.7	2.7	2.8	2.9	3.0	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7
AEA under Effort Sharing Decision and Regulation					46.9	45.8	44.6	43.5	40.9	39.8	38.7	37.7	42.8	41.7	40.6	39.5	38.4	37.3	36.2	35.1	34.0	32.9

## Progress of the EU towards its greenhouse gas emission targets

GHG emissions (Mt CO <sub>2</sub> -eq.)	Historic emissions including proxy 2017										WEM												
	2005	2010	2011	2012	2013	2014	2015	2016	2017		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>Italy</b>																							
<b>Total GHG emissions</b>	<b>581</b>	<b>504</b>	<b>491</b>	<b>472</b>	<b>441</b>	<b>425</b>	<b>433</b>	<b>428</b>	<b>426</b>		<b>429</b>	<b>427</b>	<b>426</b>	<b>422</b>	<b>418</b>	<b>415</b>	<b>411</b>	<b>407</b>	<b>404</b>	<b>401</b>	<b>398</b>	<b>395</b>	<b>392</b>
Emissions Trading System (stationary installations)	248	200	197	186	165	153	156	155	155		159	160	161	159	158	156	154	153	150	148	145	143	140
Energy Industries	169	140	138	133	114	103	108	106	105		103	102	101	99	98	96	95	94	91	88	85	82	79
Other stationary installations	79	60	59	53	50	49	48	49	50		56	58	60	60	60	60	59	59	59	60	60	60	61
Effort Sharing Decision and Regulation	330	301	291	283	273	265	273	271	269		267	265	263	261	258	256	254	252	251	251	250	250	249
Transport	125	112	111	103	101	104	103	102	100		102	102	102	101	101	101	100	100	100	100	100	100	100
Buildings	97	96	87	87	86	73	82	83	84		82	82	82	81	81	80	79	79	78	78	78	77	77
Agriculture	32	30	30	31	30	29	29	30	30		30	30	31	31	31	31	31	31	31	31	31	31	31
Waste	22	20	20	20	19	18	18	18	18		17	16	15	15	14	14	14	13	13	13	12	12	12
Industry and other	55	44	44	42	39	41	41	38	38		37	35	33	33	32	31	31	30	30	30	30	29	29
AEA under Effort Sharing Decision and Regulation					308	306	304	302	298		296	293	291	262	258	254	250	245	241	237	233	228	224
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>																							
<b>Latvia</b>																							
<b>Total GHG emissions</b>	<b>11.5</b>	<b>12.4</b>	<b>11.6</b>	<b>11.4</b>	<b>11.3</b>	<b>11.3</b>	<b>11.3</b>	<b>11.3</b>	<b>11.3</b>		<b>11.5</b>	<b>11.5</b>	<b>11.6</b>	<b>11.6</b>	<b>11.6</b>	<b>11.7</b>	<b>11.8</b>	<b>11.8</b>	<b>11.9</b>	<b>12.0</b>	<b>12.0</b>	<b>12.1</b>	<b>12.2</b>
Emissions Trading System (stationary installations)	2.9	3.3	2.9	2.8	2.6	2.4	2.3	2.2	2.0		2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5
Energy Industries	1.9	2.1	1.8	1.6	1.6	1.4	1.4	1.4	1.2		1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1
Other stationary installations	1.0	1.2	1.1	1.2	1.0	1.0	0.9	0.8	0.9		1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.4	1.4
Effort Sharing Decision and Regulation	8.6	9.1	8.6	8.6	8.8	9.0	9.0	9.1	9.2		9.1	9.2	9.2	9.3	9.3	9.4	9.4	9.5	9.5	9.5	9.6	9.6	9.7
Transport	3.1	3.4	3.0	2.9	3.0	3.1	3.2	3.2	3.3		3.1	3.1	3.0	3.1	3.1	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.3
Buildings	1.5	1.6	1.5	1.4	1.4	1.4	1.4	1.4	1.5		1.3	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2
Agriculture	2.3	2.4	2.4	2.5	2.6	2.7	2.7	2.6	2.6		3.0	3.1	3.1	3.1	3.2	3.2	3.3	3.3	3.3	3.3	3.4	3.4	3.4
Waste	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7		0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.7	0.7	0.7	0.7	0.7
Industry and other	0.9	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1		1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2
AEA under Effort Sharing Decision and Regulation					9.3	9.4	9.4	9.5	9.7		9.8	9.9	10.0	10.7	8.9	8.8	8.7	8.6	8.5	8.3	8.2	8.1	8.0
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>																							
<b>Lithuania</b>																							
<b>Total GHG emissions</b>	<b>22.8</b>	<b>20.7</b>	<b>21.3</b>	<b>21.2</b>	<b>19.9</b>	<b>19.9</b>	<b>20.2</b>	<b>20.1</b>	<b>20.5</b>		<b>20.9</b>	<b>21.1</b>	<b>21.3</b>	<b>21.3</b>	<b>21.4</b>	<b>21.2</b>	<b>21.3</b>	<b>21.4</b>	<b>21.6</b>	<b>21.7</b>	<b>21.8</b>	<b>22.0</b>	<b>22.1</b>
Emissions Trading System (stationary installations)	11.5	9.3	8.8	8.6	7.5	6.9	6.8	6.2	6.3		7.6	7.8	7.9	8.0	8.1	7.8	7.9	7.9	8.0	8.1	8.2	8.2	8.3
Energy Industries	5.9	5.6	4.3	4.2	3.7	3.1	3.0	2.7	2.5		3.3	3.3	3.4	3.4	3.5	3.2	3.3	3.3	3.4	3.5	3.5	3.6	3.7
Other stationary installations	5.6	3.7	4.5	4.3	3.7	3.8	3.8	3.5	3.8		4.3	4.4	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.7
Effort Sharing Decision and Regulation	11.3	11.4	12.5	12.7	12.4	12.9	13.3	13.9	14.2		13.5	13.6	13.6	13.5	13.5	13.6	13.6	13.7	13.7	13.8	13.8	13.9	14.0
Transport	4.2	4.3	4.4	4.4	4.4	4.8	5.1	5.5	5.8		5.4	5.5	5.6	5.6	5.7	5.8	5.8	5.9	6.0	6.0	6.1	6.2	6.3
Buildings	1.4	1.6	1.6	1.5	1.5	1.4	1.3	1.4	1.5		1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Agriculture	4.2	4.2	4.3	4.4	4.3	4.5	4.6	4.4	4.4		4.9	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.1	5.1	5.1	5.1
Waste	1.5	1.3	1.2	1.2	1.2	1.1	1.0	1.0	1.0		0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
Industry and other	0.0	0.0	1.0	1.2	1.1	1.1	1.3	1.6	1.5		1.2	1.2	1.1	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
AEA under Effort Sharing Decision and Regulation					12.9	13.3	13.7	14.0	14.1		14.5	14.9	15.2	15.8	13.5	13.3	13.1	12.9	12.8	12.6	12.4	12.2	12.1

