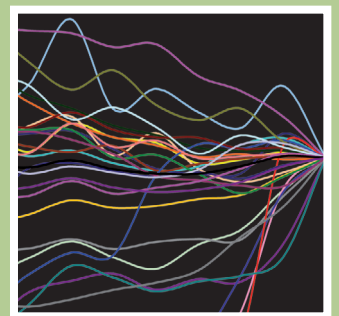


Progress towards 2008–2012 Kyoto targets in Europe

ISSN 1725-2237



Progress towards 2008–2012 Kyoto targets in Europe

Design: EEA
Cover photo: © EEA
Layout: EEA/Pia Schmidt

Legal notice

The contents of this publication do not necessarily reflect the official opinions of the European Commission or other institutions of the European Union. Neither the European Environment Agency nor any person or company acting on behalf of the Agency is responsible for the use that may be made of the information contained in this report.

Copyright notice

© European Environment Agency, 2014

Reproduction is authorised, provided the source is acknowledged, save where otherwise stated.

Information about the European Union is available on the Internet. It can be accessed through the Europa server (www.europa.eu).

Luxembourg: Publications Office of the European Union, 2014

ISBN 978-92-9213-493-8

ISSN 1725-2237

doi:10.2800/23125



European Environment Agency
Kongens Nytorv 6
1050 Copenhagen K
Denmark
Tel.: +45 33 36 71 00
Fax: +45 33 36 71 99
Web: eea.europa.eu
Enquiries: eea.europa.eu/enquiries

Contents

List of figures and tables	4
Acknowledgements	5
Executive summary	6
1 Introduction	8
2 Progress towards Kyoto targets in Europe	9
2.1 Why this analysis focuses on non-ETS emissions.....	10
2.2 Progress towards targets in 30 European countries	10
2.3 Progress towards the EU-15 target.....	13
3 GHG emission levels (2008–2012)	16
3.1 Total GHG emissions	17
3.2 Contributions of ETS and non-ETS sectors to achieving Kyoto targets in Europe	19
3.3 ETS emissions.....	21
3.4 Non-ETS GHG emissions.....	23
4 Contribution from carbon sinks	25
5 Use of flexible mechanisms	29
5.1 Intended use of flexible mechanisms, as reported by Member States.....	30
5.2 Use of flexible mechanisms to achieve compliance, as estimated by EEA	33
5.3 Use of international emission credits in the EU ETS	33
5.4 Total use of credits at national level	35
Acronyms, units and terms	38
References	41
Annex 1 Detailed calculations of Kyoto progress for individual countries	44
Annex 2 Kyoto Protocol targets	46
Annex 3 Achieving compliance under the Kyoto Protocol	51
Annex 4 Data source and data quality	58

List of figures and tables

Figures

Figure 2.1	Progress made by European countries towards their Kyoto or burden-sharing targets.....	12
Figure 2.2	Progress of the EU-15 towards its Kyoto target	15
Figure 3.1	Total GHG emissions and Kyoto (or burden-sharing) targets, 2008–2012	18
Figure 3.2	Decomposition analysis of the change in total CO ₂ emissions from fossil fuel combustion in the EU.....	19
Figure 3.3	Total, ETS and non-ETS GHG emission trends in the EU-15 compared to their respective targets, 2008–2012.....	20
Figure 3.4	Gaps between ETS and non-ETS emissions and their respective 2008–2012 allowed emission levels	21
Figure 3.5	Verified emissions of stationary EU ETS installations by sectors, 2005–2012.....	22
Figure 3.6	Trend of verified emissions in key sectors, 2005–2012	23
Figure 3.7	Gaps between non-ETS emissions and the relevant targets, 2008–2012 average	24
Figure 4.1	Contribution of carbon sequestration to Kyoto compliance.....	27
Figure 5.1	Contribution of intended use of flexible mechanisms to Kyoto compliance	31
Figure 5.2	Annual use of international Kyoto credits (CERs and ERUs) in the EU ETS, 2008–2012	35
Figure 5.3	Total use of flexible mechanisms by governments (EEA estimate) and ETS operators, 2008–2012	37
Figure A2.1	Emission targets under the Kyoto Protocol in Europe, 2008–2012	49
Figure A3.1	Possible changes in an assigned amount under the Kyoto Protocol	52
Figure A3.2	EU Kyoto targets and the split between ETS and non-ETS	55
Figure A3.3	Over-achievement and surplus assigned amount	57

Tables

Table 2.1	Detailed calculation of progress of the EU-15 towards its Kyoto target.....	14
Table 4.1	Emissions and removals from LULUCF activities, 2008–2012	28
Table 5.1	Intended use of flexible mechanisms by governments for the first commitment period, as reported by countries.....	32
Table 5.2	Use of flexible mechanisms by governments to achieve compliance, as estimated by EEA	34
Table 5.3	Entitlements for the use of international Kyoto credits (CERs and ERUs) by stationary installations in the EU ETS.....	36
Table A2.1	Emission targets under the Kyoto Protocol in Europe, 2008–2012	48

Acknowledgements

This report was prepared by the European Environment Agency (EEA) and its European Topic Centre for Air Pollution and Climate Change Mitigation (ETC/ACM). The ETC/ACM is a consortium of European institutes assisting the EEA in its support to EU policy in the field of air pollution and climate change mitigation.

The ETC/ACM partner involved in the preparation of this report is the Öko-Institut (Germany). The assessment of progress towards 2008–2012 Kyoto targets was prepared by Sabine Gores and Anne Siemons. Additional analysis on the EU ETS was provided by Johanna Claudius and Hauke Hermann, with support from Vanessa Cook, from the Öko-Institut (Germany).

The EEA project manager was François Dejean. The ETC/ACM task manager was Sabine Gores (Öko-Institut).

Additional support for the preparation of the report was provided by Andreas Barkman, Ricardo Fernandez and Paul McAleavey.

The EEA would like to thank the experts of EEA member countries for their cooperation during the quality assurance process of the information submitted in 2014. The EEA also acknowledges the comments received on the draft report from the national focal points and experts of EEA member countries, and the European Commission and its Joint Research Centre (JRC). These comments were included in the report, as far as was practically feasible.

Executive summary

Latest data confirm that the EU is on track to over-achieve its Kyoto Protocol target

In October 2013, the EEA published its annual assessment of the progress of the European Union (EU) and European countries towards achieving their commitments under the Kyoto Protocol for the period 2008–2012, as Part A of the EEA report *Trends and projections in Europe 2013 – Tracking progress towards Europe’s climate and energy targets until 2020* (EEA, 2013a). This assessment was based on approximated estimates of greenhouse gas (GHG) emissions for the year 2012 (EEA, 2013b).

This report provides an update of the 2013 assessment, based on the recent national GHG inventories submitted under the United Nations Framework Convention on Climate Change (UNFCCC) in April/May 2014 (EEA, 2014a). These inventories cover for the first time the full time series corresponding to the first commitment period of the Kyoto Protocol. It is also based on updated information on the effects of carbon sinks (also submitted in 2014 under the Kyoto Protocol) and on the use of flexible mechanisms as reported by Member States to the EU. However, final compliance will only be determined after the international review of the GHG inventories under the UNFCCC process and a subsequent 100-day period during which parties will have the possibility to finalise, if necessary, purchases of Kyoto units from other countries in order to achieve compliance.

The updated assessment confirms to a large extent the conclusions of the 2013 report: the EU is well on track towards over-achieving its commitments under the Kyoto Protocol. Of the 30 EEA member countries which have a target for the first commitment period of the Kyoto Protocol (2008–2012), all except Italy are on track to achieving their own Kyoto target.

The EU-15 has a common reduction target of – 8 % compared to base-year levels. During the period 2008–2012, total GHG emissions were on average 11.8 % below base-year emissions. Just between 2008

and 2012, GHG emissions decreased by 9.7 % in the EU-15 (9.2 % in the whole EU). Recent EEA analyses indicate that economic recession can explain between 30 % and 50 % of the observed emission reductions across the EU. The combined effects of other factors play a more important role. These factors include the lower energy intensity of the economy (improved efficiency and changes in the structure of the economy) as well as lower carbon intensity of the energy mix (an increasing share of renewables).

Besides domestic GHG emissions levels (i.e. territorial emissions) during this period, a number of other parameters must be taken into account to properly assess progress towards Kyoto and burden-sharing targets:

- The allocation of allowances under the ETS. Since such allowances are linked to Kyoto units, this is equivalent to splitting the Kyoto or burden-sharing targets into two parts: one covering the ETS sectors (the ETS cap for 2008–2012, which operators of installations covered by the ETS are legally bound to achieve), and one for the non-ETS emissions, to be achieved by governments.
- The net contribution on GHG emissions of activities related to carbon sinks and sources, such as when carbon is absorbed by forest growth with any net benefit then being accounted for.
- The use of flexible mechanisms, which allows countries to buy emission credits from other countries in order to increase their emission budget.

The EU-15 on track to over-achieve its target by 1 billion tonnes (without taking into account over-achievements in the EU ETS)

Taking the effects of all these parameters into account, the combined performance of all

EU-15 Member States could lead to a total over-delivery of about 1.0 billion tonnes CO₂-equivalent over the full 5-year period, without accounting for any over-achievement taking place within the EU ETS (which would not count towards Kyoto compliance). This results from:

- an over-achievement of the allowed level for non-ETS emissions at EU-15 level by a difference of 415 Mt CO₂-equivalent for the full period (83 Mt CO₂-equivalent per year, which corresponds to 1.9 % of EU-15 base-year emissions, in comparison with an 8 % reduction target);
- a total removal of 293 Mt CO₂-equivalent for the full the commitment period due to LULUCF activities (59 Mt CO₂-equivalent per year which corresponds to 1.4 % of EU-15 base-year emissions);
- the intended net purchase by governments of nine EU Member States of 328 million units through flexible mechanisms (66 Mt CO₂-equivalent per year, representing 1.5 % of base-year emissions). This does not include the additional use of flexible mechanisms by operators within the EU ETS.

As the intended use in most EU Member States is larger than the quantity actually needed to close the gap to target, the total amount of flexible mechanisms used is actually likely to be lower than reported. The EEA estimates that 280 million units would be sufficient for EU-15 Member States to achieve their burden-sharing targets.

When looking at total GHG emissions at national level, average emission levels for the period 2008–2012 were below Kyoto targets in 20 of the 30 European countries which are assessed in this report. When non-ETS emissions only are considered, levels for the period 2008–2012 were below the corresponding target levels in 18 of the European countries assessed in this report. Carbon sequestration from sinks could fully cover the gap remaining between emissions and non-ETS targets in Ireland, Portugal and Slovenia.

Twelve European countries intend to use flexible mechanisms provided under the Kyoto Protocol to achieve their respective targets. Altogether, these countries intend to buy approximately 389 million Kyoto units to achieve their target. However, the amount of units actually needed for compliance might be lower than the intended use reported by EU Member States.

Using the flexible mechanisms is in particular crucial for Austria, Belgium, Denmark, Italy, Liechtenstein, Luxembourg, the Netherlands, Spain and Switzerland, to reach their Kyoto or burden-sharing targets. For Austria, Liechtenstein, Luxembourg and Spain, the use of flexible mechanisms represents about 10% or more of base-year emissions.

Flexible mechanisms have also been used in the EU ETS: in total 808 million credits (528 million certified emission reductions (CERs) and 281 million emission reduction units (ERUs) have been used by operators to comply during the second trading period of the ETS (2008–2012). However, these credits do not directly contribute to the achievement of Kyoto targets by governments.

Taking together the actual use of flexible mechanisms in the EU ETS in the period 2008–2012 and the estimated use by governments, considering most actual emission data in this period, the total amount is 441 Mt CO₂-equivalent per year, which is 5.1 % of base year emissions.

Italy still not fully on track towards its burden-sharing target

As was already the case in previous assessments, Italy is still not on track towards its burden-sharing target under EU law. The current information on GHG emissions and removals from carbon sink activities indicate a need for Italy to purchase about 28 million Kyoto units for the whole commitment period, when only 10 million units have been purchased so far and no concrete plan exists for purchasing additional units. Italy falls therefore short of its burden-sharing target by a shortfall of about 18 Mt CO₂-equivalent for the whole period. Italy should therefore address this issue by revising its plans concerning the purchase of Kyoto units to fully cover this observed gap. Italy reported recently that the purchase of the necessary quantity of AAUs to achieve compliance had been approved in its 2014 economic and financial document (DEF) (Italy, 2014).

Although the EU-15 overall emission reduction largely exceeds the 8 % reduction target, formal compliance by the EU-15 still depends on the achievement by each of the EU-15 Member States of their own target set under the Burden-Sharing Agreement. Italy will need to address its current gap by increasing its use of flexible mechanisms by the end of the true-up period in 2015, in order for the EU-15 to achieve its target.

1 Introduction

This report provides an assessment of the latest progress, as of June 2014, made by the EU and European countries in achieving their GHG targets during the first commitment period of the Kyoto Protocol, from 2008 until 2012.

The assessment contains a detailed analysis of the current state of play for three broad categories.

- The EU-15 grouping (as one entity, comprising the 15 pre-2004 Member States), which has an overall 8 % reduction commitment under the Kyoto Protocol.
- The 26 EU Member States which have a Kyoto target (all 28 Member States except Cyprus and Malta).
- The four other EEA member countries ⁽¹⁾ which have a Kyoto target (Iceland, Liechtenstein, Norway and Switzerland). Cyprus, Malta and Turkey do not have a target under the Kyoto Protocol, and are therefore not covered by the assessment of progress towards Kyoto or 'burden-sharing' targets.

April/May of 2014 was the first time that countries officially reported GHG emission data covering the full period from 2008 to 2012. The report therefore provides an overview of those countries which have already achieved their Kyoto target through domestic emission reductions, and also

of those which must use the Kyoto Protocol's flexible mechanisms ⁽²⁾ in order to do likewise. The assessment pays particular attention to the specific role played by the EU Emissions Trading Scheme (ETS) in its contribution to the achievement of Kyoto targets by EU Member States.

Final compliance will only be determined in 2015, after the international review of GHG inventories under the United Nations Framework Convention on Climate Change (UNFCCC) process, and a subsequent 100-day period during which parties will be able to finalise, if necessary, purchases of Kyoto units from other countries, in order to achieve compliance. Taking into account the information provided by countries on their expected use of these flexible mechanisms, the report spotlights countries which must modify their plans on the use of such flexible mechanisms, if they are to achieve their Kyoto or burden-sharing commitments.

This report is published alongside the EEA 'Trends and projections' report (EEA, 2014e), which focuses on EU progress towards climate and energy targets set for 2020.

This report also complements the European Commission's annual report to the European Parliament and the Council on the progress of the EU and its Member States towards reaching the Kyoto objectives and the Europe 2020 targets ⁽³⁾.

⁽¹⁾ The EEA member countries are Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

⁽²⁾ Flexible mechanisms allow countries to account for emission reductions occurring in other countries.

⁽³⁾ As required by Article 21 of the Monitoring Mechanism Regulation (EU) 525/2013 (EU, 2013).

2 Progress towards Kyoto targets in Europe

This chapter presents the main results of the assessment of progress made by the EU-15 and European countries and towards their respective Kyoto or burden-sharing targets. It brings together the results of Chapter 3, Chapter 4 and Chapter 5, which analyse in further detail the building blocks

upon which Kyoto compliance is assessed, i.e. changes in domestic emissions compared to the base year, the contribution of carbon sinks and the use of flexible mechanisms, respectively. The analysis below, therefore, tracks progress taking into account all these three parameters.

Key messages

1. The EU is well on track towards achieving its commitments under the first period of the Kyoto Protocol. This confirms the results published in the EEA's 2013 report *Trends and projections in Europe 2013: Tracking progress towards Europe's climate and energy targets until 2020*.
2. All 30 EEA member countries which have a target for the first commitment period of the Kyoto Protocol (2008–2012), except Italy, are on track to achieve their Kyoto or 'burden-sharing' targets. This estimation takes into account the final emission levels observed during the period, including the contribution of carbon sinks, as well as the planned use of Kyoto mechanisms by twelve countries (including nine EU Member States) to achieve their own target. Full clarity on the issue of final compliance will only be attainable at the end of the 'true-up' period.
3. EU-15 total GHG emissions were 11.8 % below base-year emissions (on average, during the 2008–2012 period). Taking into account the effect of allowance allocations under the ETS, the use of carbon sinks and intended use of flexible mechanisms, the combined over-delivery (in terms of surplus Kyoto units) is equivalent to 1.0 billion tonnes CO₂-equivalent over the full 5-year period. This does not take into account the surplus of allowances and international credits held by ETS operators, which are not under the control of governments for Kyoto compliance. This is less than the estimated over-achievement of the EU-15 Kyoto target of 1.2 billion tonnes CO₂-equivalent presented in the 2013 assessment.
4. As in previous years, Italy is still not on course to achieve its 'burden-sharing' target. Current information on GHG emissions, removals from carbon sink activities and use of the flexible mechanisms indicates that Italy falls short of its target by an annual average of 3.6 Mt CO₂-equivalent, resulting in a total shortfall of about 18 Mt CO₂-equivalent for the whole period. Italy should therefore upgrade its plans on the use of flexible mechanisms to fully cover this observed gap. Italy reported recently that the purchase of the necessary quantity of AAUs to achieve compliance had been approved in its 2014 economic and financial document (DEF).
5. Although the EU-15 overall emission reduction largely exceeds the 8 % reduction target, formal compliance of the EU-15 still depends each EU-15 Member State achieving its own target set under the Burden-Sharing Agreement. Italy will need to address its current gap by increasing its use of flexible mechanisms by the end of the true-up period in 2015, in order for the EU-15 to achieve its target.

2.1 Why this analysis focuses on non-ETS emissions

This analysis focuses on the progress made by governments, who are responsible for the achievement of compliance of their country under the Kyoto Protocol. Therefore it only considers whether countries managed to stay below the non-ETS allowed levels. This is because the Kyoto and burden-sharing targets were split in two parts:

- ETS operators (installations) had the main responsibility for emission reductions in the ETS sector. By design, all emissions between 2008 and 2012 covered by the EU ETS were matched by an equivalent quantity of Kyoto units (ETS allowances and international Kyoto credits), surrendered by ETS operators to their governments.
- Governments had no direct control over the ETS units (allowances or credits) but their main area of responsibility was to ensure that their national emissions which were not covered by the EU ETS were reduced below their corresponding non-ETS allowed emissions, which constitute de facto a 'non-ETS target' (see further details in Annex 3). Table 2.1 below outlines the main steps in the calculations involved for the EU-15.

Assuming that the legally binding requirements under the ETS are met by all operators, the achievement by a government of its non-ETS target is equivalent to achieving its Kyoto target. Likewise, failure to achieve a non-ETS target would imply a deficit of Kyoto units to achieve Kyoto compliance, even if a surplus would exist in the EU ETS.

2.2 Progress towards targets in 30 European countries

A total of 17 countries achieved non-ETS emissions levels during the period 2008–2012 below their respective emission budgets (see Figure 2.1). Among these countries were six EU-15 Member States (Finland, France, Germany, Greece, Sweden and the United Kingdom), ten non-EU-15 Member States (Bulgaria, Croatia, the Czech Republic, Estonia,

Hungary, Latvia, Lithuania, Poland, Romania and Slovakia) and one EEA member country (Norway). See further details in Chapter 3.

In three countries (Ireland, Portugal and Slovenia), carbon sequestration from Land Use, Land-Use Change and Forestry (LULUCF) activities is expected to reduce emissions and fully cover the existing gap between (non-ETS) GHG emissions and their corresponding targets. See further details in Chapter 4.

Twelve countries (Austria, Belgium, Denmark, Ireland, Italy, Liechtenstein, Luxembourg, the Netherlands, Norway, Portugal, Spain and Switzerland) reported that they intend to use flexible mechanisms (i.e. purchasing emission reduction credits from other countries) in order to reach their targets⁽⁴⁾. However, the GHG emission levels in Ireland and Portugal during the period 2008–2012 indicate that these two EU Member States should not need to use the flexible mechanisms to achieve their burden-sharing target. Italy's intended use of flexible mechanisms, as currently reported, would not be sufficient to fill the gap. See further details in Chapter 5.

As in previous years, the assessment shows that Italy is still not on track towards its burden-sharing target, and therefore needs to consider increasing its use of flexible mechanisms. Emissions in non-ETS sectors during the period 2008–2012 were higher than their corresponding allowed level by a gap of 104 Mt CO₂-equivalent for the whole commitment period. This gap is not fully offset by the expected removals of 75 Mt CO₂-equivalent from carbon sink activities and the 10 million Kyoto flexible mechanism units that the Italian government currently expects will contribute to achieving the burden-sharing target. This leaves Italy with a total shortfall of about 18 million Kyoto units for the whole period. According to information recently provided by this Member State, the purchase of the necessary quantity of AAUs to achieve compliance was approved in its 2014 economic and financial document (DEF) (Italy, 2014). Italy is also the only EU-15 Member State intending to use flexible mechanisms that has not reported any information on the amount of financial resources allocated for this purpose.

⁽⁴⁾ The intended use of credits from flexible mechanisms is based on information reported by Member States to the European Commission. They mostly indicate the maximum amount of units from flexible mechanisms which a country might use for compliance with its Kyoto targets. The estimated use based on current inventory data can be lower than the intended use reported earlier if more emission reductions were achieved domestically. In the following, figures for intended use are used unless indicated otherwise. For an overview based on the estimated use please see Section 5.2.

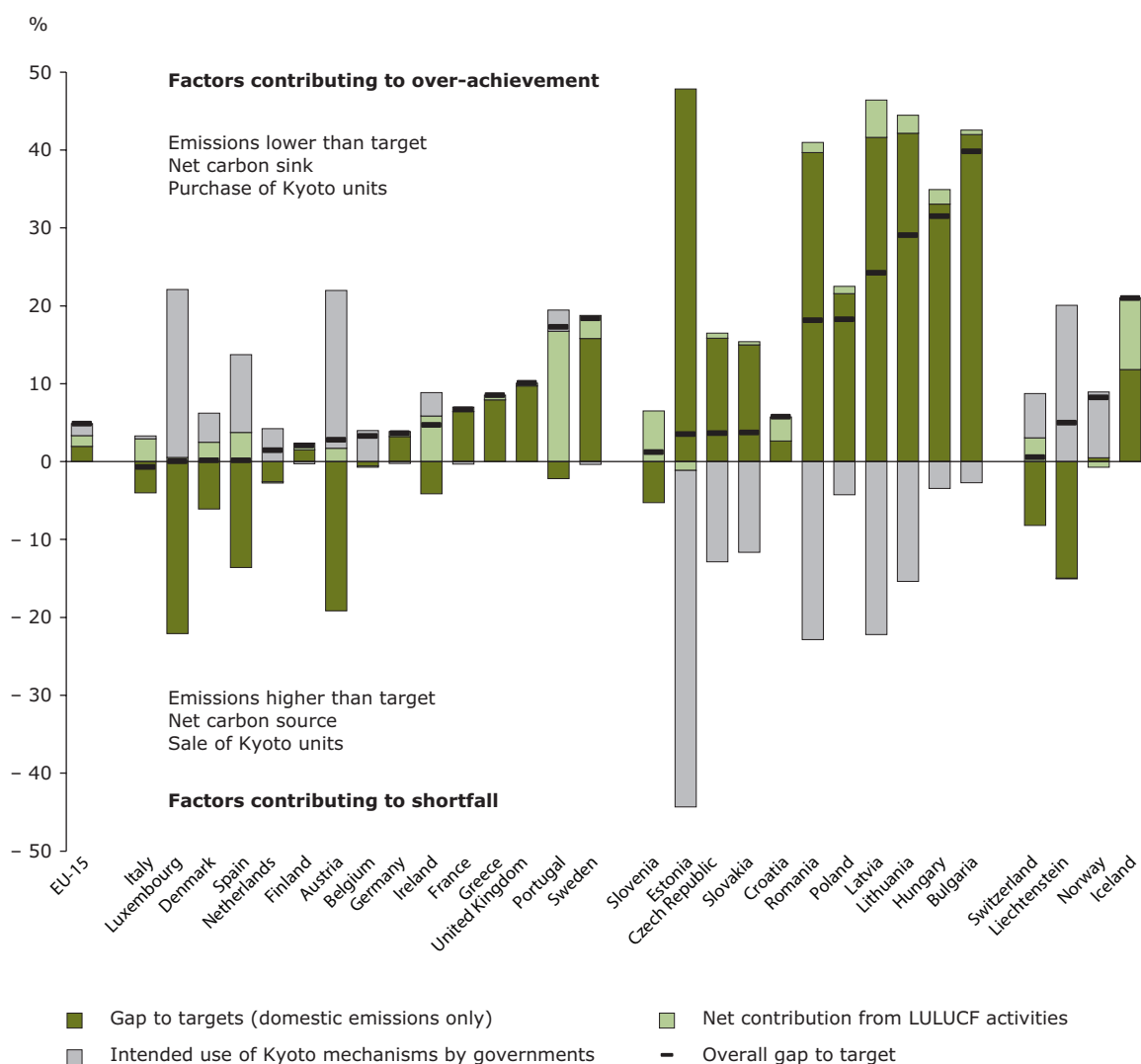
In 2014, Luxembourg is considered to be on track towards its target. This was not the case in 2013, when the EEA report *Trends and projections in Europe 2013* noted a small shortfall of about 1 million Kyoto units for the whole commitment period. Data from the latest GHG emission inventory indicate that the gap between domestic emissions and the burden-sharing target is slightly smaller than previously estimated. Furthermore, while LULUCF activities were expected to represent a net carbon source in 2013, they are now estimated as a sink. In addition, Luxembourg decided to increase the use of flexible mechanisms to 2.8 Mt CO₂-equivalent per year (which represents as much as 22 % of base-year emissions). Luxembourg holds a financial reserve for buying any extra units needed to fill the gap by 2015, when the first phase of Kyoto accounting will be closed.

