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# Trends and projections in Europe 2020

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

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European Environment Agency

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# Executive summary

Over the course of 2020, Europe has taken essential steps towards achieving its ambition of climate neutrality by 2050. In recent years, variations in the pace of greenhouse gas emission reductions, renewable energy deployment and energy efficiency improvements have, at times, cast doubt on whether EU targets for 2030 and 2050 — and even nearer term 2020 targets — can be reached. But with recent key steps and achievements, such as the proposal for a European Climate Law earlier this year, followed by the amendment to increase the ambition of the 2030 targets, the way forward has become much clearer.

Progress in greenhouse gas emission reductions across Europe has been reasonably steady in recent years, with the pace of reductions sufficient to reach the 2020 target of a 20 % reduction below 1990 emissions levels. However, continuing at the average pace achieved between 1990 and 2018 would not reduce emissions enough to reach the 2030 target of a 40 % reduction — let alone more ambitious reduction levels — without increased efforts. This is illustrated in Figure ES1.1.

Encouragingly, in 2019, a year without economic downturns or other monumental crises, the approximate rate of emission reductions in the EU-27 was a remarkable 4 % below that of 2018. This rapid drop in emissions occurred before the effects of the Covid-19 pandemic took hold in 2020 and was, to a large extent, the result of cumulative, long-term efforts towards lower emission levels across Europe.

The 2019 emission reduction illustrates that deep cuts in emissions are possible and can be achieved independently of economic trends. This achievement illustrates that, in future, higher levels of ambition in Europe's climate mitigation targets can be achieved through focused policies and measures, and continued commitment to long-term change.

Whether the notable achievements of 2019 would have marked the start of a new, long-term trend in greenhouse gas emission reductions won't be known for some time. In 2020, the Covid-19 pandemic ushered in a global crisis, both in terms of the economy and social trends. With temporary shutdowns across Europe and unusually variable levels of activity over the course of the year, major reductions in greenhouse gas emissions and energy consumption are expected for 2020.

The extraordinary reductions expected for 2020 — which will first be quantified in next year's approximated inventory — should however only be viewed as circumstantial. While a 'new normal' is expected to develop in the post-Covid society following the punctuated equilibrium of 2020, the structural changes needed to achieve climate neutrality have not yet been made.

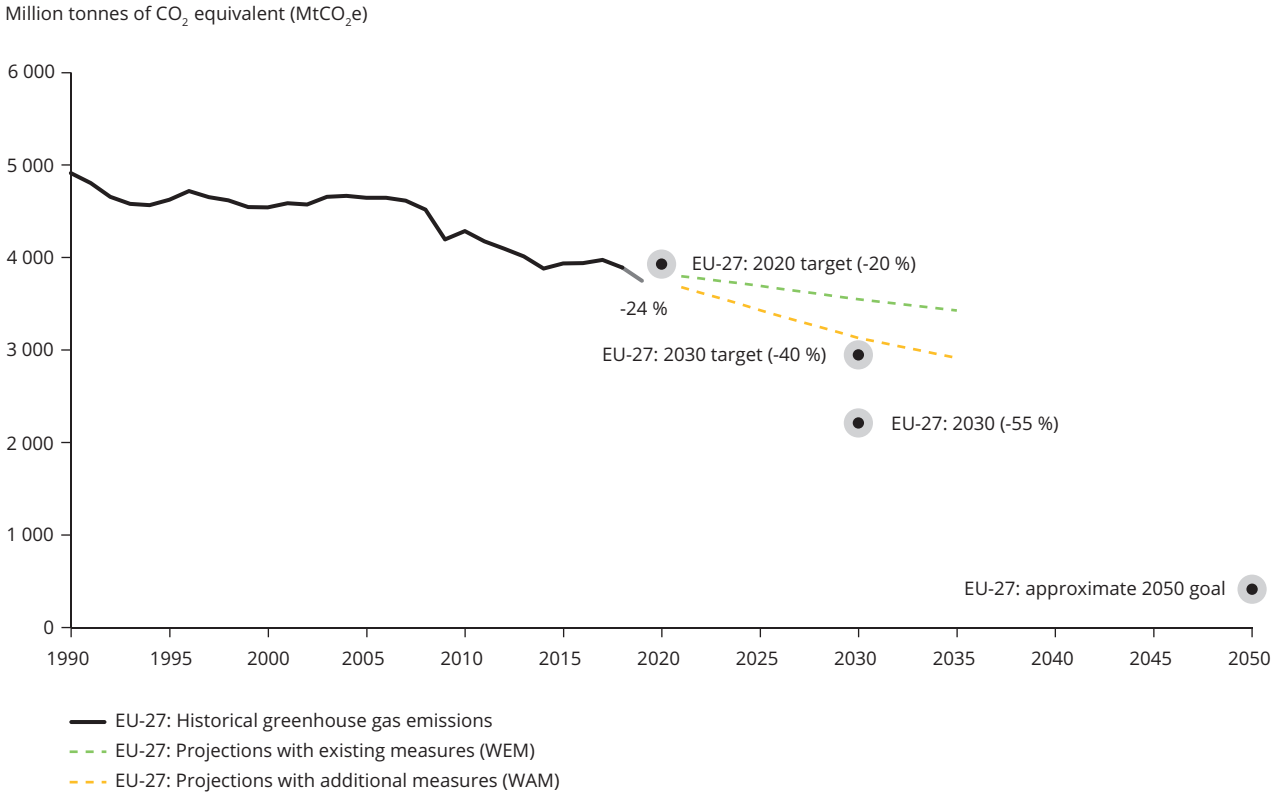
The opportunity to achieve such shifts in Europe's fundamental structures and energy consumption patterns is integrated into the post-Covid Recovery and Resilience Facility (European Council, 2020). The choices made by countries and companies across Europe in the next few years will determine which new trends come to characterise the new normal. These will affect whether the higher ambition levels for 2030, as proposed by the European Commission in September 2020, can be achieved and will influence the level of effort needed in the ensuing two decades and the run-up to net-zero emissions in 2050.

## 2020 climate and energy targets all within reach — though some at the last minute

Over recent years, trends have indicated a steady path towards achieving the 2020 greenhouse gas emission reductions, the likely achievement of the renewable energy targets and difficulties in reducing energy consumption quickly enough to reach the levels envisioned for 2020. These trends are illustrated in Figure ES1.2.

While the timing of the Covid-19 pandemic is incidental, it has major implications in terms of achieving 2020 targets. Although not yet quantified, there are strong indications that the economic downturn in 2020 has sharply reduced emissions and overall energy consumption this year, with the share of energy consumed from renewable sources likely having increased — and thereby likely securing achievement of the EU's climate and energy goals for 2020.

**Figure ES1.1 Greenhouse gas emission targets, trends and Member States' MMR projections in the EU, 1990-2050**




**Notes:** The calculations of greenhouse gas emission trends, projections and targets include emissions from international aviation and exclude emissions and removals from the land use, land use change and forestry (LULUCF) sector as well as emissions from international navigation.

The 'with existing measures' scenario reflects existing policies and measures, whereas the 'with additional measures' scenario considers the additional effects of planned measures reported by Member States under the Monitoring Mechanism Regulation (EU) 525/2013 (MMR). ([1])

The approximate value corresponding to the EU's 2050 goal was derived from those five scenarios exhibiting an emission reduction of 55 % in 2030 compared with 1990 and net-zero emissions by 2050 (i.e. REG, MIX, MIXnonCO2variant, CPRICE, ALLBNK) in the Commission's impact assessment (EC, 2020c). These scenarios take into account technical and natural carbon sinks, resulting from activities such as LULUCF and carbon capture and storage (CCS). As this graph excludes LULUCF emissions and removals, the 55 % value depicted for 2030 should be viewed as an approximation only, while the 2050 net-zero emissions goal translates into positive emissions EC (2020c).

**Sources:** EEA (2020f, 2020j, forthcoming_b).

Since 1990, greenhouse gas emissions in the EU ([2]) have been steadily declining. This trend continued in recent years, with emission reductions in the EU-28 falling to 23 % below 1990 levels in 2018 and 26 % in 2019 (24 % in the EU-27 only in 2019). Since 2014, emissions in the EU-28 have consistently remained below the EU's 20 % reduction target for 2020.

Major and sustained emission reductions have been observed in the stationary installations covered by the EU Emissions Trading System (ETS) and have been driven by the rapid decarbonisation of the EU's power sector, while emissions from aviation (also covered by the EU ETS) have been growing.

([1]) The EEA projections dataset includes Member States' most recent updates of their greenhouse gas emission projections as of March 2020. For many countries, the projected effects of additional measures ('with additional measures' scenarios) differ from those submitted in their national energy and climate plans (NECPs), as does the method to gapfill missing scenarios. For a comparison of the projections submitted under the MMR and those included in the NECPs, see the Methodology Notes to this report.

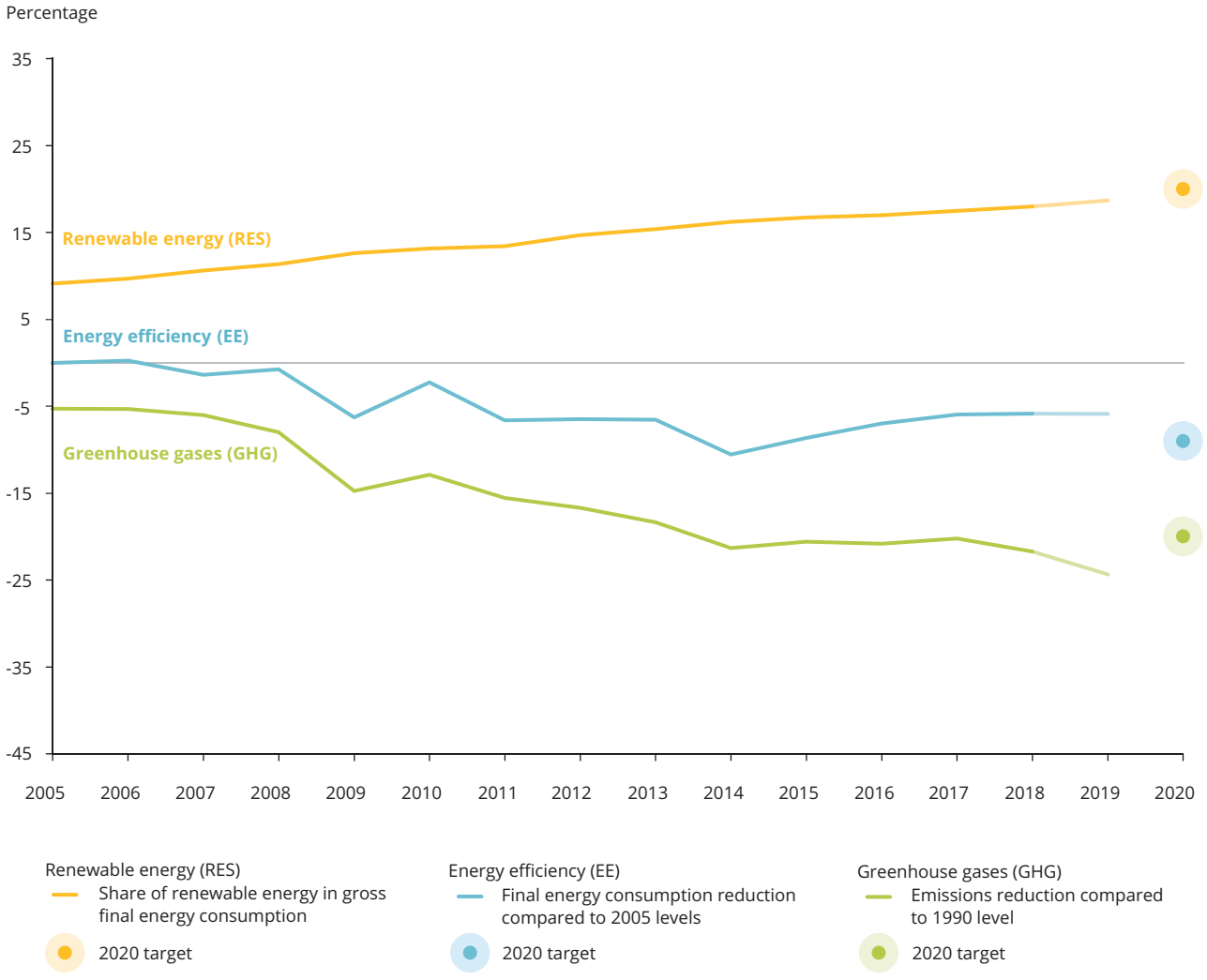
([2]) Including international aviation and excluding international navigation and land use, land use change and forestry (LULUCF).

Member States' achievement of their national annual emissions targets for the Effort Sharing sectors ([3]) over the period 2013-2020 has been consistent, although the extent of the EU's overachievement has been lessening. In 2018, Effort Sharing emissions in 11 countries (Austria, Belgium, Bulgaria, Cyprus, Estonia, Finland, Germany, Ireland, Luxembourg, Malta and Poland) were greater than their respective annual Effort Sharing emission allocations. In 2019, preliminary estimates indicate that Czechia joined the above-mentioned Member States with emission levels greater than their annual emission allocations, bringing the total to 12.

The essential net carbon sink from Europe's forests and other green spaces and agricultural land has also shrunk in recent years.

In the area of renewable energy, preliminary EEA data suggest that the EU-28 achieved a total share of energy consumed from renewable sources of 18.6 % in 2019 (and 19.4 % in the EU-27 only). The EU is therefore on track to achieve the 2020 target of a minimum 20 % share. While the shares of electricity, heating and cooling provided by renewables helped meet the overall EU target, underperformance in the growth of

**Figure ES1.2 Historical trends and progress to 2020 and 2030 targets of the EU-28**




**Sources:** EC (2007, 2013b); EEA (2019c, 2019d, 2018, 2020b, 2019b, 2011, 2020d); EU (2012, 2009b, 2018c, 2018d); Eurostat (2020b, 2020c, 2020e).

([3]) All activities not covered by the EU Emissions Trading System or related to LULUCF. For example: road transport, buildings, agriculture, small industry and waste.

renewables used in the transport sector continued. The prospect of reaching the 10 % target for transport energy needs supplied by renewable sources by 2020 remains slight.

Most Member States are making good progress towards their national RES targets for 2020. The EEA's early renewable energy estimate for 2019 indicates that thirteen of them already exceeded their 2020 target RES share in 2019. These countries are Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, Greece, Italy, Latvia, Lithuania, Romania and Sweden.

For energy efficiency, the outlook to the 2020 targets has not been positive and has often been marked by trends that diverge from the reduction target. In 2019, approximated energy consumption values for the EU-28 indicate a stabilisation in final energy consumption and a small decline in primary energy consumption of 1.4 %. The latter follows a marginal reduction in 2018 of 0.6 % after several years of growing primary energy consumption. These trends are similar to those of the EU-27 and, while stabilisation in energy consumption is a good achievement, the reductions needed to reach a 20 % decrease by 2020 have not been demonstrated.

Preliminary EEA data on final energy consumption in 2019 shows that only nine Member States (Finland, Greece, Italy, Latvia, the Netherlands, Portugal, Romania, Slovenia and Spain) were on track towards their respective 2020 energy efficiency targets. This represents a continued decline from prior years.

Table ES1.1 illustrates individual Member States' progress towards their respective interim benchmarks and final targets for 2030, before the impacts of the Covid-19 pandemic were felt. While the table illustrates good progress in many Member States in terms of emission reductions, renewable energy growth and energy efficiency, it is expected that further substantial reductions in 2020 (due to the effects of Covid-19) will result in Member States progressing more rapidly towards their targets.

## Increased ambition for 2030 will require greater effort than is currently planned

While recent trends may result in the achieving or surpassing of 2020 targets, remaining on track to the 2030 and 2050 objectives will demand sustained and long-term change. The national energy and climate plans (NECPs) submitted by Member States demonstrate how such change at national level can contribute to achieving collective EU targets on greenhouse gas emissions, renewable energy share and energy consumption by 2030.

Projections reported under the Monitoring Mechanism Regulation (MMR) to the EEA — which roughly half of Member States updated in 2020 in order to align with their respective NECPs — indicate a rather conservative outlook, with relatively moderate emission reductions by 2030 in the absence of new measures. These projections indicate a path towards a 36 % total emission reduction by 2030, based on current and planned policies and measures. The projections also indicate an aggregated Effort Sharing emission reduction of 29 %. Further effort would therefore be necessary to achieve the emission reduction targets that have already been set for 2030.

At the same time, the European Commission's aggregation of the ambition levels expressed in the NECPs indicates that the mid-term goals will be achieved. In total, the NECPs indicate that existing and planned measures will bring total greenhouse gas emissions in 2030 to a level 41 % below that of 1990, potentially surpassing the 40 % reduction target.

For emissions covered under the Effort Sharing Regulation, projections towards national targets for 2030 in the NECPs indicate an aggregated EU-27 reduction of 32 % compared with 2005 levels — also surpassing the target set for the Effort Sharing sectors.

Based on the ambitions expressed in the NECPs, which would deliver a 33-34 % renewable energy share, the 2030 target of a combined share of at least 32 % could be surpassed. However, a gap remains for the achievement of the 2030 EU-wide targets on energy consumption.

To provide greater certainty to policymakers and investors that decisions made in the coming years will not lock-in emission levels inconsistent with the EU's goal to be climate-neutral by 2050, the European Commission presented the 2030 Climate Target Plan in September 2020. With this, the Commission proposed to raise the EU's ambition on reducing net greenhouse gas emissions to at least 55 % below 1990 levels by 2030. As of early October 2020, the European Parliament had adopted a 'first reading' position, supporting a targeted 60 % reduction in total emissions by 2030, while an agreement between environment ministers on a new 2030 target is yet to be reached.

Following further discussions with co-legislators under the ordinary legislative procedure (the Parliament and the Council of ministers), by June 2021, the European Commission will review and where necessary propose to revise all relevant policy instruments to achieve the additional emission reductions. The new 2030 target will also form the basis of discussions on revising the EU's nationally determined contribution to reducing emissions under the Paris Agreement.

**Measuring progress in the light of Brexit**

In 2020, the United Kingdom departed from the European Union. While the UK will not be covered by the EU's domestic 2030 targets, the UK's obligations under the Kyoto Protocol and the Effort Sharing Decision remain part of the EU's 2020 contributions under the Withdrawal Agreement.

As far as possible, this report reflects developments for the EU-27 (i.e. without the UK's contributions) to ensure consistency between historical trends and future projections. However, the assessment of progress to the 2020 targets has also been calculated for the EU-28.

## Table ES1.1 Member States' progress to targets on greenhouse gas emissions, renewable energy and energy efficiency

| Countries | Greenhouse gas emissions | | | | Renewable energy | | | | Energy efficiency | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gap to Effort Sharing Decision emission target (2018) | Gap to Effort Sharing Decision emission target (proxy 2019) | Gap to 2030 Effort Sharing Regulation target (with existing measures) | Gap to 2030 Effort Sharing Regulation target (with additional measures) | Gap to 2017-2018 Renewable Energy Directive trajectory (2017-2018 RES share) | Gap to 2020 Renewable Energy Directive target (proxy 2019 RES share) | Gap to trajectory from national plan in 2018 | Gap to trajectory from national plan in proxy 2019 | Gap to 2018 primary energy consumption indicative linear (2018) | Gap to 2019 primary energy consumption indicative linear (proxy 2019) | Gap to 2018 final energy consumption indicative linear (2018) | Gap to 2019 final energy consumption indicative linear (proxy 2019) |
| | Percentage points (share of 2005 base-year emissions) | | | | Percentage points (share of renewable energy in gross final energy consumption) | | | | Percentage points (share of 2005 primary energy consumption) | | Percentage points share of 2005 final energy consumption) | |
| Austria | -2.5 | -4.2 | -20.2 | -9.0 | 3.0 | -0.1 | 0.1 | 0.2 | -0.4 | -1.8 | -8.8 | -10.8 |
| Belgium | -4.0 | -5.8 | -21.5 | -0.6 | 0.02 | -3.1 | -1.3 | -2.0 | -4.1 | -9.3 | -9.0 | -7.9 |
| Bulgaria | -1.1 | -3.6 | -8.1 | -8.1 | 5.9 | 5.3 | 6.8 | 6.5 | -6.1 | -6.5 | -10.6 | -11.8 |
| Croatia | 15.4 | 13.1 | -1.2 | 11.6 | 10.2 | 8.7 | 8.9 | 9.1 | 25.4 | 26.0 | 2.0 | -0.2 |
| Cyprus | -1.0 | -6.1 | -18.9 | -18.9 | 2.7 | 1.2 | 2.7 | 2.1 | -11.4 | -12.5 | 2.5 | -0.4 |
| Czechia | 8.5 | -2.0 | -1.5 | -0.5 | 4.4 | 2.5 | 1.8 | 1.8 | 8.6 | 9.9 | 0.4 | -1.7 |
| Denmark | 1.8 | 1.2 | -15.3 | -15.3 | 9.8 | 6.9 | 6.6 | 6.8 | -2.9 | -0.4 | -0.3 | -2.1 |
| Estonia | -3.0 | -9.9 | -21.7 | -6.2 | 7.0 | 6.4 | 5.5 | 6.9 | 2.5 | -3.0 | -5.1 | -5.6 |
| Finland | -0.9 | -0.7 | -15.5 | -1.9 | 6.4 | 4.2 | 5.5 | 5.4 | 8.4 | 9.4 | 2.5 | 4.4 |
| France | 2.7 | 1.7 | -13.3 | 4.6 | -2.3 | -5.8 | -3.9 | -4.8 | -5.2 | -4.6 | -7.1 | -7.9 |
| Germany | -1.9 | -4.5 | -16.2 | -16.2 | 2.2 | -0.9 | -0.2 | -0.6 | -2.8 | -1.7 | -8.0 | -9.4 |
| Greece | 23.6 | 24.7 | 9.1 | 17.7 | 3.4 | 1.6 | 3.4 | 3.6 | 9.4 | 9.5 | 13.4 | 13.0 |
| Hungary | 16.1 | 17.6 | 1.2 | 15.8 | 3.0 | -0.4 | 0.2 | -0.8 | -0.3 | -0.8 | -19.0 | -22.8 |
| Ireland | -11.8 | -12.4 | -23.9 | -1.5 | -0.7 | -4.0 | -1.9 | -2.4 | -3.4 | -3.0 | -3.5 | -6.3 |
| Italy | 5.1 | 6.3 | -6.1 | 2.6 | 5.2 | 1.4 | 3.9 | 3.3 | 7.6 | 7.7 | 6.8 | 7.9 |
| Latvia | 8.1 | 10.1 | 1.2 | 3.2 | 2.2 | 0.8 | 2.6 | 2.3 | 12.5 | 16.3 | 5.8 | 9.1 |
| Lithuania | 1.6 | 3.8 | -10.7 | 15.2 | 5.0 | 1.8 | 0.4 | 0.8 | 4.5 | 3.1 | -25.7 | -26.0 |
| Luxembourg | -5.4 | -8.9 | -24.3 | 13.4 | 0.2 | -1.3 | 1.6 | 0.5 | 1.2 | -0.2 | -1.7 | -4.0 |
| Malta | -18.8 | -18.8 | -61.7 | -61.7 | 1.1 | -1.5 | -0.3 | -0.9 | 1.5 | -4.4 | -10.5 | -9.3 |
| Netherlands | 9.5 | 7.4 | -3.6 | -3.6 | -3.0 | -5.6 | -4.7 | -4.9 | -4.0 | -3.0 | 4.0 | 4.6 |
| Poland | -6.3 | -1.9 | -17.9 | 0.4 | -1.1 | -3.4 | -2.8 | -3.4 | -6.6 | -2.9 | -3.6 | -2.7 |
| Portugal | 15.9 | 14.7 | 26.2 | 29.6 | 3.1 | -0.6 | -0.3 | -0.4 | 0.6 | 2.0 | 3.7 | 0.7 |
| Romania | 11.0 | 16.5 | -12.5 | -7.9 | 2.3 | 0.3 | 2.0 | 1.3 | 26.3 | 26.7 | 24.2 | 23.8 |
| Slovakia | 18.6 | 16.9 | -5.4 | 8.8 | 0.2 | -2.8 | 0.5 | -2.0 | 4.2 | 7.9 | -13.5 | -16.3 |

**Table ES1.1 Member States' progress to targets on greenhouse gas emissions, renewable energy and energy efficiency (cont.)**

| Countries | Greenhouse gas emissions | | | | Renewable energy | | | | Energy efficiency | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gap to Effort Sharing Decision emission target (2018) | Gap to Effort Sharing Decision emission target (proxy 2019) | Gap to 2030 Effort Sharing Regulation target (with existing measures) | Gap to 2030 Effort Sharing Regulation target (with additional measures) | Gap to 2017-2018 Renewable Energy Directive trajectory (2017-2018 RES share) | Gap to 2020 Renewable Energy Directive target (proxy 2019 RES share) | Gap to trajectory from national plan in 2018 | Gap to trajectory from national plan in proxy 2019 | Gap to 2018 primary energy consumption indicative linear (2018) | Gap to 2019 primary energy consumption indicative linear (proxy 2019) | Gap to 2018 final energy consumption indicative linear (2018) | Gap to 2019 final energy consumption indicative linear (proxy 2019) |
| | Percentage points (share of 2005 base-year emissions) | | | | Percentage points (share of renewable energy in gross final energy consumption) | | | | Percentage points (share of 2005 primary energy consumption) | | Percentage points share of 2005 final energy consumption) | |
| Slovenia | 10.2 | 12.3 | -4.7 | 11.8 | -0.7 | -3.2 | -2.5 | -2.5 | 6.2 | 8.4 | 1.8 | 3.5 |
| Spain | 5.6 | 5.7 | -9.7 | 12.7 | 1.5 | -2.0 | -2.9 | -3.5 | -0.2 | 0.2 | 1.8 | 0.1 |
| Sweden | 13.4 | 14.2 | 0.1 | 0.1 | 8.6 | 6.8 | 5.6 | 6.2 | -5.6 | -5.2 | -3.7 | -4.8 |
| United Kingdom | 6.6 | 6.5 | -4.9 | -5.0 | 0.2 | -2.6 | 0.0 | -0.6 | 3.4 | 3.8 | -1.4 | -1.5 |

**Sources:** EC (2007, 2013b); EEA (2019c, 2019d, 2018, 2020b, 2020c, 2019b, 2011); EU (2012, 2009b); Eurostat (2020b, 2020f, 2020c).