## Progress of the EU towards its greenhouse gas emission targets

GHG emissions (Mt CO <sub>2</sub> -eq.)	Historic emissions including proxy 2017										WEM											
	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>Luxembourg</b>																						
<b>Total GHG emissions</b>	<b>13.0</b>	<b>12.2</b>	<b>12.1</b>	<b>11.8</b>	<b>11.2</b>	<b>10.8</b>	<b>10.3</b>	<b>10.0</b>	<b>10.2</b>	<b>9.8</b>	<b>9.8</b>	<b>9.8</b>	<b>9.8</b>	<b>9.8</b>	<b>9.7</b>	<b>9.7</b>	<b>9.7</b>	<b>9.6</b>	<b>9.6</b>	<b>9.6</b>	<b>9.5</b>	<b>9.5</b>
Emissions Trading System (stationary installations)	2.9	2.5	2.3	2.3	1.8	1.9	1.7	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Energy Industries	0.8	0.8	0.6	0.7	0.4	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other stationary installations	2.1	1.8	1.7	1.6	1.4	1.5	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Effort Sharing Decision and Regulation	10.1	9.6	9.7	9.5	9.4	8.9	8.6	8.5	8.7	8.4	8.4	8.4	8.4	8.4	8.3	8.3	8.3	8.3	8.2	8.2	8.2	8.1
Transport	7.1	6.5	6.8	6.5	6.4	6.1	5.6	5.5	5.7	5.6	5.6	5.6	5.6	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Buildings	1.7	1.7	1.4	1.5	1.6	1.4	1.6	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.2
Agriculture	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Waste	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Industry and other	0.5	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
AEA under Effort Sharing Decision and Regulation					9.5	9.3	9.1	8.9	8.7	8.5	8.3	8.1	8.2	7.9	7.7	7.5	7.2	7.0	6.8	6.5	6.3	6.1
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>																						
<b>Malta</b>																						
<b>Total GHG emissions</b>	<b>3.0</b>	<b>3.0</b>	<b>3.0</b>	<b>3.2</b>	<b>2.9</b>	<b>2.9</b>	<b>2.2</b>	<b>1.9</b>	<b>2.2</b>	<b>1.6</b>	<b>1.7</b>	<b>1.7</b>	<b>1.7</b>	<b>1.7</b>								
Emissions Trading System (stationary installations)	2.0	1.9	1.9	2.1	1.7	1.7	0.9	0.6	0.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Effort Sharing Decision and Regulation	1.0	1.1	1.1	1.2	1.3	1.3	1.3	1.3	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4
Transport	0.5	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Buildings	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
Agriculture	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Waste	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Industry and other	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
AEA under Effort Sharing Decision and Regulation					1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.1	1.2	1.2	1.2	1.1	1.1	1.0	1.0	0.9	0.9
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>																						
<b>Netherlands</b>																						
<b>Total GHG emissions</b>	<b>214.4</b>	<b>213.4</b>	<b>199.3</b>	<b>194.5</b>	<b>194.5</b>	<b>186.5</b>	<b>194.8</b>	<b>195.2</b>	<b>192.5</b>	<b>178.9</b>	<b>174.0</b>	<b>172.1</b>	<b>172.5</b>	<b>175.8</b>	<b>176.3</b>	<b>175.9</b>	<b>175.5</b>	<b>176.4</b>	<b>175.4</b>	<b>174.2</b>	<b>173.3</b>	<b>171.1</b>
Emissions Trading System (stationary installations)	91.5	86.4	81.6	77.9	86.9	89.0	94.1	93.9	91.4	82.0	78.1	77.6	78.9	80.2	81.5	82.9	84.2	83.9	83.6	83.3	83.0	82.7
Energy Industries	61.2	59.2	55.1	52.0	59.3	62.7	67.7	66.1	62.0	54.9	51.1	50.7	52.0	53.2	54.5	55.7	57.0	56.9	56.7	56.5	56.4	56.2
Other stationary installations	30.3	27.1	26.5	26.0	27.6	26.3	26.4	27.8	29.3	27.1	27.0	26.9	26.9	27.0	27.0	27.1	27.2	27.0	26.9	26.7	26.6	26.5
Effort Sharing Decision and Regulation	122.8	127.0	117.7	116.5	108.3	97.9	101.1	101.3	101.1	96.9	96.0	94.6	93.6	95.6	94.8	93.0	91.3	92.6	91.8	90.9	90.3	88.5
Transport	35.5	34.8	34.7	33.1	32.6	30.1	30.2	30.2	31.2	30.9	30.7	30.4	30.5	30.5	30.6	30.6	30.7	30.7	30.7	30.8	30.8	30.8
Buildings	38.3	45.5	37.1	39.0	40.2	32.0	34.6	35.2	34.2	33.2	32.8	32.3	31.6	31.2	30.9	30.3	29.9	29.6	29.2	28.9	28.6	28.3
Agriculture	18.4	18.1	17.8	17.6	18.2	18.3	18.7	19.0	18.7	18.7	18.7	18.8	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7
Waste	6.4	4.6	4.3	4.1	3.9	3.6	3.4	3.2	3.1	2.8	2.7	2.5	2.5	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.6
Industry and other	24.2	24.0	23.8	22.8	13.3	13.8	14.1	13.7	13.9	11.2	11.1	10.6	10.3	12.8	12.4	11.2	10.0	11.7	11.3	10.8	10.5	9.1
AEA under Effort Sharing Decision and Regulation					122.9	120.7	118.4	116.1	114.1	111.8	109.6	107.4	97.1	95.4	93.7	92.0	90.3	88.6	86.9	85.2	83.5	81.8