In four of the countries where a gap remains between non-ETS emissions and the corresponding targets (Austria, Liechtenstein, Luxembourg and Spain), the number of international credits that the governments intend to acquire to achieve compliance represents more than 10 % of base-year emissions (see Figure 2.1). This excludes the quantities actually used by EU ETS operators. From a legal perspective, it makes no difference whether compliance is achieved through the limitation or reduction of domestic emissions alone, or with the contribution of flexible mechanisms.

However, Annex I parties to the Kyoto Protocol with a reduction or limitation target must provide information under the Protocol to demonstrate that their use of the mechanisms remains 'supplemental to domestic action' to achieve their targets. A specific level to limit the use of flexible mechanisms has not been set.

In most EU Member States from the eastern part of Europe, large emission reductions occurred in the 1990s in comparison with the targets that these countries committed to under the Kyoto Protocol. This resulted in important surpluses Kyoto units. Most of these Member States decided to sell a large part of such surplus. Six Member States (the Czech Republic, Estonia, Latvia, Lithuania, Romania and Slovakia) plan to sell quantities of their Kyoto units representing more than 10 % of their base-year emissions (see Figure 2.1).

Figure 2.1 Progress made by European countries towards their Kyoto or burden-sharing targets



Note: Gaps between emissions and targets refer to sectors not covered by the EU ETS, because the introduction of the EU ETS and its linking to the Kyoto flexible mechanisms imply that there will be no gap between ETS emissions and the emissions budget for the ETS. This also holds for Switzerland and its national emission trading scheme. For Croatia and Iceland, total emissions are used, as these countries had no installations under the EU ETS from 2008 to 2012.

The figures are based on the intended use of credits from flexible mechanisms as reported by Member States in their questionnaires to the Commission. For an overview taking into account the estimated use of credits from flexible mechanisms based on current inventory data, see Table 5.2.

Each bar represents the contribution of a factor towards the achievement of Kyoto or burden-sharing targets. A positive sign signifies a favourable contribution towards target achievement.

Source: EEA, 2014a; EEA, 2014b; EEA, 2014c; Switzerland, 2014a; Switzerland, 2014b; UNFCCC, 2014a; UNFCCC, 2014b.

2.3 Progress towards the EU-15 target

The EU-15 total GHG emissions were on average 11.8 % below base-year emissions during the first commitment period.

Taking into account the effect of allowance allocations under the ETS, the EU-15 emissions 'budget' under the control of governments corresponds to the sum of non-ETS allowed emissions, carbon sinks and flexible mechanisms (see Figure 2.2, left part of the graph). The actual emissions therefore must not exceed this 'budget' (see Figure 2.2, right part of the graph). Overall, the combined average over-delivery is equivalent to approximately 1 billion tonnes CO₂-equivalent over the full 5-year period. On annual average, this represents 207 Mt CO₂-equivalent per year, or 4.9 % of the EU-15's base-year emissions in comparison with an 8 % reduction target from base-year levels (see Table 2.1). This does not take into account the surplus of allowances and international credits held by ETS operators which are not available to governments for Kyoto compliance.

The overall surplus of Kyoto units is the sum of the following effects.

Emissions for the period from 2008 to 2012 in the sectors not covered by the ETS were lower than the corresponding non-ETS allowed level⁽⁵⁾ by 83 Mt CO₂-equivalent per year. This represents an over-achievement equivalent to 1.9 % of the EU-15 base-year emissions.

- Carbon sinks are expected to contribute towards an emission reduction of 59 Mt CO₂-equivalent per year (1.4 % of EU-15 base-year emissions).
- Flexible mechanisms are expected to contribute towards a net reduction of 66 Mt CO₂-equivalent per year (1.5 % of EU-15 base-year emissions). This contribution results from the reported intended purchase of 71 million Kyoto units

by 9 EU Member States (Austria, Belgium, Denmark, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain), from which 5 million units must be deducted related to the issuance of emission reduction units (ERUs) by 6 EU Member States (Belgium, Finland, France, Germany, Spain and Sweden)⁽⁶⁾.

Although EU-15 emissions in the non-ETS sectors do not exceed the non-ETS allowed levels, the use of flexible mechanisms is necessary in the EU-15, because formal compliance on behalf of the EU-15 still hinges on each EU-15 Member State achieving its own target set under the Burden-Sharing Agreement. A potential shortfall exists as a result of the gap currently observed in Italy. Italy will need to address this shortfall by increasing its use of flexible mechanisms by the end of the true-up period, in order for the EU-15 to achieve its target.

Compared to the 2013 assessment, the expected total over-delivery of the EU-15 Kyoto target decreased from 236 Mt CO₂-equivalent to 207 Mt CO₂-equivalent per year. This is due to:

- a reduction in the gap between domestic emissions and targets (corresponding to the difference between approximated data estimated in 2013 and the actual GHG inventory submitted in 2014), from 95 Mt CO₂-equivalent to 83 Mt CO₂-equivalent per year;
- a reduction in the expected contribution of carbon sinks, from 64 Mt CO₂-equivalent to 59 Mt CO₂-equivalent per year, due to the inclusion of 2012 data in the present assessment (the 2013 assessment was based on 2008–2011 averages);
- a reduction in the intended use of flexible mechanisms, from 81 Mt CO₂-equivalent to 66 Mt CO₂-equivalent per year on average, based on updated information reported by Member States in 2014.

⁽⁵⁾ Calculated as the difference between the initial AAUs and allowances allocated under the EU ETS, for the years from 2008 to 2012, for stationary installations.

⁽⁶⁾ The issuance of an ERU requires cancelling one AAU.

Table 2.1 Detailed calculation of progress of the EU-15 towards its Kyoto target

Category	Operation	2008	2009	2010	2011	2012	Average 2008-2012	Total 2008-2012	
Mt CO₂-equivalent									
1	Total GHG emissions	4 006.9	3 721.7	3 803.2	3 650.0	3 619.5	3 760.2	18 801.2	
2	Verified emissions under the EU ETS	1 622.3	1 436.4	1 479.5	1 434.3	1 421.5	1 478.8	7 393.9	
3	Non-ETS GHG emissions	(1) - (2)	2 384.6	2 285.3	2 323.7	2 215.7	2 198.0	2 281.5	11 407.4
4	Initial Assigned Amount (AAUs)	3 924.3	3 924.3	3 924.3	3 924.3	3 924.3	3 924.3	19 621.4	
5	Allowances issued under the EU ETS	1 511.3	1 531.0	1 565.9	1 573.3	1 617.9	1 559.9	7 799.4	
6	Non-ETS target	(4) - (5)	2 413.0	2 393.3	2 358.4	2 350.9	2 306.4	2 364.4	11 822.0
7	Difference between target and GHG emissions (non-ETS, domestic)	(6) - (3)	28.4	108.0	34.7	135.2	108.4	82.9	414.6
8	Expected carbon sequestration from LULUCF activities (RMUs)		58.6	58.6	58.6	58.6	58.6	58.6	293.0
9	Difference between target and GHG emissions (non-ETS, domestic, including carbon sinks)	'(6) + (8) - (3)'	87.0	166.6	93.3	194.8	167.0	141.5	707.7
10	Intended use of Kyoto mechanisms by government (net transfer of AAUs, CERs and ERUs)		65.7	65.7	65.7	65.7	65.7	65.7	328.3
11	Difference between target and GHG emissions (non-ETS domestic emissions including carbon sinks and plans on Kyoto mechanisms)	'(6) + (8) + (10) - (3)'	152.6	232.2	158.9	259.5	232.6	207.2	1 035.9

Note: Colours in the first column correspond to the bars in Figure 2.2. Results are based on the assumption that any EU Member State surplus could be used for EU compliance.
GHG emissions: 2014 EU GHG inventory as planned to be submitted to UNFCCC (2008–2012 total emissions); non-ETS emissions based on total emissions minus verified emissions under the ETS.

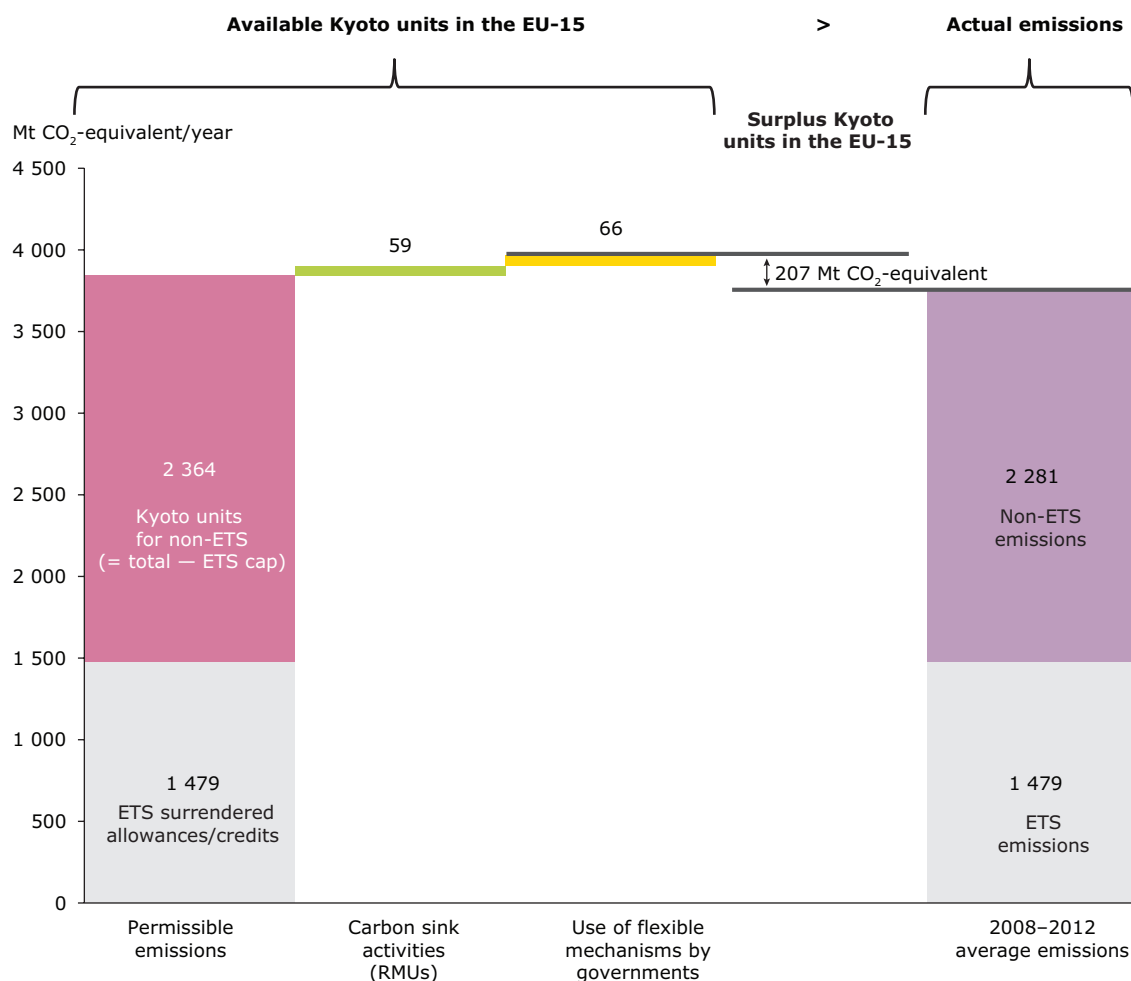
All numbers are calculated as sums of EU-15 Member States, apart from the EU-15's initial assigned amount, which was determined as 92 % of the EU-15's base-year emissions. There is a slight difference between this amount and the sum of Member States initial assigned amounts. This difference is equivalent to about 0.3 % of the EU-15's base-year emissions.

Verified emissions and allowances issued under the EU ETS take only into account stationary installations.

A table including data for all the countries covered in this assessment is provided in Annex 1.

Source: EEA, 2014a; EEA, 2014b; EEA, 2014c; UNFCCC, 2014b.

Figure 2.2 Progress of the EU-15 towards its Kyoto target



Note: All emissions between 2008 and 2012 covered by the EU ETS were matched by an equivalent quantity of Kyoto units, which ETS operators were legally bound to surrender to their government.

The difference between target and GHG emissions therefore concerns sectors not covered by the EU ETS, which represents the correct emissions and target to consider for the assessment of actual progress towards Kyoto targets.

Results are based on the assumption that any EU Member State surplus could be used for EU compliance.

Source: EEA, 2014a; EEA, 2014b; EEA, 2014c, UNFCCC, 2014b.

3 GHG emission levels (2008–2012)

This chapter looks at domestic greenhouse emissions only, not including carbon sinks or the use of flexible mechanisms, which are dealt with in the subsequent chapters. Domestic emission reductions should in principle constitute the major mitigation effort by governments in reaching their climate objectives, with direct links to domestic policies and measures.

This chapter initially presents a brief overview of the trends in total GHG emissions between the base-year and the commitment period and includes a comparison with Kyoto targets and presents the key drivers that were responsible for the decrease

in emissions observed during the commitment period. The next sections present a comparative analysis of the progress made in the EU ETS and in the non-ETS sectors towards the respective allowed emission levels. For the purpose of assessing progress of Member States towards their Kyoto or burden-sharing targets, the analysis focuses on the non-ETS side, where governments have the chief mitigation responsibility. This is because governments have split their Kyoto emission budgets by allocating one budget to sectors covered by the EU ETS, the remaining budget being allocated to non-ETS sectors.

Key messages

1. Total GHG emissions for the period from 2008 to 2012 were below Kyoto targets in 20 of the 30 European countries assessed in this report.
2. Almost all the EU Member States which are not part of the EU-15 reduced their emissions well below their targets. This was due to the large decreases observed in the 1990s. As a result, these Member States had already achieved their targets before the commitment period started in 2008.
3. The situation differs in the EU-15, where only nine EU Member States reduced their total emissions below their individual targets under the 'burden-sharing agreement' — and when considering non-ETS emissions only, this number drops to six. The largest over-achievements were achieved in Sweden, Greece and the United Kingdom. At the other end of the spectrum, emissions remained above targets by more than 9 % in Luxembourg, Austria and Spain.
4. During the 5-year commitment period (from 2008 to 2012), total EU GHG emissions decreased by 9.2 %. Recent EEA analyses indicate that 30 % to 50 % of the observed emission reductions across the EU are attributable to economic recession. The combined effects of other factors play a more significant role: the lower energy intensity of the economy (improved efficiency and changes in the structure of the economy), and the lower carbon intensity of the energy mix (an increasing share of renewables).
5. In the EU-15, the overall EU ETS cap (i.e. the maximum amount of emissions allowed) for the period from 2008 to 2012 was 9 % below 2005 levels, while non-ETS sectors had a calculated emission budget of 5 % below their 2005 levels. In Austria, Denmark, Italy, Liechtenstein, Luxembourg and Spain, non-ETS reduction needs were higher than 15 % compared to 2005 non-ETS emissions levels. For all these countries, reducing non-ETS emission below allowed levels for the 2008–2012 period was relatively more demanding than in ETS sectors.

Key messages (cont.)

6. EU ETS emissions were reduced below ETS caps in most Member States from 2008 to 2012; however, success in applying emission budgets in non-ETS sectors appeared more difficult. This may be partly explained by the fact that the crisis had a greater impact on emission trends in ETS sectors, as some of these sectors are more strongly linked to economic activity. The recession, unforeseen at the time that ETS caps were set for the second trading period, drove down emissions in the EU ETS more than in other sectors. Achieving domestic emission reductions in these sectors may have been more difficult than in the ETS, due to the broader diffusion of sources (e.g. transport and agriculture) and typically higher marginal abatement costs than in ETS sectors (essentially made up of point sources).
7. When considering non-ETS emissions with a view to assessing actual progress towards Kyoto targets, average levels for the period from 2008 to 2012 were below the corresponding targets in 18 of the European countries assessed in this report. For 12 Member States, non-ETS emissions were on average higher than the relevant non-ETS target during the commitment period.

3.1 Total GHG emissions

This section presents a comparison of total GHG emission levels with Kyoto targets. This type of basic analysis provides a simple overview of achievements in Europe with respect to targets agreed under the Kyoto Protocol. However, it does not reflect the attainment of Kyoto targets in terms of compliance, because it does not take into account the contribution from carbon sinks and the possibility for each national emissions budget (initially determined in relation to the targets inscribed in Annex B of the Kyoto Protocol) to be modified by transfers of Kyoto units to or from other countries (use of Kyoto mechanisms) or other entities, such as operators under the EU ETS.

In two thirds (20 out of 30) of the European countries which have a Kyoto or 'burden-sharing' target and are assessed in this report, average 2008–2012 GHG emissions were below the respective target ^(?).

Total GHG emissions in the EU-15 were on average 11.8 % below base-year levels, which is almost 4 percentage points below the 8 % reduction target during the first commitment period. Looking at EU-15 Member States individually, while ten Member States (Belgium, Germany, Greece, Finland, France, Ireland, the Netherlands, Portugal, Sweden

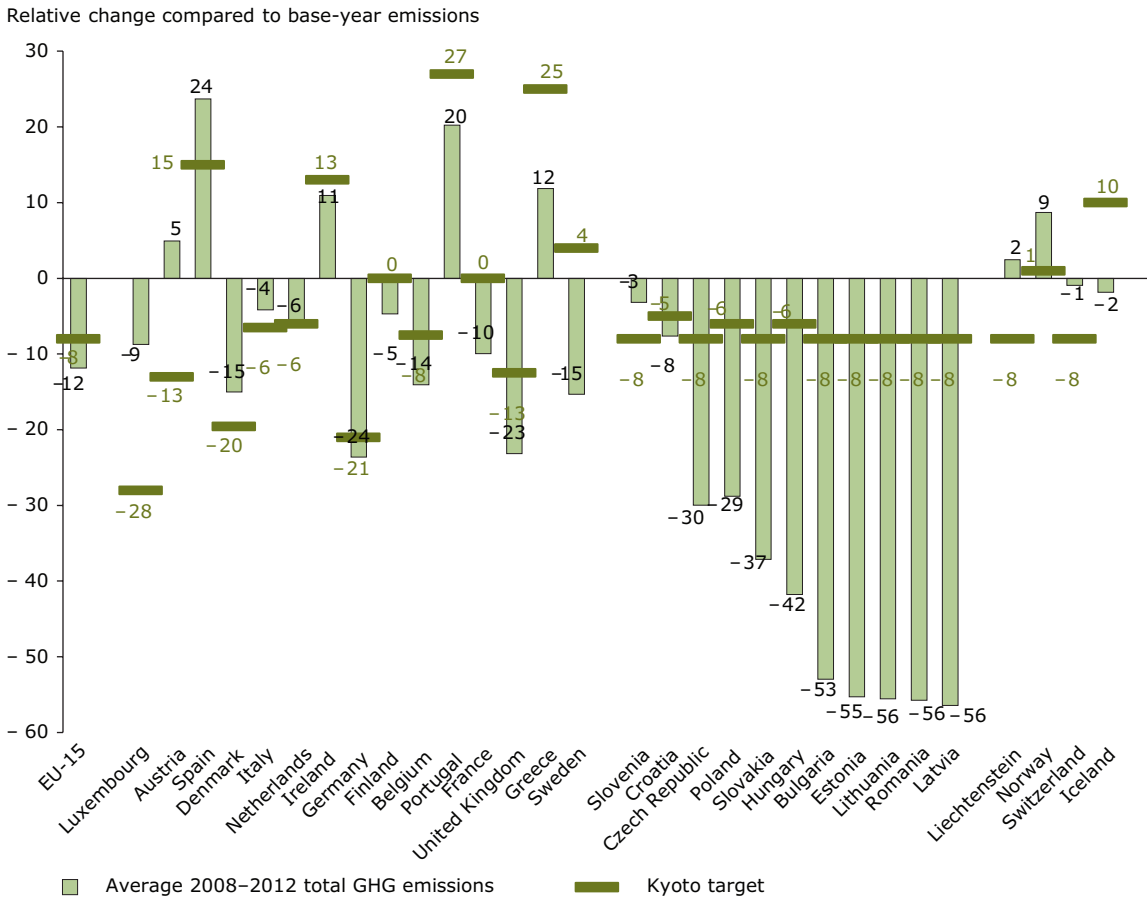
and the United Kingdom) reduced or limited their emissions below their target, six (Austria, Denmark, Italy, Luxembourg and Spain) did not do so (see Figure 2.2). The largest over-achievements (in relative terms) were achieved in Sweden, Greece and the United Kingdom, while total emissions remained significantly higher than the respective targets in Austria, Luxembourg and Spain, by a relative gap larger than 9 % in all three cases.

Large over-achievements are evident in the other Member States which are not part of the EU-15 (apart from Croatia and Slovenia). In these eastern European countries, emissions fell far below the 6 % to 8 % reduction targets. This situation is the result of their substantial emission reductions in the 1990s due to the restructuring of economies (and subsequent closure of heavily emitting plants), and the fact that Kyoto targets are based on emission levels before this decline. Since the end of the 1990s, emissions have mostly increased in these countries, but remained below target levels.

In addition to the reductions of EU emissions that took place between 1990 and the commitment period, further reductions took place during the commitment period itself. Between 2008 and 2012, total EU GHG emissions were reduced by 9.2 %. EEA analyses (EEA, 2014d) indicate that between

^(?) Without taking into account the effects of carbon sinks and the possible use of flexible mechanisms.

Figure 3.1 Total GHG emissions and Kyoto (or burden-sharing) targets, 2008–2012



Note: This figure does not take into account the effects of carbon sinks and flexible mechanisms. Each bar represents the percentage change of domestic emissions; the dark green line represents the Kyoto or burden-sharing target in relation to base-year emissions. Countries are ordered according to the distance between their average 2008–2012 GHG emissions and their Kyoto target. Cyprus, Malta and Turkey are not represented as they do not have a 2008–2012 Kyoto target.

Source: EEA, 2014a; UNFCCC, 2014a; UNFCCC, 2014b.

