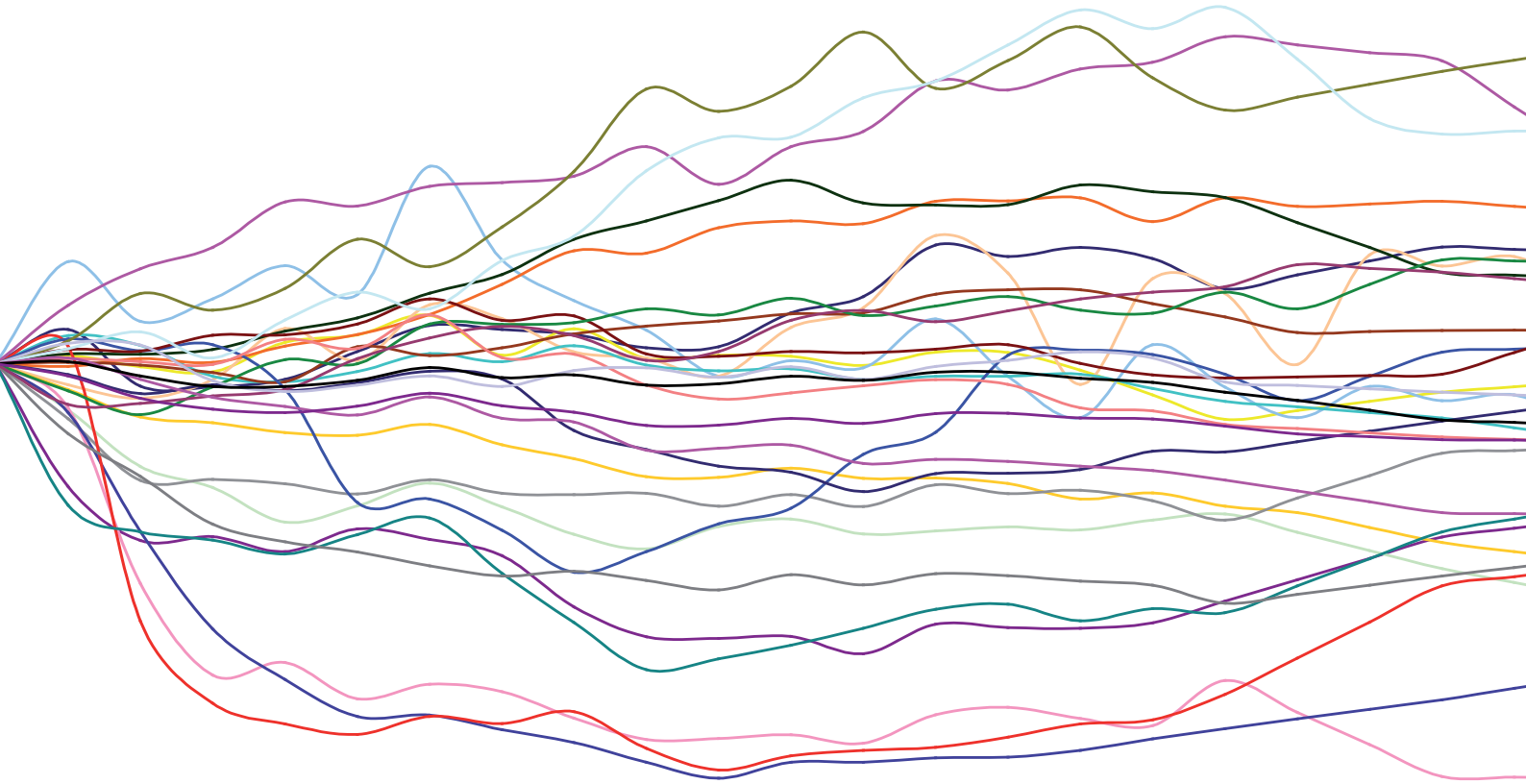
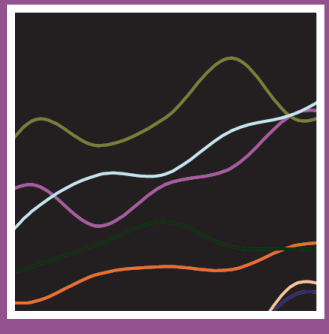
EEA Report | No 9/2009

Greenhouse gas emission trends and projections in Europe 2009

Tracking progress towards Kyoto targets

ISSN 1725-9177





European Environment Agency

EEA Report | No 9/2009

Greenhouse gas emission trends and projections in Europe 2009

Tracking progress towards Kyoto targets

European Environment Agency

Cover design: EEA
Cover illustration © EEA
Left photo © stock.xchng/Asif Akbar
Right photo © stock.xchng/Asif Akbar
Layout: EEA/Pia Schmidt

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

Luxembourg: Office for Official Publications of the European Communities, 2009

ISBN 978-92-9213-035-0
ISSN 1725-9177
DOI 10.2800/23935

Environmental production
This publication is printed according to high environmental standards.