## Progress of the EU towards its greenhouse gas emission targets

GHG emissions (Mt CO <sub>2</sub> -eq.)	Historic emissions including proxy 2017										WEM																	
Poland	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030						
<b>Total GHG emissions</b>	<b>398</b>	<b>406</b>	<b>405</b>	<b>398</b>	<b>395</b>	<b>382</b>	<b>385</b>	<b>396</b>	<b>407</b>	<b>389</b>	<b>388</b>	<b>386</b>	<b>384</b>	<b>381</b>	<b>379</b>	<b>376</b>	<b>374</b>	<b>371</b>	<b>368</b>	<b>365</b>	<b>362</b>	<b>359</b>						
Emissions Trading System (stationary installations)	221	209	212	205	206	197	199	198	202	200	198	196	194	193	191	189	187	184	181	179	176	173						
Energy Industries	178	165	166	159	161	153	157	155	161	155	154	152	150	148	145	143	141	138	135	132	129	126						
Other stationary installations	43	43	46	46	45	44	42	43	41	45	44	44	44	45	45	46	46	46	46	46	46	46						
Effort Sharing Decision and Regulation	176	197	193	193	186	182	187	199	205	190	190	190	189	188	188	187	186	186	186	186	186	186						
Transport	35	47	48	46	42	43	46	53	58	49	49	50	50	50	51	51	51	52	53	53	54	55						
Buildings	59	67	61	62	59	55	55	59	61	55	54	53	52	51	51	50	49	48	47	47	46	45						
Agriculture	30	30	30	30	30	30	30	30	31	32	33	33	33	34	34	34	34	34	34	34	35	35						
Waste	13	13	12	12	12	11	11	11	11	10	10	10	10	10	10	10	10	10	10	10	10	10						
Industry and other	40	40	43	42	43	43	45	46	44	44	44	43	43	43	43	42	42	42	42	42	41	41						
AEA under Effort Sharing Decision and Regulation											194	195	196	197	200	202	203	205	201	190	187	185	182	179	176	173	170	167
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>	<b>Historic emissions including proxy 2017</b>										<b>WEM</b>																	
<b>Portugal</b>	<b>2005</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>						
<b>Total GHG emissions</b>	<b>87.0</b>	<b>70.1</b>	<b>69.0</b>	<b>67.1</b>	<b>65.3</b>	<b>65.2</b>	<b>69.6</b>	<b>67.8</b>	<b>72.2</b>	<b>66.0</b>	<b>64.5</b>	<b>63.0</b>	<b>62.2</b>	<b>61.3</b>	<b>60.5</b>	<b>59.6</b>	<b>58.7</b>	<b>58.2</b>	<b>57.6</b>	<b>57.0</b>	<b>56.4</b>	<b>55.8</b>						
Emissions Trading System (stationary installations)	38.4	25.0	25.7	25.9	24.7	24.2	27.9	25.7	30.1	24.1	23.1	22.0	21.6	21.2	20.7	20.3	19.9	19.6	19.3	19.0	18.7	18.5						
Energy Industries	25.6	14.1	15.7	16.8	15.3	14.5	18.0	16.6	20.5	15.3	14.1	13.0	12.6	12.1	11.7	11.3	10.8	10.5	10.1	9.7	9.4	9.0						
Other stationary installations	12.8	10.9	9.9	9.1	9.4	9.7	9.9	9.1	9.5	8.8	8.9	9.0	9.0	9.0	9.0	9.1	9.1	9.1	9.2	9.3	9.4	9.4						
Effort Sharing Decision and Regulation	48.2	44.7	43.0	40.9	38.6	38.8	40.6	41.6	41.7	41.4	41.0	40.5	40.1	39.6	39.2	38.7	38.3	38.0	37.7	37.4	37.1	36.8						
Transport	19.6	18.6	17.3	15.9	15.0	15.2	15.8	16.3	16.6	14.8	14.7	14.5	14.5	14.4	14.4	14.4	14.3	14.3	14.2	14.2	14.2	14.1						
Buildings	7.4	5.4	4.8	4.6	4.4	4.3	4.4	4.4	4.4	4.5	4.5	4.5	4.5	4.5	4.5	4.6	4.6	4.6	4.6	4.6	4.7	4.7						
Agriculture	6.8	6.7	6.6	6.7	6.3	6.4	6.6	6.8	6.9	8.3	8.2	8.1	8.1	8.1	8.0	8.0	7.9	7.8	7.6	7.5	7.4	7.2						
Waste	7.7	7.0	7.2	7.0	6.5	6.3	6.4	6.5	6.3	8.6	8.5	8.3	8.1	8.0	7.9	7.7	7.6	7.5	7.3	7.2	7.1	7.0						
Industry and other	6.7	6.9	7.0	6.7	6.5	6.6	7.3	7.6	7.4	5.2	5.1	5.1	4.9	4.6	4.4	4.1	3.9	3.9	3.8	3.8	3.8	3.7						
AEA under Effort Sharing Decision and Regulation											49.3	49.6	49.9	50.1	47.9	48.3	48.7	49.1	43.0	41.3	41.2	41.0	40.9	40.8	40.7	40.6	40.5	40.3
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>	<b>Historic emissions including proxy 2017</b>										<b>WEM</b>																	
<b>Romania</b>	<b>2005</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>						
<b>Total GHG emissions</b>	<b>147.8</b>	<b>122.2</b>	<b>127.9</b>	<b>124.8</b>	<b>115.3</b>	<b>115.4</b>	<b>116.2</b>	<b>112.5</b>	<b>114.9</b>	<b>117.4</b>	<b>117.8</b>	<b>118.2</b>	<b>118.4</b>	<b>118.4</b>	<b>118.6</b>	<b>118.8</b>	<b>119.0</b>	<b>120.5</b>	<b>122.0</b>	<b>123.4</b>	<b>124.9</b>	<b>126.3</b>						
Emissions Trading System (stationary installations)	72.2	54.5	58.3	54.6	42.4	42.6	42.4	39.8	40.6	41.8	41.7	41.7	41.2	40.7	40.2	39.6	39.1	39.9	40.7	41.5	42.2	42.9						
Energy Industries	43.2	35.3	37.7	35.1	26.7	26.6	26.0	23.7	24.4	25.6	25.2	24.9	24.1	23.3	22.4	21.6	20.8	21.3	21.8	22.3	22.9	23.4						
Other stationary installations	29.1	19.2	20.6	19.5	15.7	16.0	16.4	16.1	16.2	16.2	16.5	16.8	17.1	17.4	17.7	18.0	18.4	18.6	18.9	19.1	19.4	19.6						
Effort Sharing Decision and Regulation	75.4	67.3	69.3	70.1	72.7	72.5	74.6	73.1	74.2	75.6	76.0	76.5	77.2	77.7	78.4	79.2	79.9	80.6	81.3	82.0	82.7	83.4						
Transport	12.4	13.9	14.1	15.1	14.9	15.4	16.0	16.9	17.5	16.9	17.3	17.8	18.1	18.4	18.7	19.0	19.3	19.5	19.7	19.9	20.1	20.3						
Buildings	12.1	10.7	10.9	11.5	10.9	10.4	11.0	10.9	10.4	11.2	11.3	11.5	11.6	11.8	12.0	12.2	12.3	12.5	12.7	12.9	13.0	13.2						
Agriculture	20.5	17.5	17.8	17.6	18.2	18.1	18.8	18.4	18.3	19.0	19.1	19.2	19.5	19.8	20.0	20.3	20.6	20.8	21.1	21.4	21.7	21.9						
Waste	5.7	5.6	5.0	5.6	5.9	5.8	5.9	5.9	5.8	5.4	5.3	5.2	5.1	4.9	4.8	4.7	4.6	4.6	4.5	4.4	4.4	4.3						
Industry and other	24.7	19.7	21.5	20.2	22.8	22.7	22.8	21.0	22.1	23.0	22.9	22.8	22.9	22.9	23.0	23.0	23.0	23.2	23.3	23.4	23.5	23.7						
AEA under Effort Sharing Decision and Regulation											75.6	77.5	79.3	81.1	84.1	86.0	87.9	89.8	85.2	74.2	74.2	74.2	74.1	74.1	74.1	74.0	74.0	74.0