30 % and 50 % of the observed emission reductions across the EU can be attributable to economic recession. The results also suggest that the combined effects of other factors and policies have played at least as important a role as GDP in GHG emission reductions. This includes indirect effects of economic growth on other variables, as well as factors specific to Member States and policies.

The analysis suggests the presence of certain coupling between annual changes in GDP and changes in GHG emissions between 1990 and 2012 for the EU as a whole. This is not at conflict with an absolute decoupling of GDP and GHG emission compared to 1990, with an increase in GDP of 45 % alongside a decrease in emissions of 19 % over the 22-year period.

The decomposition analysis presented on Figure 3.2 shows how the various factors affected GHG emissions during the period 2008–2012:

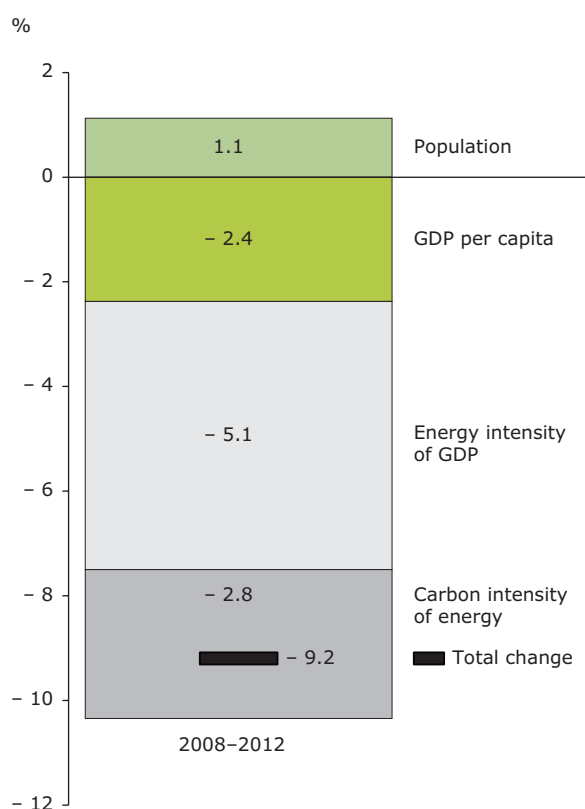
- Emissions and GDP (per capita) decreased during 2008–2012. However, emissions also decreased with increasing GDP (per capita) during 2005–2008, which shows that emissions can decrease with a growing economy.
- The lower carbon intensity of energy was a key factor underpinning lower emissions despite the significant increase in coal use since 2009 and a decline in nuclear electricity production. The lower carbon intensity is by and large accounted for by a higher contribution from renewable energy sources in the fuel mix.

- The decrease in primary energy intensity was the largest contributing factor to lower GHG emissions. Total energy consumption decreased while GDP increased, leading to an improvement in the emissions intensity of energy production and use. The economic recession partly explains lower energy demand from industry and road transportation since 2008. However, energy intensity also decreased in the period 2005–2008 where energy demand was high. Lower energy intensity of GDP can be explained by improvements in energy efficiency (transformation and end-use) and the strong uptake of renewables, as well as by changes in the structure of the economy and a higher share of the services sector compared to the more energy intensive industrial sector.
- In addition to the reduction of the energy intensity of the economy, there has been a substantial improvement of the GHG emissions intensity of the EU economy as a whole. Emissions per GDP decreased substantially in all Member States, not only since 1990, but also in the past 7 years since 2005. This improvement came along with a significant convergence of GHG emission intensities across Member States, both per-capita and per-GDP. One reason for this convergence has been the significant growth in renewables in most Member States, particularly wind, solar and biomass, and a clear move towards less carbon intensive fuels.

3.2 Contributions of ETS and non-ETS sectors to achieving Kyoto targets in Europe

As outlined in the previous chapter (see also Annex 3, Section A3.6), governments split their Kyoto emission budgets into two.

Figure 3.2 Decomposition analysis of the change in total CO₂ emissions from fossil fuel combustion in the EU



Note: The explanatory factors in this decomposition analysis should not be seen as fundamental factors in themselves nor should they be seen as independent of each other. The bar segments show changes associated with each factor individually, while the other respective factors remain constant.

Source: EEA, 2014d.

- One budget was allocated to sectors covered by the ETS. The legal obligation for ETS operators to achieve their individual cap — by buying, if necessary, additional emission allowances on the carbon market or using the Kyoto flexible mechanisms — guarantees that this part of the budget is met at the end of the commitment period.
- The remaining budget was allocated to non-ETS sectors. Governments must meet this budget by limiting or reducing their non-ETS emissions and, if necessary, making use of flexible mechanisms.
- Therefore, these emission budgets depend directly on each other, given the limited overall amount of available Kyoto units for each party.
- In the EU-15, the overall EU ETS cap (i.e. the maximum amount of emissions permitted) for the period from 2008 to 2012 was 9 % below 2005 levels, while non-ETS sectors had a calculated emission budget of 5 % below their 2005 levels.
- At Member State level, Austria, Denmark, Italy, Liechtenstein, Luxembourg and Spain needed to reduce their non-ETS emissions by more than 15 % compared to 2005 non-ETS emissions levels. For all these countries, the non-ETS allowed levels for 2008 through 2012 were relatively more demanding than in ETS sectors.

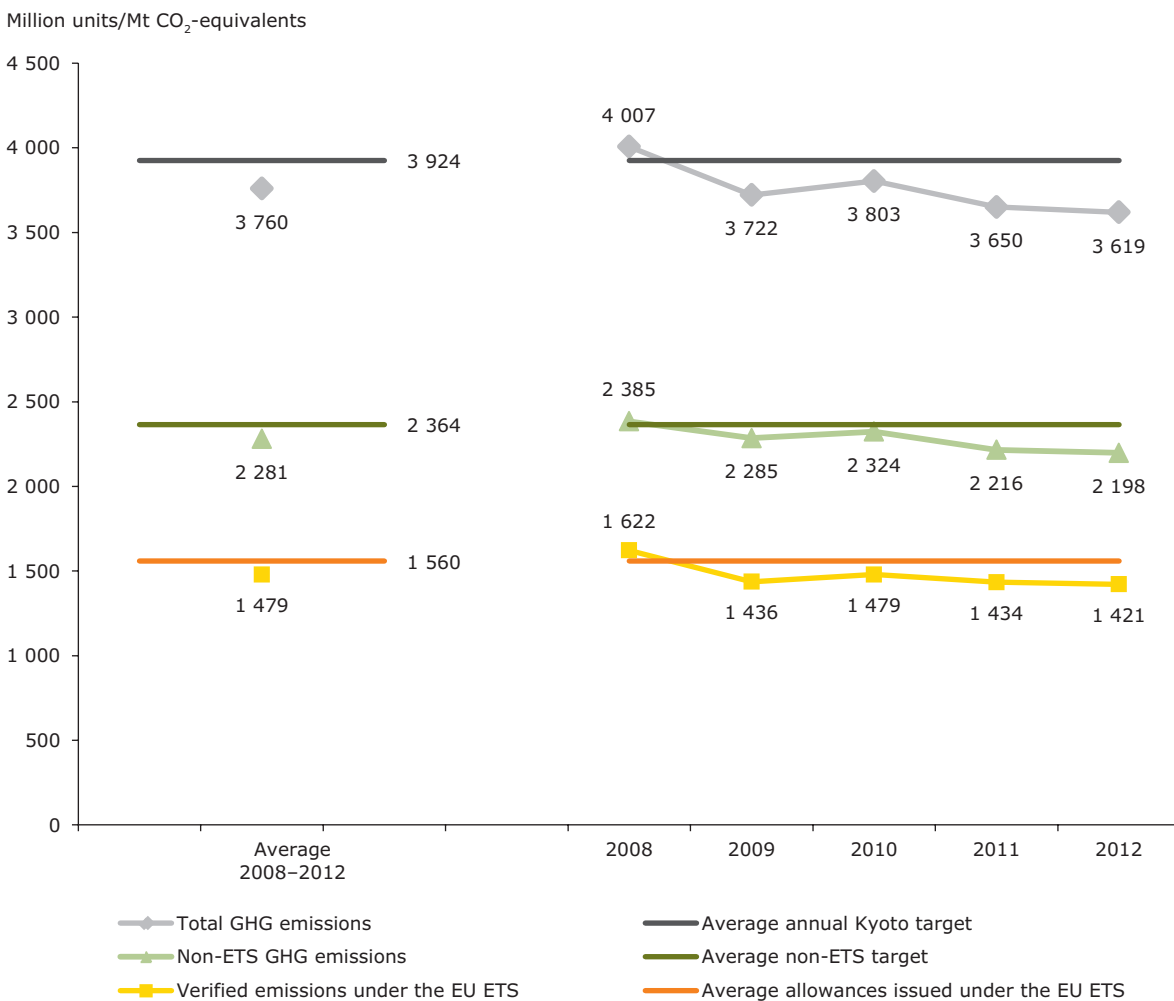
When looking at actual emission trends during the commitment period, total EU-15 GHG emissions were higher than the annual average Kyoto target in 2008, and lower in the years from 2009 to 2012 (see Figure 3.3). This is true for both EU ETS and non-EU ETS sectors: from 2009 onwards, aggregated emissions in both sectors remained below their maximum allowed level. In 2009, GHG emissions in the EU-15 decreased sharply, by 7 %, compared with 2008.

While emissions decreased in all emitting sectors between 2008 and 2009, the largest emission reductions occurred in sectors covered by the EU ETS, where the decrease reached 11 %. By

contrast, non-ETS emissions dropped by 4 %. In absolute values, the emission reduction in ETS sectors was twice as high as reductions in non-ETS sectors.

When tracking progress made in ETS and non-ETS sectors separately, EEA analysis showed that EU ETS emissions were reduced below ETS caps in most Member States during the 2008–2012 period, while success in reaching allowed emission levels in non-ETS sectors appeared more difficult (see Figure 3.4 and EEA, 2013a). This may be partly explained by the fact that the crisis had a greater impact on emission trends in ETS sectors, as these sectors are more strongly linked to economic

Figure 3.3 Total, ETS and non-ETS GHG emission trends in the EU-15 compared to their respective targets, 2008–2012



Note: Only data of stationary installations under the EU ETS have been considered, because the aviation sector was not included in the initial Kyoto fulfilment plans.

Source: EEA, 2014a; EEA, 2014b.

activity than non-ETS sectors. The recession, unforeseen at the time ETS caps were set for the second trading period, drove down emissions in the EU ETS more than in the other sectors.

Achieving important domestic emission reductions in these sectors may have been more difficult than in the ETS, due to the larger diffusion of sources (e.g. transport and agriculture) and typically higher marginal abatement costs than in ETS sectors (where the largest part of emissions is concentrated in a limited number of large combustion plants with specific emission sources).

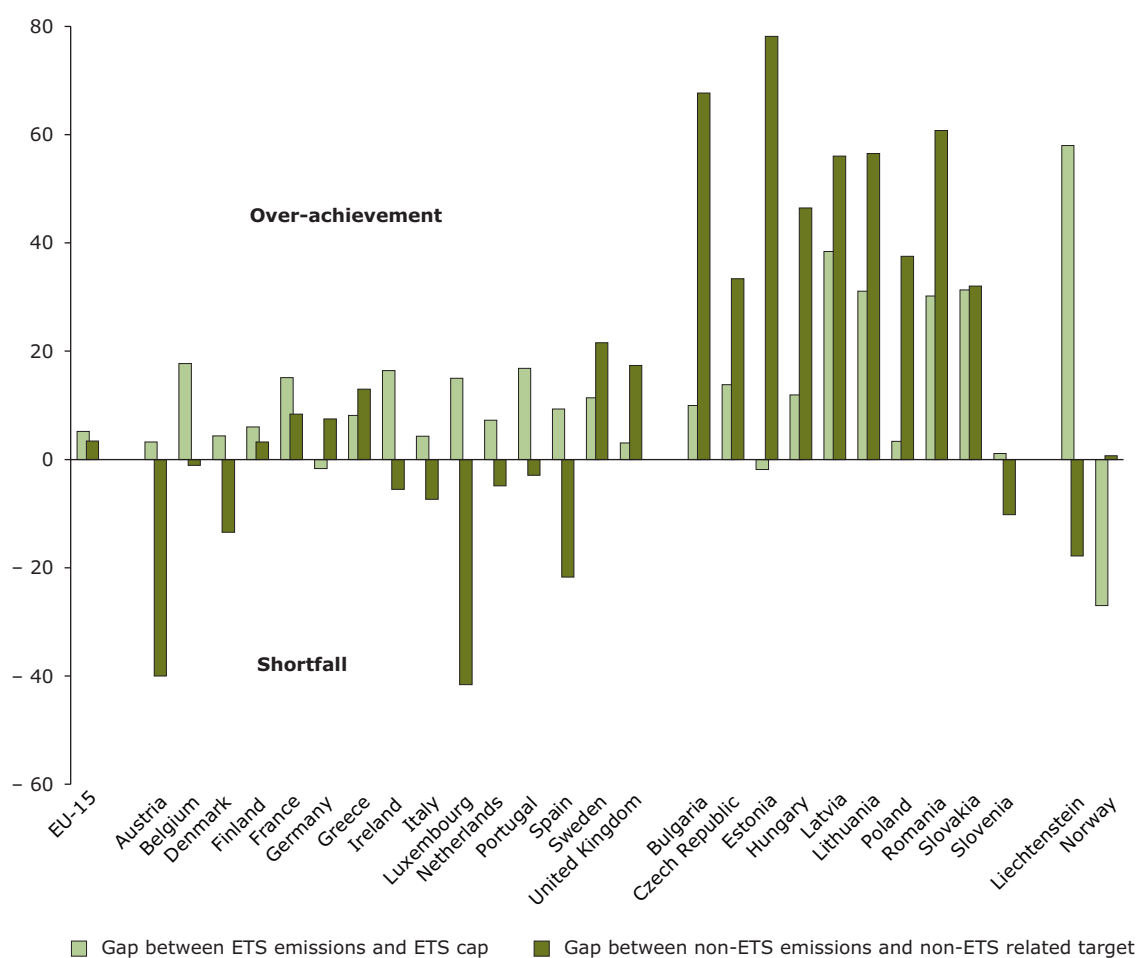
3.3 ETS emissions

This section presents an update of the analysis of emission trends in the EU ETS published in the 2013 EEA report on trends and projections in Europe (EEA, 2013a), based on the latest data available.

Between 2005 and 2012, verified emissions in stationary installations decreased by 16 %, taking into account the change in ETS scope which occurred between 2007 (end of first trading period) and 2008 (beginning of second trading period). In the first trading period, emissions increased slightly

Figure 3.4 Gaps between ETS and non-ETS emissions and their respective 2008–2012 allowed emission levels

Relative gaps between emissions and respective targets (%)



Note: A positive bar indicate that emissions (ETS or non-ETS) were lower than the respective allowed level (ETS cap or non-ETS allowed emissions), while a negative bar indicates emissions being higher than the allowed level.

The gaps are expressed as percentage of 2005 levels in the ETS and the non-ETS sectors, respectively. This is because 2005 is the relevant year for the cap-setting in the EU ETS for the period 2008–2012 and the first year of operation of the EU ETS. Furthermore, the division of emissions into ETS and non ETS emissions is not possible prior to that year.

Source: EEA, 2014a; EEA, 2014b.

between 2005 and 2007 (see Figure 3.5). During the second trading period (between 2008 and 2012), they decreased significantly in 2008 and 2009, partly due to the economic crisis. In 2008, emissions were 5 % below 2005 levels. They decreased to 15 % below 2005 levels in 2009, and stayed close to this level in 2010 (– 13 %), 2011 (– 14 %) and 2012 (– 16 %).

The four sectors with the largest emissions under the EU ETS (combustion installations, oil refineries, iron and steel, and cement clinker or lime) represent 94 % of total EU ETS emissions. Verified emissions decreased in these four sectors between 2005 and 2012 (see Figure 3.6).

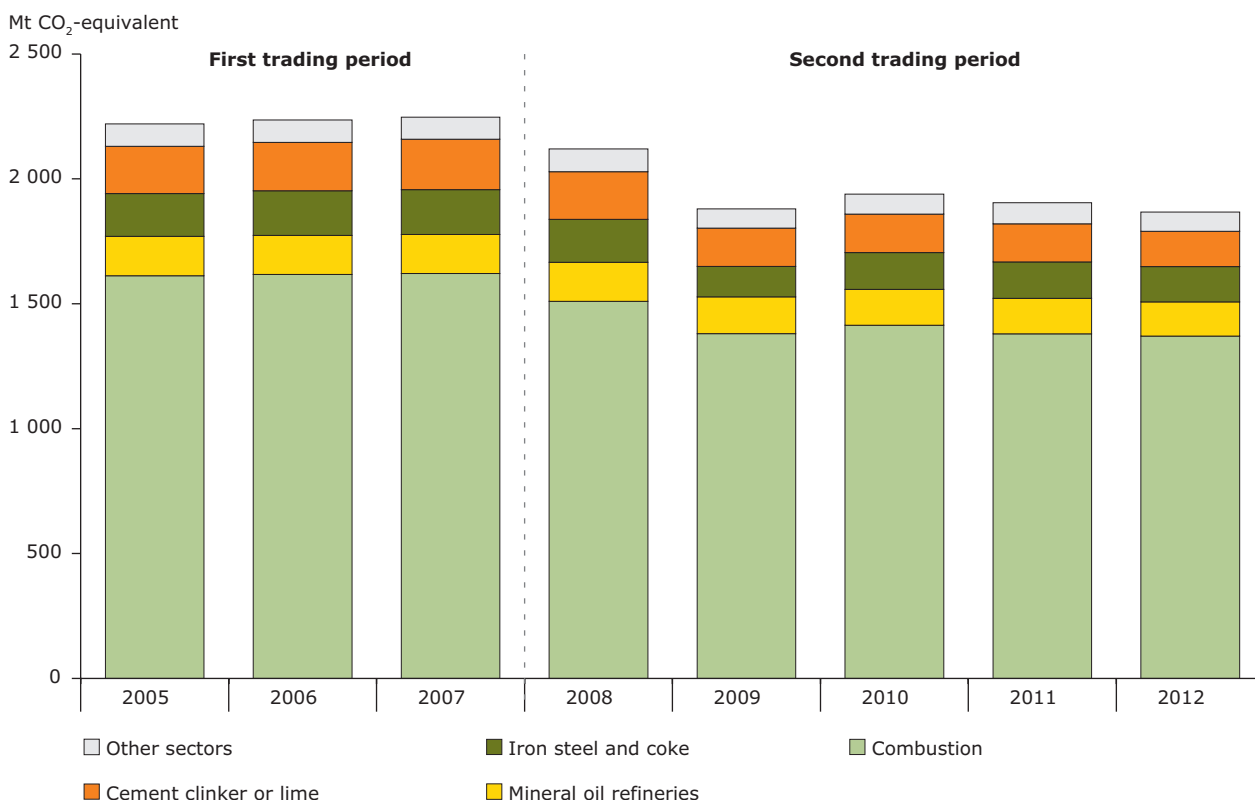
- Emissions from the iron and steel sector were most significantly influenced by the economic crisis, experiencing the biggest drop (in percentage terms) of verified emissions in 2009. However, they rebounded in 2010 and have since stabilised at around 13 % below 2005 levels.
- Emissions from the cement clinker or lime sector also dropped considerably in 2009, by nearly

20 % below 2005 emissions; in 2012 they fell further, to 25 % below 2005 levels.

- Emissions from mineral oil refineries appear to have been less impacted by the economic crisis. They decreased steadily during the second trading period, to a level of 14 % below 2005 emissions levels.
- Finally, emissions from combustion installations in the EU ETS decreased by 15 % between 2005 and 2012, with a dip of 14 % in 2009 and a slight rebound in 2010. This reduction resulted from less fossil electricity generation (thanks to lower demand triggered by the economic crisis), combined with increased renewable energy production, and fuel-switching from hard coal and oil to natural gas.

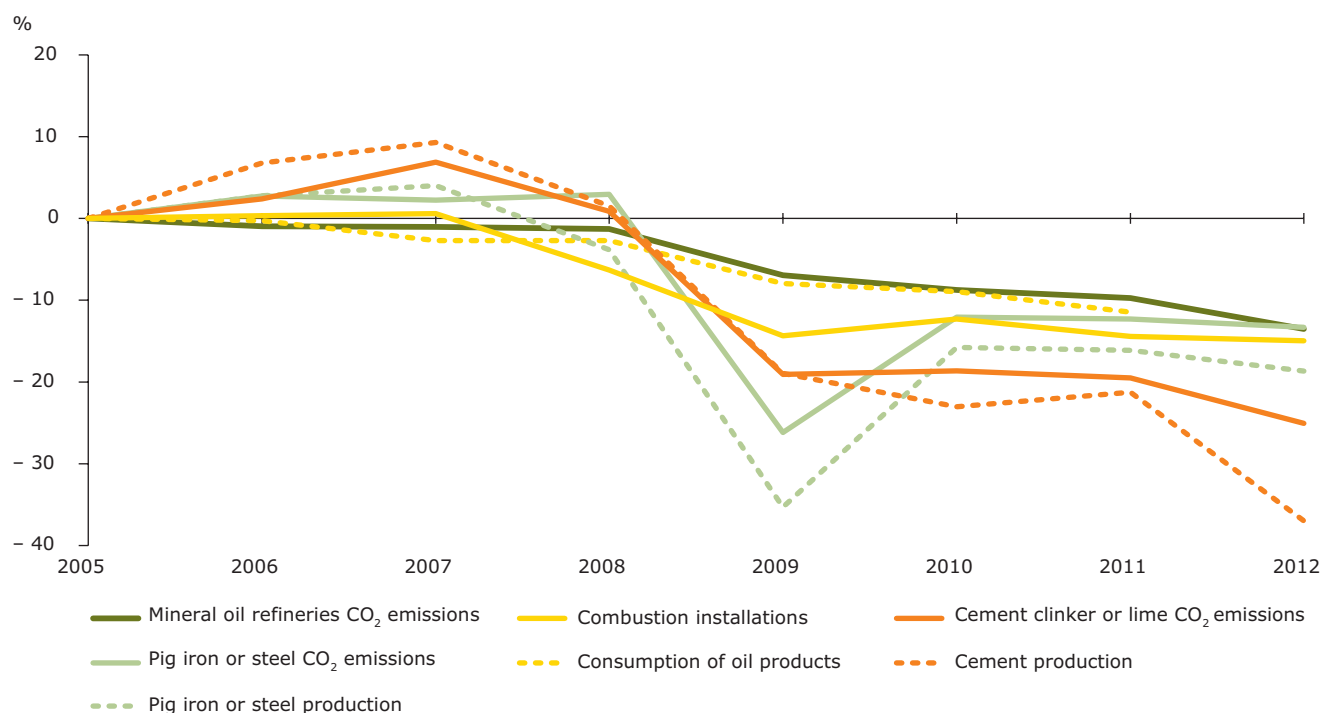
In the cement, iron and refinery sectors, verified emissions closely reflect production trends, illustrating the fact that emission reductions in these industrial sectors were driven more by reduced production than by efficiency improvements.

Figure 3.5 Verified emissions of stationary EU ETS installations by sectors, 2005–2012



Note: ETS-verified emissions for the first trading period (2005–2007) take into account a scope correction to account for emissions of installations that only entered the ETS in 2008.

Source: EEA, 2013a.

Figure 3.6 Trend of verified emissions in key sectors, 2005–2012

Note: ETS-verified emissions for the first trading period (2005–2007) take into account a scope correction to account for emissions of installations that only entered the ETS in 2008.

Source: EEA, 2013a.

3.4 Non-ETS GHG emissions

As discussed previously (see also Annex 3), an accurate assessment of current progress towards Kyoto targets in the EU consists in comparing GHG emissions with emissions budgets. Since part of the Kyoto emission budget was allocated to the ETS (with operators under the scheme being legally obliged to comply with their cap), the main effort by governments remains in achieving emission reductions or limiting emissions in other sectors not covered by the ETS. The assessment therefore compares, for the period from 2008 to 2012:

- non-ETS emissions (= total GHG emissions – verified emissions under the EU ETS);
- with the relevant 'non-ETS target' (= initial Kyoto units – allocated allowances under the EU ETS).