Printed by Schultz Grafisk
— Environmental Management Certificate: ISO 14001
— IQNet – The International Certification Network DS/EN ISO 14001:2004

— Quality Certificate: ISO 9001: 2000
— EMAS Registration. Licence no. DK – 000235
— Ecolabelling with the Nordic Swan, licence no. 541 176

Paper
RePrint — 90 gsm.
CyclusOffset — 250 gsm.
Both paper qualities are recycled paper and have obtained the ecolabel Nordic Swan.

Printed in Denmark

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

Acknowledgements

This report was coordinated by François Dejean under the guidance and support of Andreas Barkman. Assistance and feedback from EEA colleagues was much appreciated. It was written by the EEA and its European Topic Centre for Air and Climate Change (ETC/ACC). The ETC/ACC task manager was Elisabeth Kampel (Umweltbundesamt, Austria). The authors were:

EEA

Andreas Barkman, François Dejean and Ricardo Fernandez (Executive summary, Chapters 1, 2, 3, 6, 7, 8 and 13, and Annex A.3).

AEA Technology, United Kingdom (ETC/ACC)

Angela Falconer, Eleanor Glenn, Isabelle de Lovinfosse and Shoko Okamura (Chapter 4, Sections 5.2 and 5.3, and Annexes A.1, A.2 and A.7).

Öko-Institut, Germany (ETC/ACC)

Julia Busche, Verena Graichen, Hauke Herman and Lennart Mohr (Section 5.1, Annexes A.4 and A.5).

Umweltbundesamt, Austria (ETC/ACC)

Bernd Gugele, Sabine Göttlicher, Elisabeth Kampel and Nicole Mandl (Chapters 2, 3 and 9, and Annexes A.1, A.3, A.6 and A.7).

Projection data and information submitted by countries were compiled and checked by:

AEA Technology, United Kingdom (ETC/ACC)

Mihaela Dupleac, Angela Falconer, Relu Giuca, Agnieszka Griffin, Eva Kristjansdottir, Isabelle de Lovinfosse, Livia Minca, Shoko Okamura and Vasileios Paschos.

Öko-Institut, Germany (ETC/ACC)

Lennart Mohr.

Umweltbundesamt, Austria (ETC/ACC)

Elisabeth Kampel.

The EEA acknowledges the comments received on the draft report from the EEA national focal points, the experts of EEA member countries and the European Commission. These comments are included in this report as far as practically feasible.

Executive summary

This report presents an analysis of historic and projected trends of greenhouse gas emissions in Europe. It assesses the current and projected progress of EU Member States, EU candidate countries and other EEA member countries towards their respective targets under the Kyoto Protocol and under EU commitments for 2020. This analysis is based on greenhouse gas emissions inventories for 1990 to 2007, available estimates of 2008 emissions and greenhouse gas emission projections for 2010, 2015 and 2020, derived from data and related information reported by EEA member countries. All EEA member countries except Hungary, Iceland, Liechtenstein, Poland and Turkey provided updated information on emission projections and national programmes in 2009.

Greenhouse gas emission trends in Europe are, on the whole, encouraging but developments in transport emissions and the emissions of certain fluorinated gases are alarming.

Greenhouse gas emissions in the European Union are decreasing and are expected to continue to do so with the implementation of all measures planned by Member States. In 2008, for the fourth consecutive year, emissions in the EU decreased to reach their lowest level since 1990. The EU-27 has been achieving significant decoupling of its emissions from economic growth. Greenhouse gas emissions in the EU-27 now represent 11 to 12 % of global greenhouse gas emissions and each EU citizen emits on average 10.2 t CO_2-equivalent every year.