# 1 Introduction

Since its first publication in 2002, the EEA's annual *Trends and projections in Europe* report has provided insights into Europe's progress towards its goals for mitigating climate change. Reductions in greenhouse gas emissions, deployment of renewable energy and improvements in energy efficiency are critical elements in keeping global climate change in check. The EU, its Member States and the EEA's European cooperating countries are making a concerted contribution to global climate mitigation efforts, in order to fulfil Europe's obligations under the 2015 Paris Agreement and long-term ambitions to achieve climate neutrality by 2050.

The year of publication of this report, 2020, is in many ways a pivotal year. The second commitment period of the Kyoto Protocol concludes on 31 December 2020 and makes way for the new commitments under the Paris Agreement. With this transition, the EU and Member States finalise their efforts to achieve the 2020 targets and set their sights on the new 2030 contributions. A European climate law was proposed in early 2020, and a recent amendment to the text describes a substantial increase in the level of ambition for 2030. This report reflects these developments as comprehensively as possible at the time of its publication.

The monitoring framework for tracking the EU's progress also transitions in 2020, with separate legislation and monitoring systems for climate mitigation, renewable energy generation and energy efficiency being merged into a new, integrated framework, Regulation (EU) 2018/1999 (EU, 2018g) on the Governance of the Energy Union and Climate Action. From 2021, the *Trends and projections in Europe* report will begin reflecting data reported under that framework, and the reporting by Member States on the areas covered by this report will become increasingly integrated in the coming years. Member States' national energy and climate plans (NECPs), in which they establish their commitments and intended pathways towards the 2030 targets, have already been submitted and published under this new legislation, and this report reflects the information in the NECPs to the greatest degree possible.

A further notable development in the landscape covered by the *Trends and projections in Europe* report this year is the effect of the United Kingdom's departure from the EU on the aggregated progress towards meeting EU climate and energy targets. As the United Kingdom remains part of the EU-level contributions under the Kyoto Protocol towards achievement of the 2020 targets, the report tracks the historical progress of the EU along with the United Kingdom. As regards future targets and projections towards their achievement for both 2030 and 2050, the report reflects EU aggregated progress without the United Kingdom. The charts and graphs in this edition of the report thus illustrate the effect of the transition from the EU-28 to the EU-27 on the historical trends in and progress towards meeting targets.

Devoted readers of this report over the years will note that its format has changed. Compared with earlier years, the report is slightly shorter and includes more references to related in-depth analyses that are also published by the EEA and its ETC/CME. A separate document with methodology notes supplements the report. The report also continues to be accompanied by interactive country profiles, through which the reader can explore the same data that are reflected in this report and tailor the information viewed to their needs.

For an overview of the 2020 targets, 2030 targets and 2050 vision, as well as a list of the data sources that are reflected in this report, please refer to Chapter 5 in this report.

# 2 Progress towards meeting greenhouse gas emission targets

- The EU is expected to meet its 2020 greenhouse gas (GHG) emission reduction target of 20 % compared with 1990. In 2018, the GHG emissions in the EU including the United Kingdom (EU-28) were 26 % lower than 1990 levels. The decade's sharpest emissions cut was then observed in 2019, with a 3.6 % reduction in the EU-28 in just 1 year.
- As the United Kingdom departed the EU in 2020, future EU climate objectives are expected to cover the EU without the United Kingdom (EU-27). When accounting for Brexit, the EU remains on track towards achieving a 20 % reduction in GHG emissions by 2020. Among the EU-27 Member States, emission levels in 2019 represented a reduction of 24 % compared with 1990 levels.
- Progress towards 2020 targets is more diverse at national level. In 2018, 11 Member States (Austria, Belgium, Bulgaria, Cyprus, Estonia, Finland, Germany, Ireland, Luxembourg, Malta and Poland) had emission levels in Effort Sharing sectors higher than their respective annual targets. Preliminary estimates indicate that, in 2019, these same 11 countries, as well as Czechia, had emission levels higher than their 2019 targets.
- To reach their national 2030 emission reductions targets in the Effort Sharing legislation sectors, a total of 21 Member States will have to increase the pace of their average annual reductions in GHG emissions compared with the pace that they achieved between 2005 and 2018. Notably, Greece and Hungary already reported emission levels in 2018 that were below their national 2030 targets.
- The EU has its sights set on achieving climate neutrality by 2050, which will require a realistic and reliable emissions pathway into the future. The current EU-wide 2030 target of 40 % emission reductions compared with 1990 levels would put a greater burden on future generations to increase their emission reductions: the EU-27 would have to triple its annual average reductions from 2030 to 2050, compared with the average annual reductions that it achieved in the period 2005-2018. The European Commission's proposal of September 2020 would increase the 2030 emissions reduction target to at least 55 %, including removals, compared with 1990.

## 2.1 Progress toward greenhouse gas emission targets across the EU

In 2018, greenhouse gas (GHG) emissions in the EU-28 were 23.2 % lower than 1990 levels, totalling 4 392 million tonnes (Mt) of carbon dioxide equivalent ($CO_2e$) ([4]) ([5]). According to preliminary national estimates, EU-28 emissions fell by 3.6 % from 2018 to 2019. With these latest values, the EU-28's emissions were 26 % below 1990 levels in 2019 and therefore on track to meet its upcoming target of a 20 % reduction in GHG emissions by 2020 (see Chapter 5 for further details on the targets).

While the 2020 target remains applicable to all Member States as of 2020, future accounting will be based on the post-Brexit climate mitigation efforts of the EU-27. Within these 27 Member States, 2018 reduction levels were 20.7 % lower than 1990 levels, and they declined further in 2019 by 3.7 %. Therefore, the impact of Brexit does not appear to affect the achievement of the EU's 2020 climate mitigation target.

Looking forward towards the climate mitigation targets for 2030, the EU's GHG emission reductions will be the joint efforts of the EU-27 Member States. Although the short-term prognosis is a positive one, the sum of Member States' projections for the coming years indicate that the pace of total GHG emission reductions across Europe is expected to slow after 2020. According to projections submitted by Member States under the Monitoring Mechanism Regulation (EU) No 525/2013

([4]) The EU's total GHG emissions exclude emissions from land use, land use change and forestry (LULUCF) and include all emissions from aviation (including international flights). These are the emissions that are covered under the EU target.

([5]) All emission estimates used in this report were calculated using global warming potentials (GWPs) from the Intergovernmental Panel on Climate Change (IPCC)'s Fourth Assessment Report (AR4) (UNFCCC, 2013a).

(MMR projections) in 2019, the EU's total GHG emissions are expected to continue declining through 2030, but at a pace slower than that needed to achieve the 2030 target. As these projections were prepared in 2019 and early 2020, they do not factor in the scale of impacts that the coronavirus disease 2019 (COVID-19) pandemic and measures taken in response could have on future emissions ([6]).

Based on Member States' current policies and measures, emissions are projected to decline by an average 36 $MtCO_2e$ per year until 2030. Additional planned or prepared policies and measures that Member States have included in their MMR projections would enhance the annual average reduction to a total of 70 $MtCO_2e$ by 2030, which results in a 36 % emissions reduction compared to 1990. To achieve the current 2030 target of a 40 % reduction across the EU-27, Member States would have to reduce their emissions by an annual average of 86 $MtCO_2e$ per year (see Figure 2.1). An assessment of Member States' national climate and energy plans (NECPs) shows that, with information aggregated from final NECPs, the EU would reduce total GHG emissions by 41 % compared with 1990, thus overachieving its current target (EC, 2020d).

Because a 40 % reduction by 2030 would leave a steeper and more challenging reduction path to climate neutrality by mid-century, the European Commission has proposed to increase the 2030 ambition to a 55 % emission reduction compared with 1990 (EC, 2020e). This reduction would include land use, land use change and forestry (LULUCF) emissions and removals and eventually international maritime emissions, while the current 40 % target excludes these.

Beyond the major milestone in 2030, the EU's objective of achieving climate neutrality by 2050 was endorsed in December 2019 by the European Council (2019) and submitted with its long-term strategy to the United Nations Framework Convention on Climate Change (UNFCCC) in March 2020 (Council of the European Union, 2020). The European Commission's impact assessment presents several scenarios on how this objective of net-zero greenhouse gas emissions in 2050 can be achieved by the EU-27 (EC, 2020c). It previews a set of actions required across all sectors of the economy and the launch of revisions of key legislative instruments. A detailed set of legislative proposals will be published by June 2021.

## 2.2 Sectoral progress in emission reductions in the EU

Three key EU policies address GHG emissions and removals: the EU Emissions Trading System (ETS), the Effort Sharing legislation and the legislation on emissions and removals from LULUCF. Each policy covers a unique set of sources and sinks, and analysis of progress in each reveals the areas where emission reductions have been particularly successful, or particularly challenging, in recent years. Differences in historical progress, as well as future projections, in each of the three policy areas are illustrated in Figure 2.2.

The following three sections describe and analyse the emission trends in the ETS, Effort Sharing Decision (ESD) and LULUCF sectors, respectively.

### *2.2.1 Emission trends under the EU Emissions Trading System*

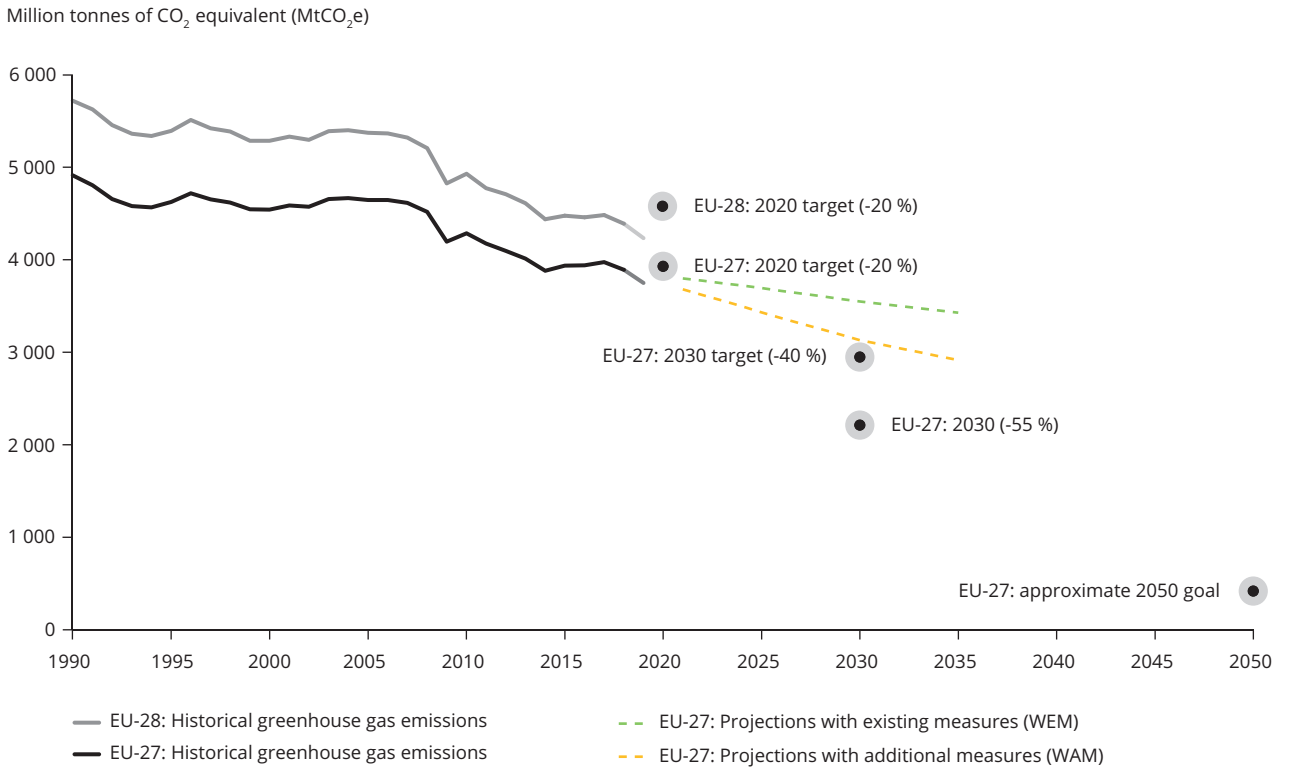
Emissions from activities included in the EU ETS are governed by the EU ETS legislation and subject to an EU-wide cap on emissions. In 2018, about 38 % of the total EU-27 GHG emissions (excluding LULUCF) stemmed from the large stationary installations that are covered by the EU ETS (EU, 2003), mostly related to power and heat production, as well as industrial installations. The EU ETS specific targets are set to reduce emissions by 21 % between 2005 and 2020 and by 43 % by 2030, compared with 2005 levels. These EU ETS specific targets were set in line with the total emission reduction targets of 20 % by 2020 and 40 % by 2030.

GHG emissions covered by the EU ETS have decreased significantly since 2005, in particular emissions related to fossil fuel use (see Figure 2.3). Particularly significant emission reductions took place in 2018 and 2019: 2018 emissions were 4 % lower than in 2017, and an even stronger reduction of 9 % was achieved in 2019 (EEA, 2020i).

By 2019, EU ETS emissions from EU-27 Member States' stationary installations had already fallen by 33 % since 2005. If the emissions of all countries that take part in the EU ETS (EU-27, United Kingdom, Iceland, Liechtenstein and Norway) are considered, stationary ETS emissions declined by 35 %.

([6]) The EEA projections data set includes Member States' most recent GHG emissions projections, thirteen of which were updated in March 2020. For some countries, the projected effects of additional measures ('WAM scenarios') differ from those submitted in their national energy and climate plans (NECPs), as does the method to gapfill missing scenarios. For a comparison of the projections submitted under the MMR and those included in the NECPs, see the Methodology Notes to this report.

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




**Notes:** The calculations of greenhouse gas emission trends, projections and targets include emissions from international aviation and exclude emissions and removals from the land use, land use change and forestry (LULUCF) sector as well as emissions from international navigation.

The 'with existing measures' scenario reflects existing policies and measures, whereas the 'with additional measures' scenario considers the additional effects of planned measures reported by Member States under the Monitoring Mechanism Regulation (EU) 525/2013 (MMR) ([7]).

The approximate value corresponding to the EU's 2050 goal was derived from those five scenarios exhibiting an emission reduction of 55 % in 2030 compared with 1990 and net-zero emissions by 2050 (i.e. REG, MIX, MIXnonCO2variant, CPRICE, ALLBNK) in the Commission's impact assessment (EC, 2020c). These scenarios take into account technical and natural carbon sinks, resulting from activities such as LULUCF and carbon capture and storage (CCS). As this graph excludes LULUCF emissions and removals, the 55 % value depicted for 2030 should be viewed as an approximation only, while the 2050 net-zero emissions goal translates into positive emissions (EC, 2020c).

**Sources:** EEA (2020f, 2020j, forthcoming_b), own calculation.

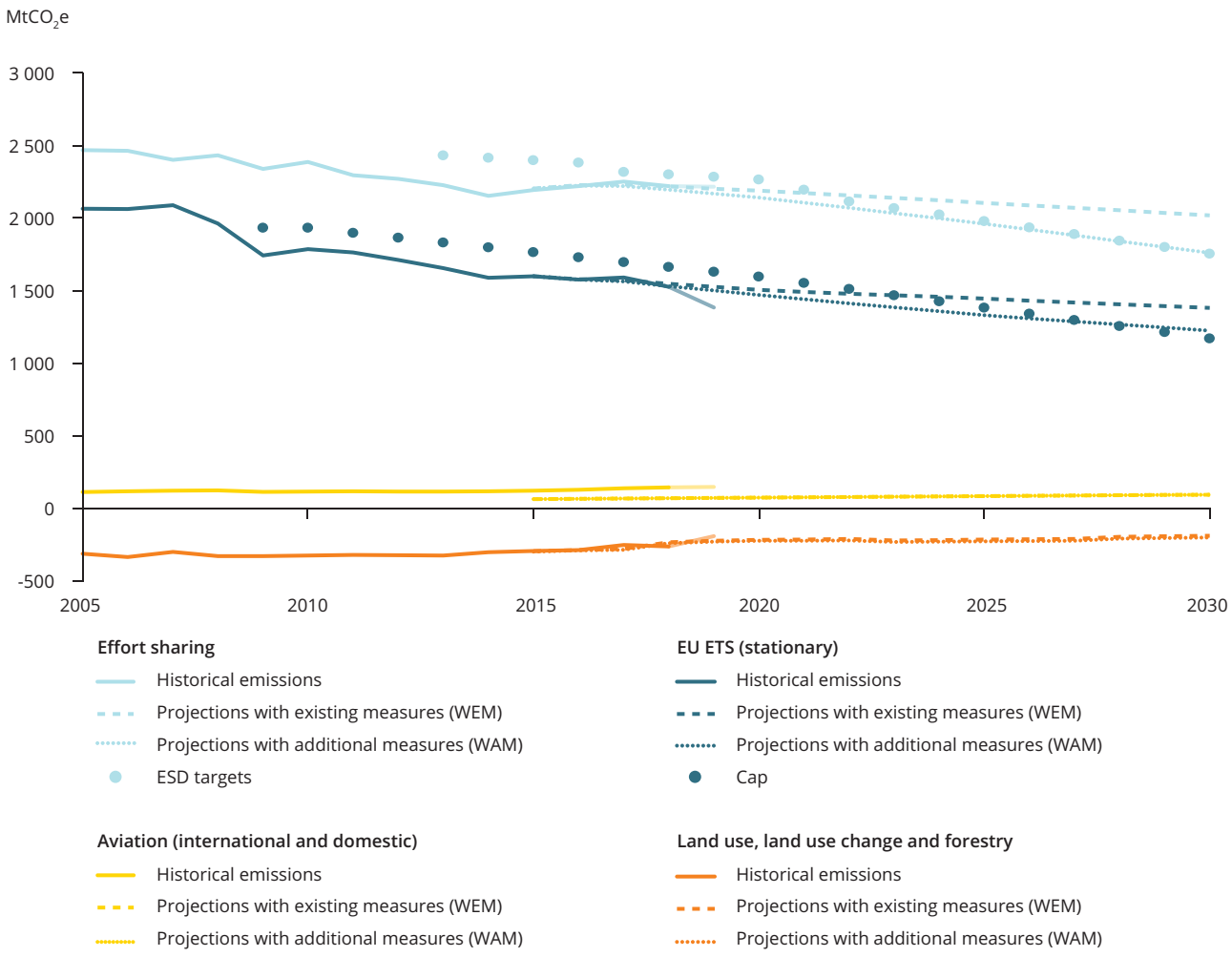
According to their reported projections, Member States also envisage further emission reductions from activities under the EU ETS, specifically in the energy industries. The increased use of renewable energies and the phase-out of coal are important measures. Projections concerning other industrial sectors, such as the production of iron, aluminium or cement, show only little progress in reducing emissions.

By 2030, existing and adopted policies and measures in the EU-27 are projected to deliver a 33 % reduction in EU ETS emissions, compared with 2005 base-year emissions (as reported in 2019 under the MMR and updated in 2020 by 13 Member States). When planned policies and measures are included, a projected emission reduction of 41 % could be achieved by 2030. The additional policies and measures thus make an important contribution towards reaching the 2030 EU ETS target. However, with unpredictability surrounding the recovery from the COVID-19 pandemic, current projections may be more uncertain than they have been in previous years.

Detailed information on emission trends under the EU ETS can be found in (EEA, forthcoming_a).

([7]) The EEA projections dataset includes Member States' most recent updates of their greenhouse gas emission projections as of March 2020. For many countries, the projected effects of additional measures ('with additional measures' scenarios) differ from those submitted in their national energy and climate plans (NECPs), as does the method to gapfill missing scenarios. For a comparison of the projections submitted under the MMR and those included in the NECPs, see the Methodology Notes to this report.

**Figure 2.2** **EU-27 Effort Sharing legislation, ETS, LULUCF and aviation emission trends and Member States' MMR projections in the EU**




**Notes:** Because the scope of sectors covered by the EU ETS changed in 2013, EU ETS (stationary) emissions for the period 2005-2012 were estimated to reflect the current scope (2013-2020) of the EU ETS; see also Annex 1 (A1.2.3 and A1.2.5) in the Methodology Notes.

The indicative EU ETS cap (stationary) for the EU-27 was calculated as 11 % less than the cap for the EU-28.

Net removals from LULUCF correspond to values reported to the UNFCCC, which differ from accounted values relevant to the Kyoto Protocol and LULUCF Regulation commitments.

The 'with existing measures' scenario reflects existing policies and measures and the 'with additional measures' scenario also includes further policies and measures that Member States plan to implement in coming years.