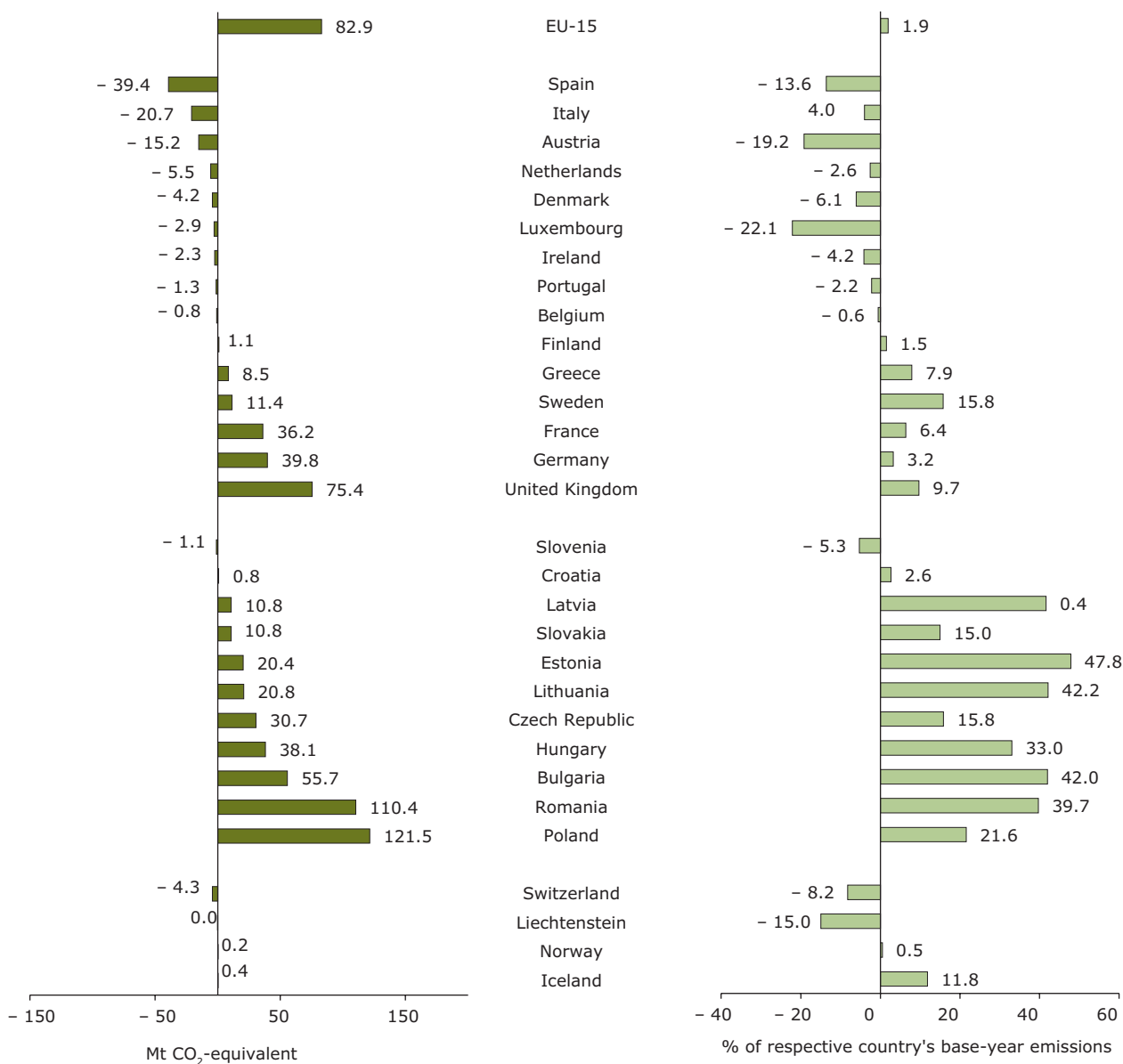
From 2008 to 2012, six EU-15 Member States (Finland, France, Germany, Greece, Sweden and the United Kingdom), ten non-EU-15 Member States (Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia) and two EEA member countries (Iceland and Norway) achieved non-ETS

emissions levels below their respective emission budgets (see Figure 3.7).

At EU-15 level, average annual emissions for the period from 2008 to 2012 in the sectors not covered by the ETS were lower than the corresponding 'non-ETS target', by 83 Mt CO₂-equivalent per year as well (see Figure 3.7), which represents an over-achievement equivalent to 1.9 % of the EU-15 base-year emissions, in comparison with an 8 % reduction target.

The comparison of non-ETS emissions with their corresponding allowed emission levels does not produce identical results to the comparison of total emissions with targets. In particular, although they reduced total GHG emissions below their initial Kyoto target, Belgium, Ireland and Portugal did not reduce their non-ETS emissions below their respective non-ETS emission budget. On the other hand, in Norway, the non-ETS target was achieved while the target for total emissions was not. These results show that reducing (or limiting) emissions in non-ETS sectors was in general more challenging for certain Member States. This issue — the respective contribution of ETS and non-ETS sectors to achievement of Kyoto targets — is further discussed in Section 3.2.

Figure 3.7 Gaps between non-ETS emissions and the relevant targets, 2008–2012 average



Note: Gaps between emissions and targets refer to sectors not covered by the EU ETS, because the introduction of the EU ETS and its linking to the Kyoto flexible mechanisms imply that there will be no gap between ETS emissions and the emissions budget for the ETS. This also holds for Switzerland and its national emission trading scheme. For Croatia and Iceland, total emissions are used, as these countries had no installations under the EU ETS from 2008 to 2012. Croatia established a domestic emissions trading system which was not connected to the EU ETS in the period 2009–2012.

Absolute values in the left bar chart represent the gap between average 2008–2012 emissions in the non-ETS sectors and the relevant target (without accounting for the use of carbon sinks and Kyoto mechanisms).

Percentages in the right bar chart represent the same gap, expressed as a share of base-year emissions. This provides a basis for comparing gaps, with Kyoto targets expressed as percent change compared to base-year emissions.

A positive value indicates that average 2008–2012 emissions in the non-ETS sectors were lower than the average annual target.

For Croatia and Iceland, total emissions are used, as these countries had no installations under the EU ETS from 2008 to 2012.

The data used in these calculations and more details concerning the calculation process are presented in the table in Annex 1, column 7 'Difference between target and GHG emissions (non-ETS, domestic)'.

Source: EEA, 2014a; EEA, 2014b; Switzerland, 2013a; Switzerland, 2013b.

4 Contribution from carbon sinks

This chapter considers the contribution of carbon sinks towards meeting the Kyoto or burden-sharing targets in the EU. For a number of countries,

LULUCF activities play an important role in reducing — or even filling — the gap between domestic emissions and Kyoto targets.

Key messages

1. In the EU-15, the net contribution from LULUCF activities represents an average removal of 59 Mt CO₂-equivalent per year of the commitment period (around 1.4 % of EU-15 base-year emissions). This is the sum of 16 Mt CO₂-equivalent per year from Article 3.3 activities (net stock change) and a net sink effect of 43 Mt CO₂-equivalent per year from Article 3.4 activities (mostly forest management).
2. Across the whole EU, the overall effect of LULUCF activities is a net average removal of 76 Mt CO₂-equivalent per year, with a significant contribution from forest management (53 Mt CO₂-equivalent per year).
3. In Ireland, Portugal and Slovenia, carbon sequestration from sinks as currently projected for the full commitment period could fully cover the gap existing between current domestic emission levels in sectors not covered by the EU ETS and their corresponding targets.

Carbon sinks play very different roles across EU Member States. Data on emissions from the LULUCF sector are available from reporting under the Kyoto Protocol to the UNFCCC, which is carried out on an annual basis. The latest data are available in the LULUCF inventories reported in May 2014, covering the period from 2008 until 2012. The assessment of actual progress towards Kyoto targets uses these 2008–2012 average values for the 5-year commitment period from 2008 through 2012 (see Table 4.1 ⁽⁸⁾).

Data quality of the actual accounting of CO₂ emissions/removals from LULUCF has been rather poor in the first years of the first commitment period, as land-use inventories were typically only conducted every few years ⁽⁹⁾. This explains why data on emissions and removals from LULUCF underwent noticeable changes from one inventory submission to another, during the first commitment period. Nevertheless, data quality of the LULUCF inventories under the Kyoto Protocol has improved considerably and the data which are now available may only be subject to changes resulting from the review process of inventories. These data were submitted under the UNFCCC in 2014, together with the national GHG inventories.

Overall, the expected effect of LULUCF in the EU-15 corresponds to the total removal of 293 Mt CO₂-equivalent (59 Mt CO₂-equivalent per year of the commitment period, around 1.4 % of EU-15 base-year emissions):

- the net removals from Article 3.3 activities reported in the 2014 Kyoto Protocol LULUCF submissions (the accounting quantities for the whole period) amount to a removal of 80 Mt CO₂-equivalent;

- the net sink effect from Article 3.4 activities amounts to a removal of 213 Mt CO₂-equivalent. For these activities, the accounting quantities of forest management, cropland management and grazing are considered, as described in Section A3.4 of Annex 3.

As a result, including the effect of carbon sinks and sources in the EU-15 increases the total gap between emission levels and targets for the EU-15: from 415 Mt CO₂-equivalent to 708 Mt CO₂-equivalent (from 83 to 142 Mt CO₂-equivalent per year on an annual average).

At EU level, the overall removal effect of carbon sinks during the period from 2008 to 2012 amounts to 381 Mt CO₂-equivalent:

- the total net removals from Article 3.3 activities amount to 87 Mt CO₂-equivalent;
- the net sink effect from Article 3.4 activities amounts to 293 Mt CO₂-equivalent.

The largest removals from actual LULUCF activities were reported by Italy (75 Mt CO₂), Spain (53 Mt CO₂), Portugal (50 Mt CO₂) and Germany (40 Mt CO₂) whereas net sources from this sector were reported by Estonia, the Netherlands and Belgium.

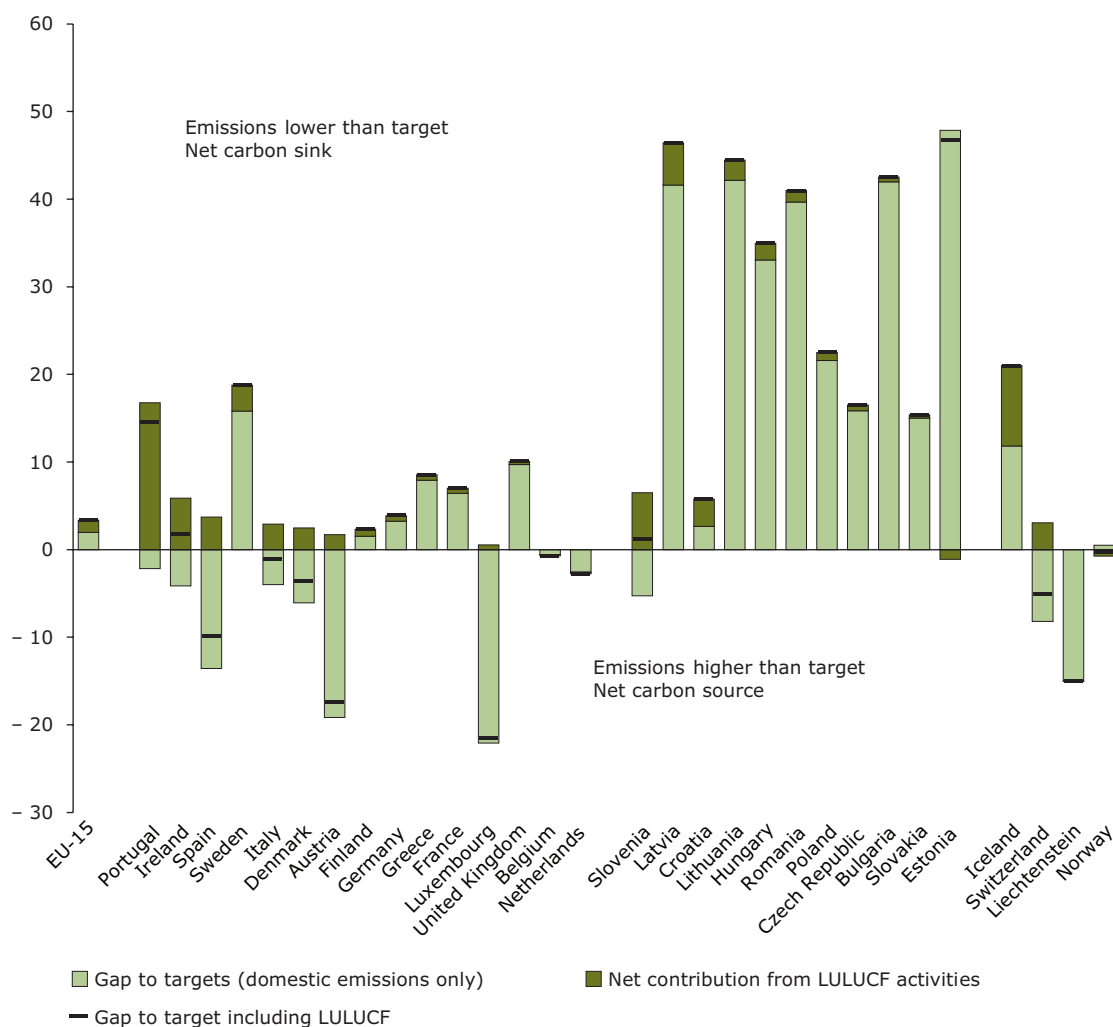
In a number of Member States, carbon sinks will play a significant role in Kyoto compliance (see Figure 4.1). In Ireland, Portugal and Slovenia, carbon sequestration from sinks as currently projected for the full commitment period could fully cover the gap existing between current domestic emission levels in sectors not covered by the EU ETS and their corresponding targets.

⁽⁸⁾ All LULUCF accounting rules have been applied in the calculation of the actual use of LULUCF (see application of the cap for forest management, as contained in the appendix to Decision 16/CMP.1).

⁽⁹⁾ Denmark, France, Hungary, Liechtenstein and Switzerland opted for annual accounting.

Figure 4.1 Contribution of carbon sequestration to Kyoto compliance

Gap to target in percentage of base-year emissions



Note: Gaps between emissions and targets refer to sectors not covered by the EU ETS, because the introduction of the EU ETS and its linking to the Kyoto flexible mechanisms imply that there will be no gap between ETS emissions and the emissions budget for the ETS. This also holds for Switzerland and its national emission trading scheme. For Croatia and Iceland, total emissions are used, as these countries had no installations under the EU ETS from 2008 to 2012.

Each bar represents the contribution of a factor towards the achievement of Kyoto or burden-sharing targets. A positive sign signifies a favourable contribution towards target achievement.

Source: EEA, 2014a; EEA, 2014b; Switzerland, 2013a; Switzerland, 2013b; UNFCCC, 2014a; UNFCCC, 2014b.

Table 4.1 Emissions and removals from LULUCF activities, 2008–2012

	Article 3.3	Article 3.4					Total used for calculation (2008–2012)		
	Net carbon stock change	Forest management ^(a)	Cropland management	Grazing land management	Revegetation	Net carbon stock change	Total	Annual average	Share of base-year emissions
	Mt CO ₂ -equivalent (2008–2012)							Mt CO ₂ -equivalent per year	%
Austria	- 6.8	0.0	0.0	0.0	0.0	0.0	- 6.8	- 1.4	- 1.7
Belgium	1.1	0.0	0.0	0.0	0.0	0.0	1.1	0.2	0.1
Bulgaria	- 3.6	0.0	0.0	0.0	0.0	0.0	- 3.6	- 0.7	- 0.6
Croatia	0.2	- 5.1	0.0	0.0	0.0	- 5.1	- 4.9	- 1.0	- 3.1
Cyprus	-	-	-	-	-	-	-	-	-
Czech Republic	- 0.7	- 5.9	0.0	0.0	0.0	- 5.9	- 6.6	- 1.3	- 0.7
Denmark ^(b)	0.3	- 1.2	- 8.2	0.6	0.0	- 8.9	- 8.6	- 1.7	- 2.5
Estonia	2.4	0.0	0.0	0.0	0.0	0.0	2.4	0.5	1.1
Finland	14.0	- 17.0	0.0	0.0	0.0	- 17.0	- 2.9	- 0.6	- 0.8
France ^(b)	28.5	- 45.9	0.0	0.0	0.0	- 45.9	- 16.1	- 3.2	- 0.6
Germany	- 17.0	- 22.7	0.0	0.0	0.0	- 22.7	- 39.7	- 7.9	- 0.6
Greece	- 0.4	- 1.7	0.0	0.0	0.0	- 1.7	- 2.1	- 0.4	- 0.4
Hungary ^(b)	- 5.6	- 5.3	0.0	0.0	0.0	- 5.3	- 11.0	- 2.2	- 1.9
Ireland	- 16.3	0.0	0.0	0.0	0.0	0.0	- 16.3	- 3.3	- 5.9
Italy	- 24.3	- 51.0	0.0	0.0	0.0	- 51.0	- 75.3	- 15.1	- 2.9
Latvia	4.8	- 11.1	0.0	0.0	0.0	- 11.1	- 6.2	- 1.2	- 4.8
Lithuania	- 0.6	- 5.1	0.0	0.0	0.0	- 5.1	- 5.7	- 1.1	- 2.3
Luxembourg	- 0.4	0.0	0.0	0.0	0.0	0.0	- 0.4	- 0.1	- 0.5
Malta	-	-	-	-	-	-	-	-	-
Netherlands	2.1	0.0	0.0	0.0	0.0	0.0	2.1	0.4	0.2
Poland	- 11.0	- 15.0	0.0	0.0	0.0	- 15.0	- 26.1	- 5.2	- 0.9
Portugal	- 23.7	- 4.0	- 17.1	- 5.5	0.0	- 26.7	- 50.3	- 10.1	- 16.7
Romania	7.1	- 27.3	0.0	0.0	1.9	- 24.0	- 18.2	- 3.6	- 1.3
Slovakia	- 1.4	0.0	0.0	0.0	0.0	0.0	- 1.4	- 0.3	- 0.4
Slovenia	1.3	- 7.9	0.0	0.0	0.0	- 7.9	- 6.6	- 1.3	- 6.5
Spain	- 39.9	- 12.3	- 0.6	0.0	0.0	- 12.9	- 52.8	- 10.6	- 3.6
Sweden	10.0	- 20.6	0.0	0.0	0.0	- 20.6	- 10.6	- 2.1	- 2.9
United Kingdom	- 7.4	- 6.8	0.0	0.0	0.0	- 6.8	- 14.2	- 2.8	- 0.4
EU-15	- 80.3	- 181.8	- 26.0	- 4.9	0.0	- 212.7	- 293.0	- 58.6	- 1.4
EU-28	- 87.4	- 264.5	- 26.0	- 4.9	1.9	- 293.4	- 380.9	- 76.2	-
Iceland	0.0	NA	NA	NA	- 0.9	- 0.9	- 1.5	- 0.3	- 9.2
Liechtenstein ^(b)	0.0	NA	NA	NA	NA/NO	0.0	0.0	0.0	0.1
Norway	0.4	- 7.3	0.0	0.0	0.0	- 7.3	1.8	0.4	0.7
Switzerland ^(b)	0.0	- 8.9	0.0	0.0	0.0	- 8.9	- 8.1	- 1.6	- 3.1

Note: ^(a) Including forest management cap and debit compensation: If parties have net emissions from activities under Article 3.3 (afforestation and deforestation), they can increase their forest management (FM) cap by this amount of net emissions. This is mainly the case for Finland, France and Sweden (and to a smaller extent for Croatia, Denmark, Latvia, Romania and Slovenia).

^(b) Under Articles 3.3 and 3.4, Denmark, France, Hungary, Liechtenstein and Switzerland have selected the annual accounting option.

In line with reporting of emission inventories, a negative sign (-) is used for removals, and a positive sign (+) for emissions. A zero denotes that calculations for LULUCF are either not applicable, not estimated or not occurring.

NA: not applicable; NO: not occurring.

Source: UNFCCC, 2014b.

5 Use of flexible mechanisms

The use of additional credits from emissions trading or projects that reduce emissions in third countries may contribute to meeting the targets under the Kyoto Protocol. The use of such

credits is allowed under so-called Kyoto flexible mechanisms, as they allow for a certain level of flexibility in meeting targets under the Kyoto Protocol.

Key messages

1. A total of 25 European countries intend to use the flexible mechanisms provided under the Kyoto Protocol, either as buyers or sellers of Kyoto units.
2. Twelve European countries (including 9 EU Member States) plan to use these mechanisms to achieve their respective targets. Altogether, these countries intend to buy approximately 389 million Kyoto units to achieve their target, including 353 million units in the EU-28 and 328 million units in the EU-15 alone. The flexible mechanisms are crucial for Austria, Belgium, Denmark, Italy, Liechtenstein, Luxembourg, the Netherlands, Norway, Spain and Switzerland to reach their Kyoto targets.
3. In Austria, Liechtenstein, Luxembourg and Spain, the amount of flexible mechanisms required to bridge the gap between non-ETS emissions and allowed emission levels represents more than 10 % of base-year emissions: 22 % (Luxembourg), 20 % (Austria and Liechtenstein) and 10 % (Spain).
4. When actual emission levels are taken into account, the amount of units needed for compliance might be lower than that indicated by the data on intended use which were reported by EU Member States.
5. Thirteen EU Member States (including four EU-15 Member States) intend to sell an aggregated total of 827 million Kyoto units to other countries through flexible mechanisms. This includes joint implementation projects.
6. In the EU ETS, flexible mechanisms have been used as well: in total 808 million credits have been used by operators to comply during the second trading period of the ETS (2008–2012). This is the sum of 528 million certified emission reductions (CERs) and 281 million ERUs.
7. The combined use of flexible between governments and ETS operators in the EU-15 represents an additional reduction of up to 5.2 % of the EU-15's base-year emissions.

5.1 Intended use of flexible mechanisms, as reported by Member States

Flexible mechanisms contribute, to varying degrees, to the achievement of countries' targets.

Nine EU-15 Member States (Austria, Belgium, Denmark, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain) intend to make use of flexible mechanisms under the Kyoto Protocol to achieve their burden-sharing targets. Overall, the intended net acquisition of Kyoto units in the EU-15 amounts to a total of 344 million Kyoto units for the whole commitment period, or 69 million units per year of the commitment period.

Eight of these Member States have reported information on allocated financial resources for using the Kyoto mechanisms: these resources amount to EUR 2 523 million for the whole first commitment period. Spain, Austria and the Netherlands are the countries (in decreasing order) that intend to acquire the largest quantities of units (up to 145 million, up to 80 million and 45 million units for the whole period, respectively). These three countries have also allocated the largest financial resources for using the Kyoto mechanisms (EUR 611 million for Austria, EUR 446 million for the Netherlands and EUR 400 million⁽¹⁰⁾ for Spain). Italy has not reported any information on the degree of financial allocation for the use of flexible mechanisms, but rather on administrative arrangements already completed.

Croatia, Finland, France, Germany, Greece, Iceland, Sweden and the United Kingdom reported that they do not intend to use Kyoto mechanisms to achieve their burden-sharing target. They did not report on any sale of units under the EU Monitoring Mechanism, either (see Table 5.1).

The pattern of using flexible mechanisms for the achievement of targets has changed to some extent, compared to the 2013 assessment. Compared to previous years, some Member States (Ireland and the Netherlands, for instance) reported a lower amount of international credits that they expect to use to comply with their target, whereas increases were reported by Denmark, Italy and Luxembourg. The reported budget for the acquisition of assigned amount units (AAUs) increased compared to 2013 for Luxembourg, the Netherlands and Spain, whereas a decrease was estimated by Denmark, despite the increased intended use of flexible mechanisms.