Historic trends of greenhouse gas emissions in the EU during the period 1990–2007 are the result of two sets of opposing factors. On the one hand, emissions have been driven upward by the increases in electricity and heat production by thermal plants (both in absolute terms and in comparison with other sources), industrial activity, transport volumes (passengers and freight) and the share of road transport compared to other modes. On the other hand, large emission reductions occurred in the same period, due to the economic downturn affecting eastern Member States in the 1990s, energy efficiency improvements (in particular by industrial end users and energy industries), a shift from coal to less polluting fuels (in particular gas and biomass) for the production of electricity and heat, and fuel efficiency improvements in vehicles.

Transport still remains the most problematic emitting sector, with upward emission trends (+ 26 % between 1990 and 2007, + 0.5 % between 2006 and 2007) due to an ever-increasing demand for transport of passengers and goods and a preference for road over other less-polluting ground transport modes. International aviation and shipping emissions have increased most of all sectors (+ 110 % and + 60 % respectively between 1990 and 2007).

Of all greenhouse gases, hydrofluorocarbons are the only ones for which emissions have drastically increased between 1990 and 2007 in the EU (+ 125 %), due to their use as a substitute for ozone-depleting substances phased-out under the Montreal Protocol and to the expansion of air conditioning.

The EU-15 is making good progress towards its common Kyoto target. Five EU-15 Member States (France, Germany, Greece, Sweden and the United Kingdom) have already achieved average GHG emission levels below their Kyoto target.

Compliance of Parties to the Kyoto Protocol with their emission targets can only finally be determined in the year 2014, when inventory data for the five-year commitment period 2008–2012 is available. This report assesses progress in two ways: using past emissions on the one hand and emission projections on the other. Taking the first approach, emissions currently available for the latest five-year period are compared to targets for the Kyoto commitment period 2008–2012. This gives an indication of how close countries currently stand to their targets. Taking the second approach, Member State projections for the Kyoto commitment period 2008–2012 are compared to targets. This gives an indication of Member State expectations with regard to their expected performance against their Kyoto targets.

Under the Kyoto Protocol, the 15 countries which were Member States of the EU when the Protocol was agreed (EU-15) are committed to reducing their collective greenhouse gas emissions in the period 2008–2012 to 8 % below levels in a chosen base year. This collective commitment has been translated into differentiated national emission targets for each EU-15 Member State which are binding under EU law.

Looking firstly at present emissions levels, the EU-15 was approximately 6.2 % below its base-year emissions in 2008. During the last five-year period 2004–2008, EU-15 emissions were on average 3.9 % below base-year level, compared to an 8.0 % reduction commitment under the Kyoto Protocol, to be achieved during the period 2008–2012.

Five EU-15 and nine EU-12 Member States (Bulgaria, Czech Republic, Estonia, France, Germany, Greece, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Sweden and the United Kingdom), and Croatia have already achieved GHG emission levels below their Kyoto target during 2003–2007 or 2004–2008 (Table ES.1).

The EU-15 could reduce its greenhouse gas emissions levels to 8.5 % below the Kyoto base year. This reduction is particularly dependent on the combined emission reductions expected in main emitting countries, in particular France, Germany, Spain and the United Kingdom.

Looking at Member State projections, if all domestic emission reductions take place as a result of the implementation of existing measures, greenhouse gas emissions in the EU-15 will be reduced to 6.8 % below Kyoto base-year levels. A number of Member States anticipate implementing additional measures in order to

Table ES.1 Current progress towards Kyoto targets (domestic emissions and targets only)

Country grouping	Party to the Kyoto Protocol with current average emissions lower than target	Party to the Kyoto Protocol with current average emissions higher than target
EU-15 Member States	• France • Germany • Greece • Sweden • United Kingdom	• EU-15 • Austria • Belgium • Denmark • Finland • Ireland • Italy • Luxembourg • Netherlands • Portugal • Spain
EU-12 Member States	• Bulgaria • Czech Republic • Estonia • Hungary • Latvia • Lithuania • Poland • Romania • Slovakia	• Slovenia
Other EEA member countries, EU candidate country	• Croatia	• Iceland • Liechtenstein • Norway • Switzerland

Note: Current average emissions represent average emissions in the period 2003–2007 except for the EU-15, Denmark, Finland, Germany, Greece, Italy, Luxembourg and Slovenia, where average emissions in the period 2004–2008 estimates are available.
Average emissions are compared to the initial Kyoto or burden-sharing target (initial assigned amount units) for the Kyoto commitment period 2008–2012. The possible use of Kyoto mechanisms and removals from carbon sinks are not taken into account in this table.