## Progress of the EU towards its greenhouse gas emission targets

GHG emissions (Mt CO <sub>2</sub> -eq.)	Historic emissions including proxy 2017										WEM											
Slovakia	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>Total GHG emissions</b>	<b>51.1</b>	<b>46.3</b>	<b>45.3</b>	<b>43.0</b>	<b>42.6</b>	<b>40.5</b>	<b>40.9</b>	<b>41.0</b>	<b>41.8</b>	<b>40.4</b>	<b>40.4</b>	<b>40.3</b>	<b>40.3</b>	<b>40.3</b>	<b>40.3</b>	<b>40.4</b>	<b>40.4</b>	<b>40.4</b>	<b>40.5</b>	<b>40.5</b>	<b>40.6</b>	<b>40.7</b>
Emissions Trading System (stationary installations)	29.0	23.3	23.3	21.9	21.8	20.9	21.2	21.3	22.1	20.4	20.3	20.2	20.2	20.2	20.2	20.3	20.3	20.4	20.4	20.4	20.5	20.6
Energy Industries	10.9	8.1	8.0	7.6	7.4	6.4	6.9	6.8	6.6	5.9	5.8	5.6	5.6	5.6	5.6	5.6	5.6	5.5	5.5	5.5	5.4	5.4
Other stationary installations	18.1	15.2	15.3	14.3	14.4	14.5	14.3	14.5	15.4	14.4	14.5	14.5	14.6	14.6	14.7	14.7	14.8	14.8	14.9	15.0	15.1	15.2
Effort Sharing Decision and Regulation	22.1	23.0	21.9	21.1	21.1	19.8	20.1	19.8	19.7	20.0	20.1	20.2	20.1	20.1	20.1	20.1	20.0	20.1	20.1	20.1	20.1	20.2
Transport	7.5	7.3	6.9	6.8	6.8	6.6	6.8	6.5	7.2	6.7	6.8	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8
Buildings	6.8	6.7	5.1	5.6	5.9	4.8	4.9	4.8	4.8	4.6	4.6	4.6	4.6	4.6	4.5	4.5	4.5	4.5	4.4	4.4	4.4	4.4
Agriculture	2.6	2.3	2.4	2.5	2.6	2.7	2.6	2.7	2.5	3.0	3.0	3.0	2.9	2.9	2.8	2.8	2.8	2.7	2.7	2.7	2.7	2.7
Waste	1.4	1.5	1.5	1.5	1.5	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Industry and other	3.9	5.1	6.0	4.6	4.3	4.1	4.2	4.2	3.7	4.2	4.2	4.2	4.2	4.1	4.1	4.1	4.0	4.0	3.9	3.9	3.9	3.9
AEA under Effort Sharing Decision and Regulation					24.0	24.4	24.7	25.1	25.0	25.3	25.6	25.9	22.0	19.9	19.9	20.0	20.0	20.1	20.1	20.1	20.2	20.2
GHG emissions (Mt CO <sub>2</sub> -eq.)	Historic emissions including proxy 2017										WEM											
Slovenia	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>Total GHG emissions</b>	<b>20.5</b>	<b>19.7</b>	<b>19.7</b>	<b>19.1</b>	<b>18.4</b>	<b>16.7</b>	<b>16.9</b>	<b>17.7</b>	<b>17.6</b>	<b>17.9</b>	<b>17.9</b>	<b>17.9</b>	<b>17.7</b>	<b>17.6</b>	<b>17.4</b>	<b>17.3</b>	<b>17.2</b>	<b>17.0</b>	<b>16.8</b>	<b>16.6</b>	<b>16.5</b>	<b>16.3</b>
Emissions Trading System (stationary installations)	8.8	8.0	7.9	7.6	7.4	6.1	6.1	6.5	6.6	7.1	7.2	7.2	7.1	7.0	6.9	6.8	6.7	6.6	6.5	6.4	6.3	6.2
Energy Industries	6.3	6.2	6.2	5.9	5.6	4.4	4.4	4.8	4.8	5.3	5.3	5.2	5.1	4.9	4.8	4.7	4.6	4.4	4.3	4.2	4.0	3.9
Other stationary installations	2.5	1.8	1.7	1.7	1.7	1.8	1.7	1.7	1.8	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3
Effort Sharing Decision and Regulation	11.8	11.7	11.7	11.5	10.9	10.5	10.7	11.2	11.0	10.7	10.7	10.7	10.7	10.6	10.5	10.5	10.4	10.4	10.3	10.2	10.1	10.1
Transport	4.4	5.3	5.7	5.8	5.4	5.3	5.3	5.7	5.6	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.3	5.3	5.3	5.2
Buildings	2.7	2.3	2.0	1.8	1.7	1.4	1.5	1.6	1.6	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1
Agriculture	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Waste	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Industry and other	2.1	1.8	1.7	1.7	1.6	1.5	1.5	1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5
AEA under Effort Sharing Decision and Regulation					12.3	12.4	12.4	12.4	12.2	12.2	12.3	12.3	11.0	10.8	10.7	10.6	10.5	10.4	10.3	10.2	10.1	10.1
GHG emissions (Mt CO <sub>2</sub> -eq.)	Historic emissions including proxy 2017										WEM											
Spain	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>Total GHG emissions</b>	<b>439</b>	<b>356</b>	<b>355</b>	<b>349</b>	<b>322</b>	<b>324</b>	<b>336</b>	<b>325</b>	<b>339</b>	<b>333</b>	<b>333</b>	<b>333</b>	<b>334</b>	<b>335</b>	<b>337</b>	<b>323</b>	<b>324</b>	<b>326</b>	<b>327</b>	<b>329</b>	<b>330</b>	<b>330</b>
Emissions Trading System (stationary installations)	200	130	141	144	123	125	137	124	136	139	140	141	142	143	145	129	130	130	130	130	129	129
Energy Industries	120.2	69.5	83.6	88.7	70.6	74.1	86.3	72.6	83.7	84.8	85.2	85.7	86.1	86.6	87.2	70.6	70.7	70.9	71.0	71.2	71.4	71.6
Other stationary installations	80.0	60.6	57.3	54.9	52.2	50.7	51.0	50.9	52.6	54.0	54.9	55.3	55.8	56.4	57.4	58.5	59.4	59.5	59.3	58.7	58.0	57.2
Effort Sharing Decision and Regulation	235	222	211	202	200	200	196	198	200	191	190	189	189	189	190	191	191	192	194	195	197	198
Transport	98	88	83	77	79	79	81	83	86	83	84	84	85	85	85	85	86	86	88	89	91	92
Buildings	43	46	44	43	40	39	40	42	41	40	40	40	40	40	40	41	41	42	42	42	42	43
Agriculture	37	34	33	32	33	34	35	34	35	30	29	28	28	28	28	28	28	28	28	27	27	27
Waste	13	15	15	15	15	14	14	14	14	10	9	8	8	8	8	8	8	7	7	7	7	7
Industry and other	44	40	36	36	33	34	26	25	23	28	28	28	28	28	29	29	29	29	29	29	29	29
AEA under Effort Sharing Decision and Regulation					228	226	224	222	218	216	214	212	193	191	189	187	185	183	181	179	177	175