A number of Member States holding a surplus of Kyoto units have also been selling units to other parties, thereby reducing their own emission budget. This is particularly the case for a number of central and eastern European countries, where the transition of their economic systems to market economies in the 1990s entailed a massive decline of their emissions in the 1990s, leading to the current situation of significant over-achievement of their Kyoto targets. For that reason, nine non-EU-15 Member States (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia) have reported on their intention to sell a net amount of Kyoto units to other parties. Compared to 2013, Romania considerably increased the number of Kyoto units it is planning to sell. So did Estonia, although to a smaller extent. Lithuania reported a lower quantity of units it intends to sell. For the first time in 2014, Poland also reported on plans to sell Kyoto units. Slovenia no longer intends to use flexible mechanisms, as its targets are attainable through domestic reductions alone (with the contribution of LULUCF).

Of the other EEA member countries, three (Liechtenstein, Norway and Switzerland) intend to use flexible mechanisms to reach their targets.

Reported information on intended use has been amended with information on the issuance of ERUs as reported by UNFCCC as of March 2014. It shows the amount of AAUs already transferred to ERUs in the accounts of Member States to be issued in joint implementation (JI) projects. The information reported in 2014 in questionnaires was more detailed concerning the types of flexible mechanisms than in the years before. This allowed a comparison of information on ERUs with amounts available from the UNFCCC. The assessment takes into account the most plausible data on ERU issuance (UNFCCC values were taken into account if they were higher in absolute terms than those reported in the questionnaires).

Finally, the amounts have been aggregated to a net total intended use of flexible mechanisms, including information on intended use and ERU issuance. For example, in France and in Germany, ERUs have been issued in JI projects, and these are taken into account for their net total intended use.

The intended net acquisition of Kyoto units in the EU-15 amounts to a total of 328 million Kyoto units for the whole commitment period, or 66 million

⁽¹⁰⁾ This amount does not include the budget allocated to bilateral acquisitions.

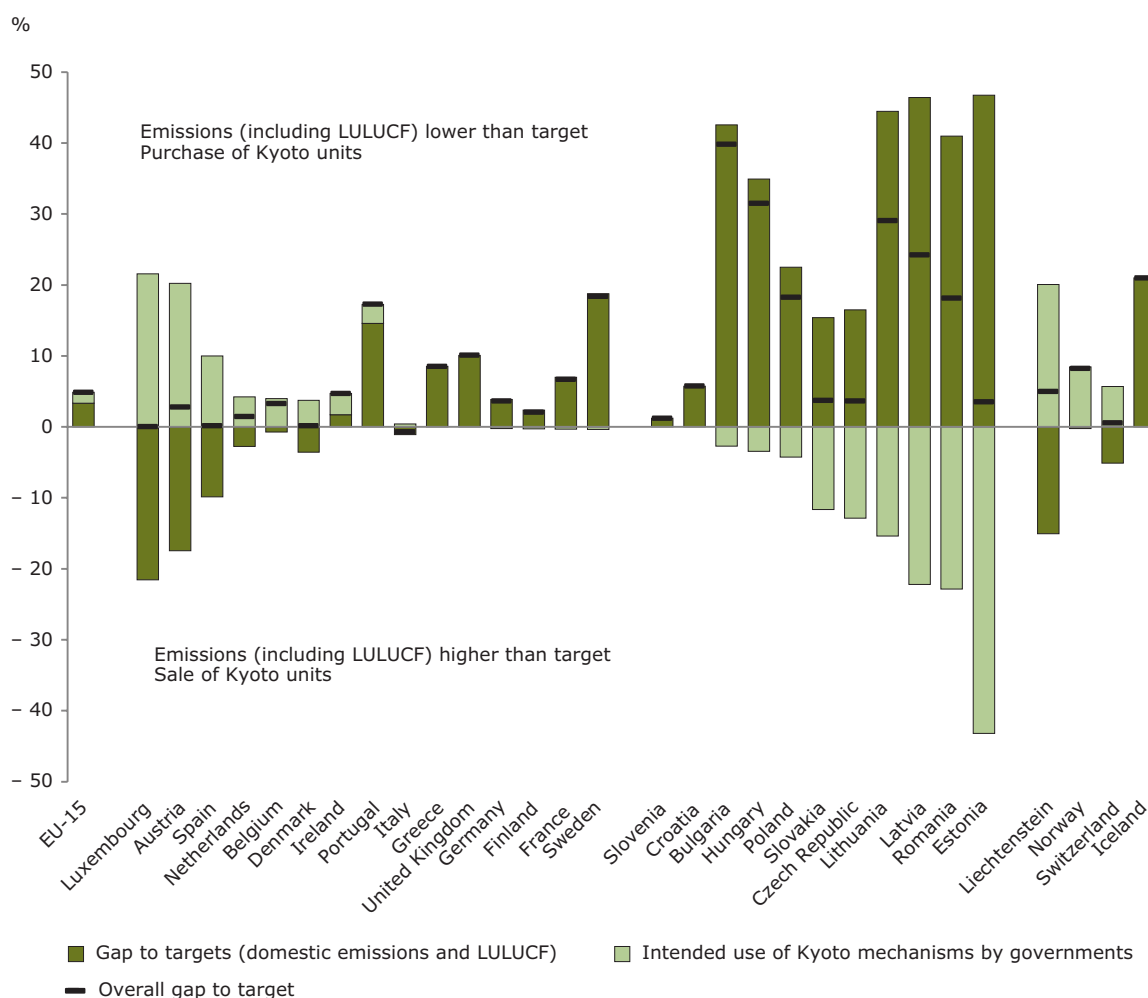
units per year of the commitment period (1.5 % of base year emissions), see Figure 5.1.

In Austria, Liechtenstein, Luxembourg and Spain, the number of international credits that these four countries intend to acquire to achieve compliance (excluding the quantities actually used by EU ETS operators) represents more than 10 % of base-year emissions: 22 % (Luxembourg), 20 % (Austria and Liechtenstein) and 10 % (Spain), compared with Kyoto or 'burden-sharing' targets of – 28 % (Luxembourg), – 13 % (Austria), – 8 %

(Liechtenstein) and + 15 % (Spain). Even if the total intended quantity of flexible mechanisms would not be needed, as it is the case taking into account most actual GHG numbers, percentages in these countries remain above 10 % of base-year emissions.

For Italy, use of flexible mechanisms is also crucial if it is to reach the target under the Burden-Sharing Agreement, but the amount necessary for achieving the target represents only 1.1 % of base-year emissions.

Figure 5.1 Contribution of intended use of flexible mechanisms to Kyoto compliance



Note: Gaps between emissions and targets refer to sectors not covered by the EU ETS, because the introduction of the EU ETS and its linking to the Kyoto flexible mechanisms imply that there will be no gap between ETS emissions and the emissions budget for the ETS. This also holds for Switzerland and its national emission trading scheme. For Croatia and Iceland, total emissions are used, as these countries had no installations under the EU ETS from 2008 to 2012.

The figure is based on the intended use of credits from flexible mechanisms as reported by Member States to the European Commission. For an overview taking into account the use of credits from flexible mechanisms as estimated by EEA based on 2014 GHG inventory data, see Table 5.2.

Each bar represents the contribution of a factor towards the achievement of Kyoto or burden-sharing targets. A positive sign signifies a favourable contribution towards target achievement.

Source: EEA, 2014a; EEA, 2014b; EEA, 2014c; Switzerland, 2014a; Switzerland, 2014b; UNFCCC, 2014a; UNFCCC, 2014c.

Table 5.1 Intended use of flexible mechanisms by governments for the first commitment period, as reported by countries

	Intended use of flexible mechanisms at governmental level, as reported by countries							ERU information from UNFCCC	Net total intended use of flexible mechanisms		
	Planned use of Kyoto mechanisms at government level	Type of Kyoto mechanisms (IET, JI, CDM)	Total	AAU	CER	ERU	Allocated budget (if intended acquisition)		Total	Annual average	Share of base-year emissions
			Mt CO ₂ -equivalent (2008–2012)				EUR million (full CP1)		Mt CO ₂ -equivalent (2008–2012)		Mt CO ₂ -equivalent per year
Austria	Yes	IET, JI, CDM	80.0	10.4	26.4	43.2	611.0	0.0	80.0	16.0	20
Belgium	Yes	IET, JI, CDM	29.4	NA	NA	NA	240.6	- 0.4	29.0	5.8	4
Bulgaria	Yes	IET, JI	- 18.0	0.0	0.0	- 7.0	-	- 8.4	- 18.0	- 3.6	- 3
Croatia	No	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0
Cyprus	NA	-	0.0	NO	NO	NO	-	0.0	0.0	0.0	-
Czech Republic	Yes	-	- 125.0	NA	NA	NA	-	- 4.4	- 125.0	- 25.0	- 13
Denmark	Yes	IET, CDM, JI	12.9	NA	NA	NA	160.9	0.0	12.9	2.6	4
Estonia	Yes	IET, JI	- 92.0	- 91.0	0.0	- 1.0	-	- 1.1	- 92.1	- 18.4	- 43
Finland	No	JI, CDM	0.0	0.0	0.0	0.0	-	- 1.0	- 1.0	- 0.2	0
France	No	JI, CDM	- 9.5	0.0	0.0	- 9.5	-	- 8.6	- 8.6	- 1.7	0
Germany	No	-	0.0	0.0	0.0	0.0	-	- 13.6	- 13.6	- 2.7	0
Greece	No	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0
Hungary	Yes	IET, JI	- 20.0	NA	NA	NA	-	- 7.4	- 20.0	- 4.0	- 3
Ireland	Yes	IET, JI, CDM	8.4	1.8	6.4	0.1	290.0	0.0	8.4	1.7	3
Italy	Yes	IET, JI, CDM	10.2	2.0	8.0	0.2	NA	0.0	10.2	2.0	0
Latvia	Yes	IET, JI	- 28.8	- 28.7	0.0	0.0	0.0	0.0	- 28.8	- 5.8	- 22
Lithuania	Yes	IET, JI	- 35.5	- 29.8	0.0	- 5.7	0.0	- 8.3	- 38.1	- 7.6	- 15
Luxembourg	Yes	IET, JI, CDM	14.2	9.0	4.7	0.6	250.0	0.0	14.2	2.8	22
Malta	NA	-	0.0	NO	NO	NO	-	0.0	0.0	0.0	-
Netherlands	Yes	IET, JI, CDM	44.9	3.0	28.2	13.7	446.1	0.0	44.9	9.0	4
Poland	Yes	IET, JI	- 120.0	- 100.0	0.0	- 20.0	-	- 20.0	- 120.0	- 24.0	- 4
Portugal	Yes	IET, JI, CDM	8.1	NA	NA	NA	124.8	0.0	8.1	1.6	3
Romania	Yes	IET, JI	- 317.9	- 300.0	0.0	- 17.9	-	- 17.9	- 317.9	- 63.6	- 23
Slovakia	Yes	IET, JI	- 42.0	- 41.5	0.0	- 0.5	-	- 0.5	- 42.0	- 8.4	- 12
Slovenia	Yes	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0
Spain	Yes	IET, JI, CDM	145.9	NA	NA	NA	400.0	- 0.9	145.0	29.0	10
Sweden	No	-	0.0	0.0	0.0	0.0	-	- 1.3	- 1.3	- 0.3	0
United Kingdom	No	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0
EU-15			344.4	26.2	73.7	48.2	2 523.3	- 25.7	328.3	65.7	2
EU-28			- 454.8	- 564.8	73.7	- 4.0	2 523.3	- 93.8	- 473.8	- 94.8	-
Iceland	No	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0
Liechtenstein	Yes	IET, JI, CDM	0.2	NA	NA	NA	-	0.0	0.2	0.0	20
Norway	Yes	IET, JI, CDM	21.0	NA	NA	NA	191.0	0.0	21.0	4.2	8
Switzerland	Yes	JI, CDM	15.5	NA	NA	NA	-	0.0	15.5	3.1	6

Note: IET: International Emissions Trading; JI: Joint Implementation; CDM: Clean Development Mechanism.

The total budget calculated for the EU-15 and the whole EU does not include the expected benefits of AAU sales.

The table is based on the intended use of credits from flexible mechanisms as reported by Member States to the European Commission. For an overview taking into account the use of credits from flexible mechanisms as estimated by EEA based on latest inventory data, see Table 5.2.

Source: EEA, 2014c; UNFCCC, 2014c; Switzerland, 2014b.

5.2 Use of flexible mechanisms to achieve compliance, as estimated by EEA

As flexible mechanisms can still be used until the end of the 'true-up period', final data on the use of these mechanisms are not available. Therefore, the analysis presented in Chapter 2 used data on the intended use of flexible mechanisms (as reported by Member States and described in the previous Section 5.1).

However, a comparison between emission data currently available for the full commitment period (including LULUCF) and emission budgets indicates that for most countries, the **intended** amounts are conservative estimates of what will actually be necessary for governments to achieve compliance (see Table 5.2).

- Taking into account the latest data on GHG emissions and the contribution from carbon sinks for Ireland and Portugal, no gap to target remains in these countries, which indicates that the use of flexible mechanisms could not be necessary to achieve compliance.
- In Austria, Belgium, the Netherlands, Norway and Spain, the intended use is higher than the actual gap to Kyoto target compliance. Austria, Ireland and Spain reported that they plan to use the amount of flexible mechanisms which is needed to close the gap to target and not to over-achieve.
- In Denmark, Liechtenstein and Luxembourg, the intended use and the gap are almost the same (less than a 2 Mt difference);
- An additional use of flexible mechanisms, compared to what is currently reported by Italy, will be necessary to achieve compliance.

5.3 Use of international emission credits in the EU ETS

Operators in all countries, except Liechtenstein, have used project-based credits to date.

Operators liable under the EU ETS are permitted to use certain credits from Clean Development Mechanism (CDM) and JI projects to comply with part of their legal obligation. According to

the Linking Directive (Directive 2004/101/EC) (EU, 2004b), CERs from the CDM were allowed from 2005, and ERUs from the JI were allowed from 2008 (EU, 2004).

For the second trading period of the EU ETS (2008–2012), entitlement limits were set in the national allocation plans (NAPs). These define the entitlements as a percentage of the free allocation to each installation in the 2008 to 2012 period. The percentages vary: from 4 % in Estonia, to 22 % in Germany. In total, this adds up to an upper limit of 1.4 billion CERs or ERUs that may be used in the second trading period (see Table 5.3). This corresponds to 14 % of the total free allocation (in all 30 countries participating in the EU ETS) in the second trading period.

No CERs and ERUs were surrendered during the first trading period of the ETS. This was due to the fact that only a small number of CERs had been issued before 2006⁽¹¹⁾. In 2006, it became clear that verified emissions were lower than the caps set for the first trading period. This resulted in a significant decrease in European Union allowance (EUA) prices and made the use of CERs not attractive (given the absence of possible banking of units between the first and the second trading periods).

During the second trading period, a total of 1 048 million credits was used by ETS operators in all participating countries (including 1 035 million credits in the EU-28). 64 % of these credits were CERs and 36 % ERUs. This total amount of units represents 76 % of the allowable offsets. However the use of credits differs significantly across countries. A total of 10 countries have used 90 % or more of the allowable offsets: Malta (100 %), Cyprus, Greece and Slovenia (96 %), Poland (93 %), Portugal and Austria (92 %), Sweden (91 %), the Czech Republic and Estonia (90 %). In absolute terms, the most credits from flexible mechanisms were used by operators in Germany (302 million), Spain (107 million), Poland (96 million), Italy (96 million), the United Kingdom (77 million) and France (76 million). Those six countries together account for 72 % of the CERs and ERUs used.

In the EU-15, ETS operators used a total of 808 million credits (528 million CERs and 281 million ERUs) during the second trading phase. This represents an average of 162 million credits

⁽¹¹⁾ <http://cdmpipeline.org>.

Table 5.2 Use of flexible mechanisms by governments to achieve compliance, as estimated by EEA

	Non-ETS GHG-emissions	Non-ETS target	Distance to non-ETS target	Effect of carbon sinks	Distance to non-ETS target (including carbon sinks)	Net intended use of flexible mechanisms by governments	Net use of flexible mechanisms (as estimated by EEA)	Difference between intended and estimated use
Mt CO ₂ -equivalent (2008–2012)								
Austria	265	190	76	7	69	80	69	11
Belgium	385	381	4	- 1	5	29	6	24
Bulgaria	133	411	- 278	4	- 282	- 18	- 18	0
Croatia	145	149	- 4	5	- 9	0	0	0
Cyprus	25							
Czech Republic	307	461	- 154	7	- 160	- 125	- 125	0
Denmark	178	157	21	9	12	13	12	0
Estonia	29	130	- 102	- 2	- 100	- 92	- 92	0
Finland	162	167	- 5	3	- 8	- 1	- 1	0
France	1 979	2 160	- 181	16	- 197	- 9	- 9	0
Germany	2 448	2 646	- 199	40	- 239	- 14	- 14	0
Greece	285	327	- 42	3	- 46	0	0	0
Hungary	220	410	- 191	11	- 202	- 20	- 20	0
Ireland	221	209	12	16	- 5	8	0	8
Italy	1 511	1 407	104	75	28	10	28	- 18
Latvia	42	96	- 54	6	- 60	- 29	- 29	0
Lithuania	80	184	- 104	6	- 110	- 38	- 38	0
Luxembourg	50	35	15	0	14	14	14	0
Malta	5							
Netherlands	591	564	27	- 2	30	45	30	15
Poland	1 012	1 619	- 608	26	- 634	- 120	- 120	0
Portugal	229	222	7	50	- 44	8	0	8
Romania	356	908	- 552	18	- 570	- 318	- 318	0
Slovakia	115	169	- 54	1	- 55	- 42	- 42	0
Slovenia	58	53	5	7	- 1	0	0	0
Spain	1 102	905	197	54	143	145	144	2
Sweden	207	264	- 57	11	- 68	- 1	- 1	0
United Kingdom	1 796	2 173	- 377	14	- 391	0	0	0
EU-15	11 407	11 808	- 400	295	- 696	328	278	51
EU-28	13 933	16 399	- 2 496	383	- 2 879	- 474	- 524	51
Iceland	17	19	- 2	2	- 4	0	0	0
Liechtenstein	1	1	0	0	0	0	0	0
Norway	174	175	- 1	- 2	1	21	1	20
Switzerland	248	226	22	8	14	16	14	2

Note: Non-ETS emissions in Croatia and Iceland refer to total GHG emissions as no EU ETS emissions occurred in the 2008–2012 period in these countries.

Net use of flexible mechanisms (as estimated by EEA) refers to the assumption that Member States intending to use flexible mechanisms to comply in CP1 will do so only with the amount finally necessary to close the gap. On the other hand, for Member States indicating they would sell AAUs, intended amounts are assumed to be finally sold.

Difference between intended and estimated use compares the intended use of flexible mechanisms with the amount of flexible mechanisms to be used in order to strictly achieve compliance. Positive values show that the reported intended amount is fully necessary to achieve compliance.

Source: EEA, 2014a; EEA, 2014b; EEA, 2014c; Switzerland, 2014a; Switzerland, 2014b; UNFCCC, 2014a; UNFCCC, 2014b; UNFCCC, 2014c.

per year, which is equivalent to 3.8 % of the EU-15 base-year emissions.

The use of CDM and JI credits gained increasing importance during the second trading period (see Figure 5.2). The number of surrendered credits increased: from 4 % of total verified emissions in 2008 and 2009, to 7 % in 2010, 13 % in 2011 and 26 % in 2012 (nearly 500 million units). Units from JI projects (ERUs) only accounted for 0.1 % of those credits in 2008. However, their use increased significantly, and covered 4 % of surrendered credits in 2009, 15 % in 2010, 30 % in 2011 and 57 % in 2012.

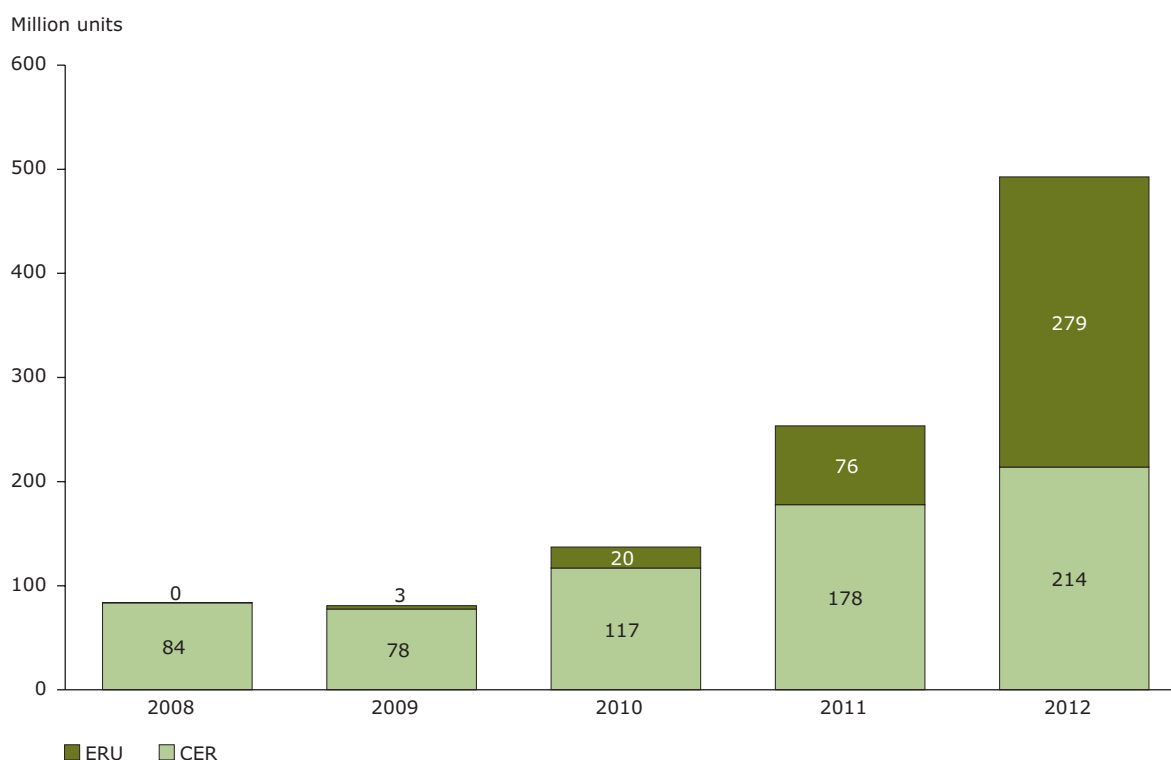
As prices for international offsets reduced significantly during the second half of the second trading period, the spread between EUA and CER/ERU prices widened, and because of

quality restrictions starting in 2013 ⁽¹²⁾, operators submitted large quantities of these permits instead of EUAs.

5.4 Total use of credits at national level

Based on the use of flexible mechanisms by governments estimated by EEA and the actual use of flexible mechanisms by EU ETS operators for compliance under the second phase of the EU ETS, the total EU-15 use of flexible mechanisms could amount to a total of 2 206 million credits (441 million units per year on annual average, or 5.2 % of base-year emissions). The largest use of flexible mechanisms at national level (both at governmental and operator level) are observed in Luxembourg (22.8 %), Austria (21.0 %) and Spain (17.4 %) in share of base-year emissions (see Figure 5.3).

Figure 5.2 Annual use of international Kyoto credits (CERs and ERUs) in the EU ETS, 2008–2012



Source: EEA, 2013a.

⁽¹²⁾ During the second trading period, EU legislation excluded JI/CDM credits from nuclear projects and temporary forest credits; for large hydroelectricity projects, certain conditions applied. From 2013 onwards, the use of credits from CDM and JI projects destroying trifluoromethane (HFC-23) and N₂O from adipic acid production will no longer be permitted under the EU ETS either, due to concerns about the additionality of such projects (see Sandbag (2013) for a more detailed discussion).