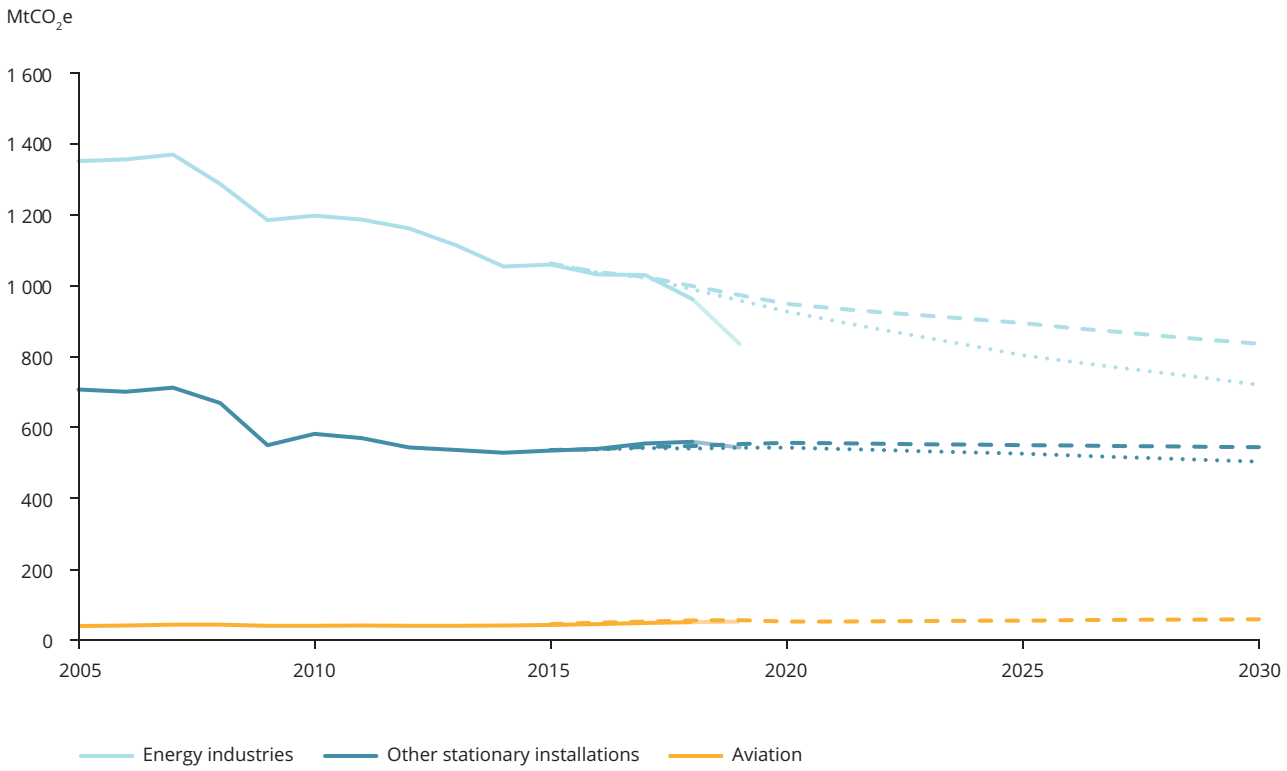
**Sources:** EU (2017, 2013b); EEA (2020f, 2020h, 2020j, 2020i, forthcoming_a, forthcoming_b).

### *2.2.2 Emission trends under the Effort Sharing legislation*

The Effort Sharing legislation covers emissions that are neither covered under the EU ETS nor related to the LULUCF sector. These emissions are produced by a diverse range of sectors and activities, including road transport, energy consumption in buildings, agriculture (animals and soils), smaller industrial installations, smaller energy generation facilities and waste management. Together, these sources accounted for 57 % of total EU-27 GHG emissions in 2018.

The Effort Sharing legislation sets annual emission trajectories for each EU Member State for the period 2013-2020 in the Effort Sharing Decision, or ESD (EU, 2009a, 2013b, 2017), and for each Member State for the period 2021-2030 in the Effort Sharing Regulation, or ESR (EU, 2018f). These emission trajectories are translated into national annual emission targets by implementing legislation. Taken together, the aggregated Effort Sharing targets for 2020 represent an 8.2 % reduction at EU-27 level (and a 9.3 % reduction at EU-28 level) compared with 2005 base-year levels.

**Figure 2.3 EU-27 GHG emission trends and projections under the scope of the EU ETS in the EU**




**Notes:** GHG emission trends and projections depicted here represent EU-27-wide data. Iceland, Liechtenstein and Norway are part of the EU ETS but are not depicted above.

**Dashed lines** represent projections for the scenario taking only existing measures into account, while **dotted lines** represent projections for the scenario with additional measures. See Annex 1 (A1.2) in the Methodology Notes for additional information on data sources for GHG emissions and an explanation of how the EU ETS sectors are categorised.

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 MMR projections, to EU ETS sectors and/or Effort Sharing sectors. Emissions for the period 2005-2012 were estimated to reflect the current scope (2013-2020) of the EU ETS. See also Annex 1 (A1.2.3 and A1.2.5) in the Methodology Notes.

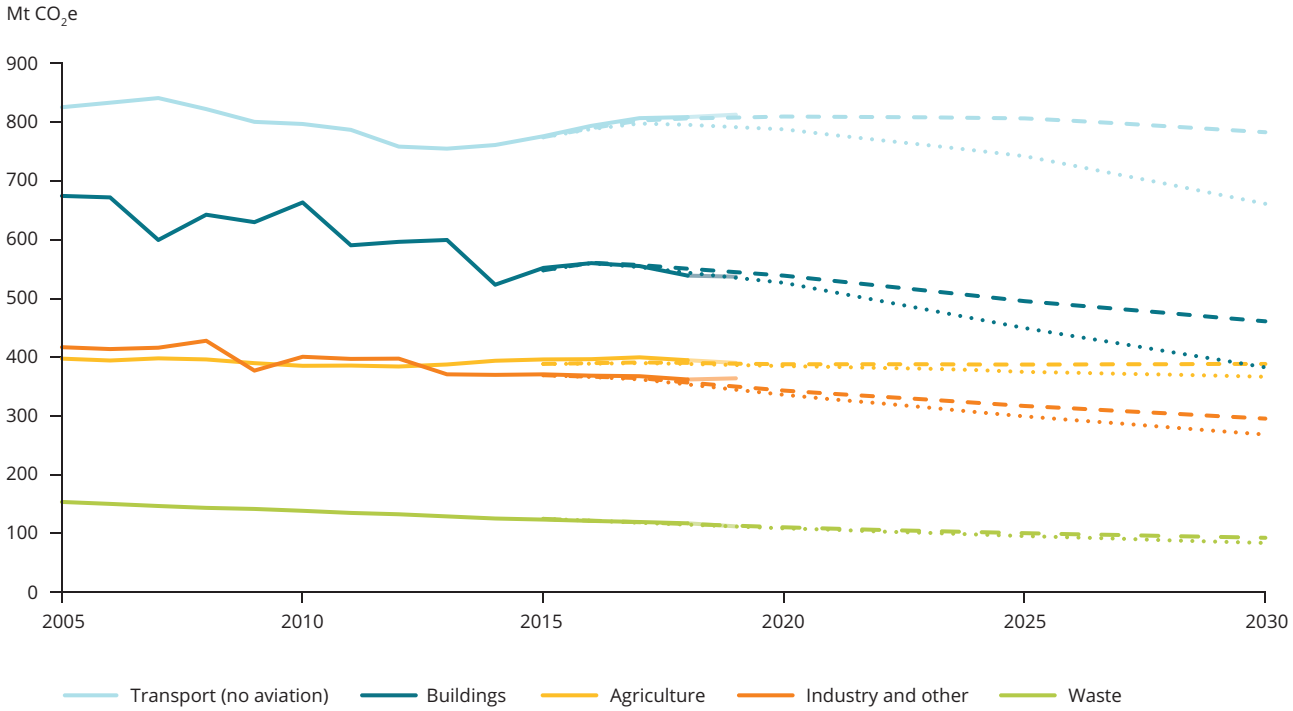
**Sources:** EEA (2020g, 2020d, 2020j, 2020f, forthcoming_b).

Figure 2.4 illustrates the historical trends and future projections in emissions under the Effort Sharing legislation. Effort Sharing emissions fell steadily between 2005 and 2014, though at a slower rate than those covered under the EU ETS. In large part, this reflects a diversity of trends and reduction potentials in the various sectors covered by the Effort Sharing legislation. In 2018, Effort Sharing legislation sector emissions in the EU-27 were 10 % below 2005 levels. However, emission levels during the period 2015-2019 remained above 2014 levels. This was largely due to increased emissions observed in the transport sector (Figure 2.4).

By 2030, aggregated projections from EU-27 Member States point to at least a 18 % reduction in Effort Sharing emissions, compared with 2005 base-year levels ([8]). This reduction is projected to be achieved through existing and adopted policies and measures. Member States project that additional policies and measures would result in a 29 % reduction in Effort Sharing emissions by 2030 — nearly reaching the 30 % reduction that the Effort Sharing legislation calls for by 2030. An assessment of Member States' NECPs shows that the EU-27 plans to reduce its Effort Sharing emissions by an aggregated 32 % (EC, 2020d).

([8]) 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, 2009a); the absolute 2020 Effort Sharing target is determined by the European Commission (EU, 2017a, 2013a, 2013b). The EEA calculates the 2005 Effort Sharing base-year emissions as follows: Effort Sharing base-year emissions = 2020 absolute target/(1 + % of 2020 Effort Sharing target).

**Figure 2.4 EU-27 GHG emission trends and projections under the scope of the Effort Sharing legislation**




**Notes:** **Solid lines** represent historical GHG emissions (available for the period 1990-2019). **Dashed lines** represent projections for the scenario with existing measures. **Dotted lines** represent projections for the scenario with additional measures. The Effort Sharing emissions presented are estimated based on the attribution of GHG emissions, reported by source categories in national GHG inventories and national MMR projections, to EU ETS sectors and/or Effort Sharing sectors. See Annex 1 (A1.2) in the Methodology Notes for additional information on data sources for GHG emissions.

The sector summarised here as 'industry and other' aggregates emissions from 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 (2020i, 2020j, 2020h, 2020f, forthcoming_b).

For more detailed insights into past and projected developments in the Effort Sharing sectors, please refer to the ETC/CME publication (EEA, forthcoming_c).

### *2.2.3 Emissions from land use, land use change and forestry*

The LULUCF sector at EU level represents a net carbon sink of about 263 $MtCO_2e$ in 2018. The net carbon sink is the combination of removals of $CO_2$ by forest land and by carbon stored in harvested wood products and of GHG emissions mainly from cropland or due to the conversion of land to settlements.

Forest land formed a carbon sink of 347 $MtCO_2e$ in 2018 and showed an interannual variability in the size of the carbon sink in the period 1990-2018 (see Figure 2.5). The EU's forest carbon sink gradually increased in the 1990s, due to forest area expansion and net forest increments, but a gradual decrease has been observed in the past decade, due to a combination of ageing forests that have a lower forested increment and higher harvesting rates (EEA, 2020f). Stronger inter-annual variations are related to natural disturbances such as major wind storms in central-western Europe and wildfires in southern Europe.

Most EU countries similarly report a net carbon sink from LULUCF, with the exception of Czechia, Denmark, Ireland, Latvia, Malta, the Netherlands and Slovenia. Iceland and Liechtenstein also report net emissions from this sector. For some countries this is related to the relatively small amount of forest area (e.g. Malta), natural disturbances (Czechia and Slovenia), ageing forests (Denmark) or the impact of drainage of organic soils on cropland, grassland and wetlands (Ireland, Iceland) or of the majority of land being used as agricultural land (Netherlands). More details on the sector can be found in the EEA's *Annual European Union approximated greenhouse gas inventory for the year 2019* (EEA, 2020a).

Member States' recent MMR projections indicate that the reported LULUCF sink in the EU-27 is expected to shrink by 26 % between 1990 and 2030, when taking

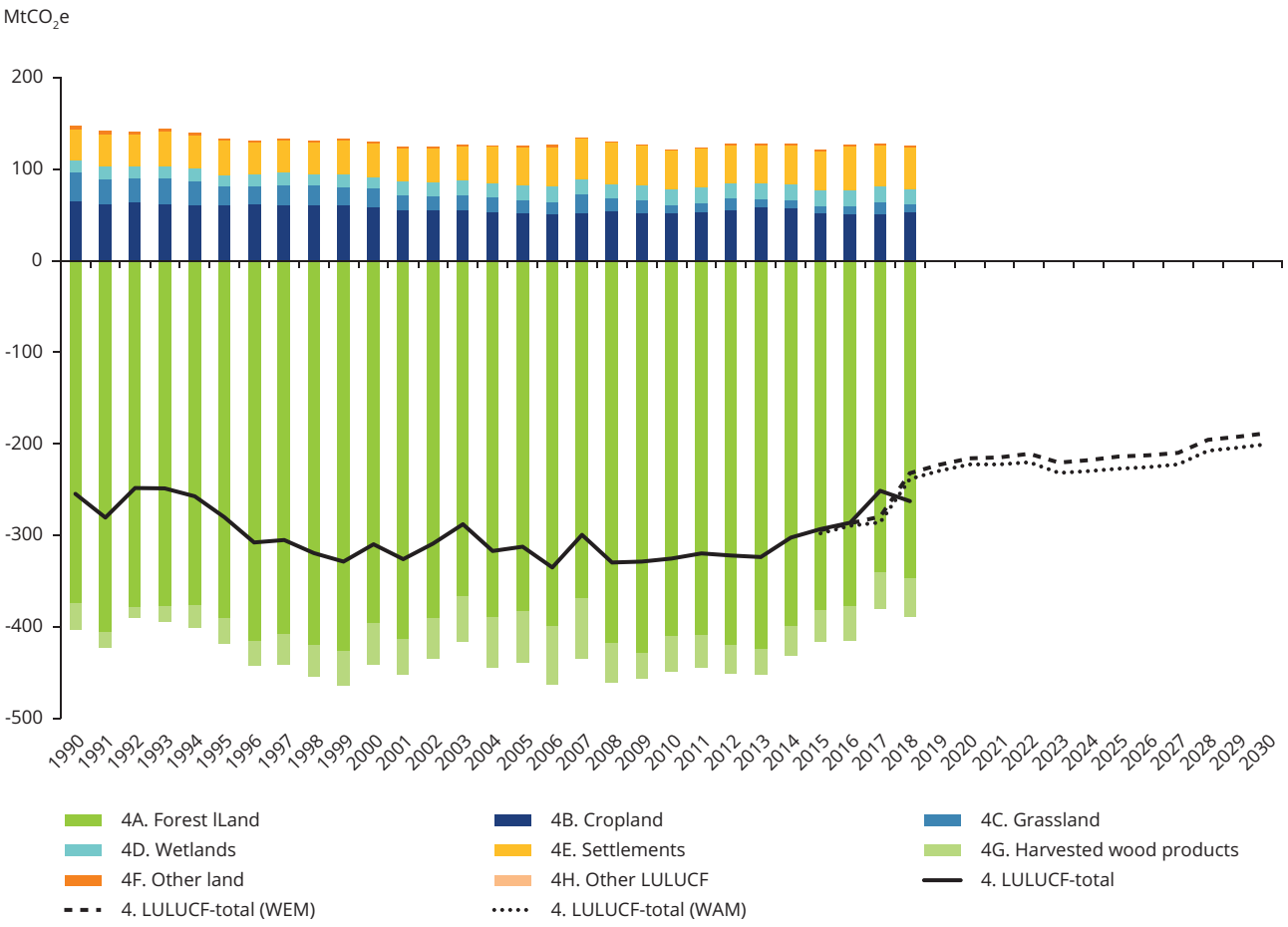
into account existing policies and measures. When also considering planned measures, this decrease would be contained at 21 %.

Data availability under the MMR does not allow for an analysis of the details of the underlying changes in this sector. Reporting obligations under the Governance Regulation (Regulation (EU) 2018/1999) will require more details on LULUCF accounting at category level. This means that, in the future, data reported on LULUCF will make it more feasible to identify the reasons for changes in emissions — and reductions in emissions — from this sector.

## 2.3 Progress towards meeting greenhouse gas emission targets at national level

Figure 2.6 shows how Effort Sharing emissions developed from 2005 to 2018 in each country and provides, at a glance, an indication of the share and direction of national developments in the Effort Sharing sectors. It highlights similarities and differences across countries that help illustrate both national progress and challenges to implementing change.

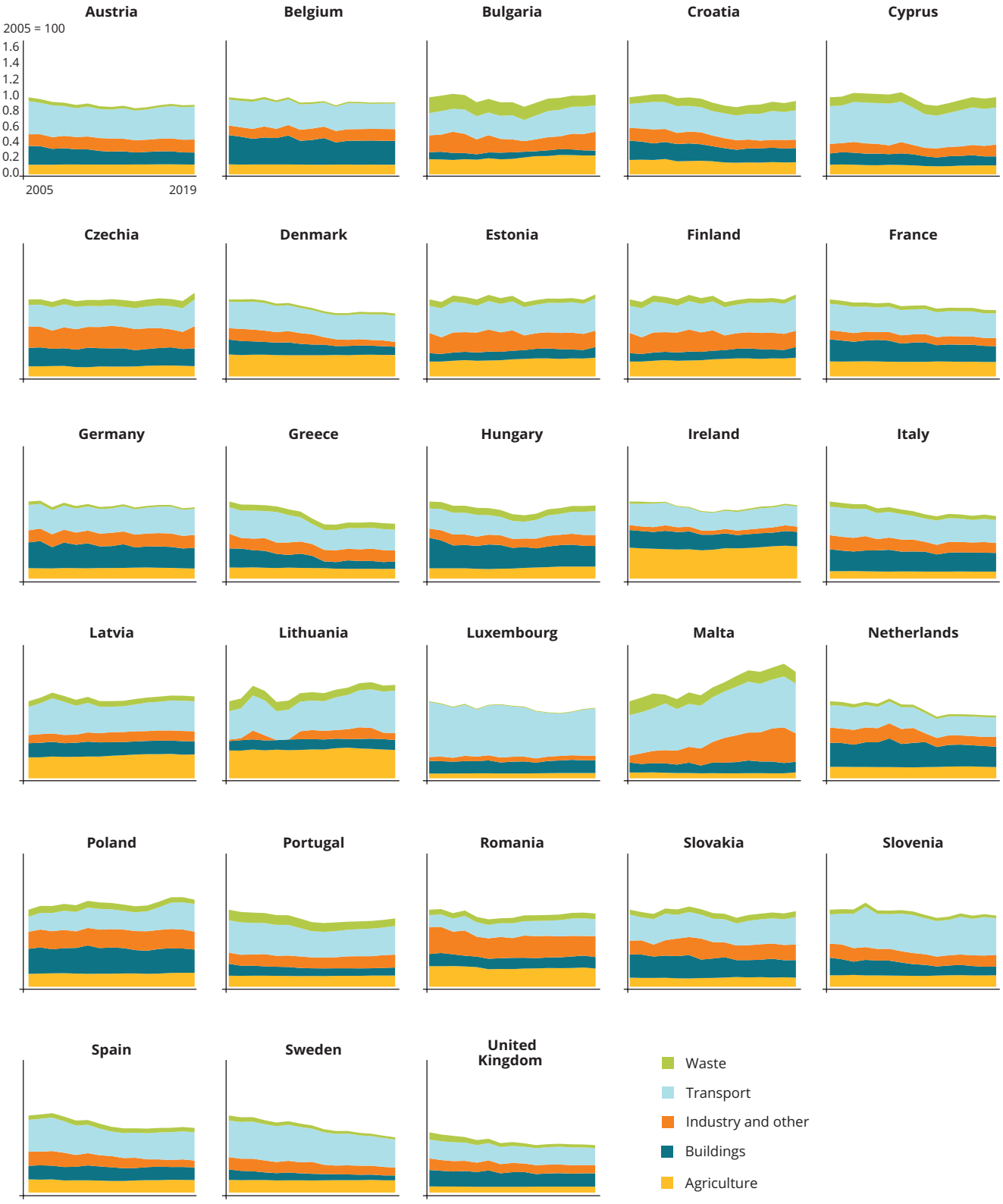
**Figure 2.5 Reported EU-27 LULUCF emissions and removals by land use category**




**Note:** **Bars** and **solid lines** represent historical GHG emissions (available for the period 1990-2018). **Dashed lines** represent projections for the scenario with existing measures (WEM). Dotted lines represent projections for the scenario with additional measures (WAM).

**Sources:** EEA (2020f, 2020j).

## Figure 2.6 Trends in Effort Sharing GHG emissions by sector in the EU-28, 2005-2019




**Note:** The years run from 2005 to 2019 along the horizontal axis. In 2005, the sum of the sectoral Effort Sharing emissions is set to 100. In any other year, the sum of sectoral emissions is expressed relative to 2005. Please refer to Annex 1 (A1.2) in the Methodology Notes to this report for an explanation of how the 'industry and other' sector is derived.

**Sources:** EEA (2020f, 2020h, 2020i, forthcoming_b).

### *2.3.1 Progress towards national 2020 Effort Sharing targets*

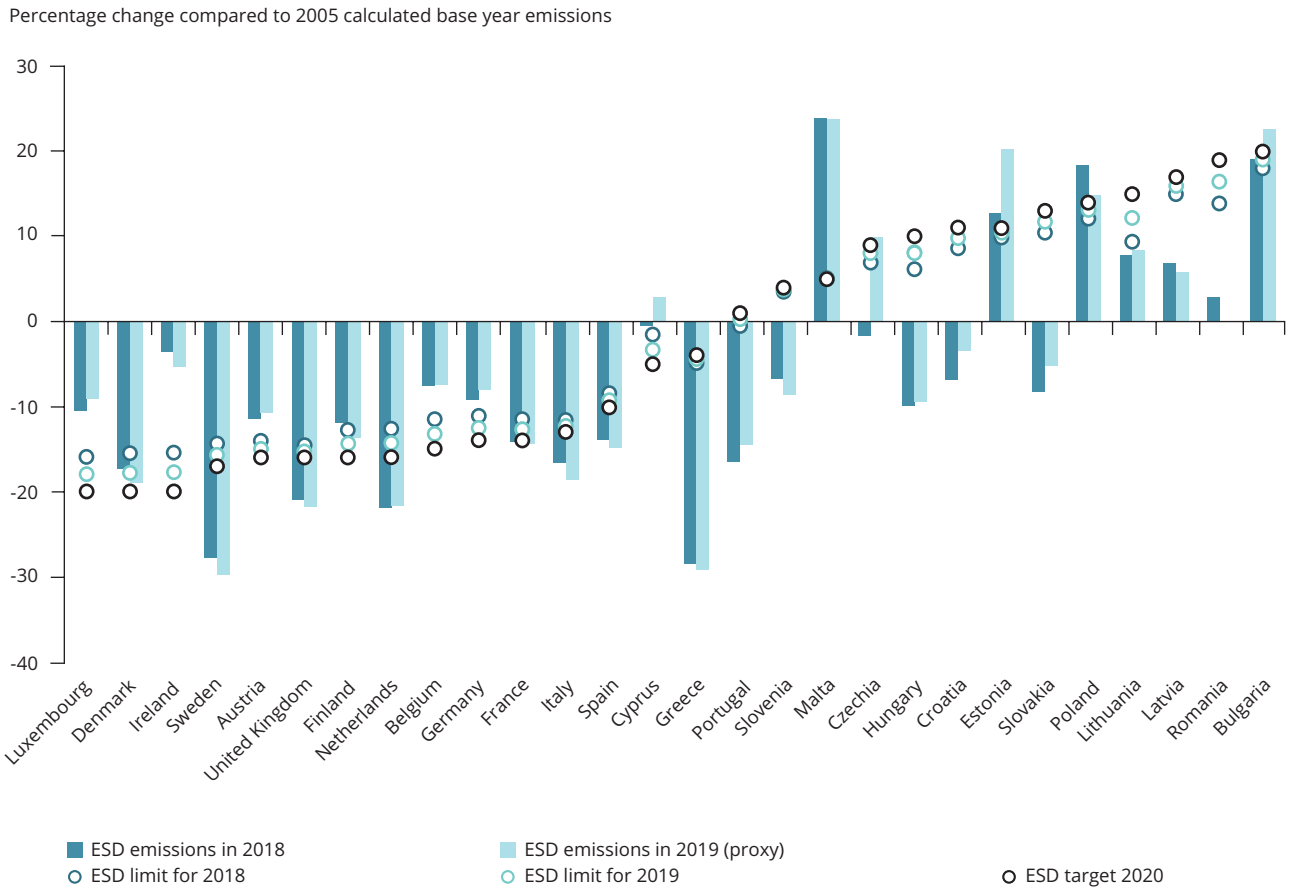
The national Effort Sharing targets for 2020 vary among the European countries, as they were set according to their gross domestic product (GDP) per capita. In 15 countries, the 2020 Effort Sharing targets require reductions in GHG emissions from the Effort Sharing sectors, compared with the 2005 base year. In 2018, 7 of these 15 countries (France, Greece, Italy, Netherlands, Spain, Sweden and the United Kingdom) had already achieved their GHG reduction target for 2020 (see Figure 2.7).