## Progress of the EU towards its greenhouse gas emission targets

GHG emissions (Mt CO <sub>2</sub> -eq.)	Historic emissions including proxy 2017										WEM											
	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>Sweden</b>																						
<b>Total GHG emissions</b>	<b>66.7</b>	<b>64.4</b>	<b>60.3</b>	<b>57.0</b>	<b>55.4</b>	<b>53.9</b>	<b>53.8</b>	<b>52.9</b>	<b>52.2</b>	<b>51.4</b>	<b>50.7</b>	<b>49.9</b>	<b>49.5</b>	<b>49.0</b>	<b>48.6</b>	<b>48.1</b>	<b>47.7</b>	<b>47.3</b>	<b>46.9</b>	<b>46.4</b>	<b>46.0</b>	<b>45.6</b>
Emissions Trading System (stationary installations)	23.4	24.6	21.5	19.7	20.1	19.3	19.2	19.7	18.9	19.5	19.6	19.7	19.7	19.7	19.7	19.7	19.7	19.6	19.5	19.4	19.3	19.2
Energy Industries	10.3	12.9	10.6	9.9	9.9	9.2	9.2	9.3	9.3	9.6	9.7	9.8	9.8	9.8	9.9	9.9	9.9	9.8	9.7	9.7	9.6	9.5
Other stationary installations	13.2	11.7	10.9	9.8	10.3	10.1	10.0	10.4	9.6	10.0	10.0	9.9	9.9	9.9	9.8	9.8	9.8	9.8	9.7	9.7	9.7	9.6
Effort Sharing Decision and Regulation	42.6	39.4	38.3	36.8	35.3	34.5	33.9	32.6	32.7	31.4	30.5	29.7	29.2	28.8	28.4	28.0	27.5	27.2	26.9	26.6	26.3	26.0
Transport	20.4	19.9	19.3	18.1	17.9	17.7	17.3	16.3	16.3	16.0	15.5	14.9	14.7	14.5	14.3	14.0	13.8	13.7	13.5	13.4	13.2	13.1
Buildings	5.9	4.4	4.1	3.8	3.7	3.6	3.5	3.4	3.5	3.0	2.8	2.7	2.7	2.7	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5
Agriculture	7.0	6.8	7.1	6.7	7.0	7.1	6.8	6.9	6.9	6.6	6.5	6.4	6.3	6.3	6.2	6.2	6.1	6.1	6.0	6.0	5.9	5.9
Waste	2.7	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.7	0.7
Industry and other	6.6	6.3	5.9	6.4	5.0	4.7	4.8	4.7	4.8	4.6	4.6	4.6	4.5	4.4	4.3	4.3	4.2	4.1	4.0	4.0	3.9	3.8
AEA under Effort Sharing Decision and Regulation					41.7	41.0	40.4	39.8	37.8	37.2	36.7	36.1	31.3	30.7	30.1	29.6	29.0	28.4	27.8	27.2	26.7	26.1
<b>GHG emissions (Mt CO<sub>2</sub>-eq.)</b>	<b>Historic emissions including proxy 2017</b>										<b>WEM</b>											
<b>United Kingdom</b>																						
<b>Total GHG emissions</b>	<b>693</b>	<b>612</b>	<b>564</b>	<b>581</b>	<b>566</b>	<b>526</b>	<b>508</b>	<b>483</b>	<b>470</b>	<b>461</b>	<b>452</b>	<b>436</b>	<b>433</b>	<b>417</b>	<b>413</b>	<b>414</b>	<b>405</b>	<b>401</b>	<b>397</b>	<b>399</b>	<b>403</b>	<b>403</b>
Emissions Trading System (stationary installations)	275	239	221	231	225	198	176	147	137	142	136	125	123	110	109	110	107	103	101	104	107	110
Energy Industries	209	184	171	180	172	147	127	102	94	96	89	79	77	65	64	66	63	59	58	61	64	69
Other stationary installations	66	54	50	51	53	51	49	45	43	46	46	46	45	45	45	44	44	43	43	42	42	42
Effort Sharing Decision and Regulation	416	371	341	348	339	324	326	334	332	317	314	309	309	305	303	302	296	296	294	293	295	291
Transport	130	119	117	116	115	116	118	122	122	114	113	112	111	111	110	109	108	108	107	107	106	106
Buildings	114	114	93	102	103	87	90	95	91	97	97	95	97	96	95	97	93	95	95	95	99	97
Agriculture	44	41	41	41	41	42	41	42	42	43	43	42	42	42	41	41	41	41	41	41	41	41
Waste	49	30	28	26	22	20	19	20	20	15	15	14	14	14	13	13	13	13	13	13	13	13
Industry and other	78	67	62	62	57	59	59	56	57	48	47	46	45	44	43	41	40	39	38	37	35	34
AEA under Effort Sharing Decision and Regulation					359	354	350	345	360	357	354	351	318	312	306	300	294	287	281	275	269	263

**Notes:** Transport emissions are related to CRF category 1.A.3 without domestic aviation. Buildings emissions are related to CRF category 1.A.4 and 1.A.5, agriculture to CRF category 3 and waste to CRF category 5. The subsector 'industry and other' includes Effort Sharing emissions covered under CRF categories 1.A.1, 1.A.2, 1.B and 2.

AEAs for the years 2021-2030 are best available estimates. Final AEAs for this period will be determined only in 2020, following a comprehensive review of Member States' GHG inventories.

**Sources:** (EC, 2013a, 2013b, 2017c; EEA, 2018c; EU, 2009c).

### ***A1.3 Tracking progress towards targets under the Effort Sharing Decision***

The progress of Member States towards their targets under the ESD is assessed by comparing Effort Sharing GHG emission levels with the relevant annual targets under the ESD. The assessment does not consider the possible use of flexibility options as permitted under the ESD and is therefore not an assessment of compliance under the ESD.

The assessment of current progress towards 2016 Effort Sharing targets is based on a comparison between Effort Sharing GHG emissions and Effort Sharing emission targets (AEAs) for 2016:

- Member States with historical emissions below their annual Effort Sharing emission targets are considered to be currently on track towards their targets under the ESD.
- Member States with historical emissions higher than their Effort Sharing emission targets are considered to be currently not on track towards their targets under the ESD.

The assessment of projected progress towards 2020 Effort Sharing targets is based on a comparison between projected domestic Effort Sharing GHG emissions in the WEM scenario in 2020 and Effort Sharing targets (AEAs) for 2020:

- Member States with WEM projections lower than their 2020 target are projected to be on track towards their targets.
- Member States with WEM projections higher than their 2020 target are projected to be not on track towards their targets.

All the data used for this assessment (Effort Sharing GHG emissions and absolute annual Effort Sharing emission targets (AEAs)) are consistent with the scope of the EU ETS for the period 2013-2020.

The assessment of projected progress towards provisional 2030 ESR targets is based on a comparison between projected domestic Effort Sharing GHG emissions in the WAM scenario in 2030 and provisional ESR targets for 2030.