Table 5.3 Entitlements for the use of international Kyoto credits (CERs and ERUs) by stationary installations in the EU ETS

	CER/ERU use allowed as % of free allocation in second trading period	Total allowed CER/ERU use 2008–2012	Actual use of CER/ERU 2008–2012	Remaining CER/ERU use from second trading period	Share of used budget until 2012
	%	Million CER/ERU			%
Austria	10 %	15.2	14.0	1.2	92
Belgium	8 %	23.8	19.1	4.7	80
Bulgaria	15 %	29.8	23.4	6.4	79
Cyprus	10 %	2.7	2.6	0.1	96
Czech Republic	10 %	43.0	38.6	4.4	90
Denmark	17 %	20.3	12.5	7.8	61
Estonia ^(a)	4 %	3.0	2.7	0.3	90
Finland	10 %	18.8	16.3	2.4	87
France	14 %	89.1	75.6	13.5	85
Germany	22 %	440.3	302.2	138.1	69
Greece	9 %	29.1	27.9	1.2	96
Hungary	10 %	12.5	9.8	2.7	78
Ireland	10 %	10.4	6.6	3.9	63
Italy	15 %	151.3	95.5	55.8	63
Latvia	10 %	2.3	1.6	0.7	71
Liechtenstein	11 %	0.0	0.0	0.0	0
Lithuania	20 %	7.9	6.8	1.1	86
Luxembourg	10 %	1.2	0.8	0.4	64
Malta	10 %	1.1	1.1	0.0	100
Netherlands	10 %	42.1	28.6	13.5	68
Norway ^(b)	13 %	12.4	9.0	3.4	73
Poland	10 %	102.9	95.6	7.3	93
Portugal	10 %	16.0	14.7	1.3	92
Romania	10 %	37.1	32.2	4.9	87
Slovakia	7 %	11.4	10.0	1.4	88
Slovenia	16 %	6.5	6.2	0.3	96
Spain	20 %	152.2	107.1	45.2	70
Sweden	10 %	11.1	10.1	1.0	91
United Kingdom	8 %	88.3	77.4	11.0	88
EU-25	14 %	1 302.6	983.4	319.3	75
EU-27	14 %	1 369.5	1 038.9	330.6	76
All countries	14 %	1 381.9	1 047.9	334.0	76

Note: ^(a) Estonia: As the final Estonian NAP had only been approved in 2011, it only included use of international credits in 2011 and 2012. For 2011 and 2012, 10 % was allowed (based on the NAP notified by Estonia on 5 September 2011): this is equivalent to 4 % over the 5-year period from 2008 to 2012.

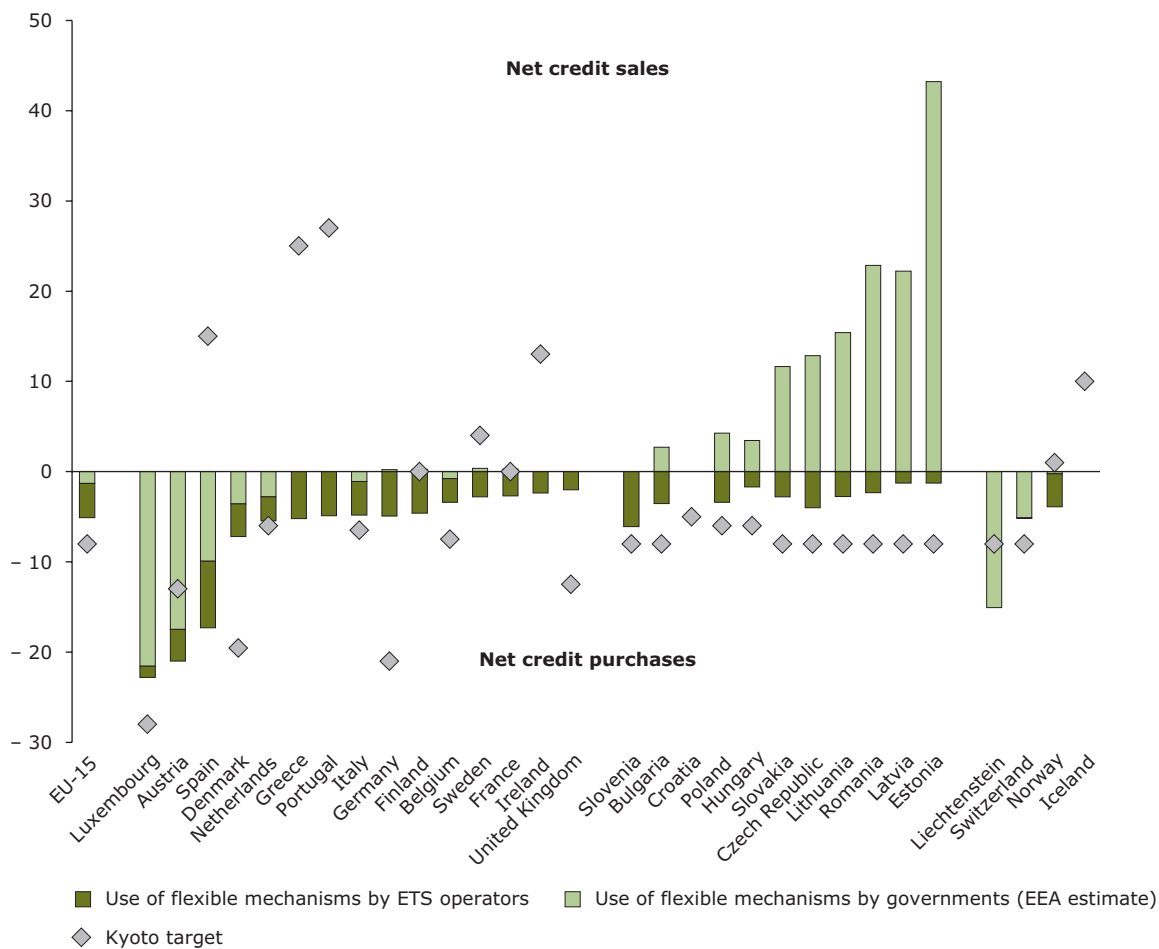
^(b) Norway: The allowed use of CER/ERU is defined as a share of verified emissions (instead of free allocation). The share of free allocation compared to emissions is considerably lower in Norway than in all the other participating countries (Norwegian operators of combustion installations received only 19 % of their actual 2008–2011 emissions as free allocation). Whereas EU Member States were bound by the Emissions Trading Directive (Directive 2003/87/EC), which foresaw at least 90 % of free allocation in the second trading period, Norway was free to choose to apply stricter standards.

In Switzerland, not included in this table, an amount of 0.5 million CERs has been used in the Swiss ETS.

Source: EEA, 2013a; EC, 2010b.

Figure 5.3 Total use of flexible mechanisms by governments (EEA estimate) and ETS operators, 2008–2012

Use of flexible mechanisms (% of base-year emissions)



Source: EEA, 2014a; EEA, 2014b; EEA, 2014c; Switzerland, 2014a; Switzerland, 2014b.

Acronyms, units and terms

AAU(s)	Assigned amount unit(s). A Kyoto unit representing an allowance to emit 1 metric tonne of carbon dioxide-equivalent (CO ₂ -equivalent). AAUs are created (issued) up to a level of a party's initial assigned amount
Annex I	The annex to the UNFCCC specifying which developed country parties and other parties to the UNFCCC have committed to limiting anthropogenic emissions and enhancing their GHG sinks and reservoirs
Assigned amount	The total quantity of valid emission allowances (Kyoto units) held by a party within its national registry. The initial assigned amount for a party is determined by its base-year emissions, and its emission limitation and reduction objective contained in Annex B to the Kyoto Protocol. Any Kyoto units that the party acquires through the Kyoto mechanisms, or issues for removals from LULUCF activities under Article 3, paragraphs 3 and 4, are added to the party's assigned amount; any units that the party transfers, or cancels for emissions from LULUCF activities under Article 3, paragraphs 3 and 4, are subtracted from the party's assigned amount. At the end of the commitment period, each party must ensure that its total emissions over the commitment period are less than or equal to its total assigned amount
Cancellation	The transfer of a unit to a cancellation account. Such units may not be further transferred, and may not be used towards meeting a party's Kyoto target
Carry-over	The authorisation for a unit that was issued in one commitment period to be used in a subsequent commitment period. Individual unit types are subject to different rules for carry-over
CDM	Clean Development Mechanism. A Kyoto Protocol mechanism that allows Annex I parties to purchase emission allowances from projects in non-Annex I parties that reduce or remove emissions. The emission allowances from CDM projects are called certified emission reductions (CERs)
CER(s)	Certified emission reduction(s). A Kyoto unit representing an allowance to emit 1 metric tonne of CO ₂ -equivalent CERs are issued for emission reductions from CDM project activities
CFC	Chlorofluorocarbon
CH ₄	methane
CITL	Community Independent Transaction Log
CO ₂	Carbon dioxide
CO ₂ -equivalent	Carbon dioxide-equivalent
COP	Conference of the Parties to the UNFCCC
Domestic	Pertaining to a country's or group of countries' own emissions or internal action to reduce emissions
EEA	European Environment Agency
ERU(s)	Emission reduction unit(s). A Kyoto unit representing an allowance to emit 1 metric tonne of CO ₂ -equivalent. ERUs are issued for emission reductions or emission removals from JI project activities by converting an equivalent quantity of the party's existing AAUs or removal units (RMUs)

ETC/ACM	European Topic Centre on Air Pollution and Climate Change Mitigation. The ETC/ACM is a consortium of European institutes contracted by the EEA to carry out specific tasks in the field of air pollution and climate change
EU ETS	European Union Emissions Trading System
EU	European Union: Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom
EU-15	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom
EUA	European Union allowance
EUAA	European Union aviation allowance
EUTL	European Union Transaction Log
FM	Forest Management
GDP	Gross domestic product
GHG(s)	Greenhouse gas(es)
HFC	hydrofluorocarbon
IET	International emissions trading. One of the three Kyoto Protocol emissions trading mechanisms by which an Annex I party may transfer Kyoto units to or acquire units from another Annex I party. A party must meet specific eligibility requirements to participate in emissions trading
IPCC	Intergovernmental Panel on Climate Change
ITL	International Transaction Log. An electronic data system, administered by the UNFCCC Secretariat, which monitors and tracks parties' transactions of Kyoto units
JI	Joint implementation. A Kyoto Protocol mechanism that allows Annex I parties to purchase emission allowances from projects of other Annex I parties that reduce or remove emissions. The emission allowances from JI projects are called emission reduction units (ERUs)
JRC	Joint Research Centre
KfW	German Development Bank
ktoe	Kilotonnes of oil equivalent
LULUCF	Land Use, Land-Use Change, and Forestry. A GHG inventory sector subject to specific accounting rules
MMD	Monitoring Mechanism Decision (Decision 28/2004/EC of 11 February 2004 concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol)
MMR	Monitoring Mechanism Regulation (Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC)
Mt	Mega (million) tonnes
Mtoe	million tonnes of oil equivalent
N ₂ O	nitrous oxide
NAP	National allocation plan
National registry	An electronic database maintained by a party, or group of parties, for the transfer and tracking of units under Kyoto Protocol rules

NER	New entrants reserve
NF ₃	Nitrogen trifluoride
Non-Annex I parties	Parties not included in Annex I to the UNFCCC
PFC	perfluorocarbon
Pledge	Emission reduction expressed as a percentage reduction, relative to the base year, which has to be achieved by a given year in the future
QA/QC	Quality assurance/Quality control
QELRC(s)	Quantified Emission Limitation or Reduction Commitment(s), average level of anthropogenic carbon dioxide equivalent emissions of GHG expressed as a percentage in relation to the base year
Retirement	The transfer of a unit to a retirement account to be used towards meeting a party's Kyoto commitment
RMU(s)	Removal unit(s). A Kyoto unit representing an allowance to emit 1 metric tonne of CO ₂ -equivalent. RMUs are issued for emission removals from LULUCF activities under Article 3, paragraphs 3 and 4
SEF	Standard electronic format for reporting Kyoto Protocol units
SF ₆	sulphur hexafluoride
True-up period	A 100-day period after final emissions have been reported for the commitment period during which parties have the opportunity to undertake final transactions necessary to achieve compliance with their Kyoto commitment
UNFCCC	United Nations Framework Convention on Climate Change

References

- EC, 2006, Commission Decision 2006/944/EC of 14 December 2006 determining the respective emission levels allocated to the Community and each of its Member States under the Kyoto Protocol pursuant to Council Decision 2002/358/EC (OJ L 358, 16.12.2006, p. 87–89) (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32006D0944:EN:NOT>) accessed 2 October 2013.
- EC, 2010a, Commission Decision 2010/778/EU of 15 December 2010 amending Decision 2006/944/EC determining the respective emission levels allocated to the Community and each of its Member States under the Kyoto Protocol pursuant to Council Decision 2002/358/EC (OJ L 332, 16.12.2010, p. 41–42) (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32010D0778:EN:NOT>) accessed 2 October 2013.
- EC, 2010b, National allocation plans notified to the Commission and Commission Decisions (http://ec.europa.eu/clima/policies/ets/pre2013/nap/documentation_en.htm) accessed 2 October 2013.
- EEA, 2006, *The European Community's initial report under the Kyoto Protocol*, EEA Technical report No 10/2006, European Environment Agency (http://www.eea.europa.eu/publications/technical_report_2006_10) accessed 19 September 2012.
- EEA, 2013a, *Trends and projections in Europe 2013: Tracking progress towards Europe's climate and energy targets until 2020*, EEA Report No 10/2013 (<http://www.eea.europa.eu/publications/trends-and-projections-2013>) accessed 17 June 2014.
- EEA, 2013b, *Approximated EU GHG inventory: early estimates for 2012*, EEA Technical report No 14/2013, European Environment Agency (<http://www.eea.europa.eu/publications/approximated-EU-ghg-inventory-2012>) accessed 18 June 2014.
- EEA, 2014a, *Annual European Community greenhouse gas inventory 1990–2012 and inventory report 2014*, EEA Technical report No 9/2014, European Environment Agency (<http://www.eea.europa.eu/publications/european-union-greenhouse-gas-inventory-2014>) accessed 18 June 2014.
- EEA, 2014b, EU Emissions Trading System (ETS) data viewer, European Environment Agency. (www.eea.europa.eu/data-and-maps/data/data-viewers/emissions-trading-viewer) accessed 20 June 2014.
- EEA, 2014c, Questionnaires on the use of flexible mechanisms reported under the EU Monitoring Mechanism, European Environment Agency.
- EEA, 2014d, *Why did GHG emissions decrease in the EU between 1990 and 2012?*, European Environment Agency (<http://www.eea.europa.eu/publications/why-are-greenhouse-gases-decreasing>) accessed 20 June 2014.
- EEA, 2014e, *Trends and projections in Europe 2014: Tracking progress towards Europe's climate and energy targets for 2020*, EEA Report No 6/2014.
- EU, 2002, Council Decision 2002/358/EC of 25 April 2002 concerning the approval, on behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the joint fulfilment of commitments thereunder (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002D0358:EN:NOT>) accessed 2 October 2013.
- EU, 2003, Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (OJ L 275, 25.10.2003, pp. 32–46) (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32003L0087:EN:NOT>) accessed 19 September 2012.
- EU, 2004a, Decision No 280/2004/EC of the European Parliament and of the Council of 11 February 2004 concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol (OJ L 49, 19.2.2004, pp. 1–8) (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32004D0280:EN:NOT>) accessed 19 September 2012.

do?uri=CELEX:32004D0280:EN:NOT) accessed 2 October 2013.

EU, 2004b, Directive 2004/101/EC of the European Parliament and of the Council of 27 October 2004 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms (OJ L 338, 13.11.2004, pp. 18–23) (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32004L0101:EN:NOT>) accessed 2 October 2013.

EU, 2008, Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community (OJ L 8, 13.1.2009, pp. 3–21) (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0101:EN:NOT>) accessed 2 October 2013.

EU, 2009, Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community (OJ L 140, 5.6.2009, pp. 63–87) (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32009L0029:EN:NOT>) accessed 2 October 2013.

EU, 2013, Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC (OJ L 165, 18.6.2013, pp. 13–40) (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32013R0525:EN:NOT>) accessed 2 October 2013.

EU, 2014, 'European Union Transaction Log' (EUTL) (<http://ec.europa.eu/environment/ets>) accessed 17 June 2014.

Italy, 2014, *Economic and financial document (DEF), Section III National Reform Program*, Ministry of Economy and Finance (http://www.mef.gov.it/doc-finanza-pubblica/def/2014/documenti/DEF_Sezione_III_Programma_Nazionale_di_Riforma_xParte_IIX_a.pdf) accessed 23 June 2014.

Norway, 2008, *Norwegian National Allocation Plan for the ETS in 2008–2012*, Norwegian Ministry of the Environment.

Öko-Institut, 2012, *Strengthening the European Union Emissions Trading Scheme and raising climate ambition, Facts, Measures and Implications* (Report for WWF/Greenpeace), Berlin: Öko-Institut e.V. (Institute for Applied Ecology).

Sandbag, 2013, *Drifting toward disaster? The ETS adrift in Europe's climate efforts, The 2013 Environmental Outlook for the EU ETS*, Sandbag Climate Campaign (http://www.sandbag.org.uk/site_media/pdfs/reports/Drifting_Towards_Disaster.pdf) accessed 2 October 2013.

Switzerland, 2014a, *Faktenblatt 1. Schweizer Kyoto-Bilanz 2008 bis 2012* (<http://www.news.admin.ch/NSBSubscriber/message/attachments/34418.pdf>) accessed 19 June 2014.

Switzerland, 2014b, *Faktenblatt 2. CO₂-Abgabebefreiung für Unternehmen: Bilanz der 1. Verpflichtungsperiode* (www.bafu.admin.ch/klima/03449/12696/index.html?lang=de&msg-id=49576) accessed 19 June 2014.

Switzerland, 2014c, *Swiss National Emissions Trading Registry* (www.national-registry.ch) accessed 19 June 2014.

UNFCCC, 2006a, *Decision 16/CMP.1 Land use, land-use change and forestry, Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its first session, United Nations Framework Convention on Climate Change, Bonn* (<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=3>) accessed 19 September 2012.

UNFCCC, 2006b, *Modalities for the accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol, Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its first session, United Nations Framework Convention on Climate Change, Bonn* (<http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=23>) accessed 19 September 2012.

UNFCCC, 2011, *Proposal from Cyprus and the European Union to amend Annex I to the Convention, Note by the secretariat, United Nations Framework Convention on Climate Change, Bonn* (<http://unfccc.int/resource/docs/2011/cop17/eng/03.pdf>) accessed 17 June 2014.

UNFCCC, 2012, *Analysis of quantified emission limitation and reduction commitments expressed as percentage of base year and absolute emission levels*, United Nations Framework Convention on Climate Change, Bonn (http://unfccc.int/files/meetings/ad_hoc_working_groups/kp/application/pdf/tableqelrcs_fromparties_for_website_posting_17aug2012_cln.pdf) accessed 25 September 2012.

UNFCCC, 2013, *Kyoto Protocol, targets for the first commitment period*, United Nations Framework Convention on Climate Change, Bonn (http://unfccc.int/kyoto_protocol/items/3145.php) accessed 17 June 2014.

UNFCCC, 2014a, GHG inventories of non-EU countries (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php) accessed 20 June 2014.

UNFCCC, 2014b, 2008–2012 data on LULUCF reported under the Kyoto Protocol (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php) accessed 20 June 2014.

UNFCCC, 2014c, Table on ERU issuance (http://ji.unfccc.int/statistics/2014/ERU_Issuance.pdf) accessed 19 June 2014.

Annex 1 Detailed calculations of Kyoto progress for individual countries

Country	Total GHG emissions	Verified emissions under the EU ETS	Non-ETS GHG emissions	Initial Assigned Amount (AAUs)	Allowances issued under the EU ETS	Non-ETS target	Difference between target and GHG emissions (non-ETS, domestic)	Expected carbon sequestration from LULUCF activities (RMUs)	Difference between target and GHG emissions (non-ETS, domestic), including effect of carbon sequestration	Intended use of Kyoto mechanisms by government (net transfer of AAUs + purchase of CERs + ERUs)	Difference between target and GHG emissions (non-ETS domestic emissions including plans on Kyoto mechanisms and carbon sinks)
	1	2	3	4	5	6	7	8	9	10	11
			(1) - (2)			(4) - (5)	(6) - (3)		(7) + (8)		(9) + (10)
Mt CO ₂ -equivalent (2008–2012)											
Austria	414.7	149.3	265.3	343.9	154.3	189.5	- 75.8	6.8	- 69.0	80.0	11.0
Belgium	626.3	241.0	385.3	674.0	292.9	381.1	- 4.2	- 1.1	- 5.3	29.0	23.7
Bulgaria	311.9	178.9	133.0	610.0	198.6	411.4	278.4	3.6	282.1	- 18.0	264.1
Croatia	144.6	0.0	144.6	148.8	0.0	148.8	4.1	4.9	9.0	0.0	9.0
Cyprus	49.8	25.0	24.8	0.0	27.4	- 27.4	- 52.2	0.0	- 52.2	0.0	- 52.2
Czech Republic	680.1	373.3	306.9	893.5	433.0	460.6	153.7	6.6	160.3	- 125.0	35.3
Denmark	294.5	116.9	177.6	278.8	122.3	156.6	- 21.0	8.6	- 12.4	13.0	0.6
Estonia	95.3	66.8	28.5	196.1	65.6	130.5	102.0	- 2.4	99.6	- 92.1	7.5
Finland	338.4	176.4	162.0	355.0	187.7	167.3	5.4	2.9	8.3	- 1.0	7.3
France	2 538.7	560.0	1 978.6	2 819.6	660.0	2 159.7	181.0	16.1	197.1	- 8.6	188.6
Germany	4 706.6	2 258.9	2 447.6	4 868.1	2 221.6	2 646.5	198.8	39.7	238.6	- 13.6	225.0
Greece	598.5	313.7	284.7	668.7	341.5	327.1	42.4	2.1	44.5	0.0	44.5
Hungary	336.0	116.4	219.6	542.4	132.1	410.2	190.6	11.0	201.6	- 20.0	181.6
Iceland	16.5	0.0	16.5	18.5	0.0	18.5	2.0	1.5	3.5	0.0	3.5
Ireland	308.5	87.6	220.9	314.2	104.8	209.3	- 11.5	16.3	4.8	8.4	13.1
Italy	2 476.8	966.1	1 510.7	2 416.3	1 009.2	1 407.1	- 103.6	75.3	- 28.4	10.2	- 18.2
Latvia	56.5	14.1	42.3	119.2	23.0	96.2	53.9	6.2	60.1	- 28.8	31.4
Liechtenstein	1.2	0.0	1.1	1.1	0.1	1.0	- 0.2	0.0	- 0.2	0.2	0.1
Lithuania	109.8	29.6	80.2	227.3	43.0	184.3	104.2	5.7	109.9	- 38.1	71.8
Luxembourg	60.1	10.6	49.5	47.4	12.4	35.0	- 14.5	0.4	- 14.2	14.2	0.0
Malta	15.2	9.8	5.4	0.0	10.7	- 10.7	- 16.1	0.0	- 16.1	0.0	- 16.1
Netherlands	997.1	405.7	591.4	1 001.3	437.3	564.0	- 27.5	- 2.1	- 29.5	44.9	15.4
Norway	269.7	95.7	174.0	250.6	75.4	175.2	1.2	- 1.8	- 0.6	21.0	20.4
Poland	2 006.3	994.7	1 011.6	2 648.2	1 028.9	1 619.3	607.7	26.1	633.8	- 120.1	513.7
Portugal	361.6	132.6	229.0	381.9	159.5	222.5	- 6.5	50.3	43.8	8.1	51.9
Romania	615.8	259.3	356.5	1 279.8	371.4	908.4	552.0	18.2	570.2	- 317.9	252.3
Slovakia	226.5	111.8	114.7	331.4	162.7	168.7	54.0	1.4	55.4	- 42.0	13.4

Country	Total GHG emissions	Verified emissions under the EU ETS	Non-ETS GHG emissions	Initial Assigned Amount (AAUs)	Allowances issued under the EU ETS	Non-ETS target	Difference between target and GHG emissions (non-ETS, domestic)	Expected carbon sequestration from LULUCF activities (RMUs)	Difference between target and GHG emissions (non-ETS, domestic), including effect of carbon sequestration	Intended use of Kyoto mechanisms by government (net transfer of AAUs + purchase of CERs + ERUs)	Difference between target and GHG emissions (non-ETS domestic emissions including plans on Kyoto mechanisms and carbon sinks)
	1	2	3	4	5	6	7	8	9	10	11
			(1) - (2)			(4) - (5)	(6) - (3)		(7) + (8)		(9) + (10)
Mt CO₂-equivalent (2008–2012)											
Slovenia	98.5	40.7	57.9	93.6	41.1	52.5	- 5.4	6.6	1.2	0.0	1.2
Spain	1 792.0	690.2	1 101.8	1 666.2	761.2	905.0	- 196.8	52.8	- 144.0	145.0	1.0
Sweden	305.5	98.3	207.3	375.2	110.9	264.3	57.0	10.6	67.7	- 1.3	66.3
Switzerland	261.5	13.6	247.9	242.8	16.6	226.2	- 21.3	8.1	- 13.5	15.5	2.0
United Kingdom	2 982.0	1 186.5	1 795.6	3 396.5	1 223.8	2 172.7	377.1	14.2	391.4	0.0	391.4
EU-15	18 801.2	7 393.8	11 407.4	19 621.4	7 799.4	11 822.0	414.6	293.0	707.6	328.3	1 035.9
Mt CO₂- equivalent/year											
EU-15	3 760.2	1 478.8	2 281.5	3 924.3	1 559.9	2 364.4	82.9	58.6	141.5	65.7	207.2
Corrections taken into account											
Austria	Allowances issued under the EU ETS: Downward correction as free allocation recorded in the EUTL includes allocations to new entrants that Austria bought on the market (7.9 million EUA in total).										
Denmark	Initial Assigned Amount: Correction of AAU initial to EU territory and inclusion of base-year compensation. Allowances issued under the EU ETS: Downward correction because deleted EUA (0.07 million EUA/year) are not recorded in the EUTL.										
France	Allowances issued under the EU ETS: Downward correction to 132 million EUA as free allocation recorded in the EUTL includes allocations to new entrants that France bought on the market.										
Germany	Correction of allowances issued under the EU ETS in 2008 with 8.1 M EUAs for refinancing the KfW Mechanism and correction of - 4 M EUAs in 2009 and 2010 due to recoveries from operators that are not recorded in the EUTL.										
Iceland	Correction of Total GHG emissions: Emissions from aluminium production are excluded according to 14/CP.7.										
United Kingdom	Consideration of AAU initial related to EU territory only.										