The remaining 13 countries have limitation targets for 2020, which permit a certain increase in national Effort Sharing emissions, compared with 2005 levels. In nine of the countries with limitation targets (Croatia, Czechia, Hungary, Latvia, Lithuania, Portugal, Romania, Slovakia and Slovenia), Effort Sharing emissions in 2018 remained below the national 2020 target levels.

In addition to their national Effort Sharing targets for 2020, countries also have annual emission allocations (AEAs), which limit their emissions in the period 2013-2019. In 2018, 17 countries (Croatia, Czechia, Denmark, France, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom) stayed within their emission allocations without making use of flexibilities. Eight of these countries (Croatia, Greece, Hungary, Portugal, Romania, Slovakia, Slovenia and Sweden) did so by more than 10 percentage points.

Meanwhile, 11 countries (Austria, Belgium, Bulgaria, Cyprus, Estonia, Finland, Germany, Ireland, Luxembourg, Malta and Poland) had 2018 Effort Sharing emission levels greater than their respective

**Figure 2.7 Progress of EU countries towards their Effort Sharing emission targets**




**Notes:** Member States are ranked according to their 2020 Effort Sharing targets, from the largest required reduction (Luxembourg, Member States are ranked according to their 2020 Effort Sharing emission 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. (See also Annex 1 (A1.2) in of the Methodology Notes.)

**Sources:** EEA (2020i, forthcoming_b); EU (2017, 2013b).

annual Effort Sharing emission allocations. Preliminary estimates indicate that, in 2019, the same 11 countries, as well as Czechia, had emission levels greater than their annual emission allocations for 2019.

### *2.3.2 The pace necessary to reach national 2030 Effort Sharing targets*

The 2030 Effort Sharing targets are set to deliver an aggregated 30 % in emission reductions compared with 2005 base-year levels. The national targets for 2030 range from 0 % (Bulgaria) to -40 % (Luxembourg, Sweden) compared with base-year levels, and no country has a limitation target that would permit increases in emissions levels. In 2018, Greece and Hungary already achieved emission levels that are lower than their respective 2030 targets.

Figure 2.8 illustrates the historical average pace of change in each EU-27 country, compared with the pace of change that will be necessary to achieve the national 2030 targets. Between 2005 and 2018, the EU-28 countries reduced their combined Effort Sharing emissions by an average of 0.4 % per year, with different rates in each country. To jointly reach the reduction targets for 2030, the EU-27 countries will need to achieve a combined average reduction of 1.4 % per year between 2018 and 2030.

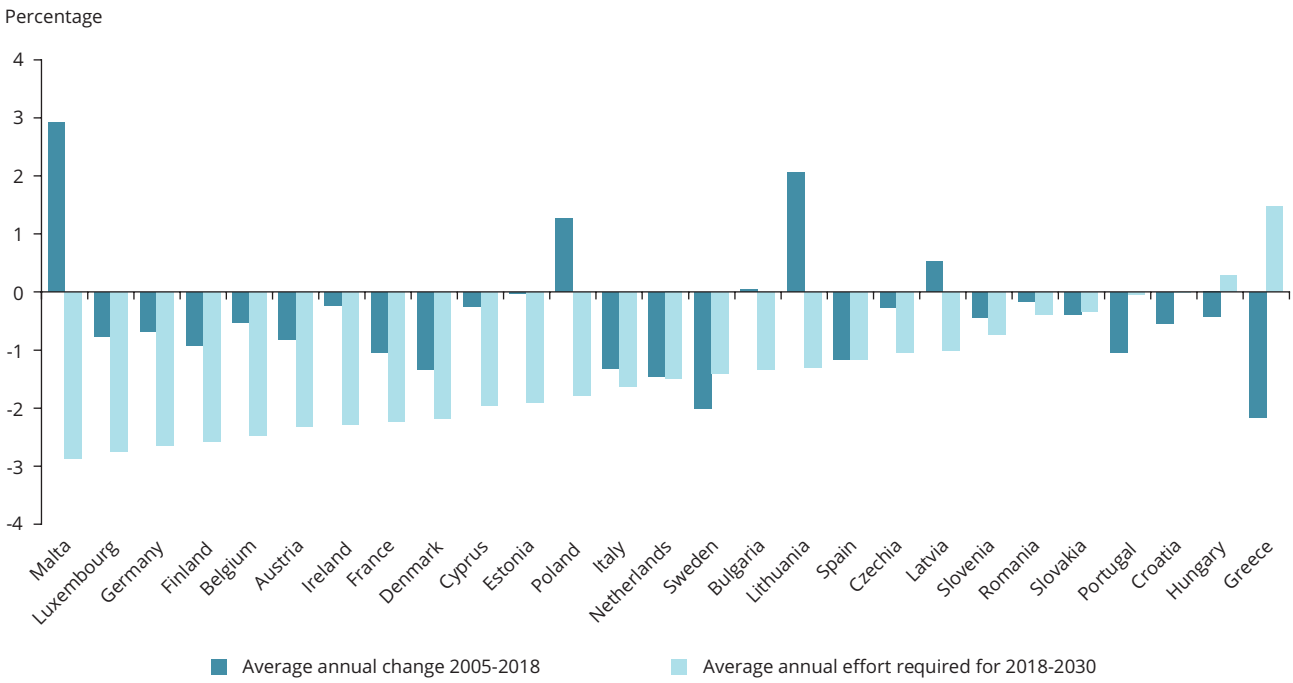
For more information on the flexibility mechanism afforded to Member States to achieve compliance with their respective Effort Sharing targets, please see Annex 1 in the Methodology Notes to this report.

## 2.4 Emissions in other European countries

Historical GHG emissions excluding LULUCF in Iceland, Liechtenstein, Norway, Switzerland and Turkey followed very different trends between 1990 and 2018 (see Figure 2.9).

**Iceland** set a long-term GHG mitigation target of between 50 % and 75 % by 2050 compared with GHG emissions in 1990. In 2018, Iceland's emissions were 30 % higher than in 1990, while in 2019 Iceland reduced its emissions and exhibited emission levels 28 % higher than in 1990. Up until 2030, Iceland aims to achieve

**Figure 2.8 Average annual change in emissions required to stay below the 2030 Effort Sharing targets, compared with past efforts, by country**




**Note:** Dark blue bars show the historical average annual change in Effort Sharing emissions from 2005-2018. Light blue bars show the comparable average annual change between 2018 and 2030 required to achieve the 2030 Effort Sharing target. MS Effort Sharing targets 2030 are currently estimates, see Annex1 (A1.2.5) in the Methodology Notes to this report.

**Sources:** Compiled from data in EEA (2020i) and EU (2018f).

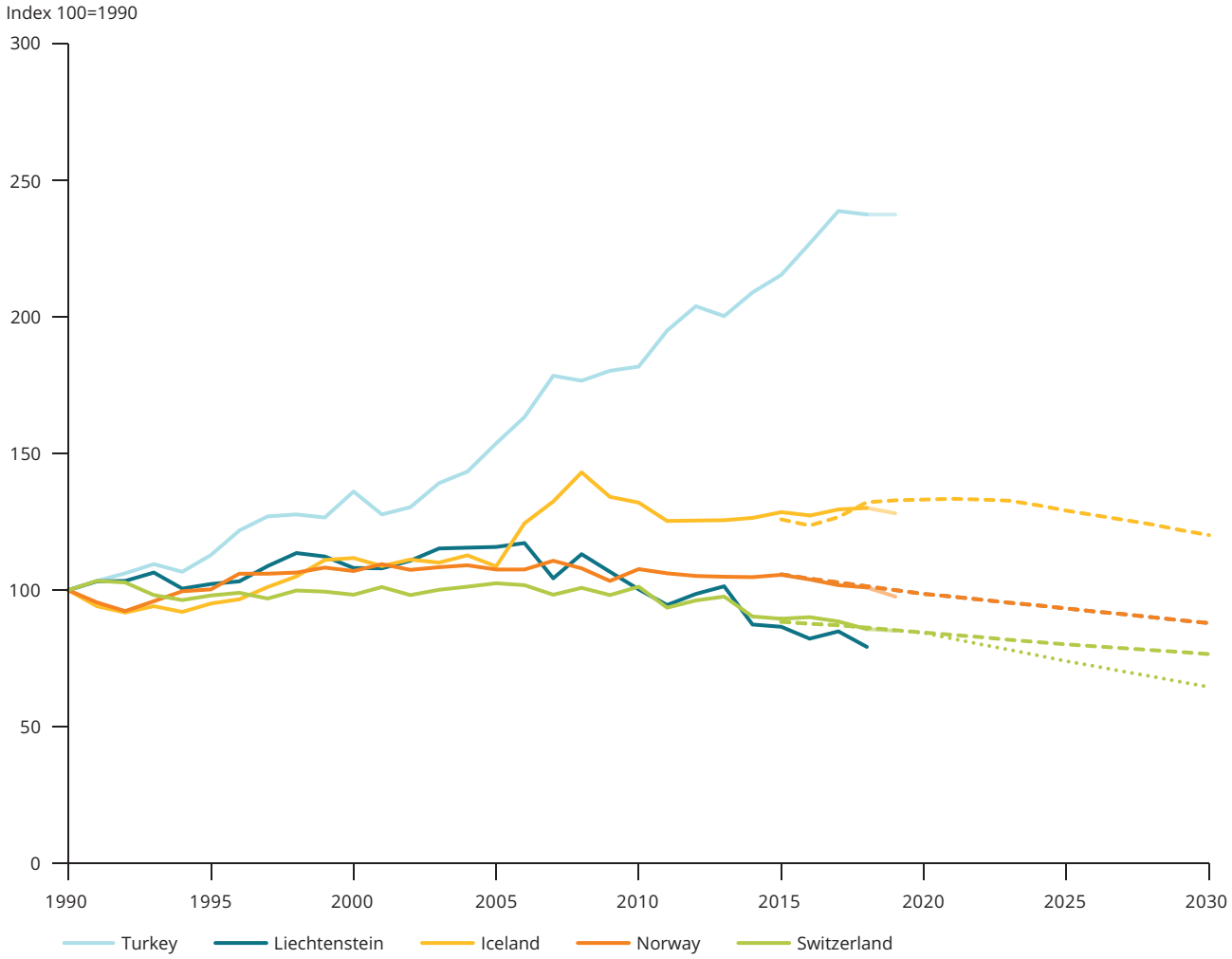
a 40 % emission reduction together with the EU. This is laid down in its nationally determined contribution (NDC) under the Paris Agreement. Iceland aims to achieve carbon neutrality no later than 2040.

**Liechtenstein** aims to attain at least a 40 % reduction in GHG emissions in 2030 compared with 1990 levels (Liechtenstein, 2015) including emission removals from LULUCF. To achieve this, Liechtenstein also set a sectoral goal: it aims to reduce the GHG emissions of the energy sector by 20 % between 1990 and 2020. In 2018, Liechtenstein's emissions were 21 % lower than in 1990, which was 19 percentage points from the level of emission reductions it aims to achieve by 2030.

In 2018, **Norway's** GHG emissions increased by 1 % compared with 1990 levels, while Norway has indicated a drop in emissions in 2019 to a level 2 % lower than in 1990. According to its revised NDC, submitted in February 2020, Norway aims to reduce its GHG emissions by at least 50 % and towards 55 % by 2030 compared with 1990 (Norway, 2020b). Norway had an agreement with the EU and Iceland to cooperate on the implementation of their respective NDCs. It also seeks such cooperation for the revised NDC.

In 2016, Norway's parliament agreed on a goal to reduce GHG emissions to net zero by 2030 (Norway, 2017), but this has not been laid down

**Figure 2.9 Total GHG emission trends and projections in Iceland, Liechtenstein, Norway, Switzerland and Turkey**




**Notes:** Projections display total GHG emissions excluding LULUCF and international aviation. **Solid lines** represent historical values; **dashed lines** represent projections with existing measures, and **dotted lines** indicate projections with additional measures.

Values shown for Iceland include inventory data, taking into account total $CO_2$ emissions from industrial processes. Iceland excluded these emissions in order to comply in the first commitment period of the Kyoto Protocol.

Turkey's INDC and Norway's NDC include emissions and removals from LULUCF, which are not shown in this figure.

**Sources:** EEA (2020f, 2020j); Iceland (2020); Liechtenstein (2020); Norway (2020a); Switzerland (2020a, 2020b, 2020c); Turkey (2020).

in climate legislation. This goal is to be achieved through emissions trading in the EU, international cooperation on reducing emissions, other forms of emissions trading and project-based cooperation. In 2019, the Norwegian government presented a low-emission strategy for 2050. In this strategy, Norway's government announced that it will increase the climate target for 2050 to represent an emission reduction of 90-95 % compared with 1990 levels (Hermansen and Lahn, 2019; Norwegian Government, 2019).

For 2030, **Switzerland** submitted an NDC to the UNFCCC that states its intention to reduce its GHG emissions by 50 % compared with 1990 levels. This target will be reached partly by using carbon credits from international mechanisms (Switzerland, 2015). In 2018, emissions in Switzerland were 15 % lower than 1990 levels, and in 2019 they remained 15 % lower than in 1990.

**Turkey** has submitted an intended NDC (INDC) to the UNFCCC secretariat of up to a 21 % economy-wide cut in GHG emissions by 2030, compared with a business-as-usual scenario, including a conditional part (Turkey, 2015). Turkey also aims to use carbon credits from international market mechanisms. According to its INDC, Turkey is planning to increase its capacity to generate electricity from solar energy to 10 GW and from wind energy to 16 GW by 2030 (Turkey, 2015). In 2018, Turkey's GHG emissions were more than twice as high as in 1990.

# 3 Progress towards meeting renewable energy targets

- The EU is on track to achieve its target of a 20 % share of energy consumption derived from renewable sources (RES share) by 2020. In 2018, the RES share in the EU-27 (excluding the United Kingdom) reached a total of 18.9 % (18.0 % in the EU-28, which includes the United Kingdom). Preliminary EEA estimates indicate that a RES share of 19.5 % was reached in the EU-27 in 2019. A gap of 0.5 percentage point remains to be filled in 2020.
- Between 2005 and 2018, the RES share in the EU-27 grew by an average 0.7 percentage points per year. Among the Member States, growth in national renewable energy shares ranged from an annual average of 0.3 percentage points in Croatia and Poland to 1.5 percentage points in Denmark.
- For 2030, the EU-27 countries have a binding target to achieve at least a 32 % share of renewables in gross final consumption. To reach this, the RES share across the EU-27 will have to grow by an average of 1.1 percentage points per year between 2018 and 2030.
- In their national energy and climate plans, countries have outlined national RES contributions for 2030 and these will count towards the EU's binding 2030 target. To meet these contributions, all but six Member States (Bulgaria, Cyprus, Czechia, Finland, Malta and Sweden) plan to speed up the average annual increase in their RES shares between 2018 and 2030, compared with the paces they achieved between 2005 and 2018.
- After 2030, the RES share in the EU-27 will need to grow substantially, with an annual average growth rate of at least 2.7 percentage points each year from 2030 through 2050, in order to reach levels compatible with achieving the long-term EU climate neutrality objective for 2050.

## 3.1 Progress towards meeting the EU's renewable energy targets

The EU-27's use of renewable energy continued to grow in 2018 and 2019. In 2018, the EU-27's total share of gross final energy consumption that was generated from renewable sources (RES share) reached 18.9 % (Eurostat, 2020e). This share increased to 19.5 % in 2019, according to preliminary estimates from the EEA (EEA, 2020d). These levels were well above those resulting from the aggregation of EU-27 Member States' indicative trajectories in the Renewable Energy Directive (2009/28/EC; RED) (EU, 2009b). The EU is therefore on track to achieve its target of a 20 % RES share by 2020 ([9]).

Between 2005 and 2018, the use of energy from renewable sources in the EU-27, as a share of gross final energy consumption, increased on average by 0.7 percentage points every year (see Figure 3.1). This steady increase reflects two dynamics: first, renewable energy production in absolute terms nearly doubled between 2005 and 2018. Second, gross final energy consumption from all sources ([10]) declined by about 4.2 % over the same period (see Figure 3.2).

In the context of increasing renewable energy use, the drop in gross final energy consumption from all sources recorded between 2005 and 2014 corresponds to a progressive substitution of fossil and nuclear fuels with renewables. Thereafter, the consumption of energy from non-renewable sources started to increase in absolute terms too, albeit by less than the increase in renewable energy use, marking a return to increasing total final energy consumption.

([9]) This *Trends and Projections 2020* report tracks progress to a 20 % aggregated RES target for 2020. In its 2020 RES Progress Report (EC, 2020b) of October 2020, the European Commission has calculated an indicative aggregated RES share for the EU-27 of 20.6 %. Adjustment of the 2020 target will be considered for future editions of the *Trends and Projections* report.

([10]) Gross final energy consumption as defined in Article 3 of Directive 2009/28/EC (RED) and including the adjustment for aviation in conformity with Article 5(6) of that directive.

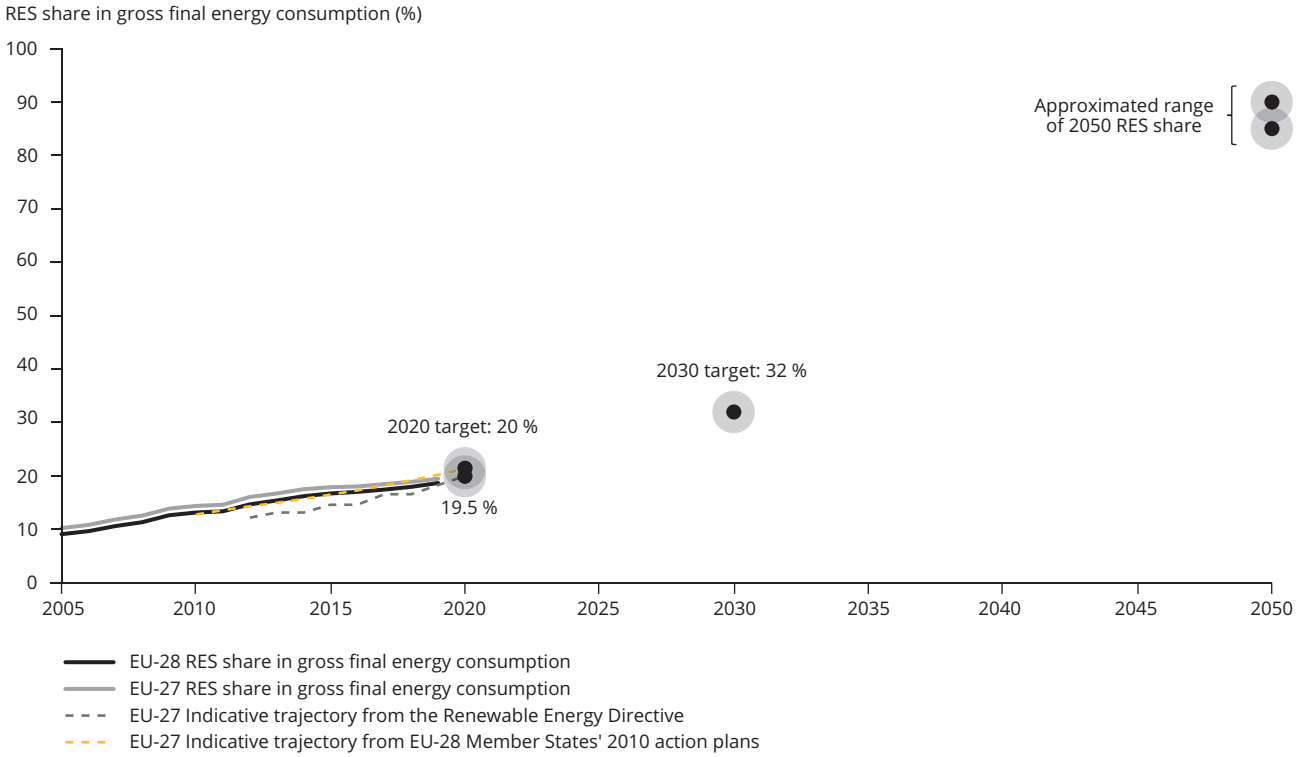
In 2018, gross final energy consumption from non-renewable sources in the EU-27 decreased marginally (by 4 Mtoe, or million tonnes of oil equivalent). While this is positive, the underlying steady growth in total final energy consumption recorded between 2014 and 2018 (from 976 Mtoe to 1 029 Mtoe) is thwarting efforts to meet energy efficiency targets (see also Chapter 4) and slowing down progress in enhancing the share of renewable energy use. Preliminary estimates indicate that total gross final energy consumption stayed about constant in 2019, while renewable energy consumption increased. With this development, consumption of energy from non-renewable sources remains at about at the level it was in 2015.

While the 2020 targets for renewable energy appear to be within reach, achieving the 2030 targets will require further efforts. The revised RED sets the objective of increasing the EU-wide share of RES consumption to a binding, minimum level of 32 % by 2030, with a possible upwards revision of this target in 2023. To meet this 2030 target, the pace of growth of RES consumption in the EU-27 would need to be 1.1 percentage points on average per year from 2018 onwards.

In their national energy and climate plans (NECPs), EU Member States have indicated national renewable energy contributions for 2030. The European Commission's assessment of the NECPs in September 2020 finds that, at EU level, the combined commitments of the Member States will lead to a total RES share in 2030 of between 33.1 % and 33.7 % (EC, 2020d).

Beyond 2030, the EU has no quantified, binding target for renewable energy. However, the European Green Deal sets the goal of achieving climate neutrality in the EU in 2050 (EC, 2019e). The Commission's proposal for a European climate law, published in March 2020, aims to incorporate this goal into law (EC, 2020g).