Source: EEA, 2009.

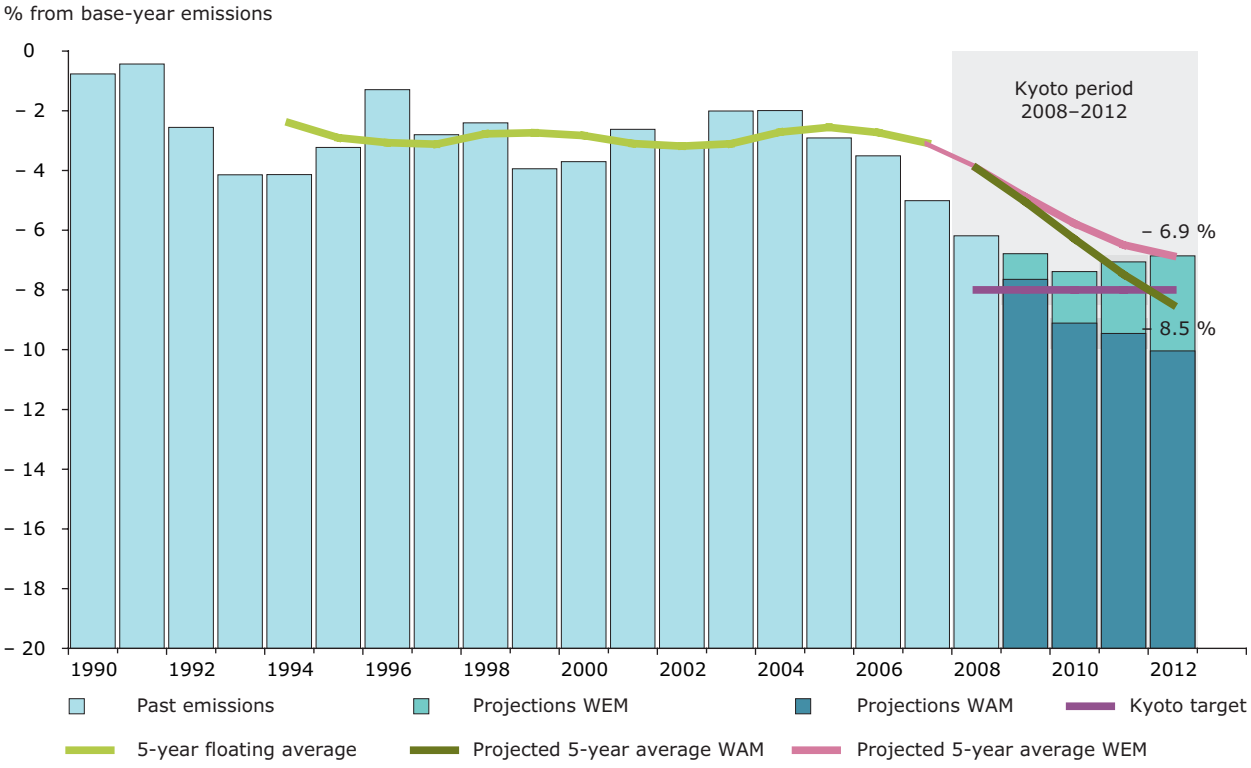
further reduce emissions by 2012. In this instance, EU-15 emissions in the period 2008–2012 would be 8.5 % below base-year emissions (Figure ES.1). This reduction is particularly dependent on the combined emission reductions expected in main emitting countries such as France, Germany, Spain and the United Kingdom. EU-wide policies are expected to contribute towards most of the planned emissions savings by the end of the period 2008–2012, in particular the European Union Emission Trading Scheme (EU ETS), the promotion of renewable energy sources, policies targeting the energy performance of buildings and internal energy market policies. Further implementation of EU legislation on renewable energy, energy end-use efficiency and energy services might also provide additional savings.

The EU-15 could over-achieve its Kyoto target by an average 217 Mt CO_2-equivalent per year over the Kyoto period if all existing and planned additional measures are fully implemented in a timely manner and if Member States use Kyoto mechanisms and enhance carbon sinks as planned. This represents a 5.1 % overachievement beyond the 8 % Kyoto target.

Under the Kyoto Protocol, Parties can increase the quantity of emission rights held (or Kyoto units), which constitute their assigned amount, by using the Kyoto Protocol's flexible mechanisms, as well as by enhancing carbon sinks. The EU ETS, which requires operators of certain industrial installations to meet emission caps during 2008–2012, will also have an effect on the assigned amount of Member States and of the EU-15.