Annex 2 Kyoto Protocol targets

A2.1 What is a Kyoto target?

A target under the Kyoto Protocol expresses a quantified objective to reduce or limit national GHG emissions over a certain period of time. A target is characterised by a number of parameters. Country-specific details are provided in Table A2.1.

Gases covered

The Kyoto Protocol covers six greenhouse gases covered by the Kyoto Protocol: CO₂, methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆). Although chlorofluorocarbons (CFCs) are GHGs, they are regulated by the Montreal Protocol because of their contribution to ozone depletion. For the second commitment period, it was agreed to include nitrogen trifluoride (NF₃) in the basket of gases covered.

Sectors covered

Kyoto targets cover all the activities of a country which are a source (or a sink) of GHGs. International aviation and maritime transport are the only sectors where emissions are not covered by the Kyoto Protocol.

Target level

Each Kyoto target is determined as level of GHG emissions which has to be achieved, expressed as a percentage of base-year emissions. Targets can be negative (reduction) or positive (limitation). In Annex B of the Kyoto Protocol, targets are actually mentioned as an index where base-year emissions are 100. For example, the EU-15 target is 92 (– 8 % compared to the base year).

Base year

The base year serves as a reference to express how much GHG emissions should be limited or reduced. For the Kyoto Protocol, 1990 is used as the base year. However, some flexibility exists for the choice of base years for fluorinated gases and for countries undergoing the process of transition to a market economy.

Commitment period

Kyoto targets must be achieved during specific commitment periods. The first commitment period lasted 5 years, from 2008 until 2012. The second commitment period will last 8 years, from 2013 until 2020.

Assigned amount

To implement these commitments in practice, each Kyoto target corresponds to an emission budget (corresponding to a quantity of 'Kyoto units') for each commitment period of the Kyoto Protocol. This emission budget is an assigned amount.

Monitoring, reporting and verification

Kyoto targets are quantified. They relate to levels of GHGs emitted at national level. Each year, Annex I parties to the UNFCCC report a detailed inventory of their GHG emissions under the UNFCCC. GHG emissions are calculated following specific internationally agreed guidelines prepared by experts from the IPCC. These data, which are regularly reviewed by international experts, constitute the source for the determination of targets and the assessment of compliance under the Kyoto Protocol. Kyoto targets are legally binding: a process coordinated by the UNFCCC Secretariat

aims to check that parties to the Kyoto Protocol are achieving their commitments.

A2.2 Targets for the first commitment period (2008–2012)

The UNFCCC was signed in 1992. It lays down the obligation for all parties to undertake measures to mitigate climate change, taking into consideration their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances. Thus, developed country parties are specifically obliged to commit to adopting national policies and take corresponding measures on the mitigation of climate change. The extent to which developing country parties will effectively implement their commitments under the Convention is stated as depending on the effective implementation by developed country parties of their commitments relating to financial resources and the transfer of technology.

The Kyoto Protocol was agreed in 1997 and entered into force in 2005. It is the first international legally binding agreement specifying the commitments of developed countries listed in Annex I to the Convention to limit or reduce their GHG emissions. The first commitment period lasted 5 years, from 2008 to 2012.

Under the Kyoto Protocol, the EU-15 has committed to a common annual emission reduction target of

– 8 % compared to base-year levels, to be achieved on average over the 5-year period from 2008 to 2012.

To take into consideration the specific situation of the 15 Member States covered under this joint commitment, differentiated emission limitation or reduction targets were agreed for each of the 15 pre-2004 Member States, under an EU accord known as the Burden-Sharing Agreement. Thus, domestic legislation has been adopted by the EU in order to implement its international commitments.

The EU as it stands today (comprising 28 Member States) does not have a single Kyoto target for the 2008–2012 period: the protocol was ratified before 2004, and 13 countries became EU Member States after this. Nevertheless, 11 of these 13 Member States have individual targets under the Kyoto Protocol. Cyprus and Malta do not have targets for the first commitment period, but are both parties to the Kyoto Protocol. They became Annex I parties to the Convention in 2013 and 2010, respectively.

Of the other EEA member countries, Iceland, Liechtenstein, Norway and Switzerland have individual targets under the Kyoto Protocol. Turkey, which acceded to the Kyoto Protocol in February 2009, has no quantified emission reduction commitment. Despite being an Annex I party to the UNFCCC, Turkey is not included in the Kyoto Protocol's Annex B because it was not a party to the UNFCCC when the Kyoto Protocol was adopted⁽¹³⁾.

⁽¹³⁾ See also the UNFCCC's KP target information online (UNFCCC, 2013).

Table A2.1 Emission targets under the Kyoto Protocol in Europe, 2008–2012

	Annex I Party to the Convention	Kyoto Protocol					Participating in EU ETS	
		Included in Annex B of the Kyoto Protocol	Base year		Base-year emissions (e)	Burden-sharing target		Kyoto target
			CO ₂ , CH ₄ , N ₂ O	HFC, PFC, SF ₆	Mt CO ₂ -equivalent	in % of base year		
EU-15	x				4 265.5	- 8.0 %		
Austria	x	x	1990	1990	79.0	- 13.0 %	x	
Belgium	x	x	1990	1995	145.7	- 7.5 %	x	
Germany	x	x	1990	1995	1 232.4	- 21.0 %	x	
Denmark ^(a)	x	x	1990	1995	69.3	- 21.0 %	x	
Greece	x	x	1990	1995	107.0	25.0 %	x	
Spain	x	x	1990	1995	289.8	15.0 %	x	
Finland	x	x	1990	1995	71.0	0.0 %	x	
France	x	x	1990	1990	563.9	0.0 %	x	
Ireland	x	x	1990	1995	55.6	13.0 %	x	
Italy	x	x	1990	1990	516.9	- 6.5 %	x	
Luxembourg	x	x	1990	1995	13.2	- 28.0 %	x	
Netherlands	x	x	1990	1995	213.0	- 6.0 %	x	
Portugal	x	x	1990	1995	60.1	27.0 %	x	
Sweden	x	x	1990	1995	72.2	4.0 %	x	
United Kingdom ^(a)	x	x	1990	1995	776.3	- 12.5 %	x	
Bulgaria	x	x	1988	1995	132.6	- 8.0 %	Since 2007	
Croatia	x	x	1990	1990	31.3	- 5.0 %	Since 2013	
Cyprus ^(b)							x	
Czech Republic	x	x	1990	1995	194.2	- 8.0 %	x	
Estonia	x	x	1990	1995	42.6	- 8.0 %	x	
Hungary	x	x	1985–1987	1995	115.4	- 6.0 %	x	
Lithuania	x	x	1990	1995	49.4	- 8.0 %	x	
Latvia	x	x	1990	1995	25.9	- 8.0 %	x	
Malta	x ^(c)						x	
Poland	x	x	1988	1995	563.4	- 6.0 %	x	
Romania	x	x	1989	1989	278.2	- 8.0 %	Since 2007	
Slovenia	x	x	1986	1995	20.4	- 8.0 %	x	
Slovakia	x	x	1990	1990	72.1	- 8.0 %	x	
Iceland	x	x	1990	1990	3.4	10.0 %	Since 2008	
Liechtenstein	x	x	1990	1990	0.2	- 8.0 %	Since 2008	
Norway	x	x	1990	1990	49.6	1.0 %	Since 2008	
Switzerland	x	x	1990	1990	52.8	- 8.0 %		
Turkey	x	^(d)						

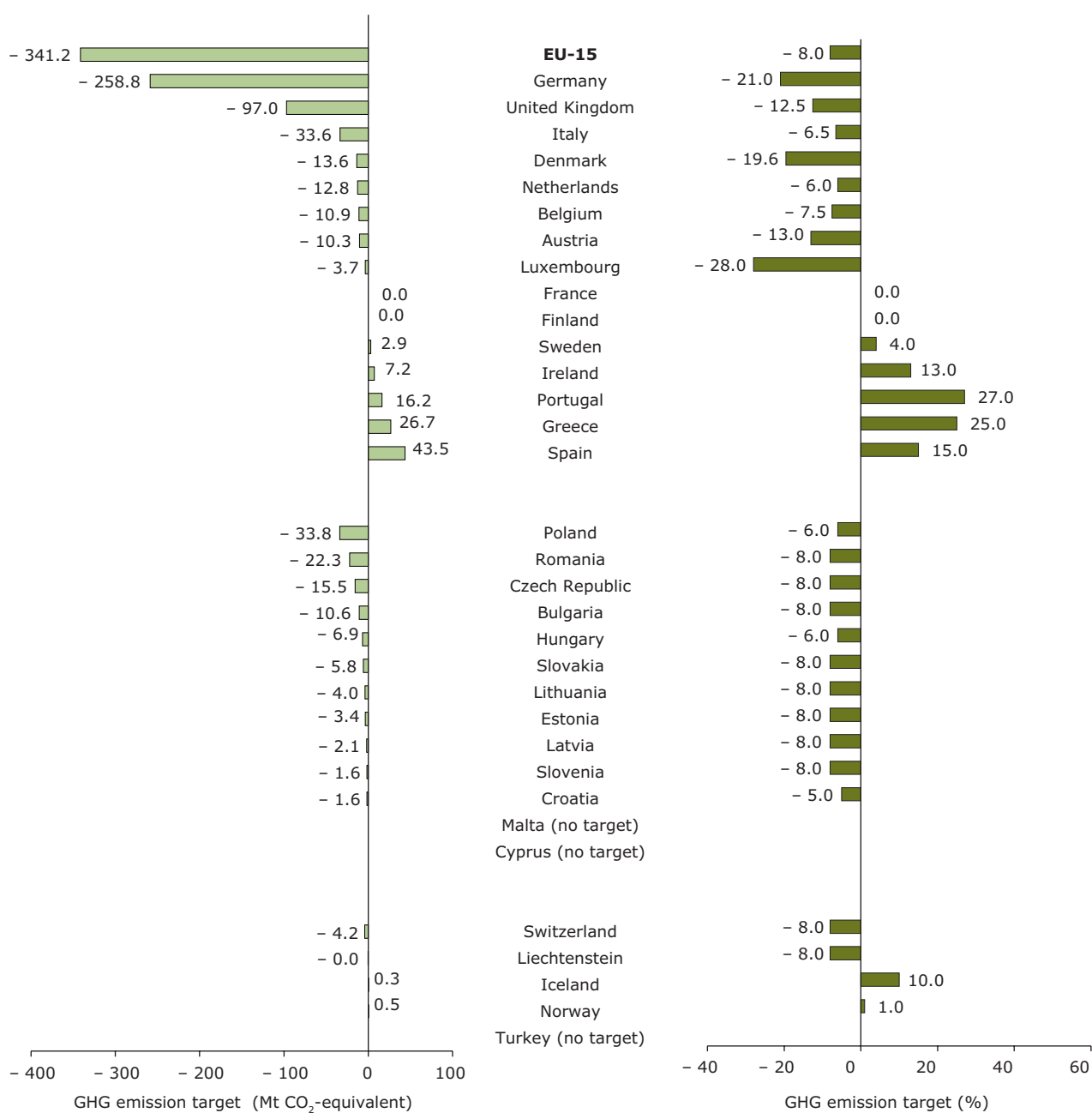
Note: ^(a) The Faroe Islands and Greenland, in the case of Denmark, and the United Kingdom overseas territories are not members of the European Union and therefore are not included here.

^(b) Cyprus ratified the UNFCCC in 1997 and the Kyoto Protocol in 1999.

^(c) Malta ratified the UNFCCC in 1994 and became an Annex I party to the Convention at the end of 2010. It ratified the Kyoto Protocol in 2001.

^(d) Turkey was not party to the UNFCCC when the Kyoto Protocol was adopted. It ratified the Kyoto Protocol in 2009.

Source: See http://unfccc.int/ghg_data/kp_data_unfccc/base_year_data/items/4354.php; EC, 2006; EC, 2009a; EU, 2002.

Figure A2.1 Emission targets under the Kyoto Protocol in Europe, 2008–2012


Note: The final emission levels allocated to the EU and each Member State were established after completion of the reviews of the initial reports pursuant to Article 8 of the Kyoto Protocol in 2008. To account for Denmark's exceptionally low base-year emissions compared to other years, Denmark received 5 million AAUs from the Union registry for the first commitment period under the Kyoto Protocol; this is reflected in the numbers above (EC, 2010a).

Source: EEA, 2006; EC, 2006; EC, 2010a.

A2.3 Targets for the second commitment period (2013–2020)

This report focuses on assessing progress towards the EU's target for the first commitment period only. The forthcoming 2014 EEA report on GHG trends and projections in Europe (publication expected in October 2014) will provide a detailed description of the EU's domestic and international targets for 2020 and the second commitment period, and an assessment of progress towards reaching these targets.

At the Doha climate conference in December 2012 (COP18/CMP.8), consensus was not reached on a succeeding agreement to the Kyoto Protocol that would comprise obligations for a bigger group of countries. Consequently, the Kyoto Protocol was extended beyond 2012.

The amendment to the Kyoto Protocol to establish a second commitment period running from 2013 to 2020 was adopted in Decision 1/CMP.8. However, ratification of the amendment by Parties is still on-going. Methodological issues related to the Kyoto Protocol for the second commitment period have not yet been agreed (this includes rules on accounting of emissions from the land sector, rules on joint fulfilment by the EU, rules on the implementation of Article 3.7ter of the Doha amendment on the carry-over of AAUs and rules on reporting for parties without commitments for the second commitment period). These issues are expected to be resolved at the Conference of the Parties to the UNFCCC (COP) 20 in December in 2014.

The set of amendments to the Kyoto Protocol includes a new Annex B, with quantified emission limitation and reduction commitments (QELRCs) for Annex I parties that intend to take part in such a second commitment period.

The EU, its 28 Member States and Iceland agreed to a quantified emission reduction commitment of 80 % (of base-year emissions, equivalent to a 20 % reduction) under the Kyoto Protocol's second commitment period (2013 to 2020). In Doha, the EU, its Member States and Iceland declared that they

intended to fulfil this commitment jointly in line with Article 4 of the Kyoto Protocol.

Liechtenstein, Norway and Switzerland also agreed to QELRCs for the second commitment period, of 84 (– 16 %), 84 (– 16 %) and 84.2 (– 15.8 %), respectively.

A2.4 Difference between the EU's 2013–2020 Kyoto target and its 2020 domestic target

In 2007, the EU committed to a unilateral reduction target of 20 % compared to 1990 levels by 2020. The EU's target for the second commitment of the Kyoto Protocol and the EU's domestic target for 2020 therefore have the same headline number and are consistent in terms of ambition level, but are not directly comparable. This is because the scope of existing EU legislation implementing the domestic 20 % commitment is different from the scope of the EU's Kyoto target for the second commitment period. The two targets mainly differ in terms of emissions included and methodologies used to determine emissions.

International aviation is included in the Climate and Energy Package and the EU's overall 20 % reduction target, while its emissions from international aviation are not accounted for under the Kyoto Protocol.

The LULUCF sector in the EU is not included in the 20 % target under the Climate and Energy Package, but it is accounted for under the Kyoto Protocol, according to the relevant decisions made in Durban.

Nitrogen trifluoride (NF₃) is not included in the Climate and Energy Package, whereas the scope of the second commitment period has been extended to include the additional gas. However, the impact of NF₃ on aggregate EU emissions is insignificant.

The EU's domestic 2020 target is defined against 1990 as the base year, while it was agreed in Durban to continue to apply the same flexibilities to set a different base-year for fluorinated gases and economies in transition (see Section A2.1).

Annex 3 Achieving compliance under the Kyoto Protocol

Key messages

1. To comply with its objective under the Kyoto Protocol, a country must ensure that its total GHG emissions during the whole commitment period do not exceed an emission budget which is determined in relation to the agreed Kyoto target.
2. This can be achieved by reducing or limiting GHG emissions through climate mitigation policies, or increasing the emission budget so that it matches GHG emissions.
3. Emission budgets increase when carbon sinks (such as forests) remove CO₂ from the atmosphere.
4. Emission budgets can be further increased by acquiring Kyoto units from other parties through the use of 'flexible mechanisms' under the Kyoto Protocol.
5. The EU ETS is a domestic EU policy where EU allowances are linked to Kyoto units. Through the allocation of ETS allowances, countries have determined the contribution of the ETS to their achievement of Kyoto targets. They also indirectly assigned themselves a 'non-ETS target' for 2008 to 2012, equivalent to their initial assigned amount, reduced by the ETS cap that they have determined.

A3.1 Percentage targets converted into emission budgets

Targets under the Kyoto Protocol are initially expressed as a percentage of base-year emissions. For example, the EU-15 target is 92 %, which corresponds to an 8 % reduction from base-year levels. This target is to be achieved by a specific date or during a certain commitment period. For example, the 8 % reduction target for the EU-15 has to be achieved on average during the first commitment period (2008–2012). This means that in a given year of the commitment period, GHG emissions may be higher than the target, as long as they remain lower when considering the average over a 5-year period.

These targets are then expressed in terms of emission budgets for the commitment period considered. Each emission budget corresponds to a specific quantity of 'Kyoto units'. There are several types of Kyoto units, but any type of Kyoto unit corresponds to 1 tonne of CO₂-equivalent emissions.

The initial emission budgets assigned to each state for the whole commitment period are called initial assigned amounts, and these correspond to a certain number of AAUs, which is determined as follows.

$$\text{Initial AAUs} = \text{base-year emissions} \times (1 + \% \text{ target}) \times 5$$

A3.2 GHG emissions must not exceed emission budgets

For a party to achieve its target, total GHG emissions during the whole commitment period must be equal to or below the party's assigned amount, which is the total quantity of valid Kyoto units it holds. A 'Kyoto compliance formula' can be summarised as follows.

$$'2008\text{--}2012 \text{ total GHG emissions}' \leq \text{'total Kyoto units'}$$

Where one **Kyoto unit** corresponds to 1 tonne of CO₂-equivalent.

Emissions are reported in national GHG inventories while Kyoto units are recorded in national registries. There are several types of accounts in a registry. The units considered for compliance are those placed in the 'retirement account' of a country's registry. A party must therefore 'retire' a sufficient number of Kyoto units by the end of the commitment period. This number of retired units must be at least equal to the amount of GHGs emitted during the whole commitment period, and reported in the national GHG inventory.

A3.3 Compliance achieved by acting on GHG emissions and emission budgets

To achieve its target under the Kyoto Protocol, a party can at the same time:

- **reduce or limit its domestic GHG emissions**, by implementing climate mitigation policies;
- **increase its emission budget** so that it matches GHG emissions, something that can be achieved by:
 - further enhancing CO₂ removals by carbon sinks (such as forests) and reducing GHG emissions from activities related to land use;
 - acquiring additional Kyoto units from other parties through the use of 'flexible mechanisms' under the Kyoto Protocol (sometimes also called Kyoto mechanisms).

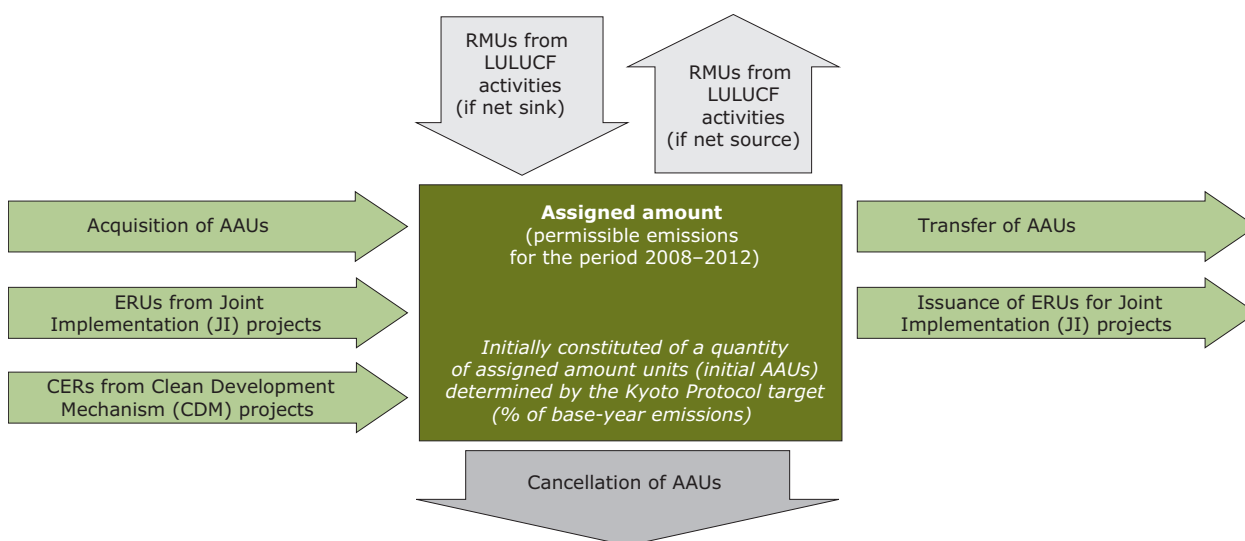
The three types of flexible mechanisms are international emission trading (IET), the CDM and JI.