## Progress of the EU towards its greenhouse gas emission targets

**Table A1.2 Current progress towards 2016 Effort Sharing targets**

Member State	2005	2016 progress under the ESD				2017 progress under the ESD (approximated)			
	Base year emissions	Effort Sharing target	Effort Sharing emissions	Absolute gap	Relative	Effort Sharing target	Effort Sharing emissions	Absolute gap	Relative gap
	Mt CO <sub>2</sub> eq.	Mt CO <sub>2</sub> eq.	Mt CO <sub>2</sub> eq.	Mt CO <sub>2</sub> eq.	% (share of 2005 base year)	Mt CO <sub>2</sub> eq.	Mt CO <sub>2</sub> eq.	Mt CO <sub>2</sub> eq.	% (share of 2005 base year)
Austria	56.8	51.0	50.6	0.4	0.6	49.5	51.3	-1.8	-3.1
Belgium	80.3	73.8	74.1	-0.3	-0.3	72.5	72.4	0.1	0.1
Bulgaria	22.1	27.7	25.6	2.1	9.7	25.9	26.1	-0.2	-0.9
Croatia	17.4	20.2	16.0	4.2	24.0	18.7	16.1	2.6	15.1
Cyprus	4.2	5.9	4.1	1.8	43.4	4.2	4.3	-0.1	-2.9
Czechia	61.7	64.7	62.8	1.9	3.0	65.2	64.0	1.2	2.0
Denmark	40.1	34.1	33.1	1.0	2.5	34.8	32.6	2.2	5.4
Estonia	5.4	6.4	6.2	0.2	2.8	5.9	6.0	0.0	-0.9
Finland	33.9	30.3	31.4	-1.0	-3.1	30.2	30.8	-0.6	-1.7
France	398.2	379.4	351.9	27.5	6.9	358.2	354.7	3.5	0.9
Germany	477.8	452.4	454.2	-1.7	-0.4	432.35	464.7	-32.4	-6.8
Greece	62.6	59.9	44.9	15.0	24.0	59.1	44.3	14.9	23.8
Hungary	48.0	53.8	42.1	11.7	24.3	50.1	43.8	6.3	13.1
Ireland	47.1	43.5	43.8	-0.3	-0.6	40.9	44.0	-3.1	-6.7
Italy	334.5	302.3	270.7	31.6	9.4	298.3	268.9	29.3	8.8
Latvia	8.5	9.5	9.1	0.4	5.0	9.7	9.2	0.5	5.9
Lithuania	13.3	14.0	13.9	0.1	0.7	14.1	14.2	-0.1	-0.9
Luxembourg	10.1	8.9	8.5	0.417	4.11	8.7	8.7	0.1	0.7
Malta	1.1	1.2	1.3	-0.2	-14.9	1.2	1.4	-0.3	-23.1
Netherlands	127.8	116.1	101.3	14.8	11.6	114.1	101.1	13.0	10.1
Poland	180.0	197.4	198.7	-1.3	-0.7	200.0	204.8	-4.8	-2.7
Portugal	48.6	50.1	41.6	8.6	17.6	47.9	41.7	6.2	12.8
Romania	75.5	81.1	73.1	8.0	10.6	84.1	74.2	9.9	13.1
Slovakia	23.0	25.1	19.8	5.3	23.3	25.0	19.7	5.3	23.1
Slovenia	11.8	12.4	11.2	1.2	9.9	12.2	11.0	1.2	9.9
Spain	236.0	221.8	198.5	23.3	9.9	218.3	199.9	18.4	7.8
Sweden	43.5	39.8	32.6	7.2	16.5	37.8	32.7	5.1	11.7
United Kingdom	417.8	345.2	333.9	11.3	2.7	360.4	331.9	28.5	6.8
<b>EU</b>	<b>2 887</b>	<b>2 728</b>	<b>2 555</b>	<b>173</b>	<b>6.0</b>	<b>2 679</b>	<b>2 574</b>	<b>105</b>	<b>3.6</b>

**Notes:** Distances to targets (i.e. surpluses of emission allocations compared with existing emissions) are calculated as 'Effort Sharing target' - 'Effort Sharing GHG emissions'. A positive value indicates a surplus of AEAs (emissions lower than the target); a negative value indicates a shortfall of AEAs (emissions higher than the target).

See Section A1.2 in Annex 1 regarding the calculation of 2005 base year emissions by the EEA.

**Sources:** (EC, 2013a, 2013b, 2017a; EEA, 2018a, 2018b, 2018e, 2018d, 2018g; EU, 2009c), based on Member States' submissions.

## Progress of the EU towards its greenhouse gas emission targets

**Table A1.3 Projected progress towards 2020 ESD targets**

Member State	2005		2020 Effort Sharing target		Projected progress WEM by 2020			Projected progress WAM by 2020		
	Base year emissions		Relative target to 2020	Absolute target	Effort Sharing emission	Absolute gap	Relative gap	Effort Sharing emission:	Absolute gap	Relative gap
	Mt CO <sub>2</sub> eq		%	Mt CO <sub>2</sub> eq	Mt CO <sub>2</sub> eq	Mt CO <sub>2</sub> eq	% (share of 2005 base year)	Mt CO <sub>2</sub> eq	Mt CO <sub>2</sub> eq	% (share of 2005 base year)
Austria	56.8		-16.0	47.8	49.1	-1.4	-2.4	49.1	-1.4	-2.4
Belgium	80.3		-15.0	68.2	71.0	-2.8	-3.5	70.2	-2.0	-2.5
Bulgaria	22.1		20.0	26.5	21.7	4.8	21.7	21.7	4.8	21.7
Croatia	17.4		11.0	19.3	15.2	4.1	23.5	14.3	5.0	28.9
Cyprus	4.2		-5.0	4.0	4.5	-0.5	-12.5	4.4	-0.4	-10.7
Czechia	61.7		9.0	67.2	61.9	5.3	8.5	61.6	5.6	9.0
Denmark	40.1		-20.0	32.1	31.1	0.9	2.3	31.1	0.9	2.3
Estonia	5.4		11.0	6.0	6.0	0.0	0.3	5.7	0.3	6.1
Finland	33.9		-16.0	28.5	28.8	-0.3	-0.7	28.7	-0.1	-0.4
France	398.2		-14.0	342.5	318.2	24.3	6.1	318.2	24.3	6.1
Germany	477.8		-14.0	410.9	426.5	-15.6	-3.3	419.0	-8.1	-1.7
Greece	62.6		-4.0	60.0	48.9	11.1	17.8	48.9	11.1	17.8
Hungary	48.0		10.0	52.8	39.1	13.7	28.6	39.0	13.8	28.7
Ireland	47.1		-20.0	37.7	46.8	-9.2	-19.5	46.5	-8.8	-18.7
Italy	334.5		-13.0	291.0	262.7	28.3	8.5	262.7	28.3	8.5
Latvia	8.5		17.0	10.0	9.2	0.8	9.2	9.1	0.9	10.5
Lithuania	13.3		15.0	15.2	13.6	1.7	12.6	13.0	2.2	16.9
Luxembourg	10.1		-20.0	8.1	8.4	-0.3	-2.6	8.2	-0.1	-0.9
Malta	1.1		5.0	1.2	1.3	-0.1	-11.5	1.3	-0.1	-11.5
Netherlands	127.8		-16.0	107.4	94.6	12.8	10.0	93.2	14.1	11.0
Poland	180.0		14.0	205.2	190.1	15.1	8.4	190.1	15.1	8.4
Portugal	48.6		1.0	49.1	40.5	8.6	17.6	40.5	8.6	17.7
Romania	75.5		19.0	89.8	76.5	13.3	17.6	74.7	15.1	20.0
Slovakia	23.0		13.0	25.9	20.2	5.8	25.2	19.3	6.6	28.7
Slovenia	11.8		4.0	12.3	10.7	1.6	13.3	10.7	1.6	13.3
Spain	236.0		-10.0	212.4	189.1	23.3	9.9	189.1	23.3	9.9
Sweden	43.5		-17.0	36.1	29.7	6.4	14.8	29.7	6.4	14.8
United Kingdom	417.8		-16.0	350.9	309.4	41.5	9.9	301.2	49.8	11.9
<b>EU-28</b>	<b>2887.1</b>		<b>-9.3</b>	<b>2618.2</b>	<b>2425.0</b>	<b>193.2</b>	<b>6.7</b>	<b>2401.3</b>	<b>216.8</b>	<b>7.5</b>