Use of flexible mechanisms by ten Member States to cover the shortfall between expected emissions in 2008–2012 and their total assigned amounts is expected to generate Kyoto units equivalent to 2.2 % of EU-15 base-year levels ([1]). Spain and Italy

Figure ES.1 Projected emission scenarios in the EU-15



Note: WEM: with existing measures (measures implemented or adopted), WAM: with additional measures (planned measures)

Source: EEA, 2009.

([1]) Based on information reported Member States under the Monitoring Mechanism Decision. Here, only Hungary reports net sales of Kyoto units. However, latest information available from other sources indicates that additional transfers of Kyoto units are taking place between at least eight EU-15 and six EU-12 Member States.

are expected to make a significant contribution to the overall anticipated increase of the EU-15's assigned amount.

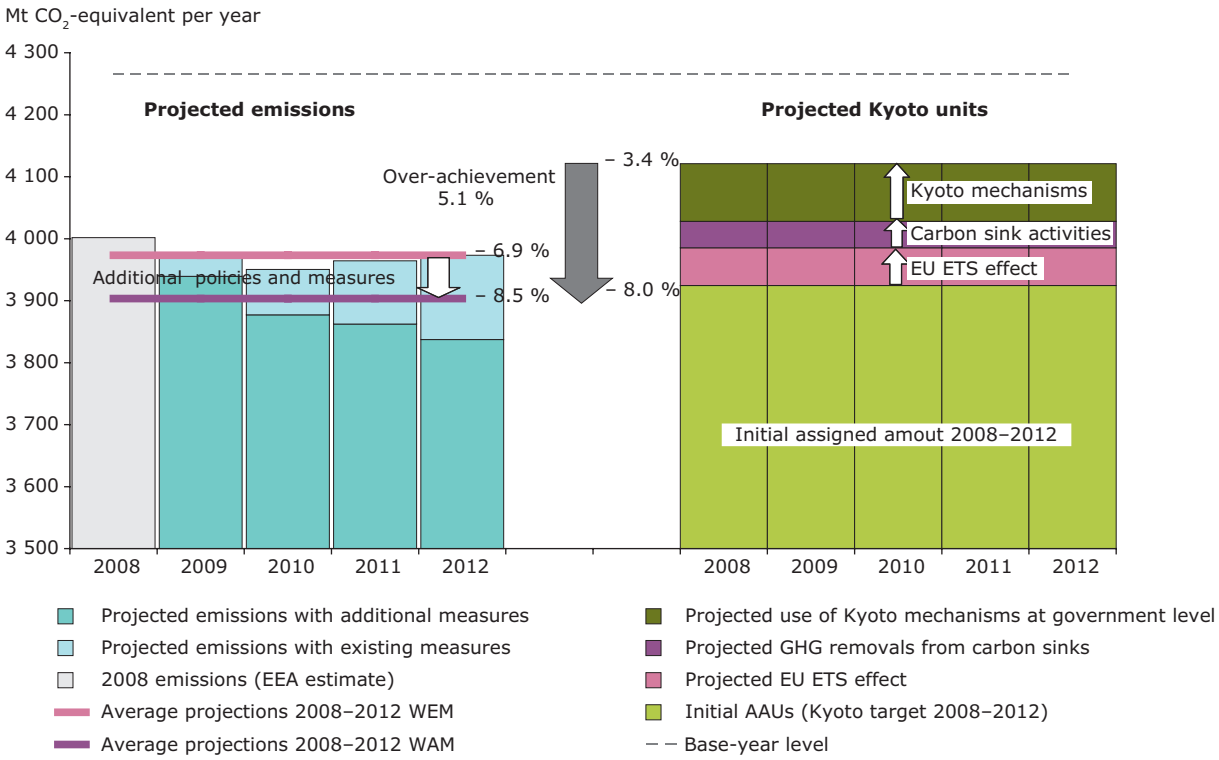
The EU ETS is expected to result in important reductions of domestic EU emissions. In addition, EU ETS operators may also acquire emission allowances or project-based credits using the Kyoto flexible mechanisms. It is estimated that such acquisitions would increase the EU-15's assigned amount by approximately 1.4 % of EU-15 base-year levels. In comparison, in 2008 ETS operators in the EU-15 had to purchase the equivalent of 3.9 % of EU-15 base-year emissions in order to comply with their obligations.