**Figure 3.1 Share of energy from renewable sources in the EU's gross final energy consumption, 2005-2019, 2020 and 2030 targets and 2050 scenario for reaching carbon neutrality**



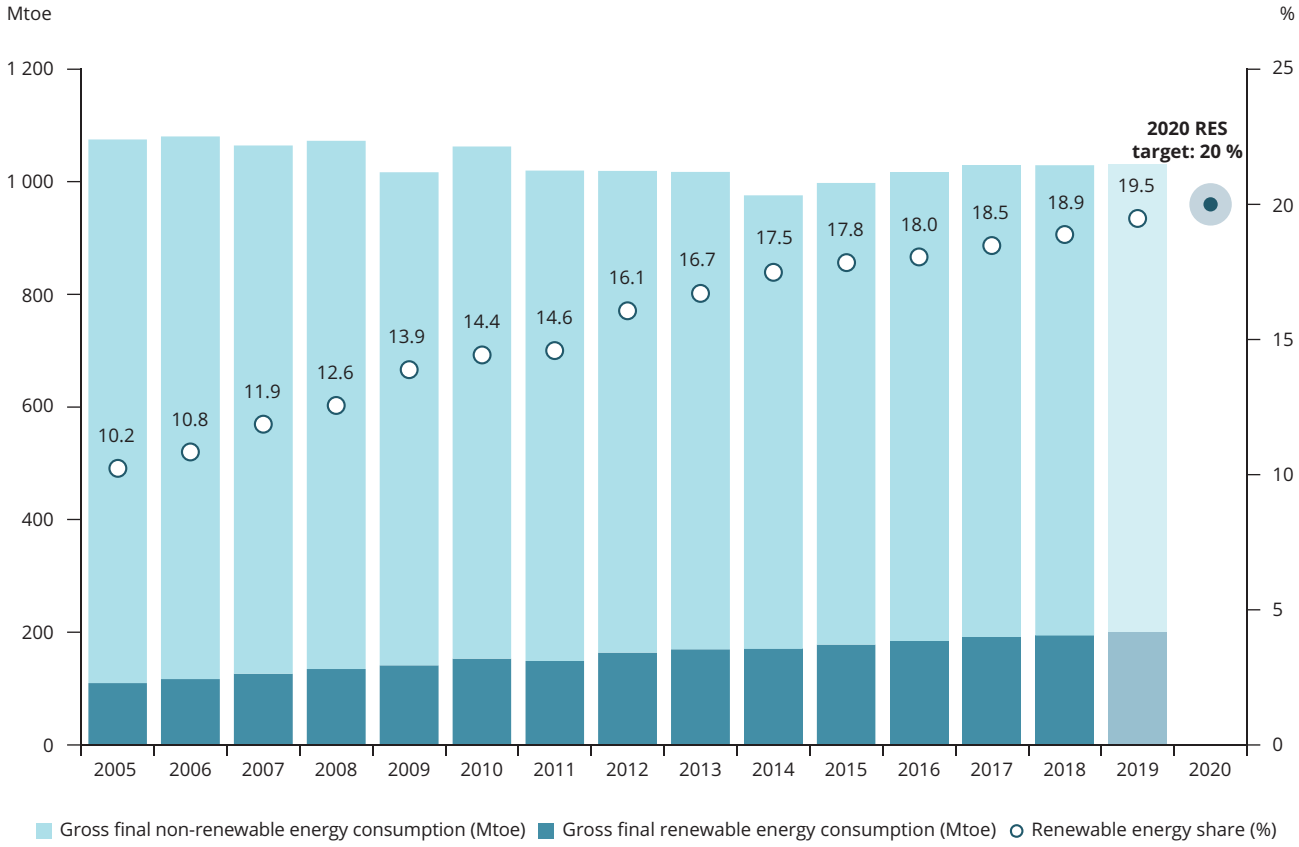

**Notes:** The 2050 values represent the indicative share of renewable energy in the EU's gross final consumption as presented in Figures 5 and 8 in a Commission communication (EC, 2020e) for scenarios that achieve a reduction of at least 55 % in 2030.

If extended into the future, the 0.7 percentage point average growth rate of renewable shares observed annually since 2005 will be insufficient to reach the EU's 2030 target.

Growth rates are the authors' own calculations.

**Sources:** EC (2011b, 2011a, 2020e); EEA (2020d); EU (2009b, 2018c); Eurostat (2020e).

**Figure 3.2** **EU-27 gross final energy consumption from renewable and non-renewable energy sources, 2005-2018 and proxy 2019**




**Notes:** Eurostat calculates the shares of RES consumption, and as part of this process normalises wind power and hydroelectricity generation, which are part of the RES share numerator. However, the total consumption of electricity included in the denominator is not normalised. In the figure above, non-normalised gross final energy consumption is displayed together with shares of RES consumption, in which the numerator has been normalised.

**Sources:** EEA (2020d); Eurostat (2020g); EU (2009b).

To reach this goal, some of the scenarios included in the in-depth analysis accompanying the long-term vision published in 2018 (EC, 2018b) describe the EU-wide RES share as increasing to 100 % of gross final energy consumption when calculated in accordance with the methodology introduced by the RED (EU, 2009b). Other scenarios would combine high rates of renewables with nuclear power generation and carbon capture and storage (CCS). To reach full decarbonisation of the energy system with a 100 % RES share, the EU-27 would need to increase its generation of renewable energy by about 3.4 percentage points on average per year until 2050, after reaching a 32 % reduction in 2030.

In September 2020, the European Commission proposed increasing Europe's climate ambition and reducing net greenhouse gas (GHG) emissions by at least 55 % by 2030 compared with 1990. Alongside this proposal, an impact assessment (EC, 2020c) provides several scenarios that reach the proposed 55 % emission reduction. The integrated scenarios run until 2050 and include information on renewable energy shares. From these, a range of 85-90 % RES share for 2050 can be derived (see Figures 5 and 8 in the Commission communication (EC, 2020c)). This implies annual average changes of between 2.7 and 2.9 percentage points on average per year after reaching the higher targets proposed for 2030.

An EEA report (EEA, 2019a) concludes that it is essential for the EU energy system to become more climate resilient. Addressing adaptation needs at the outset of the clean energy transition, even where this may increase initial uncertainty, will allow investments in renewable energy to be more efficient and effective in the medium and long term and will maximise the resilience of energy infrastructures. Furthermore, recent priorities surrounding hydrogen fuels and offshore wind energy, including recent and upcoming EU strategies in these areas, may indicate new important areas to consider in the future (EC, 2020a).

Stepping up near-term efforts to deploy renewables and transition the energy system towards meeting the requirements of the 2050 scenarios is thus vitally important to prepare for the pace of growth required up until 2030 and between 2030 and 2050.

### *3.1.1 Progress in the electricity, heating and cooling, and transport sectors*

Renewable energy sources contribute to energy needs in three well-defined sectors: electricity generation, heating and cooling, and transport. In addition to the overall 20 % target for renewable energy use in all sectors by 2020, the RED sets a 10 % target in the transport sector at EU and Member State levels ([11]).

Between 2005 and 2018, the share of electricity from renewable sources consumed in the EU-27 grew at an average of 1.2 percentage points per year, with 32 % of the electricity consumed in the EU-27 in 2018 having been generated from renewables. The most important contributions came from wind power (34 %), hydropower (37 %) and solar photovoltaic (PV) power (12 %), which also means that roughly half of all renewable electricity came from variable sources (wind and solar power). Wind power also experienced the highest growth rates in 2018 (Eurostat, 2020e).

In 2019, the EEA's approximated estimates indicate that about 34 % of total electricity consumed was derived from renewable sources, with more than 48 % of this share from wind (36%) and solar power (13 %) (EEA, 2020d). This overall level is on a par with the average share of renewable electricity that Member States expected to achieve by 2020, according to their national renewable energy action plans (NREAPs) (2010) (EEA, 2011; EEA and ETC/CME, 2020).

In the heating and cooling sector, heating from renewable sources is increasingly being used as a cost-efficient and secure alternative to fossil fuels for district heating and at local levels. In addition, the link with the electricity sector is growing stronger due to a rapid deployment of heat pumps.

Between 2005 and 2018, the share of renewable contributions across the EU-27 grew by an average of 0.7 percentage points per year. The major sources for renewable heating and cooling throughout the EU are solid biomass, heat pumps and biogas, followed by solar thermal collectors (Eurostat, 2020e). The share of energy from renewable sources used in this sector increased only marginally in 2018 and amounted to 21.1 % in that year.

It was estimated to have further increased in 2019 to 21.7 % (EEA, 2020d). This level was almost equivalent to the average level of 22 % that Member States planned to achieve by 2020, according to their NREAPs (2010) (EEA, 2011; EEA and ETC/CME, 2020).

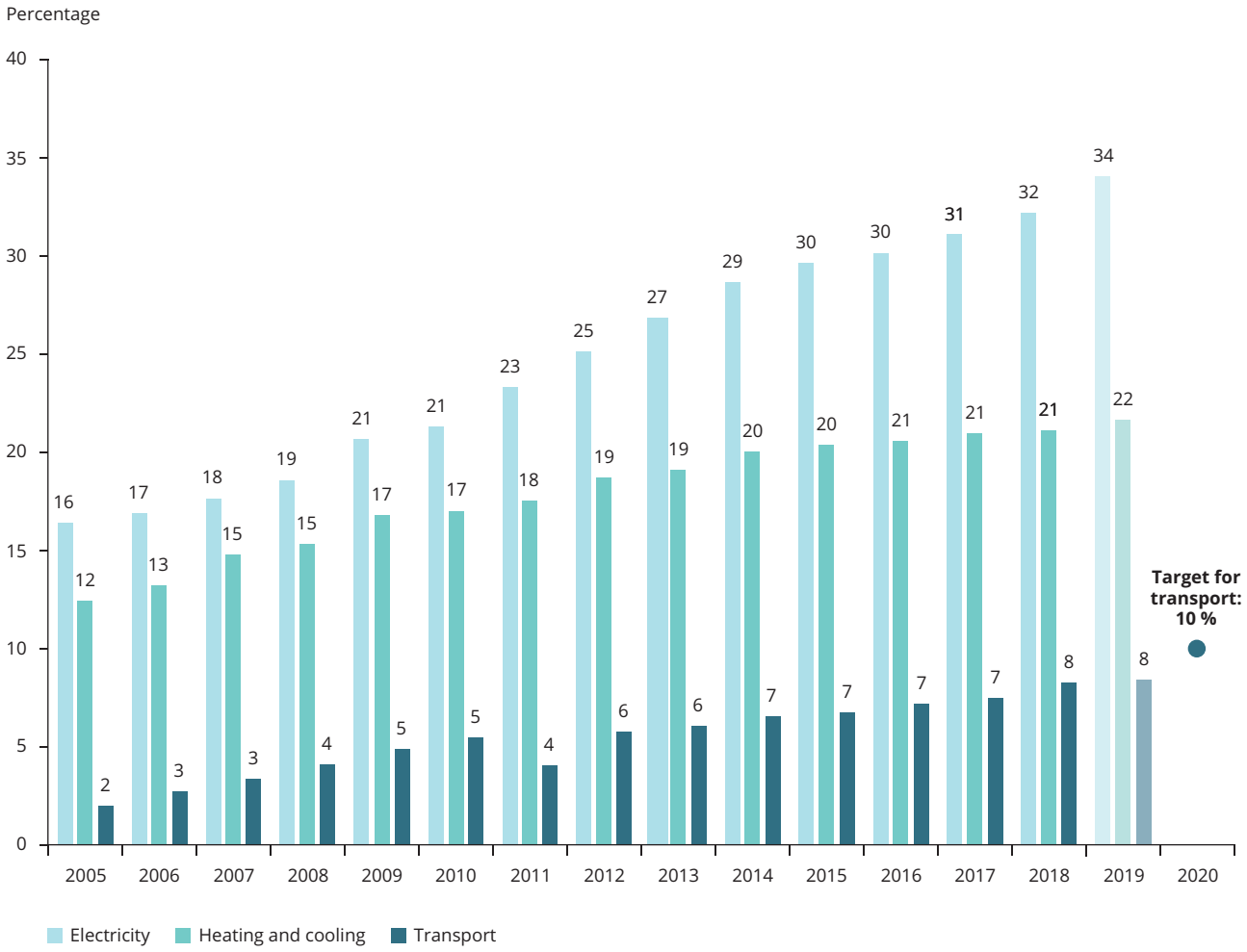
In the transport sector, renewable energy represented only 8.3 % of energy consumption in 2018 — nearly 2 percentage points under the 10 % target RES share target for 2020, set under the RED (see Figure 3.3). According to preliminary estimates from the EEA, this proportion was 8.4 % in 2019. In the transport sector, blended biofuels and electromobility using electricity from renewable sources are important mitigation options based on the deployment of energy from renewable sources. Infrastructural changes, such as for public transport and electric charging stations, are important elements for developing a more climate-compatible sector.

After rapid growth between 2005 and 2010, the RES share in transport dropped in 2011 and has been increasing at a slower pace since 2012. This can be explained by several factors. Firstly, the implementation of the legal provisions meant to ensure compliance with sustainability criteria set under the RED was prolonged. Further, different rules in different Member States have created a fragmented market. The debate concerning the future of biofuel policy may also have contributed to slower development rates. Studies showed that growth in first-generation biofuels could entail a risk of higher GHG emissions caused by indirect land use change, such as indirect clearance of forests to grow conventional biofuels (Searchinger et al., 2008).

To avoid such environmental risks, a 7 % cap on the use of conventional biofuels and targets to promote advanced biofuels has been adopted at the EU level. The Indirect Land Use Change (ILUC) Directive sets an indicative target of 0.5 % use of advanced biofuels by 2020 (EU, 2015a, 2015b, 2019a). Furthermore, the recast RED (EU, 2009b, 2018c) ((EU) 2018/2001; RED II) forces all biofuels to comply with detailed sustainability criteria and encourages the use of advanced renewable fuels. The use of biofuels to reduce GHG emissions remains a relatively high-cost climate mitigation option, while biomethane from waste streams and biogas, which comprise the cheapest biofuels available, can compete with fossil fuels in certain niche markets. Overall, the majority of biofuels can be expected to

([11]) The renewable energy shares presented on sectoral level in this section do not account for statistical transfers that can be made between Member States.

**Figure 3.3** **EU-27 shares of energy from renewable sources used by sector in the EU, 2005-2018 and proxy 2019**




**Note:** Percentages indicate the RES share of the corresponding sector. The sectoral renewable energy shares shown here do not include statistical transfers.

**Sources:** EEA (2020d); EU (2008a); Eurostat (2020g).

remain more expensive than fossil fuels, unless the costs of mitigating climate change are factored into the cost of fossil fuels. Nonetheless, biofuels and other renewable fuels will be one option to replace fossil fuels in emission-intensive sectors such as aviation and shipping (EC, 2017).

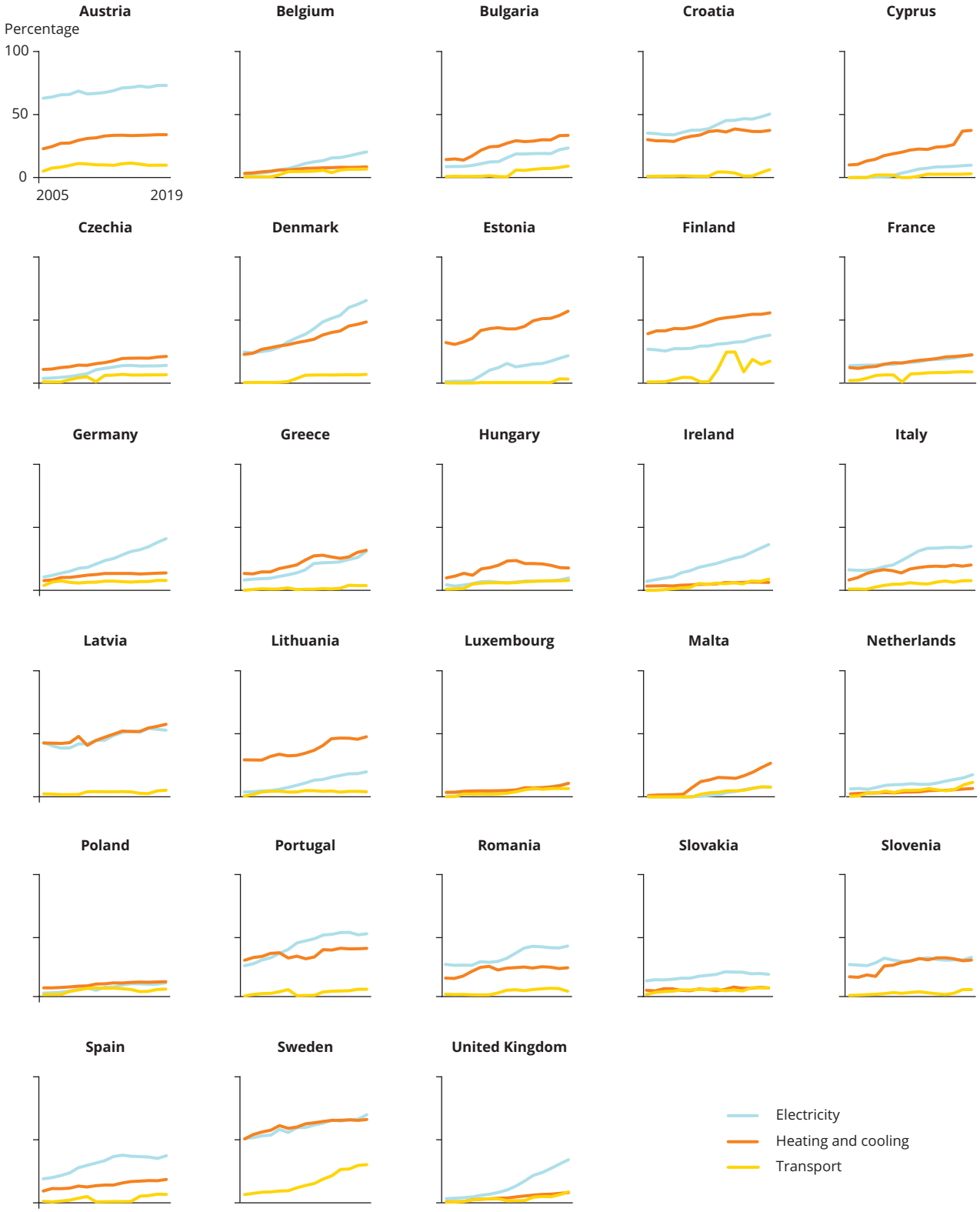
Regarding the overall GHG intensity of fuels, the EU is lagging behind its 2020 target set in the Fuel Quality Directive (98/70/EC) (EU, 1998) with a projected reduction of 4.7 %, instead of the targeted 6 % in 2020, compared with 2010 levels. Between 2021 and 2030, Member States will place obligations on fuel suppliers to ensure that at least 14 % of transport fuels stem from renewable sources ([12]) with a maximum 7 % contribution of biofuels from food and feed crops (EU, 2018c). Generally, progress in the transport sector is much slower compared with overall growth rates in renewable energy for all sectors.

## 3.2 Progress of Member States towards their national renewable energy targets

Figure 3.4 shows how countries' individual renewable energy shares developed, by sector, between 2005 and 2019 (Eurostat, 2020e; EEA, 2020d). As described

([12]) The RED II prescribes that each EU country will need to make sure that fuel suppliers provide a minimum of 14 % of renewable energy in road and rail transport. This figure relates to energy consumed (EU, 2018c).

**Figure 3.4 Trends in sectoral renewable energy shares in the EU-28, 2005-2019**




**Note:** The years run from 2005 to 2019 along the horizontal axis. The scale is set to 0-100 % of gross final energy consumption. Statistical transfers are not included.

**Sources:** EEA (2020d); Eurostat (2020e).

**Figure 3.5 Gross final energy consumption (total and from renewable sources) and shares of energy from renewable sources in the EU-28 Member States, 2005-2018**

| Member States and UK | Gross final energy consumption<br>Total change 2005-2018 (%) | Gross final energy consumption from renewable sources<br>Total change 2005-2018 (%) | Renewable energy share<br>Percentage points change 2005-2018 |
|---|---|---|---|
| Austria | 2.3 | 40 | 9.0 |
| Belgium | -1.3 | 299 | 7.1 |
| Bulgaria | -1.5 | 120 | 11.4 |
| Croatia | -5.0 | 12 | 4.3 |
| Cyprus | 3.3 | 358 | 10.8 |
| Czechia | -2.5 | 108 | 8.0 |
| Denmark | -3.3 | 116 | 19.8 |
| Estonia | 4.8 | 80 | 12.6 |
| Finland | 3.9 | 48 | 12.3 |
| France | -6.0 | 62 | 7.0 |
| Germany | -1.5 | 126 | 9.3 |
| Greece | -23.3 | 90 | 10.7 |
| Hungary | -1.3 | 78 | 5.6 |
| Ireland | -4.8 | 274 | 8.2 |
| Italy | -13.8 | 103 | 10.2 |
| Latvia | 2.3 | 28 | 8.0 |
| Lithuania | 13.9 | 66 | 7.7 |
| Luxembourg | -7.2 | 499 | 7.7 |
| Malta | 33.0 | 8 377 | 7.9 |
| Netherlands | -8.1 | 174 | 4.9 |
| Poland | 21.8 | 99 | 4.4 |
| Portugal | -8.9 | 41 | 10.8 |
| Romania | -4.7 | 30 | 6.3 |
| Slovakia | -4.8 | 78 | 5.5 |
| Slovenia | 1.8 | 35 | 5.1 |
| Spain | -11.8 | 83 | 9.0 |
| Sweden | -1.9 | 32 | 13.9 |
| United Kingdom | -12.2 | 767 | 9.9 |

**Notes:** In Malta, there was an increase in RES share of 8 377 % between 2005 and 2018, as renewable energy represented only a tiny fraction of the country's gross final energy use in 2005. At the same time, because of the very small absolute size of the country's renewable energy use in 2005, the data cannot be accurately represented in the figure and are thus not shown above. In Belgium, Cyprus, Ireland, Luxembourg and the United Kingdom, the RES share also grew from very low levels in 2005 (from 1 to 3 Mtoe, from 0.05 to 2 Mtoe, from 0.36 to 13 Mtoe, from 0.06 to 0.37 Mtoe and from 2 to 15 Mtoe, respectively).

The data on total gross final energy consumption take into account adjustments regarding the amounts of energy consumed in aviation, as stipulated under the RED.

**Source:** Eurostat (2020e).

above, the growth in countries' RES shares is a combined result of the development of renewable energy use in absolute terms and changes in gross final energy consumption. Since 2005, gross final energy consumption has declined, to varying degrees, in 19 countries (see Figure 3.5). As of last year, increases in gross final energy consumption, compared with 2005, were observed in Austria, Cyprus, Estonia, Finland, Latvia, Lithuania, Poland and Slovenia.