Each party's emission budget is therefore equal to the sum of the following.

- An initial assigned amount, determined according to the party's base-year emissions and its Kyoto target, measured in AAUs;
- **Plus/minus** any Kyoto units accruing from the land sector: if a country undertakes LULUCF activities that lead to removals of GHG emissions under Article 3.3 and Article 3.4 of the Kyoto Protocol, the sector serves as a net sink and the country can issue additional Kyoto units (RMUs) corresponding to the emissions removed by that activity. If the land sector produces further emissions, it becomes a net source, and thus, an amount of Kyoto units corresponding to the emissions generated needs to be cancelled, and cannot therefore be used for compliance (see Section A3.4).
- **Plus/minus** any Kyoto units that the party has acquired from or transferred to other parties through the Kyoto mechanisms (see Section A3.5).

If a party participates in an emission trading system where allowances are linked to Kyoto units, it cannot account for the units that belong to operators

Figure A3.1 Possible changes in an assigned amount under the Kyoto Protocol



Note: CER: certified emission reduction; ERU: emission reduction unit; RMU: removal unit; LULUCF: Land Use, Land-Use Change and Forestry.

participating in the scheme: Kyoto units must be surrendered by operators in order to be used by the country for Kyoto compliance (see Section A3.6).

For EU-15 Member States, who must comply with their targets set out in the internal EU Burden-Sharing Agreement, compliance is determined in the same way. Each Member State's initial assigned amount is set according to its individual burden-sharing target. Member States have the possibility to use the Kyoto mechanisms in addition to domestic action to limit or reduce GHG emissions.

Figure A3.2 summarises the factors determining the total quantity of valid emission allowances (Kyoto units) held by Member States within their national registry (their assigned amounts), and subsequently the target for sectors not covered by the EU ETS.

A3.4 Carbon sinks help increasing emission budgets

As outlined above, in addition to policies and measures targeting sources of GHG emissions, Member States can use policies and measures to:

- protect their existing terrestrial carbon stocks, e.g. by reducing deforestation and forest degradation, devegetation, and land degradation;
- further enhance terrestrial carbon stocks, e.g. by increasing the area or carbon density of forests by afforestation and reforestation, rehabilitating degraded forests, and altering the management of forest and agricultural lands to sequester more carbon in biomass and soil.

According to the Kyoto Protocol, the following LULUCF activities are accountable towards parties' commitments:

- afforestation, reforestation and deforestation since 1990 (mandatory activities covered by Article 3.3 of the Kyoto Protocol), which encompass lands that have been subject to direct, human-induced conversion from a non-forest to a forest state, or vice versa;
- forest management, cropland management, grazing land management and revegetation (voluntary activities under Article 3.4 of the Kyoto Protocol), which encompass lands that have not undergone conversion since 1990, but are otherwise subject to a specific land activity.

Parties account for net emissions or removals for each activity during the commitment period, by issuing RMUs in the case of net GHG removals from LULUCF activities, or cancelling Kyoto units in the case of LULUCF activities being the net source of GHG emissions. LULUCF activities can therefore be used to compensate for emissions from other sources, if the removals are higher than the emissions from this sector. The number of RMUs that can be issued by each party under Article 3.4 'Activity forest management' is restricted by country-specific caps, which are, in most cases, only a fraction of the anticipated uptake (according to the UNFCCC (2006a)). Thus, issued RMUs corresponding to this activity might be lower than the carbon removals from forest management that are actually reported.

RMUs can be accounted for at the end of the first commitment period or annually. According to Decision 13/CMP.1, parties must indicate the frequency of accounting for each activity under Article 3.3 and Article 3.4, with their initial reports that were submitted between 2006 and 2008. The decision on the frequency determines when parties may issue RMUs or cancel other units in the case of emissions from Article 3.3 and Article 3.4 activities. Of the countries assessed in this report, Denmark, France, Hungary, Liechtenstein and Switzerland have opted for annual accounting.

Actual emissions from LULUCF activities accounted under the Kyoto Protocol are calculated according to the IPCC guidelines and the respective accounting rules for the Member States. One important rule relates to debit compensation under Article 3.3: if a Member State has net emissions from Article 3.3 activities (Article 1 and Article 2), it can increase its FM cap by this amount of net emissions, on condition that the sink provided by forest management activities is larger than the cap.

A3.5 Kyoto mechanisms used to increase emission budgets

Parties may use three market-based mechanisms to lower the overall costs of achieving emission targets for the commitment period from 2008 to 2012:

- project-based mechanisms in Annex I parties (JI);
- implementation of CDM projects in developing countries;
- IET, which allows countries that have achieved emission reductions beyond those required by

the Kyoto Protocol to sell their surplus Kyoto units to countries finding it more difficult or expensive to meet their commitments.

Thus, by making use of these flexible mechanisms, a country increases its allowed emissions level during the commitment period. The use of such mechanisms to achieve Kyoto Protocol targets must be 'supplemental to domestic action', although it is not capped in quantitative terms.

Member States are required to provide information on the extent to which they intend to use flexible mechanisms for reaching their targets. This information is used in the present assessment of progress. The analysis presented in Chapter 5 provides an indication of countries' progress in relation to their emission reduction targets after the end of the first commitment period, but it cannot predict whether a country will ultimately be compliant.

A3.6 Linking an emission trading scheme to the Kyoto Protocol

The EU ETS is a domestic EU policy which aims at achieving cost-efficient emission reductions by setting emission targets to operators (primarily of industrial installations and power plants) in the EU. Operators have a choice between reducing their own emissions, and purchasing carbon allowances on the European carbon market, whenever this is more cost-effective.

However, the fundamental contribution of the EU ETS in the achievement by the EU of its Kyoto target lays in the linking of the EU ETS to the flexible mechanisms under the Kyoto Protocol, and subsequently, the linking of EU allowances to Kyoto units. Any trading or transfer of EUAs, which serve the purpose of proving compliance of an operator under the EU ETS, implies the transfer of an equal quantity of AAUs under the Kyoto Protocol between Member States or within a Member State. Besides, operators have also the possibility to use CDM/JI credits to achieve compliance under the EU ETS.

Following the introduction of the EU ETS and the finalisation of the second NAPs, EU Member States

as well as Liechtenstein and Norway (who joined the ETS in 2008) have determined national caps for the emissions from sectors covered by the EU ETS for the first commitment period of the Kyoto Protocol. These caps correspond to a certain number of Kyoto units being transformed into EU emission allowances and allocated/sold to EU ETS operators. In so doing, these countries have fixed in advance the overall contribution of sectors covered by the ETS to the national effort required to reach their Kyoto target.

This is equivalent to splitting each national Kyoto emission budget (consistent with the national Kyoto target) into two distinct emission budgets for sectors covered by the ETS and for other sectors. The legal obligation to comply with their cap for all operators participating in the ETS guarantees that at least the emission budget related to the ETS will be met by the end of the commitment period.

The same logic also applies to Switzerland, which has its own national emission trading system linked to the Kyoto flexible mechanisms.

As a consequence, the number of Kyoto units remaining for other sectors not covered by the EU ETS (such as buildings, transport or agriculture) was determined by this sharing of effort between the ETS and the non-ETS sectors. Through the ETS allocation process and cap determination, countries have assigned themselves a 'non-ETS target' for 2008 to 2012, equivalent to their initial assigned amount, reduced by the ETS cap that they have determined.

Since national caps have been fixed for the 2008–2012 trading period of the EU ETS, the situation is as follows ⁽¹⁴⁾.

Governments must reach their Kyoto or burden-sharing targets through emission reductions from policies and measures addressing the sectors **not** covered by the ETS and/or through flexible mechanisms. A country's progress towards its Kyoto target is therefore determined by comparing its emissions in non-ETS sectors with its emission budget for the non-ETS sectors.

Emission levels in the sectors covered by the ETS result in the trading of allowances at ETS level,

⁽¹⁴⁾ Instead of the caps fixed in the national allocation plan decisions, EUAs issued to the trading sector (the sum of free allocation and auctions/sales) were used for the calculation. This is because allowances remaining in the NER at the end of the trading period that are not sold to the market might be used to achieve the national Kyoto target. Most Member States have not yet decided how to use remaining allowances. Ireland reported the quantity of unused allowances they expect to remain in the NER, which is intended to be used towards achieving its burden-sharing target. As Member States deciding to sell the allowances remaining in the NER on the market could do so beginning of 2013, in this report it was assumed that those not sold are likely to be used for Kyoto compliance.

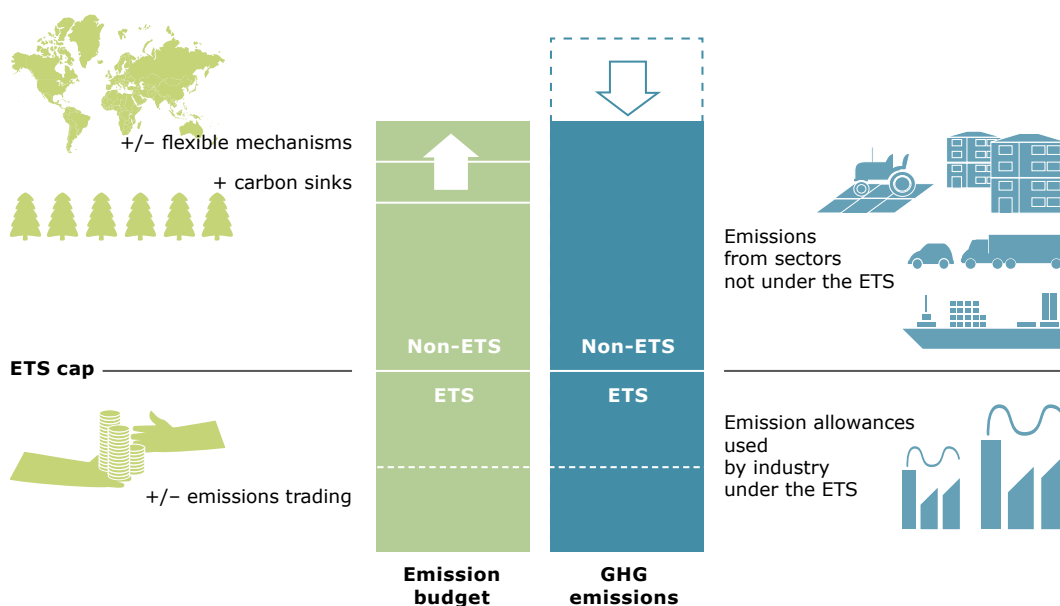
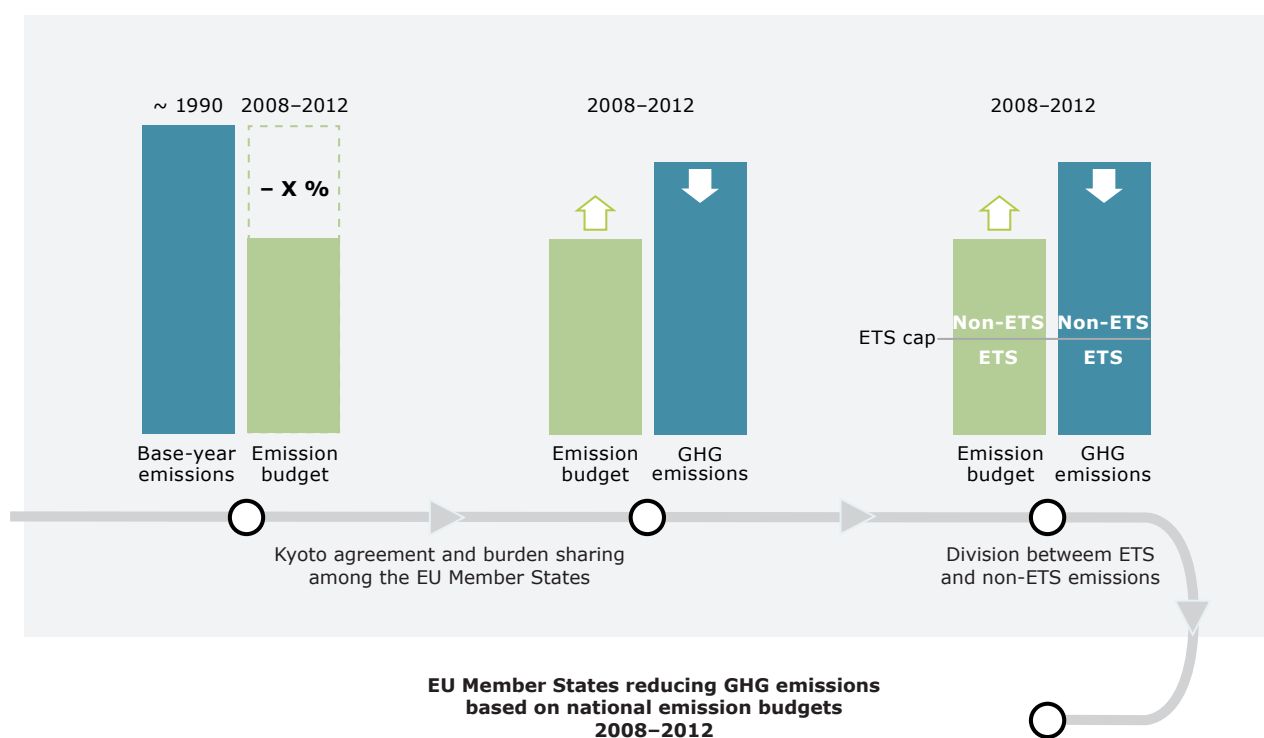
but do not influence the achievement by a country of its Kyoto or burden-sharing target, since ETS operators are legally bound to surrender to their government an amount of allowances equivalent to their emissions.

The role of the ETS linked to the Kyoto Protocol somewhat alters the 'Kyoto compliance equation' discussed previously. To comply with their Kyoto obligations, countries with an emission trading

scheme in the 2008 to 2012 period as well as an individual Kyoto target (i.e. all countries except Croatia, Cyprus and Malta), must satisfy the following equation.

$$\text{Total GHG emissions} \leq \text{'initial assigned amount'} - \text{'allowances allocated to the ETS'} + \text{'surrendered allowances from the ETS'} + \text{'use of flexible mechanisms at government level'} + \text{'carbon sink removals'}$$

Figure A3.2 EU Kyoto targets and the split between ETS and non-ETS



With: 'allowances allocated to the ETS' = 'free allocation 2008–2012 ETS' + 'ETS auctions/sales for the period 2008–2012' and 'surrendered allowances from the ETS' = allowances, ERUs and CERs surrendered by ETS operators for compliance under the EU ETS.

As the amount of surrendered allowances corresponds to ETS verified emissions, we can also write:

$$\begin{aligned} & \text{Total GHG emissions} - \text{ETS verified emissions} \\ & \leq \\ & \text{'initial assigned amount'} - \text{'allowances issued under the ETS'} \\ & + \text{'use of flexible mechanisms at government level'} + \\ & \text{'carbon sink removals'} \end{aligned}$$

This condition for compliance under the Kyoto Protocol is also equivalent to:

$$\begin{aligned} & \text{Non-ETS GHG emissions} \\ & \leq \\ & \text{'non-ETS cap'} + \text{'use of flexible mechanisms at government level'} + \text{'carbon sink removals'} \end{aligned}$$

This method is used in Chapter 2 to assess progress towards Kyoto and burden-sharing targets in Europe.

In Switzerland, an emission trading system is also in place, and is linked to flexible mechanisms under the Kyoto Protocol; therefore, in the following assessment, it is considered in parallel to the EU ETS.

A3.7 Emissions from domestic aviation included in the EU ETS in 2012

In 2012, the EU ETS was extended to include emissions from the aviation sector. Of these emissions, those from domestic aviation are covered by the Kyoto Protocol. For the present analysis, verified emissions and free allowances of the aviation sector have not been taken into account, as aviation was not included in the initial Kyoto fulfilment plans. Here, the EU ETS is used to refer exclusively to emissions and allowances of stationary installations.

A3.8 Final compliance, surplus, shortfall and carry-over

Any shortfall in emission reductions, in particular in the sectors not covered by the EU ETS, will have to be balanced by the acquisition of additional Kyoto units through Kyoto mechanisms.

The Kyoto mechanisms will, in practice, act as a safety valve: parties, under the Kyoto Protocol, can undertake final transactions necessary to comply with their commitment during a 100-day period after their GHG emissions for the 2008–2012 period have been reported in April and May 2014 and reviewed by the UNFCCC. This 100-day period is called the 'true-up period' ⁽¹⁵⁾.

While some countries may already have a clear indication that their emission levels were lower than their target during the first commitment period, other countries might need to wait for the review of their 2014 GHG emission inventory in order to find out the exact amount of additional Kyoto units needed to reach their target.

By the end of the true-up period, parties to the protocol will have:

- 'retired' an amount of Kyoto units equivalent to their GHG emissions during the 5 years from 2008 until 2012, in order to achieve their Kyoto or burden-sharing target;
- transferred Kyoto units to or from other parties' registries (e.g. under international emissions trading);
- cancelled Kyoto units (e.g. due to positive emissions from forestry activities), in which case these units will not be able to be further transferred or used towards meeting a Kyoto or burden-sharing commitment.

A party with an insufficient quantity of Kyoto units (shortfall) will in principle miss its objective.

If a party has retired a sufficient quantity of Kyoto units, it will have achieved its target. The number of Kyoto units remaining in the party's registry

⁽¹⁵⁾ The final date for the end of the true-up period has not been set yet. Formally, the review processes of Annex I countries' inventories is to be concluded 1 year after the inventory has been submitted, i.e. 15 April 2015 for CP1. However, experience has shown that it usually takes 1.5 years after the submission of inventories for all review reports to be made available. For that reason, Annex I countries proposed to set the end date of the true-up period in October or November 2015, while the G77 countries support an earlier date. Consensus might be reached at the UNFCCC negotiations in June 2014. If 15 April 2015 is set as the end date of the period, Annex I countries might receive the review reports only when the true-up period has already been concluded. Final transactions to ensure that all countries reach their targets for CP1 could not then be carried out.

and which are neither retired nor cancelled will correspond to a surplus of units (see Figure A3.3).

The Kyoto Protocol allows parties holding surplus units by the end of the commitment period to request that these units (with the exception of RMUs⁽¹⁶⁾) be carried over to the subsequent commitment period, subject to applicable rules. The COP 18 in 2012 stated that parties with commitments under the Kyoto Protocol for the second commitment period are required to establish 'previous period surplus reserves'. AAUs in a party's national registry which are carried over are then to be transferred to its previous period surplus reserve account. Units in this reserve account can only be used for a country's own compliance, and only a limited amount of up to 2 % of the initial assigned amount a country received for the first commitment period can be transferred to other parties. However, countries not participating in a second commitment period are not permitted to sell their surplus AAUs to a country with a second period commitment. The EU, as well as a number of other developed countries

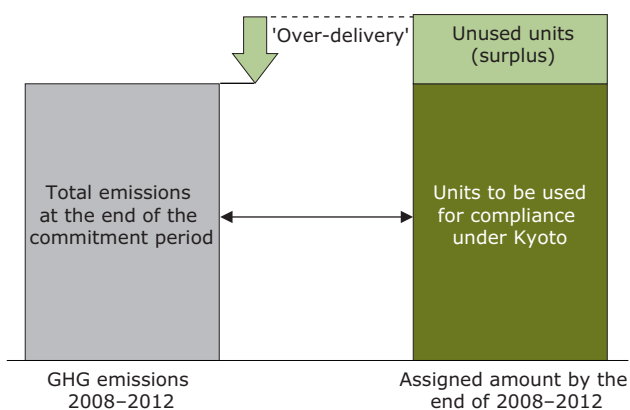
(Australia, Japan, Liechtenstein, Monaco, Norway and Switzerland), have declared that they will not purchase banked AAUs from other countries to achieve their targets for the period from 2013 until 2020 (Annex II to Decision 1/CMP.8).

A3.9 Compliance of the EU-15 relies on the compliance of 15 Member States with their individual targets

The compliance of the EU-15 will depend on the total amount of Kyoto units retired by the 15 individual Member States.

- EU-15 emissions are the exact sum of the 15 Member States' GHG emissions. These emissions will have to be matched by an equivalent quantity of surrendered units within the EU-15.
- The quantity of surrendered units within the EU-15 is the sum of the quantities surrendered by the 15 Member States in their own registry.

Figure A3.3 Over-achievement and surplus assigned amount



To achieve its 8 % reduction target, the EU-15 therefore needs all EU-15 Member States to achieve their individual burden-sharing target. Any shortfall in one Member States would not necessarily be compensated by a surplus in other Member States, as long as such surplus is not 'retired' (in order, for example, to be carried over to the second commitment period).

As it cannot be taken for granted that any other EU-15 Member State will make surplus Kyoto units available to the EU-15 for its compliance, the EU-15 relies on each single EU-15 Member State to achieve its own burden-sharing target. Any Member State not complying with its target could lead to non-compliance for the EU-15 as well.

⁽¹⁶⁾ See Decision 13/CMP.1 16. of the Report of the Conference of the Parties (UNFCCC, 2006b).

Annex 4 Data source and data quality

A4.1 Data

The assessments presented in this report are for the most part based on information submitted by Member States themselves under the Monitoring Mechanism Decision (MMD) (EU, 2004a) ⁽¹⁷⁾. Under the MMD, Member States reported the following in 2014.

GHG inventory reports, including annual GHG emission data for the period from 1990 to 2012, as well as average accounting of carbon removals due to LULUCF activities for the whole first commitment period (2008–2012).

Information on the average use of flexible mechanisms as planned by Member States to achieve their Kyoto targets for the first commitment period. Although information on the actual transfers of Kyoto units through the Kyoto Protocol's flexible mechanisms is available from national registries, it is currently impossible to distinguish between the use of such mechanisms by governments and by operators under the EU ETS. The planned use of credits for the whole first commitment period is actually assumed to contribute towards better estimates of final national emission budgets than the mere consideration of annual historic data does.

This information was reported in questionnaires submitted by Member States to the European Commission under the MMD or from other publications (e.g. Switzerland, 2014a, Switzerland, 2014b). All countries except Belgium, the Czech Republic, Finland, Iceland, Norway and Portugal provided updated information in 2014.

Additional data used for the GHG assessments include quantitative information on the EU ETS from the EU transaction log (EUTL) ⁽¹⁸⁾ and made available by the European Commission, as well as information from the national ETS Registry of Switzerland (Switzerland, 2014c).

A4.2 Data quality management

By March 2014, all the EU countries and Iceland covered in this report had reported their GHG inventory for the period from 1990 to 2012. The EU GHG inventory is based on the annual inventories of the Member States. The Member States and the EU implement Quality assurance and Quality control (QA/QC) procedures in their inventory compilation process, in order to comply with Intergovernmental Panel on Climate Change (IPCC) good practice guidance.

⁽¹⁷⁾ Replaced by the MMR as of 8 June 2013.

⁽¹⁸⁾ The EUTL automatically checks, records, and authorises all transactions in the EU ETS.

European Environment Agency

Progress towards 2008–2012 Kyoto targets in Europe

2014 — 58 pp. — 21 x 29.7 cm

ISBN 978-92-9213-493-8

ISSN 1725-2237

doi:10.2800/23125

HOW TO OBTAIN EU PUBLICATIONS

Free publications:

- via EU Bookshop (<http://bookshop.europa.eu>);
- at the European Union's representations or delegations. You can obtain their contact details on the Internet (<http://ec.europa.eu>) or by sending a fax to +352 2929-42758.

Priced publications:

- via EU Bookshop (<http://bookshop.europa.eu>).

Priced subscriptions (e.g. annual series of the *Official Journal of the European Union* and reports of cases before the Court of Justice of the European Union):

- via one of the sales agents of the Publications Office of the European Union (http://publications.europa.eu/others/agents/index_en.htm).

European Environment Agency
Kongens Nytorv 6
1050 Copenhagen K
Denmark

Tel.: +45 33 36 71 00
Fax: +45 33 36 71 99

Web: eea.europa.eu
Enquiries: eea.europa.eu/enquiries