**Notes:** Distances to targets are calculated as 'Effort Sharing target' - 'Effort Sharing GHG emissions'. A positive value indicates a surplus of AEs (emissions lower than the target); a negative value indicates a shortfall of AEs (emissions higher than the target).

See Section A1.2 in Annex 1 regarding the calculation of 2005 base year emissions by the EEA.

**Sources:** (EC, 2013a, 2013b, 2017a; EEA, 2018c; EU, 2009c), based on Member States' submissions.

### **A1.4 Use of flexibilities under the Effort Sharing Decision**

The assessment of progress towards the Effort Sharing targets does not consider the possible use of flexibility options as permitted under the ESD, which can be used by Member States for compliance under the ESD <sup>(15)</sup>.

If flexibility options are considered, only Malta will need to buy additional AEs from other Member States or use international project credits to comply in the years 2013 to 2016.

<sup>(15)</sup> A Member State can carry forward (i.e. 'borrow') an emission allocation of up to 5 % from the following year, during the period 2013-2019, to guarantee compliance. A Member State can also carry over from a past year any surplus emission allocations. It is also possible to use other flexibilities under the ESD, such as buying AEs from other Member States or using international project credits under the Kyoto Protocol up to a certain limit.

## Progress of the EU towards its greenhouse gas emission targets

Considering WEM emissions, for all Member States other than Ireland and Malta the use of the flexibility to carry over AEAs that have not been used in previous years will be enough for compliance in the period 2013-2020.

### A1.5 Annual and cumulative gaps between emissions and Effort Sharing Decision targets

Table A1.4 Annual distance between historical or projected ESD emissions and annual Effort Sharing targets, 2013-2020

Member State	Scenario	Inventory				Proxy	Projections		
		2013	2014	2015	2016		2017	2018	2019
Austria	WEM	2.5	3.9	2.2	0.4	-1.8	-0.5	-1.0	-1.4
	WAM						-0.5	-1.0	-1.4
Belgium	WEM	4.1	6.8	2.6	-0.3	0.1	-0.7	-1.8	-2.8
	WAM						-0.7	-1.8	-2.0
Bulgaria	WEM	4.7	4.3	2.1	2.1	-0.2	3.9	4.4	4.8
	WAM						3.9	4.4	4.8
Croatia	WEM	4.5	5.1	4.4	4.2	2.6	3.7	3.9	4.1
	WAM						4.3	4.7	5.0
Cyprus	WEM	2.0	2.0	1.9	1.8	-0.1	-0.2	-0.3	-0.5
	WAM						-0.1	-0.3	-0.4
Czechia	WEM	1.0	5.6	2.7	1.9	1.2	5.7	5.5	5.3
	WAM						5.9	5.8	5.6
Denmark	WEM	3.1	3.3	2.5	1.0	2.2	2.1	1.5	0.9
	WAM						2.1	1.5	0.9
Estonia	WEM	0.5	0.2	0.2	0.2	-0.05	-0.1	-0.02	0.02
	WAM						0.2	0.3	0.3
Finland	WEM	0.2	1.1	0.9	-1.0	-0.6	0.2	-0.04	-0.3
	WAM						0.3	0.05	-0.1
France	WEM	28.0	35.9	31.4	27.5	3.5	20.8	22.5	24.3
	WAM						20.8	22.5	24.3
Germany	WEM	12.3	29.0	15.1	-1.7	-32.4	-11.1	-13.1	-15.6
	WAM						-4.2	-5.9	-8.1
Greece	WEM	14.8	14.9	14.2	15.0	14.9	11.2	11.1	11.1
	WAM						11.2	11.1	11.1
Hungary	WEM	12.0	13.1	11.2	11.7	6.3	11.0	12.4	13.7
	WAM						11.0	12.5	13.8
Ireland	WEM	4.7	4.1	1.6	-0.3	-3.1	-6.1	-7.7	-9.2
	WAM						-6.0	-7.4	-8.8
Italy	WEM	34.8	40.9	31.0	31.6	29.3	28.4	28.3	28.3
	WAM						28.4	28.3	28.3
Latvia	WEM	0.5	0.3	0.4	0.4	0.5	0.7	0.7	0.8
	WAM						0.7	0.7	0.9
Lithuania	WEM	0.5	0.4	0.4	0.1	-0.1	1.0	1.3	1.7
	WAM						1.4	1.8	2.2
Luxembourg	WEM	0.2	0.5	0.5	0.4	0.1	0.2	-0.03	-0.3
	WAM						0.2	0.0	-0.1
Malta	WEM	-0.1	-0.1	-0.1	-0.2	-0.3	-0.1	-0.1	-0.1
	WAM						-0.1	-0.1	-0.1
Netherlands	WEM	14.7	22.8	17.3	14.8	13.0	14.9	13.6	12.8
	WAM						16.0	14.8	14.1
Poland	WEM	7.5	13.3	9.4	-1.3	-4.8	12.2	13.6	15.1
	WAM						12.2	13.6	15.1
Portugal	WEM	10.7	10.8	9.2	8.6	6.2	6.9	7.7	8.6
	WAM						6.9	7.7	8.6
Romania	WEM	2.9	4.9	4.7	8.0	9.9	10.4	11.8	13.3
	WAM						11.5	13.3	15.1

## Progress of the EU towards its greenhouse gas emission targets

Member State	Scenario	Inventory				Proxy	Projections		
		2013	2014	2015	2016		2017	2018	2019
Slovakia	WEM	2.9	4.6	4.7	5.3	5.3	5.3	5.6	5.8
	WAM						5.9	6.2	6.6
Slovenia	WEM	1.4	1.9	1.7	1.2	1.2	1.5	1.5	1.6
	WAM						1.5	1.5	1.6
Spain	WEM	27.3	25.9	27.6	23.3	18.4	25.1	23.9	23.3
	WAM						25.1	23.9	23.3
Sweden	WEM	6.4	6.5	6.5	7.2	5.1	5.9	6.1	6.4
	WAM						5.9	6.1	6.4
United Kingdom	WEM	19.3	29.8	23.7	11.3	28.5	40.6	39.7	41.5
	WAM						45.0	46.1	49.8
EU	WEM	223	292	230	173	105	193	191	193
	WAM						209	210	217

**Notes:** A positive value (green shading) indicates a surplus of AEAs (emissions lower than the target). A negative value (red shading) indicates a shortfall of AEAs (emissions higher than the target). The darker the colour, the larger the gap (red) or the surplus (green). The shading of the colours always refers to the timeline of each individual country. The lowest negative value is the darkest red, the median value and zero is white, and the highest value is the darkest green.