### *3.2.1 Current progress towards national targets for 2020*

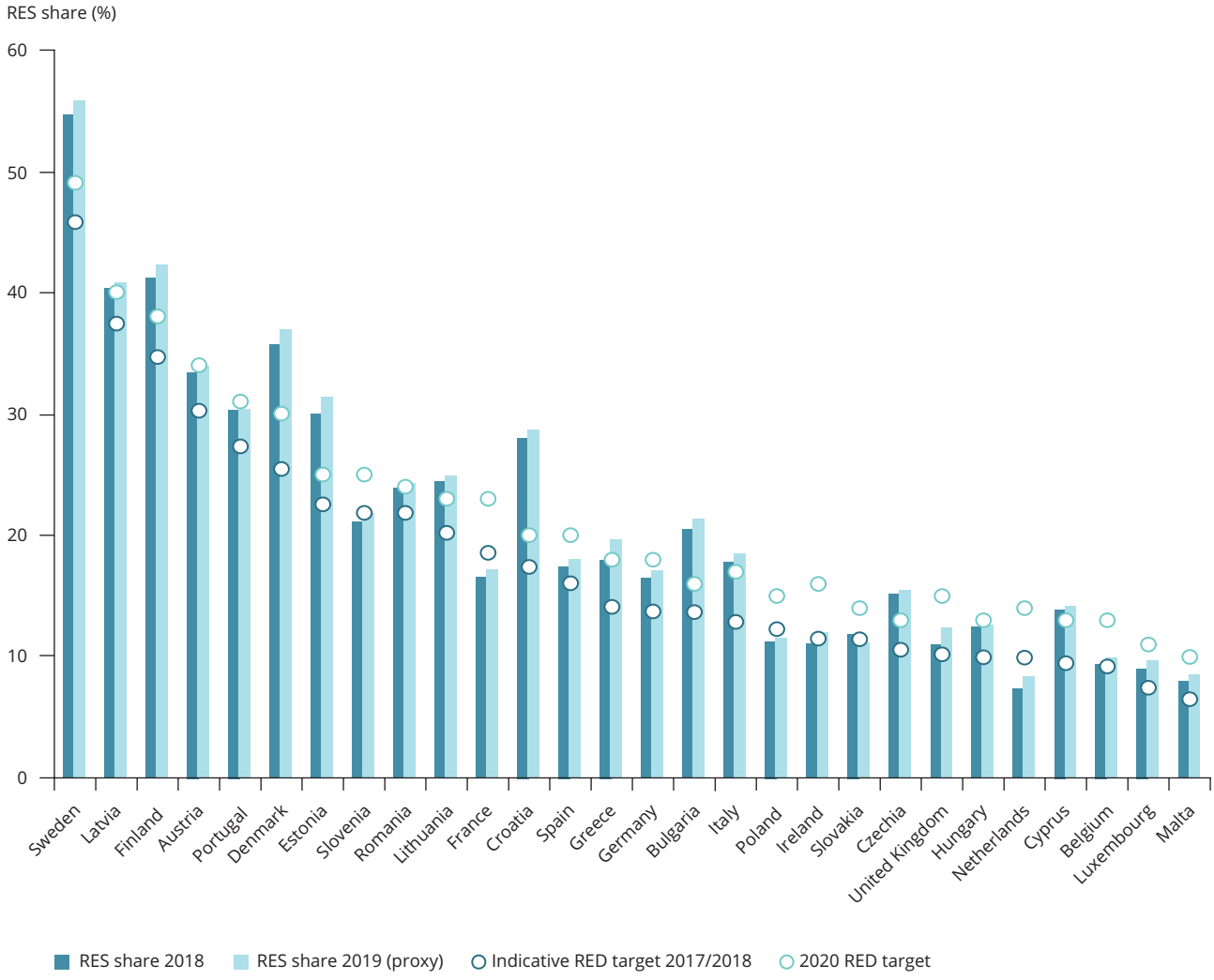
In addition to setting EU-wide targets for renewable energy deployment, the RED also sets binding national 2020 targets for all EU countries (EU, 2009b). These national targets range from 10 % for Malta to 49 % for Sweden and reflect differing national circumstances. To ensure that the 2020 targets are achieved, the

RED also sets indicative trajectories for the period 2011-2018. EU countries may reach their indicative RED targets for 2020 domestically, e.g. by establishing adequate support measures for renewable energy, or through cooperation between local, regional and national authorities, planned statistical transfers or joint projects ([13]) (EEA, forthcoming_d).

In all EU countries except five (France, Ireland, Netherlands, Poland, Slovenia) the national RES share in 2018 had already progressed to levels above the 2017-2018 indicative trajectories set in the RED (see Figure 3.6).

Taking into account the EEA's early renewable energy estimate for 2019, 13 Member States are already exceeding their 2020 targets. These countries are Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, Greece, Italy, Latvia, Lithuania, Romania and Sweden. All but Romania did so already with their RES shares in 2018. See also Annex 2 in the Methodology Notes to this report for further details.

**Figure 3.6 National shares of energy from renewable sources in relation to indicative trajectories set out in the RED**




**Sources:** EEA (2020d); Eurostat (2020e).

([13]) The RED provides for three main cooperation mechanisms among Member States in pursuit of their national targets: (1) 'statistical transfers', in which Member States agree to reattribute renewable energy production among themselves in their statistical accounting for target compliance, without any physical energy exchanges taking place; (2) 'joint projects', in which the renewable energy from a particular project is shared between the parties, with or without a physical flow of the energy produced; and (3) 'joint support schemes', in which Member States co-finance their renewable energy production independent of its location (within their territories). RES shares shown here include all current agreements, following Eurostat's methodology.

According to the Governance Regulation (Regulation (EU) 2018/1999), from 2021 onwards, countries' renewable energy shares may not be lower than their 2020 target laid out in the RED. For the Netherlands, this entails a need to rapidly increase its renewable energy share in order to reach its 2020 target under the RED. To do so, the Netherlands has entered a memorandum of understanding with Denmark on the purchase of 8-16 TWh of renewable energy via statistical transfers (Tweede Kamer, 2020).

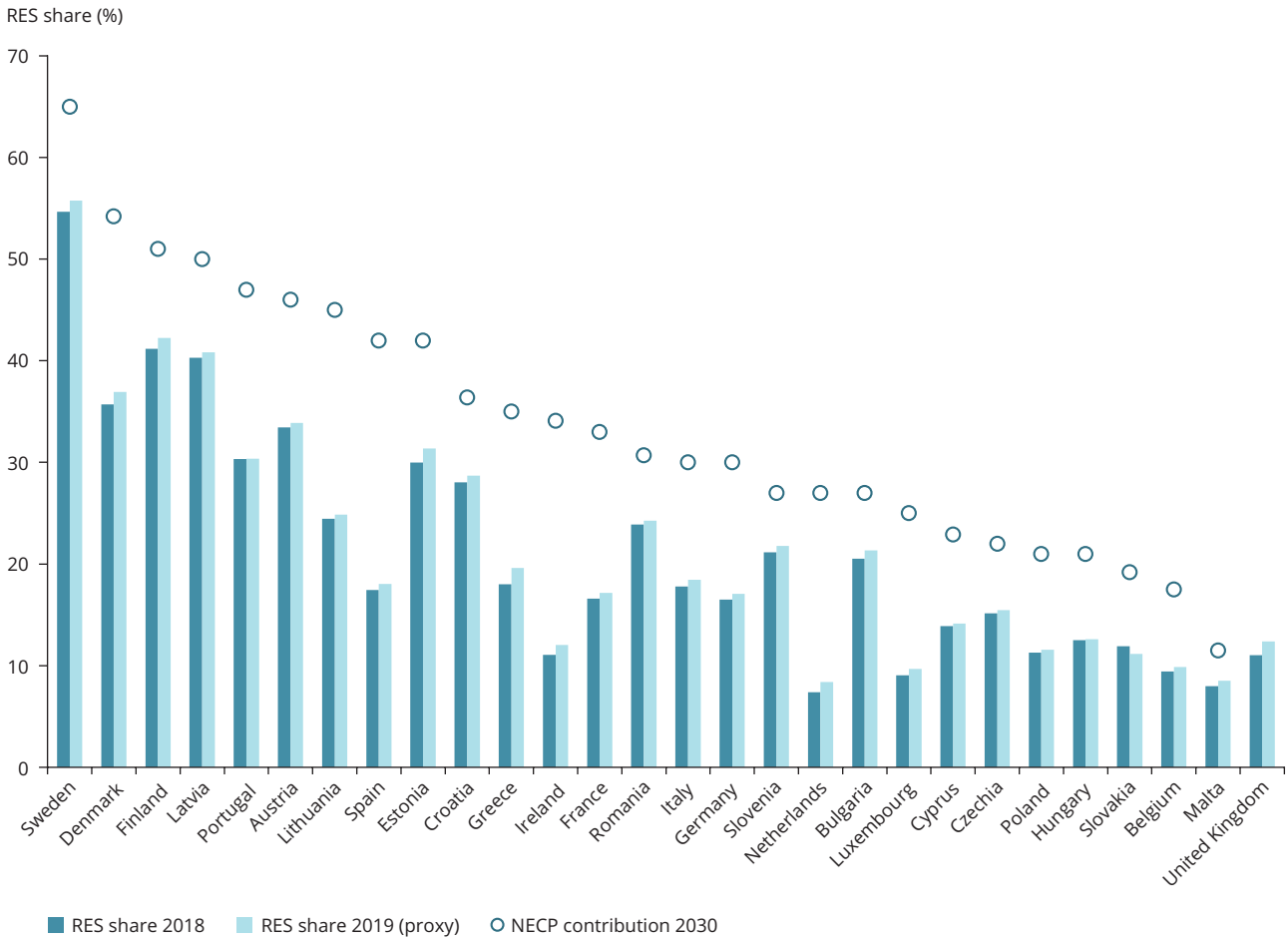
EU countries have adopted their own national trajectories to 2020 as part of their NREAPs, which they reported in 2010 and which some countries have subsequently updated. These action plans concern the deployment of renewable energy at the national level, and they include expected trajectories as well as planned RES shares in specific market sectors: in transport (RES-T), in heating and cooling (RES-H&C) and in electricity (RES-E). For all EU countries but Slovakia, these NREAP trajectories are more ambitious than the indicative trajectories defined in the RED.

In 2018, 18 countries reached or exceeded the RES share targets outlined in their NREAPs for that year, while 10 countries (Belgium, France, Germany, Ireland, Malta, Netherlands, Poland, Portugal, Slovenia and Spain) did not. Renewable shares in the transport sectors of Finland and Sweden exceeded 10 % in 2018. In 26 other EU countries, the shares ranged from 2.7 % (Cyprus) to 9.8 % (Austria). Preliminary estimates for 2019 reveal that the number of countries not reaching their NREAP trajectory levels increased from 10 to 13 (the additional countries being Hungary, Slovakia and the United Kingdom).

### *3.2.2 Current progress towards national targets for 2030*

For 2030, no national targets related to the RES share have been set via EU legislation. Rather, countries have individually expressed their intended national contributions to the EU-wide 2030 RES share target in their NECPs and will report on progress in

**Figure 3.7 Renewable energy shares 2018 and 2019 (approximated) in relation to 2030 contributions laid out in countries' NECPs**




**Sources:** EEA (2020d); EC (2020f); Eurostat (2020e).

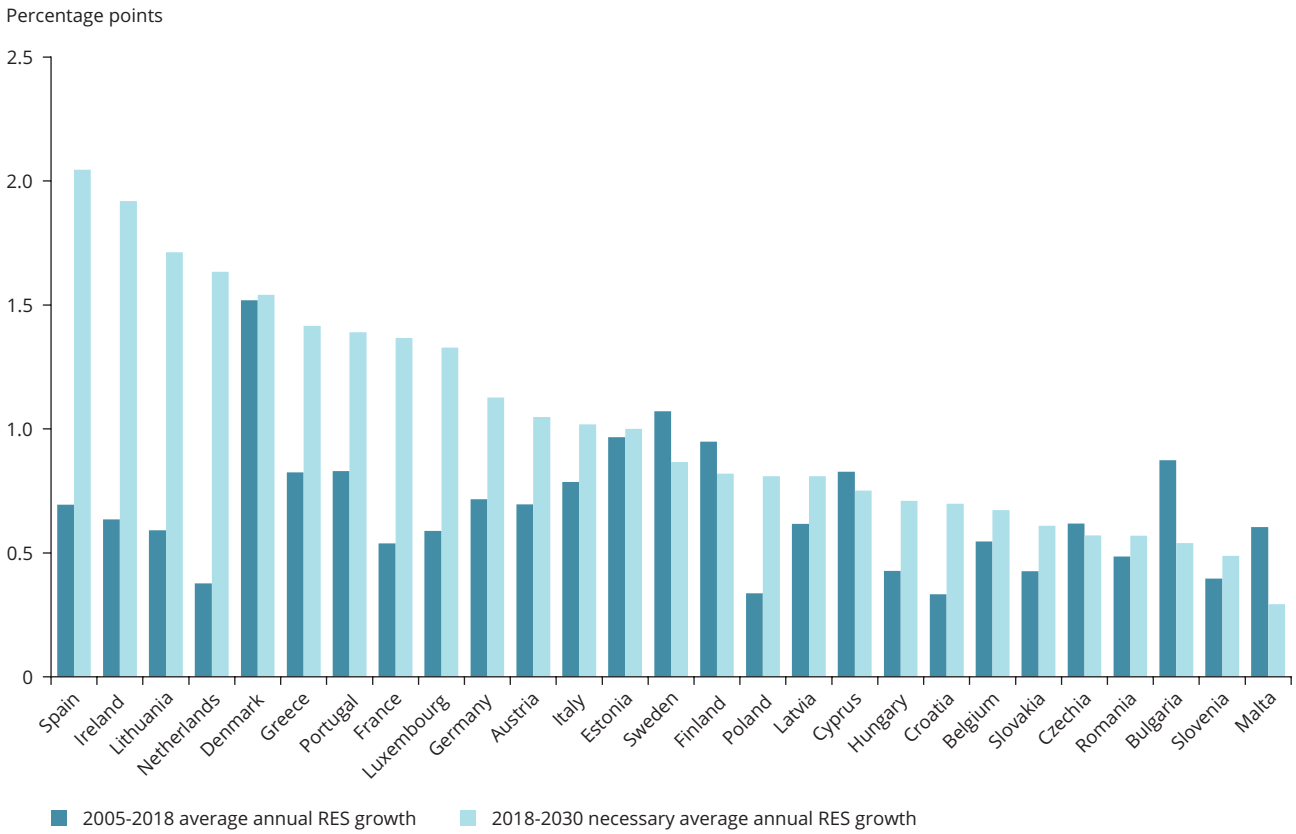
implementing these plans in biennial NECP progress reports starting in 2023 (EC, 2019b).

The European Commission's analysis of the NECPs concludes that, together, Member States' intended contributions to the 2030 targets will reach a 33.1-33.7 % RES share by 2030 (EC, 2020d). Figure 3.7 compares the renewable energy contributions communicated by EU countries in their NECPs to their current renewable energy shares in 2018 and approximated shares in 2019.

As illustrated in Figure 3.8, average increases in national renewable energy shares between 2005 and 2018 ranged from 0.3 percentage points per year (Croatia and Poland) to 1.5 percentage points per year (Denmark). To achieve the contributions set in their NECPs, most Member States plan to increase the pace of expanding renewable energy. The planned average increases range from 0.3 percentage points per year (Malta ([14])) to 2 percentage points per year (Spain) from 2018 to 2030.

Economic stimulus programmes that focus on achieving a sustainable economic recovery from the COVID-19 crisis may create positive momentum for the development of renewable energy over the next decade. In Germany, for example, the renewable energy levy will be reduced as part of the recovery package (Germany, 2020a, 2020b) so that prices for renewable electricity will decline. Other countries, such as Austria and France, provide direct financial support for the expansion of renewable energy as part of their economic recovery packages.

**Figure 3.8 Average annual (linear) increases in renewable energy shares towards national 2030 renewable energy contributions, compared with past efforts**




**Note:** Dark blue bars show the historical average annual change in renewable energy shares relative to 2005. Light blue bars show the comparable average annual change required to achieve the 2030 contributions.

**Sources:** EC (2020f); Eurostat (2020e).

([14]) Malta's planned increased in renewable energy shares up to 2030 will constitute a doubling of its current renewables capacity. Without strong efforts to improve energy efficiency and to decouple energy use from gross domestic product and population growth, efforts by Malta to increase its renewable energy share could be thwarted in future, especially in the context of the country's heavy reliance on aviation.

## 3.3 Renewable energy in other European countries

Beyond the EU Member States, the RED is also relevant to member countries of the European Economic Area ([15]). In accordance with the RED, Iceland and Norway submitted NREAPs to the European Commission with 2020 targets and details of the steps required to achieve these targets.

**Iceland's** 2020 target for its RES share under the RED was set at 64 % gross final energy consumption and the national target under the NREAP was set at 76.8 % by 2020 (see Table 3.1). These targets are higher than those for most Member States, as Iceland has an exceptional potential for hydropower and geothermal energy. To date, these energy sources are mainly used for district heating and producing electricity. Iceland's current share of RES in gross final energy consumption was 72.2 % in 2018 and thus above its binding national target under the RED.

**Norway's** binding RED target for 2020 is to achieve a RES share that accounts for 67.5 % of gross final energy consumption. Norway is ahead of its indicative RED trajectory for 2017-2018 and its NREAP trajectory for 2018. In 2018, its RES share accounted for 72.8 % of gross final energy consumption. Thus, Norway had already exceeded its 2020 target for its RES share by 5 percentage points in 2018.

The NREAP for **Turkey**, announced in 2015, has the characteristics of a roadmap for rigorous planning and efficient development of renewable energy up until 2023. The plan was prepared in accordance with the RED and focuses on exploring renewable energy sources in support of energy generation and consumption. The NREAP is available to the public and describes Turkey's planned development and essential measures taken to sustain this path.

No information is available from EU sources on the RES shares used or targets for Liechtenstein or Switzerland.

**Table 3.1 Iceland, Norway and Turkey's progress on renewable energy**

| Country | 2018 RES share (%) | 2020 target under the RED (%) | 2020 target under NREAP (%) | Distance to 2020 NREAP target in 2018 (percentage points) |
|---|---|---|---|---|
| Iceland | 72.2 | 64.0 | 76.8 | 8.2 |
| Norway | 72.8 | 67.5 | 67.5 | 5.3 |
| Turkey | 13.7 | N/A | 19.3 | -5.6 |

**Notes:** Although Iceland indicates in its 2014 NREAP that it assumes a national overall target of 72 % for its RES share as its target for 2020 under the RED, a 64 % target for RES share by 2020 is mentioned as the binding target for Iceland in Annex IV (Energy) of the Agreement on the European Economic Area.

**Sources:** EU (2009b); Eurostat (2020e); Iceland (2014); Norway (2013); Turkey (2014).

([15]) In addition to the EU Member States, the European Economic Area also includes Iceland, Norway and Liechtenstein.

# 4 Progress towards meeting energy efficiency targets

- The EU's achievement of its 2020 energy efficiency targets remains uncertain. The targets are expressed in both primary energy consumption (total energy demand, including that for transformation into electricity) and final energy consumption (consumption by end users).
- In the primary energy consumption of the EU-27 (excluding the United Kingdom), a marginal decrease of 0.7 % was observed between 2017 and 2018 (and of 0.6 % for the EU-28, which includes the United Kingdom). Preliminary estimates from the EEA indicate a further 1.2 % decrease in primary energy consumption in 2019 compared with 2018 levels. Despite these recent reductions, primary energy consumption levels still remain above the indicative linear trajectory to the 2020 target for both EU-27 and EU-28.
- Final energy consumption in the EU grew between 2017 and 2018, while a reduction would be needed to reach the 2020 target. In the EU-27, this growth totalled 0.03 % (and 0.1 % in the EU-28). Preliminary EEA estimates indicate a small increase in 2019 of 0.1 % in the EU-27 compared with 2018. This makes 2019 the fifth consecutive year without any decrease in final energy consumption.
- Among the EU-28 Member States, in 2018, 15 reduced, or limited, the increase in their primary energy consumption to levels below their respective indicative linear trajectories between 2005 levels and 2020 targets, while only 12 achieved the same in the area of final energy consumption.
- For 2030, the EU-27 has a binding target to improve its energy consumption by at least 32.5 %. Between 2005 and 2018, EU-27 primary energy consumption fell on average by 9 Mtoe (million tonnes of oil equivalent) per year and final energy consumption by 4 Mtoe per year. To meet the 2030 target, annual reductions in energy consumption will have to more than double the average rate of reductions achieved between 2005 and 2018. In their national energy and climate plans, all but eight Member States plan to step up their annual reduction rates for final energy consumption until 2030.
- For the EU to achieve climate neutrality by 2050, it would need to reduce its primary and final energy consumption considerably faster than it has since 2005.

## 4.1 Progress towards the EU's 2020 energy efficiency targets

The Energy Efficiency Directive (2012/27/EU) defines the EU energy efficiency target for 2020, which can be expressed in terms of either primary energy consumption ([16]) or final energy consumption ([17]). Meeting the 2020 energy efficiency target requires a 20 % reduction in primary or final energy consumption in the EU-28 (EU, 2012), compared with levels projected for 2020 in the European Commission's 2007 baseline scenario. In equivalent terms, the 2020 target for primary energy consumption equals a 13.8 % reduction from 2005 levels and, for final energy consumption, a reduction of 9.0 % from 2005 levels.

Between 2005 and 2018, EU-27 primary energy consumption fell on average by 9 Mtoe (million tonnes of oil equivalent) per year and final energy consumption by 4 Mtoe per year. For the EU-28, these reductions were, respectively, 13 Mtoe and 5 Mtoe. With the exception of an uptick in 2010, both primary and final energy consumption fell year on year from 2009 to 2014. This pronounced downward trend was the result of multiple

([16]) Primary energy in the context of the Energy Efficiency Directive means gross inland energy consumption minus non-energy use. Primary energy consumption measures the total energy demand of a country. It covers consumption by the energy sector itself, losses during transformation (e.g. from oil or gas into electricity) and distribution of energy, and final consumption by end users. It excludes energy carriers used for non-energy purposes (e.g. petroleum used not for combustion but for producing plastics).

([17]) Final energy consumption includes all energy delivered to the final consumer's door (in industry, transport, households and other sectors) for all energy uses. It excludes deliveries for transformation and/or own use of the energy-producing industries, as well as network losses.

drivers, including national efforts to improve efficiency and low economic activity across countries in the aftermath of the 2008 global recession. The subsequent increase in activity since 2015 has coincided with growing primary and final energy consumption trends at the EU level, highlighting the need to seek to further decouple economic growth and energy use at the national level.

In 2018, final energy consumption in the EU-28 increased to 1 124 Mtoe, while primary energy consumption decreased to 1 552 Mtoe. For primary energy consumption, this comprises a total EU-28 reduction of 9.8 %, or 169 Mtoe below 2005 levels (Eurostat, 2020d, 2020a). In the EU-27, the total reduction was 8.1 % below 2005 levels. Preliminary estimates from the EEA show that, in 2019, the EU-28 primary energy consumption decreased by 22 Mtoe compared with 2018, this being the second consecutive year of lower consumption in contrast to the period 2014-2017. On the other hand, final energy consumption stabilised in 2019 , marking the fifth consecutive year without a fall in final energy consumption (EEA, 2020b).

To monitor progress towards the energy efficiency targets, the EEA uses an indicative linear trajectory between the 2005 levels of energy consumption and the level of the target in 2020. If the EU-28 energy consumption levels are at or below the linear trajectory, the EU is considered to be on track towards meeting its energy efficiency targets. Conversely, if the EU-28 primary or final energy consumption levels are above the linear trajectories, EU energy consumption must decrease at a faster pace to meet the targets. (For further details of the methodology, see the Methodology Notes to this report).

As illustrated in Figure 4.1, most recent data indicate that in 2018, both the EU-28's final and primary energy consumption levels are higher than the indicative trajectories to 2020: by 2.1 % (or 23.6 Mtoe) and by 2.4 % (or 37 Mtoe), respectively. Furthermore, preliminary EEA estimates of EU-28 final and primary energy consumption in 2019 indicate levels higher than the indicative trajectories to the 2020 targets, at 2.8 % (30 Mtoe) and 2.0 % (31 Mtoe), respectively. There is no EU-27 target calculated for energy efficiency in 2020.

## 4.2 Progress towards the EU's 2030 and 2050 energy efficiency targets

An EU target for 2030 of at least 32.5 % improvements in energy efficiency (compared with 2007 PRIMES model baseline projections) was set in the revised Energy Efficiency Directive (EU, 2018d) ((EU) 2018/2002). The legislation also includes a clause for a possible upwards revision of the target in 2023. Projections to this 32.5 % target for the EU-27 show that, by 2030, primary energy consumption should be 1 128 Mtoe or less for primary energy consumption and 846 Mtoe or less for final energy consumption (EU, 2019b).

The EU-27 target for 2030 corresponds to reductions in primary and final energy consumption of 24.7 % and 18.7 %, respectively, relative to the reference levels of 2005. To reach the 2030 target, the EU-27 will need to achieve an average reduction of 21 Mtoe in primary energy consumption and 12 Mtoe in final energy consumption from the 2018 levels each year until 2030. Although this is equivalent to more than double the average pace that was achieved between 2005 and 2018 ([18]), if the new shift in the energy consumption trend is maintained, this higher pace will be achievable over the next decade.

Looking towards 2050, the Commission's strategic long-term vision illustrates the contributions that energy efficiency can make towards achieving climate neutrality. In September 2020, the European Commission proposed increasing Europe's climate ambition and reducing net GHG emissions by at least 55 % compared with 1990 by 2030. Alongside this proposal the Commission carried out an impact assessment (EC, 2020c). This includes several scenarios which reach the proposed 55 % reduction in emissions. Figure 4.1 illustrates how EU energy consumption may evolve towards carbon neutrality by 2050 according to an increased climate ambition by 2030 scenario.

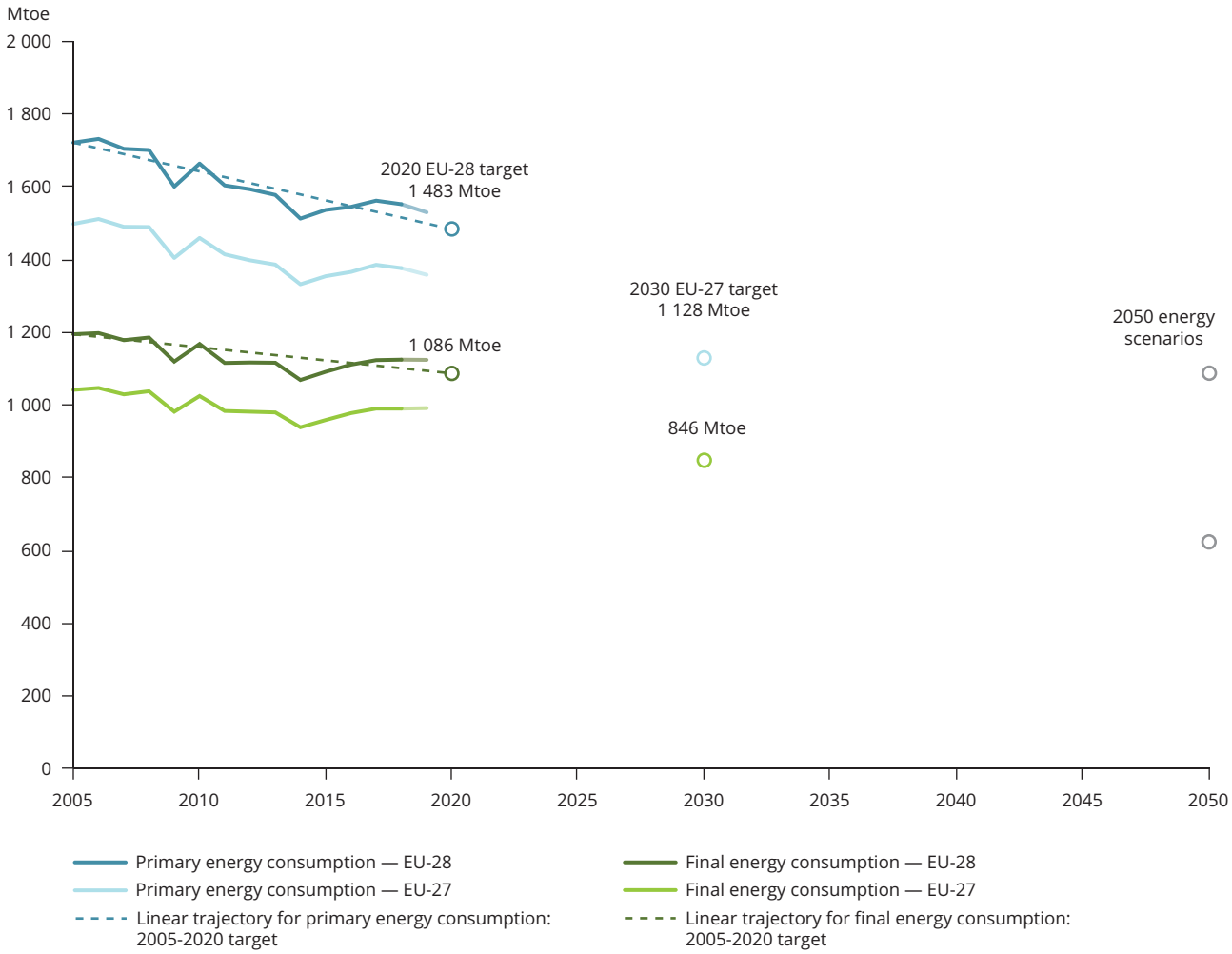
## 4.3 Progress towards 2020 national energy efficiency targets

Figure 4.2 illustrates how primary and final energy consumption developed in the EU-28 between 2005 and 2019.

Under the Energy Efficiency Directive, EU-28 countries set their own national non-binding targets for energy efficiency for 2020. These targets can be based on primary or final energy consumption, on primary or final energy savings, or on energy intensity. The Energy Efficiency Directive requires, however, that when doing so Member States also express those targets in terms of absolute levels of primary and final energy consumption (EU, 2012, 2018d).

([18]) It should be noted that the period 2005-2018 was characterised by some substantial shifts in energy consumption. The rebound in energy consumption between 2014 and 2018 effectively reduces the average annual pace used in this analysis.

**Figure 4.1 Primary and final energy consumption in the EU, 2005-2019, 2020 and 2030 targets and 2050 scenarios for reaching carbon neutrality**




**Notes:** The 2020 EU-28 target represents energy savings of 20 % from levels projected for 2020 in the Commission's 2007 energy baseline scenario (EC, 2008). The EU-27 energy efficiency target for 2030 represents an improved energy efficiency of at least 32.5 % compared with 2030 projections using the same energy baseline scenario. The 2050 values represent indicative scenarios for primary and final energy consumption in the EU-27 that, combined with high shares of energy from renewable sources in the energy mix, would allow the EU to reach a 55 % net GHG reduction by 2030 and carbon neutrality by 2050. The 2050 values are drawn from the GHG reduction scenario MIX assuming medium energy efficiency intensification policies, from the impact assessment accompanying the Commission's recent communication to increase Europe's climate ambition.

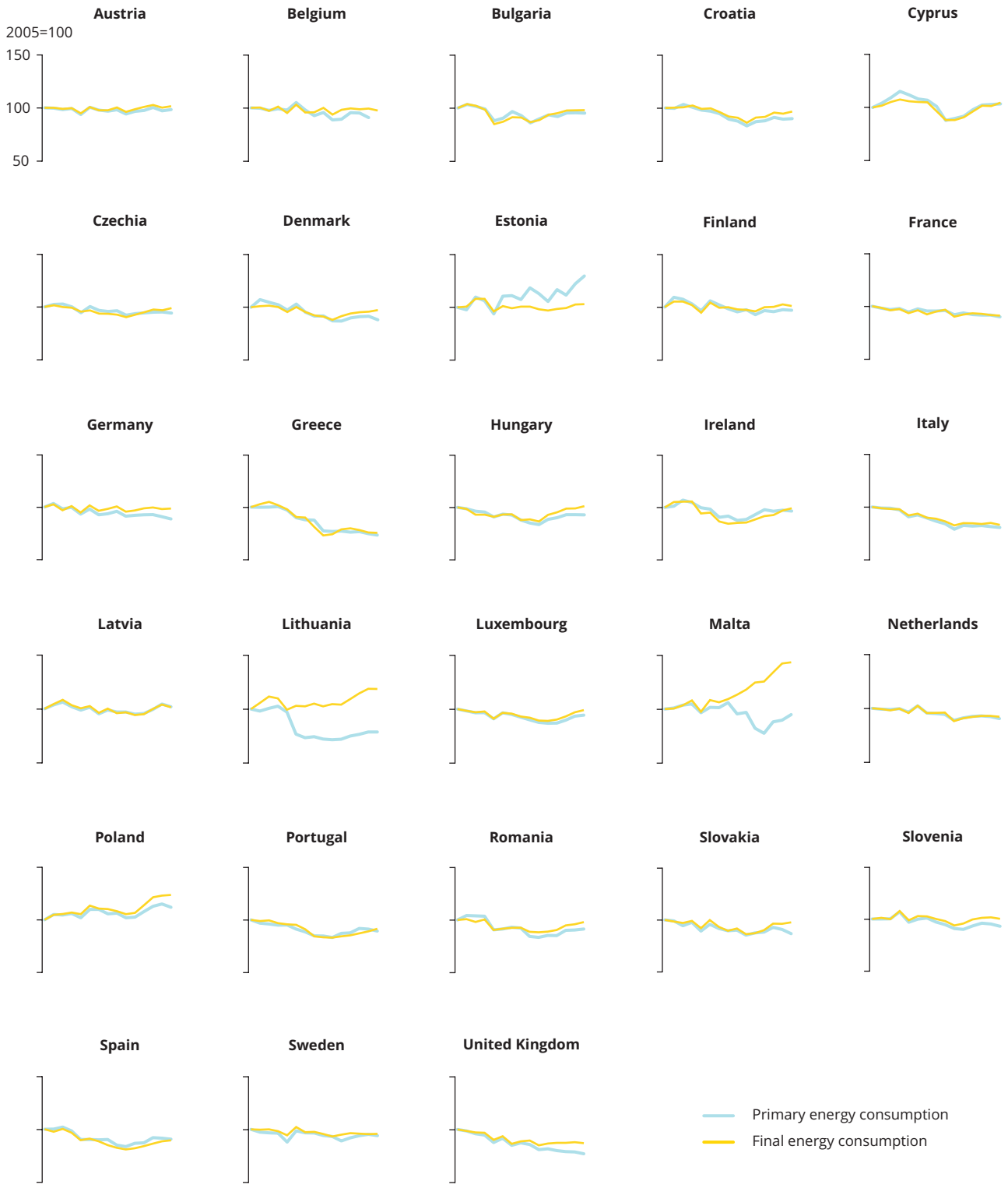
**Sources:** EEA (2020d); EC (2020c); EU (2012, 2018d); Eurostat (2020d, 2020a).

National indicative 2020 targets for final energy consumption set by Member States range from -23.2 % (Hungary) to +36.5 % (Malta), compared with 2005 levels. A total of 21 countries set targets to decrease their final energy consumption, while seven (Cyprus, Finland, Latvia, Malta, Poland, Romania and Slovenia) set targets that are higher than their 2005 final consumption levels. Countries' frequent revisions of their voluntary targets for 2020, especially in recent years, raise challenges for a transparent and consistent evaluation of national and EU progress towards the 2020 targets.

Between 2005 and 2018, final energy consumption decreased in 19 countries and increased in nine (Austria, Cyprus, Estonia, Finland, Latvia, Lithuania, Malta, Poland and Slovenia). The greatest increases were observed in Malta (+42.2 %) and Poland (+23.0 %), and are largely explained by the strong growth of energy consumption in the transport sector (+40 % in Malta and +83 % in Poland) and in the services sector (+97 % in Malta +19 % in Poland) (Eurostat, 2020d, 2020a).

Neither the Member States nor the EU legislation set an indicative trajectory to monitor national progress towards the 2020 targets. The current analysis uses, for each Member State, an indicative linear trajectory between primary and final energy consumption levels in 2005 and the 2020 targets, comparing the absolute

**Figure 4.2 Trends in primary and final energy consumption in the EU-28, 2005-2019**




**Note:** The graphs indicate the 2005-2019 trends in primary and final energy consumption in the EU-28, in comparison with 2005 levels, which are expressed as 100 %.

**Sources:** EEA (2020b); Eurostat (2020d, 2020a).

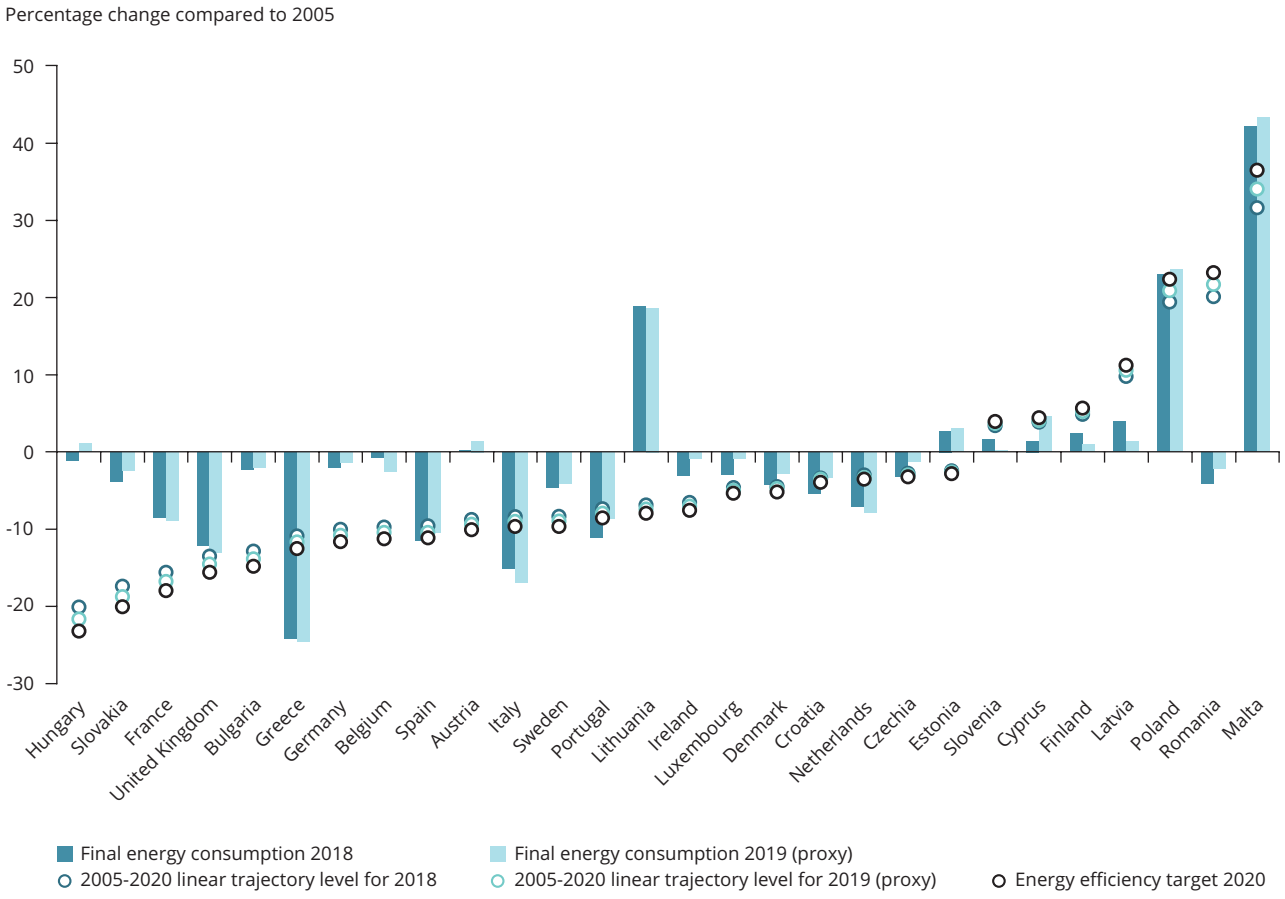
levels of energy consumption in the most recently reported year with this linear trajectory.

In 2018, 12 of the EU-28 Member States were in line with or below their linear trajectories for final energy consumption (see Figure 4.3). If maintained until 2020, the pace of reductions (or limited increases) observed since 2005 should allow these 12 Member States to meet their 2020 final energy targets. However, Austria, Belgium, Bulgaria, Denmark, Estonia, France, Germany, Hungary, Ireland, Lithuania, Luxembourg, Malta ([19]), Poland, Slovakia, Sweden ([20]) and the United Kingdom had not reduced their final energy consumption enough to stay below their linear trajectories. This marks a strong decline from 2017, when 16 EU countries stayed below their trajectories, and a continued decline from earlier years.

According to preliminary EEA data on final energy consumption in 2019, the number of Member States that have sufficiently reduced their consumption further decreased to nine (Finland, Greece, Italy, Latvia, the Netherlands, Portugal, Romania, Slovenia and Spain) (EEA, 2020b).

For primary energy consumption, national targets range from a 20.5 % reduction (United Kingdom) to a 28.6 % increase (Estonia) compared with 2005 levels. Between 2005 and 2018, primary energy consumption decreased in 24 EU countries and increased in Cyprus (+2.9 %), Estonia (+22.2 %), Latvia (+4.4 %) and Poland (+14.9 %). A total of 15 EU countries reduced (or limited the increase in) their primary energy consumption to levels below their corresponding linear trajectories in 2018. However, Austria, Belgium, Bulgaria, Cyprus,

**Figure 4.3 Final energy consumption and linear trajectory levels to reach 2020 targets, 2018 and 2019**




**Notes:** The figure compares, for each of the EU-28 countries, final energy consumption levels in 2018 and 2019 with the level of the corresponding indicative linear trajectory and the 2020 target for final energy consumption.

**Sources:** EEA (2020b); EC (2020h); Eurostat (2020a, 2020d).

([19]) See also footnote 14 on trends in Malta's energy consumption.
([20]) Sweden has opted for an energy intensity target where both the assumed level of GDP growth and energy consumption impacts the target level. The country may still reach its 2020 target, subject to future official figures for energy consumption and GDP.

Denmark, France, Germany, Hungary, Ireland, the Netherlands, Poland, Spain and Sweden have not sufficiently reduced their primary energy consumption. According to preliminary EEA data for 2019, a further three Member States' primary energy consumption levels were above their linear trajectories in that year.

## 4.4 Progress towards national 2030 energy efficiency targets

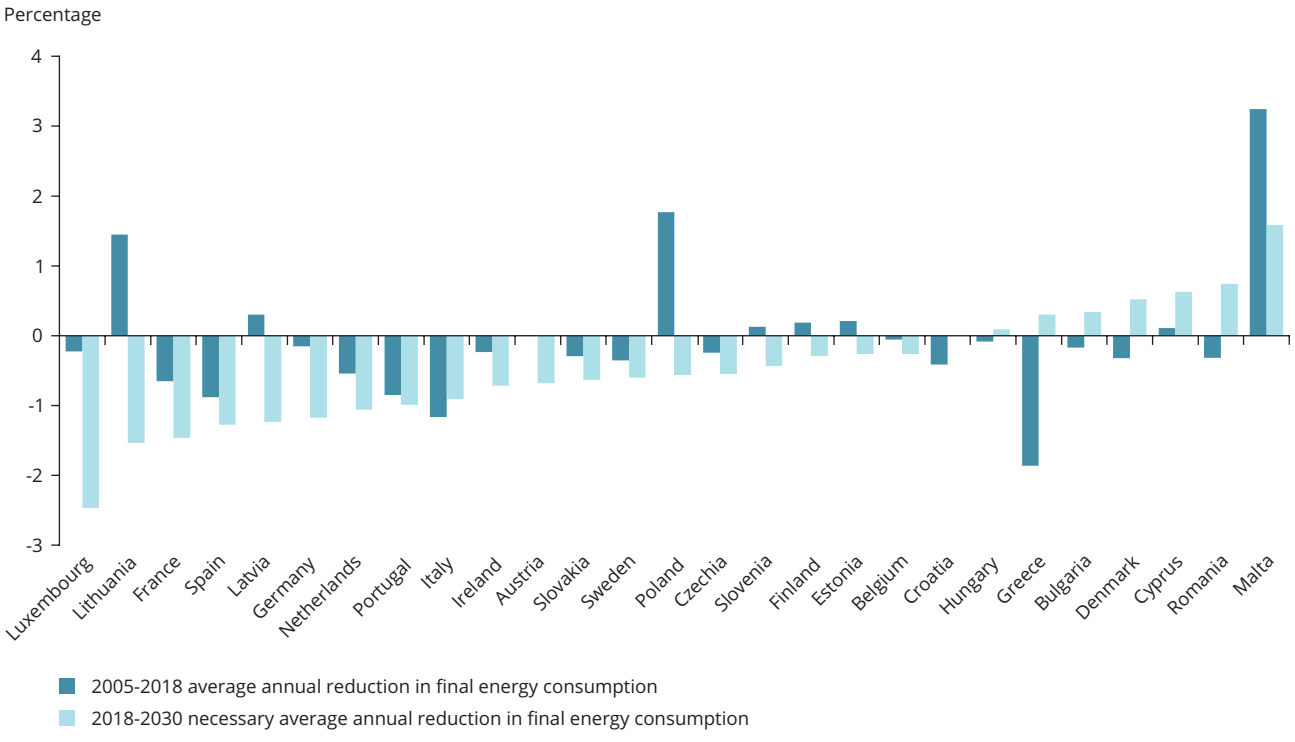
Similar to the 2020 targets, EU-27 countries set their own national non-binding contributions for energy efficiency for 2030 in their national energy and climate plans (NECPs). Together, their intended contributions to 2030 energy efficiency targets total 1 176 Mtoe for primary energy consumption and 885 Mtoe for final energy consumption, in comparison with the EU 2030 targets of 1 128 Mtoe for primary energy and 846 Mtoe for final energy consumption.

The contributions in the NECPs indicate that countries envisage considerably greater efforts, in line with national projections, to decrease energy consumption by 2030. As illustrated in Figure 4.4, 19 Member States aim to improve their annual, average change of final energy consumption by 2030 in comparison with historical, average annual rates. In contrast, six Member States envisage an increase or stabilisation in their final energy consumption by 2030 compared with 2018, despite having achieved annual reductions from 2005 to 2018 (Bulgaria, Croatia, Denmark, Greece, Hungary and Romania).

The efforts required to reach the 2030 contributions are affected by the historical progress by Member States as well. If all Member States had been on track to achieve their 2020 national indicative targets, only 13 Member States would have to accelerate their efforts to reduce final energy consumption between 2018 and 2030 compared with 2005-2018.

The efforts envisaged to lower primary energy consumption are less pronounced, in comparison with average historical rates achieved annually over the period 2005-2018: 12 Member States will require smaller annual reductions in primary energy consumption in the period 2018-2030 than in 2005-2018. Meanwhile, 15 Member States will need to accelerate their annual reduction in primary energy consumption by 2030 (Austria, Belgium, Bulgaria, Cyprus, Estonia, France, Germany, Ireland, Latvia,

**Figure 4.4 Average annual decreases in final energy consumption required to achieve the 2030 final energy consumptions contributions, compared with past efforts from 2005 to 2018**




**Note:** Dark blue bars show the historical average annual changes in final energy consumption relative to 2005. Light blue bars show the comparable average annual changes required to achieve the 2030 contributions for final energy as reported by Member states in their NECPs.

**Sources:** Compiled from data in EC (2020f); Eurostat (2020a, 2020d).

Luxembourg, the Netherlands, Poland, Slovenia, Spain and Sweden).