The calculations do not consider any possible use of the flexibilities provided under the ESD (such as trading Effort Sharing emission allocations or buying international certificates). For this calculation, recalculated AEAs for the years 2017-2020 were considered (EC, 2017a).

The data are based on Effort Sharing emissions for 2013, 2014 2015 and 2016 as determined after the reviews of Effort Sharing emissions, approximated data for 2017 and projections for the period 2017-2020. No approximated GHG data were available for Bulgaria, Cyprus and Romania. For these, the EEA GHG emissions proxy was used instead. For the aggregation of projections in the WAM scenario at EU level, WAM projections of Member States which did not report a WAM scenario have been gap-filled using the WEM scenario projections.

**Sources:** (EC, 2013a, 2013b, 2017a; EEA, 2018a, 2018b, 2018c, 2018e, 2018g), based on Member States' submissions

**Table A1.5 Cumulative gaps between historical and projected ESD emissions and annual Effort Sharing targets, 2013-2020**

Member State	Scenario	Inventory				Proxy	Projections		
		2013	2014	2015	2016		2017	2018	2019
Austria	WEM	2.5	6.4	8.7	9.0	7.2	6.7	5.8	4.4
	WAM						6.7	5.8	4.4
Belgium	WEM	4.1	10.9	13.5	13.2	13.3	12.7	10.9	8.1
	WAM						12.7	10.9	8.9
Bulgaria	WEM	4.7	9.0	11.1	13.3	13.1	17.0	21.3	26.1
	WAM						17.0	21.3	26.1
Croatia	WEM	4.5	9.6	14.1	18.2	20.9	24.6	28.5	32.6
	WAM						25.2	29.8	34.9
Cyprus	WEM	2.0	4.0	5.8	7.7	7.5	7.4	7.0	6.5
	WAM						7.4	7.1	6.7
Czechia	WEM	1.0	6.6	9.3	11.2	12.4	18.1	23.5	28.8
	WAM						18.3	24.1	29.6
Denmark	WEM	3.1	6.4	8.9	9.9	12.1	14.1	15.6	16.6
	WAM						14.1	15.6	16.6
Estonia	WEM	0.5	0.8	1.0	1.1	1.1	1.0	1.0	1.0
	WAM						1.3	1.6	2.0
Finland	WEM	0.2	1.3	2.2	1.2	0.6	0.8	0.7	0.5
	WAM						0.9	0.9	0.8
France	WEM	28.0	63.9	95.3	122.8	126.3	147.1	169.6	193.9
	WAM						147.1	169.6	193.9
Germany	WEM	12.3	41.4	56.4	54.7	22.3	11.2	-1.9	-17.5
	WAM						18.1	12.2	4.1
Greece	WEM	14.8	29.6	43.8	58.8	73.7	84.9	96.0	107.1
	WAM						84.9	96.0	107.1

## Progress of the EU towards its greenhouse gas emission targets

Member State	Scenario	Inventory				Proxy	Projections		
		2013	2014	2015	2016		2017	2018	2019
Hungary	WEM	12.0	25.1	36.3	47.9	54.2	65.2	77.6	91.3
	WAM						65.2	77.7	91.5
Ireland	WEM	4.7	8.8	10.4	10.1	6.9	0.8	-6.8	-16.0
	WAM						0.9	-6.5	-15.3
Italy	WEM	34.8	75.7	106.7	138.3	167.6	195.9	224.3	252.6
	WAM						195.9	224.3	252.6
Latvia	WEM	0.5	0.8	1.3	1.7	2.2	2.9	3.6	4.4
	WAM						2.9	3.6	4.5
Lithuania	WEM	0.5	0.9	1.3	1.4	1.3	2.2	3.5	5.2
	WAM						2.6	4.4	6.6
Luxembourg	WEM	0.2	0.7	1.2	1.6	1.7	1.9	1.8	1.6
	WAM						1.9	1.9	1.8
Malta	WEM	-0.1	-0.2	-0.3	-0.5	-0.8	-0.9	-1.0	-1.1
	WAM						-0.9	-1.0	-1.1
Netherlands	WEM	14.7	37.5	54.8	69.6	82.5	97.5	111.1	123.9
	WAM						98.5	113.3	127.5
Poland	WEM	7.5	20.9	30.2	29.0	24.2	36.4	50.0	65.1
	WAM						36.4	50.0	65.1
Portugal	WEM	10.7	21.5	30.7	39.3	45.5	52.3	60.0	68.6
	WAM						52.4	60.1	68.7
Romania	WEM	2.9	7.8	12.5	20.5	30.4	40.8	52.6	65.9
	WAM						41.9	55.2	70.3
Slovakia	WEM	2.9	7.5	12.2	17.5	22.8	28.2	33.7	39.5
	WAM						28.7	34.9	41.5
Slovenia	WEM	1.4	3.3	4.9	6.1	7.3	8.8	10.3	11.9
	WAM						8.8	10.3	11.9
Spain	WEM	27.3	53.2	80.8	104.1	122.5	147.6	171.5	194.8
	WAM						147.6	171.5	194.8
Sweden	WEM	6.4	12.9	19.4	26.6	31.7	37.5	43.7	50.1
	WAM						37.5	43.7	50.1
United Kingdom	WEM	19.3	49.1	72.7	84.0	112.6	153.1	192.9	234.4
	WAM						157.6	203.7	253.4
EU	WEM	223	515	745	918	1 023	1 216	1 407	1 600
	WAM						1 232	1 442	1 659

**Notes:** A positive value (green shading) indicates a surplus of AEAs (emissions lower than the target). A negative value (red shading) indicates a shortfall of AEAs (emissions higher than the target). The darker the colour, the larger the gap (red) or the surplus (green). The shading of the colours always refers to the timeline of each individual country. The lowest negative value is the darkest red, the median value and zero is white, and the highest value is the darkest green.

The calculation of the cumulative gap takes only previous years' gaps into account and does not consider any possible use of the flexibilities provided under the ESD (such as trading Effort Sharing emission allocations or buying international certificates). For this calculation, recalculated AEAs for the years 2017-2020 were considered (EC, 2017a).

The data are based on Effort Sharing emissions for 2013, 2014 2015 and 2016 as determined after the reviews of Effort Sharing emissions, approximated data for 2017 and projections for the period 2017-2020. No approximated GHG data were available for Bulgaria, Cyprus and Romania. For the aggregation of projections in the WAM scenario at EU level, WAM projections of Member States that did not report a WAM scenario have been gap-filled using the WEM scenario projections.

**Sources:** (EC, 2013a, 2013b, 2017a; EEA, 2018a, 2018b, 2018c, 2018e, 2018g), based on Member States' submissions

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