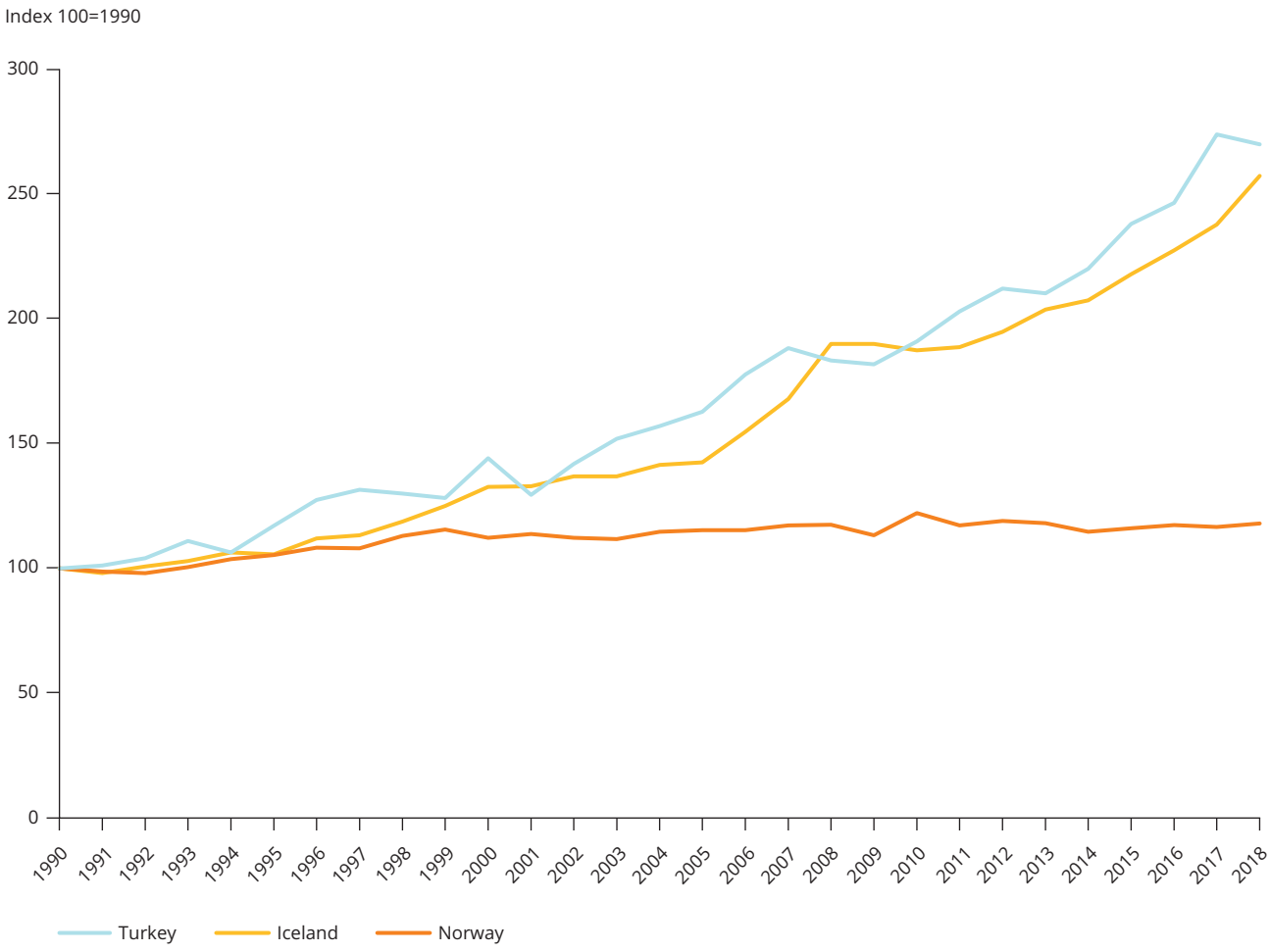
## 4.5 Trends in energy consumption in other European countries

Statistics on energy consumption are available from the European Commission for Iceland, Norway and Turkey (see Figure 4.5). Between 1990 and 2018, primary and final energy consumption increased in these three countries to greatly varying extents. Although **Turkey** experienced a relatively steady increase over the whole period and **Norway** a limited increase over the years, **Iceland** experienced a pronounced jump after 2005, mainly in primary energy consumption. Between 2005 and 2018, the primary energy consumption (final energy consumption) of Turkey, Norway and Iceland increased by 77 % (66 %), 5 % (2 %) and 103 % (81 %), respectively ([21]).

In **Switzerland**, final energy consumption increased by 4.6 % between 1990 and 2018 but decreased by 5.4 % between 2005 and 2018 (SFOE, 2019).

In relation to energy efficiency targets, Turkey implemented a national energy efficiency action plan for the period 2017-2023, aiming to reduce its primary energy consumption by 14 % by 2023 through 55 actions defined in six categories, namely buildings and services, energy, transport, industry and technology, agriculture, and cross-cutting (horizontal) areas. It is also projected to achieve cumulative savings of 23.9 Mtoe by 2023 (Turkey, 2018).

**Figure 4.5 Final energy consumption in Iceland, Norway and Turkey, 1990-2018**




**Sources:** Eurostat (2020a, 2020d).

([21]) Turkey has updated its energy consumption values since the data for this report were finalised, which results in slightly more modest increases in primary and final energy consumptions of 73 % and 60 %, respectively.

# 5 Methodology and data sources

## 5.1 EU Targets

### *5.1.1 2020 Targets*

For 2020, the EU-28 and its Member States have been working towards what are known as the '20-20-20' targets. These include targets to achieve the following by 2020:

- reduce greenhouse gas (GHG) emissions by 20 % compared with 1990 levels;
- increase to 20 % the share of energy from renewable sources in the EU's gross final energy consumption, with a minimum of a 10 % share of renewables in the transport sector; and
- reduce energy consumption by 20 %, compared with 2007 baseline projections for 2020.

These targets have been in effect since 2007, when the European Council committed the EU to becoming a highly energy-efficient, low-carbon economy by 2020 (Council of the European Union, 2007). To help Member States to meet the 2020 targets for GHG emissions, the EU adopted a climate and energy package in 2009. The package defined a single EU target for GHG emissions covered under the Emissions Trading System (ETS) (EU, 2003) and a set of national target trajectories for 2013-2020 for emissions within the scope of the Effort Sharing Decision (ESD) (EU, 2009a). Regarding renewable energy, the Renewable Energy Directive (RED) (EU, 2009b) set binding targets for each EU 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) (EU, 2012).

In 2010, the EU-28 submitted a pledge to the United Nations Framework Convention on Climate Change (UNFCCC) to reduce its GHG emissions by 20 % by 2020, compared with 1990 levels. This was intended to contribute to the UNFCCC's ultimate objective: to stabilise global GHG concentrations 'at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system' (UN, 1992) — in other words, to limit the global temperature increase to less than 2º C above average temperature levels before industrialisation. The EU clarified that its accounting rules for its target under the UNFCCC are more ambitious than the current rules under the Kyoto Protocol. For example, international aviation is included, an annual compliance cycle for emissions under the ESD has been added, and there are higher quality standards for emission credits from the Kyoto Protocol's clean development mechanism (CDM), used under the ETS (UNFCCC, 2013b).

This year being the target year, 2020, this report uses the most recent information available to assess progress towards meeting the 20-20-20 targets. It includes data on emissions, energy consumption and renewable energy shares in 2018, and approximated data for the year 2019. Recent trends are used to illustrate the pace and direction of reductions in GHG emissions, deployment of renewable energy and gains in energy efficiency.

### *5.1.2 2030 targets*

In October 2014, the European Council endorsed a binding EU target of an at least 40 % domestic reduction in GHG emissions by 2030 compared with 1990 (EC, 2014). This target was submitted to the UNFCCC as the EU's first nationally determined contribution (NDC) (EC, 2015b).

This report describes how current trends and developments may contribute to achieving the current 2030 targets for reducing GHG emissions, deploying renewable energy and making energy efficiency gains at European level, and also to reducing GHG emissions at Member State level. The current 2030 targets for GHG emissions, renewable energy and energy efficiency are:

- A binding target of at least a 40 % reduction in the EU-27's domestic GHG emissions (compared with 1990 levels). A binding emission cap is set for the sectors covered by the EU ETS (EU, 2018b) and binding annual minimum targets for reducing GHG emissions from 2021 to 2030 are set for EU Member States for the sectors not covered by the

EU ETS (EU, 2018f). Furthermore, the Land use, land use change and forestry (LULUCF) Regulation (EU, 2018e) stipulates that 'EU Member States have to ensure that GHG emissions from land use, land use change or forestry are offset by at least an equivalent removal of $CO_2$ from the atmosphere in the period 2021 to 2030' (EC, 2018c).

- A binding target to increase the share of energy from renewable sources in the EU-27 to at least 32 % of gross final energy consumption by 2030, including an upwards revision clause by 2023, set in the RED (EU, 2018c).

- A target of at least a 32.5 % improvement in energy efficiency by 2030 at EU-27 level (compared with the Commission's 2007 energy baseline scenario), with a clause for an upwards revision by 2023, set in the EED (EU, 2018d).

Although the above all include EU-27-wide targets for 2030, only GHG emission reduction targets have been set for 2030 at national level. In this report, progress towards meeting the national 2030 GHG emission targets can therefore be measured, as these are established and binding at national level. National, non-binding contributions in the areas of renewable energy deployment and energy efficiency have been set by Member States in the context of their national energy and climate plans (NECPs). Individual Member States are free to set their own higher national contributions and to adjust these upwards in future updates of their NECPs.

In September 2020 the European Commission proposed in its 2030 climate target plan to cut net GHG emissions by at least 55 % by 2030 to set Europe on a responsible path to becoming climate neutral by 2050 (EC, 2020e).

#### *5.1.3 2050 goals*

Although the 2030 targets provide a concrete objective in the medium term, they also provide a milestone towards achieving longer term goals for greater reductions in GHG emissions in the EU-27. In 2009, the European Council supported an EU objective of achieving emission reductions of at least 80-95 % by 2050 compared with 1990 levels (in the context of necessary reductions according to the Intergovernmental Panel on Climate Change, IPCC, by developed countries as a group). The Council articulated that 'such objectives should provide both the aspiration and the yardstick to establish mid-term goals' (European Council, 2009). This long-term goal was further consolidated in the *Roadmap for transforming the European Union into a competitive low-carbon economy by 2050*, which was adopted by the Commission in 2011 and provided guidance for long-term planning and policy development at EU and Member State levels (EC, 2011c).

In November 2018, the European Commission presented the communication *A clean planet for all — A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy* (EC, 2018a), which aims for the EU-27 to be climate neutral by 2050. In December 2019 this objective was endorsed by the European Council (European Council, 2019) and submitted with its long-term strategy to the United Framework Convention on Climate Change (UNFCCC) in March 2020 (Council of the European Union, 2020).

In September 2020 the European Commission presented a proposal to raise the EU's ambition to reducing net GHG emissions by at least 55 % below 1990 levels by 2030 (EC, 2020e). The accompanying impact assessment (EC, 2020c) presents several scenarios on how this can contribute to the objective of net-zero GHG emissions in 2050. It previews a set of actions required across all sectors of the economy and the launch of revisions of key legislative instruments. Detailed legislative proposals to support the increase in ambition with revised instruments will be published by June 2021.

When referring to the scenarios accompanying the Commission's impact assessment, this report describes the levels depicted in the assessment's 55 % reduction scenarios rather than specific values.

## 5.2 Data sources

The information in this report is based on the latest official data on GHG emissions and energy consumption in 2018, as reported by Member States to the European Commission and the EEA under the Monitoring Mechanism Regulation (MMR) (EU, 2013d), and to the European Commission under the Energy Statistics Regulation (EU, 2008b). It also reflects approximated data for GHG emissions in 2019, as reported under the MMR in July 2020, and early EEA estimates for the renewable energy shares and energy consumption in 2019. Designed to ensure monitoring of GHG emissions and related information that is necessary to track the EU and Member States' progress towards fulfilling their commitments under the Kyoto Protocol (UNFCCC, 1997), the MMR has been in effect since 2013, replacing the Monitoring Mechanism Decision (EU, 2004) which had been in place since 2004.

The MMR-related data are submitted by countries to the EEA's environment data repository, Reportnet ([22]), after which the EEA, supported by its European Topic Centre on Climate Change Mitigation and Energy (ETC/CME), performs quality control procedures in consultation with individual countries. For example, the national inventory data are quality checked, Effort Sharing emission data are reviewed and projection data are quality checked. Reviews and quality check procedures ensure that potential over- or underestimates in national inventory data are detected and corrected, and this helps to reduce the uncertainty inherent in projections.

The EEA and ETC/CME then compile the reported data and publish data sets, data viewers and related products on the EEA's website.

The following data sets are highlighted in this report:

- GHG emission inventory for the period 1990-2018, reported under the MMR in March 2020;
- Effort Sharing emission data for the period 2013-2018 (2018 data reviewed in 2020)
- ETS emission data for the years 2005-2019, from the European Union Transaction Log (EUTL), extracted in July 2020;
- GHG emission projection data up until 2035, reported under the MMR in March 2020;
- approximated ('proxy') GHG emission data, renewable energy shares and energy consumption for the year 2019, partly reported by Member States in July 2020 and gap-filled with estimates by the EEA (national GHG proxy data were not provided by Cyprus and Bulgaria);
- share of energy from renewable sources related to renewable energy use in Europe, reported under the Energy Statistics Regulation and the RED, and published by Eurostat in its SHARES tool in 2020 (Eurostat, 2020e);
- EEA early estimates for the share of energy from renewable sources in gross final energy consumption in 2019;
- primary (PEC) and final energy consumption (FEC) (indicators FEC2020-2030, PEC2020-2030), reported in the Energy Statistics Regulation and published by Eurostat in its energy statistics database, extracted in May 2020;
- EEA early estimates for the primary and final consumption of energy in 2019.

## 5.3 Geographical scope

This report describes the progress towards meeting climate mitigation and energy targets in Europe. While the report focuses mainly on aggregated and national progress in the EU-28 with regard to 2020 and in the EU-27 with regard to 2030 and 2050, a number of additional European countries provide the EEA with data and information on their own national achievements in these areas. These countries (Iceland, Liechtenstein, Norway, Switzerland and Turkey) are EEA member countries but not EU Member States, and they report their climate and energy information in the same format as the EU Member States do. A dedicated section in each chapter of the report describes trends and projected progress in Iceland, Liechtenstein, Norway, Switzerland and Turkey.

## 5.4 Supporting documents

Accompanying this report is a background document describing the methodology used in the analysis. This file is available at https://www.eea.europa.eu/publications/trends-and-projections-in-europe-2020/methodology-notes-trends-and-projections/view.

In addition, interactive country profiles that describe and compare national-level progress on all the dimensions covered in this report are available at: https://www.eea.europa.eu/themes/climate/trends-and-projections-in-europe/climate-and-energy-country-profiles.

## 5.5 Table of EU-28 countries' progress to targets

([22]) https://www.eionet.europa.eu/reportnet

## Table 5.1 Member States' progress to targets on greenhouse gas emissions, renewable energy and energy efficiency ([23])

| Countries | Greenhouse gas emissions | | | | Renewable energy | | | | Energy efficiency | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gap to Effort Sharing Decision emission target (2018) | Gap to Effort Sharing Decision emission target (proxy 2019) | Gap to 2030 Effort Sharing Regulation target (with existing measures) | Gap to 2030 Effort Sharing Regulation target (with additional measures) | Gap to 2017-2018 Renewable Energy Directive trajectory (2017-2018 RES share) | Gap to 2020 Renewable Energy Directive target (proxy 2019 RES share) | Gap to trajectory from national plan in 2018 | Gap to trajectory from national plan in proxy 2019 | Gap to 2018 primary energy consumption indicative linear (2018) | Gap to 2019 primary energy consumption indicative linear (proxy 2019) | Gap to 2018 final energy consumption indicative linear (2018) | Gap to 2019 final energy consumption indicative linear (proxy 2019) |
| | Percentage points (share of 2005 base-year emissions) | | | | Percentage points (share of renewable energy in gross final energy consumption) | | | | Percentage points (share of 2005 primary energy consumption) | | Percentage points share of 2005 final energy consumption) | |
| Austria | -2.5 | -4.2 | -20.2 | -9.0 | 3.0 | -0.1 | 0.1 | 0.2 | -0.4 | -1.8 | -8.8 | -10.8 |
| Belgium | -4.0 | -5.8 | -21.5 | -0.6 | 0.02 | -3.1 | -1.3 | -2.0 | -4.1 | -9.3 | -9.0 | -7.9 |
| Bulgaria | -1.1 | -3.6 | -8.1 | -8.1 | 5.9 | 5.3 | 6.8 | 6.5 | -6.1 | -6.5 | -10.6 | -11.8 |
| Croatia | 15.4 | 13.1 | -1.2 | 11.6 | 10.2 | 8.7 | 8.9 | 9.1 | 25.4 | 26.0 | 2.0 | -0.2 |
| Cyprus | -1.0 | -6.1 | -18.9 | -18.9 | 2.7 | 1.2 | 2.7 | 2.1 | -11.4 | -12.5 | 2.5 | -0.4 |
| Czechia | 8.5 | -2.0 | -1.5 | -0.5 | 4.4 | 2.5 | 1.8 | 1.8 | 8.6 | 9.9 | 0.4 | -1.7 |
| Denmark | 1.8 | 1.2 | -15.3 | -15.3 | 9.8 | 6.9 | 6.6 | 6.8 | -2.9 | -0.4 | -0.3 | -2.1 |
| Estonia | -3.0 | -9.9 | -21.7 | -6.2 | 7.0 | 6.4 | 5.5 | 6.9 | 2.5 | -3.0 | -5.1 | -5.6 |
| Finland | -0.9 | -0.7 | -15.5 | -1.9 | 6.4 | 4.2 | 5.5 | 5.4 | 8.4 | 9.4 | 2.5 | 4.4 |
| France | 2.7 | 1.7 | -13.3 | 4.6 | -2.3 | -5.8 | -3.9 | -4.8 | -5.2 | -4.6 | -7.1 | -7.9 |
| Germany | -1.9 | -4.5 | -16.2 | -16.2 | 2.2 | -0.9 | -0.2 | -0.6 | -2.8 | -1.7 | -8.0 | -9.4 |
| Greece | 23.6 | 24.7 | 9.1 | 17.7 | 3.4 | 1.6 | 3.4 | 3.6 | 9.4 | 9.5 | 13.4 | 13.0 |
| Hungary | 16.1 | 17.6 | 1.2 | 15.8 | 3.0 | -0.4 | 0.2 | -0.8 | -0.3 | -0.8 | -19.0 | -22.8 |
| Ireland | -11.8 | -12.4 | -23.9 | -1.5 | -0.7 | -4.0 | -1.9 | -2.4 | -3.4 | -3.0 | -3.5 | -6.3 |
| Italy | 5.1 | 6.3 | -6.1 | 2.6 | 5.2 | 1.4 | 3.9 | 3.3 | 7.6 | 7.7 | 6.8 | 7.9 |
| Latvia | 8.1 | 10.1 | 1.2 | 3.2 | 2.2 | 0.8 | 2.6 | 2.3 | 12.5 | 16.3 | 5.8 | 9.1 |
| Lithuania | 1.6 | 3.8 | -10.7 | 15.2 | 5.0 | 1.8 | 0.4 | 0.8 | 4.5 | 3.1 | -25.7 | -26.0 |
| Luxembourg | -5.4 | -8.9 | -24.3 | 13.4 | 0.2 | -1.3 | 1.6 | 0.5 | 1.2 | -0.2 | -1.7 | -4.0 |
| Malta | -18.8 | -18.8 | -61.7 | -61.7 | 1.1 | -1.5 | -0.3 | -0.9 | 1.5 | -4.4 | -10.5 | -9.3 |
| Netherlands | 9.5 | 7.4 | -3.6 | -3.6 | -3.0 | -5.6 | -4.7 | -4.9 | -4.0 | -3.0 | 4.0 | 4.6 |
| Poland | -6.3 | -1.9 | -17.9 | 0.4 | -1.1 | -3.4 | -2.8 | -3.4 | -6.6 | -2.9 | -3.6 | -2.7 |

([23]) The EEA projections dataset includes Member States' most recent updates of their GHG emissions projections as of March 2020. For many countries, the projected effects of additional measures ('WAM scenarios') differ from those submitted in their NECPs, as does the method to gapfill missing scenarios. For a comparison of the projections submitted under the MMR and those included in the NECPs, see the Methodology Notes to this report.

**Table 5.1 Member States' progress to targets on greenhouse gas emissions, renewable energy and energy efficiency ([23]) (cont.)**

| Countries | Greenhouse gas emissions | | | | Renewable energy | | | | Energy efficiency | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gap to Effort Sharing Decision emission target (2018) | Gap to Effort Sharing Decision emission target (proxy 2019) | Gap to 2030 Effort Sharing Regulation target (with existing measures) | Gap to 2030 Effort Sharing Regulation target (with additional measures) | Gap to 2017-2018 Renewable Energy Directive trajectory (2017-2018 RES share) | Gap to 2020 Renewable Energy Directive target (proxy 2019 RES share) | Gap to trajectory from national plan in 2018 | Gap to trajectory from national plan in proxy 2019 | Gap to 2018 primary energy consumption indicative linear (2018) | Gap to 2019 primary energy consumption indicative linear (proxy 2019) | Gap to 2018 final energy consumption indicative linear (2018) | Gap to 2019 final energy consumption indicative linear (proxy 2019) |
| | Percentage points (share of 2005 base-year emissions) | | | | Percentage points (share of renewable energy in gross final energy consumption) | | | | Percentage points (share of 2005 primary energy consumption) | | Percentage points share of 2005 final energy consumption) | |
| Portugal | 15.9 | 14.7 | 26.2 | 29.6 | 3.1 | -0.6 | -0.3 | -0.4 | 0.6 | 2.0 | 3.7 | 0.7 |
| Romania | 11.0 | 16.5 | -12.5 | -7.9 | 2.3 | 0.3 | 2.0 | 1.3 | 26.3 | 26.7 | 24.2 | 23.8 |
| Slovakia | 18.6 | 16.9 | -5.4 | 8.8 | 0.2 | -2.8 | 0.5 | -2.0 | 4.2 | 7.9 | -13.5 | -16.3 |
| Slovenia | 10.2 | 12.3 | -4.7 | 11.8 | -0.7 | -3.2 | -2.5 | -2.5 | 6.2 | 8.4 | 1.8 | 3.5 |
| Spain | 5.6 | 5.7 | -9.7 | 12.7 | 1.5 | -2.0 | -2.9 | -3.5 | -0.2 | 0.2 | 1.8 | 0.1 |
| Sweden | 13.4 | 14.2 | 0.1 | 0.1 | 8.6 | 6.8 | 5.6 | 6.2 | -5.6 | -5.2 | -3.7 | -4.8 |
| United Kingdom | 6.6 | 6.5 | -4.9 | -5.0 | 0.2 | -2.6 | 0.0 | -0.6 | 3.4 | 3.8 | -1.4 | -1.5 |

**Sources:** EEA (2020i, 2020b, 2020d, 2020b); EC (2020h); EU (2013b, 2017, 2009b); Eurostat (2020e, 2020d).

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# Abbreviations

| | |
|---|---|
| AEA | Annual emission allocation |
| AR4 | Fourth Assessment Report |
| CDM | Clean development mechanism |
| $CO_2$ | Carbon dioxide |
| $CO_2e$ | Carbon dioxide equivalent |
| EEA | European Environment Agency |
| EED | Energy Efficiency Directive |
| EEO | Energy efficiency obligation |
| ESD | Effort Sharing Decision |
| ESR | Effort Sharing Regulation |
| ETC/CME | European Topic Centre for Climate Change Mitigation and Energy (from 1 January 2019) |
| ETS | Emissions Trading System |
| EU | European Union |
| EU-27 | 27 Member States of the European Union (post-Brexit) |
| EU-28 | 28 Member States of the European Union (pre-Brexit) |
| EUTL | European Union Transaction Log |
| FEC | Final energy consumption |
| GDP | Gross domestic product |
| GHG | Greenhouse gas |
| GW | Gigawatt |
| GWP | Global warming potential |
| ILUC | Indirect Land Use Change (Directive) |
| INDC | Intended nationally determined contribution |
| IPCC | Intergovernmental Panel on Climate Change |

| | |
|---|---|
| LMU | Land mitigation units |
| LULUCF | Land use, land use change and forestry |
| MMR | Monitoring Mechanism Regulation |
| Mt | Million tonnes |
| $MtCO_2e$ | Million tonnes of $CO_2$ equivalent |
| Mtoe | Million tonnes of oil equivalent |
| NDC | Nationally determined contribution |
| NECP | National energy and climate plan |
| NEEAP | National energy efficiency action plan |
| $NF_3$ | Nitrogen trifluoride |
| NREAP | National renewable energy action plan |
| PEC | Primary energy consumption |
| PRIMES | Price-driven and Agent-based Simulation of Markets Energy System (models) |
| QA/QC | Quality assurance and quality control |
| RED | Renewable Energy Directive |
| RES | Renewable energy sources |
| RES-E | Renewable energy sources in electricity |
| RES-H/C | Renewable energy sources in heating and cooling |
| RES-T | Renewable energy sources in transport |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WAM | With additional measures |
| WEM | With existing measures |

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