CO_2 removals from the atmosphere due to enhancement of carbon sinks (e.g. through improved forest management) are expected to generate Kyoto units equivalent to 1.0 % of base-year levels.

Overall, if all existing and planned additional measures are fully implemented in a timely manner, the EU-15 could over-achieve its Kyoto target by an average 217 Mt CO_2-equivalent per year over the Kyoto period, which represents 5.1 % of base-year emissions. This represents the difference between EU-15 projected emissions over 2008–2012 (8.5 % below the base-year) and the EU-15 total assigned amount, expected to be increased from the initial level 8 % below the base year to a level 3.4 % below the base year (Figure ES.2). The projected achievement of its Kyoto target by the EU-15 relies on each single EU-15 Member State achieving its own burden-sharing target through domestic emission reductions, enhancement of carbon sinks and use of Kyoto mechanisms. Should any EU-15 Member State miss its own target, the EU-15 would need to rely on the use of surplus Kyoto units from other Member States at the end of the commitment period in order to fill any shortfall.

All but one EU Member State as well as all other EEA member countries anticipate that they will meet their commitments under the Kyoto Protocol. To ensure that domestic

Figure ES.2 Summary of EU-15 projections of greenhouse gas emissions compared to projected Kyoto units



Note: The left section shows the projected emissions considering domestic measures (existing and additional) and is showing them as average 2008–2012 emissions (lines) and annual emissions (bars). The right section shows the projected amount of Kyoto units (emission rights) by the end of the commitment period, which is the initial EC assigned amount, the contribution of the EU ETS, carbon sink removals and use of Kyoto mechanisms.

Source: EEA, 2009.

emission reductions contribute toward targets, governments should focus on reducing emissions in the sectors not covered by the EU ETS (for example the transport, residential and agriculture sectors).

Through the second national allocation plans for the period 2008–2012, Member States have fixed the overall contribution that the EU ETS will provide towards reaching burden-sharing or Kyoto targets at national level. Therefore governments should focus on reducing emissions in the sectors not covered by the EU ETS (for example the transport, residential and agriculture sectors). Although the economic downturn is likely to trigger lower greenhouse gas emissions in most sectors, it is now only the emission reductions in the non-ETS sectors that are needed in order for Member States to comply with their Kyoto or burden-sharing targets. Success here will determine the extent to which governments will need to use the Kyoto flexible mechanisms (acquisition of Kyoto units from other parties to the Kyoto Protocol), if at all, to achieve their targets.

France, Germany, Greece, Sweden and the United Kingdom expect that they will maintain emission levels below their burden-sharing targets with the existing measures in place. Further emission reductions from additional domestic policies and measures, along with CO_2 removal from carbon sink activities, are projected to lead to over-achievement of the burden-sharing targets for these countries. These countries do not plan to rely on acquiring extra Kyoto units to meet their targets.

The planned domestic actions in the ten remaining EU-15 Member States will not be sufficient to reduce national GHG emission below their burden sharing targets. Nine of these Member States expect to meet their target through planned domestic action, carbon sink activities and use of Kyoto mechanisms (Figure ES.3).

Only Austria does not expect to reach its burden-sharing target under current arrangements. Domestic emission reductions, the use of Kyoto mechanisms as currently planned and emission removals from carbon sink activities will not suffice to meet the target. However, the projections reported by Austria do not reflect the current economic downturn, and recent GDP growth estimates are much lower than those that Austria has used in their projections.

Compared to the EEA analysis from 2008, Denmark, Italy and Spain are now expected to reach their burden-sharing target. Denmark has now reported updated projections that take into account recent measures in the energy sector. Italy now expects higher CO_2 removal from carbon sinks than last year. Spain now expects a more intensive use of the Kyoto flexible mechanisms. The EU ETS, which was not fully factored in the 2008 EEA analysis, will also play an important role in bringing additional allowances or credits from Kyoto mechanisms to these countries — thereby increasing their assigned amounts.

In the EU-12, the emissions reductions achieved since 1990 are such that, despite the expected emission increases from current levels, all Member States with a Kyoto target expect to meet or over-achieve their Kyoto targets. This will result in a surplus of Kyoto units. Slovenia is the only EU-12 Member State which anticipates that it will need to use the Kyoto mechanisms to meet its target. Cyprus and Malta do not have a target under the Kyoto Protocol.

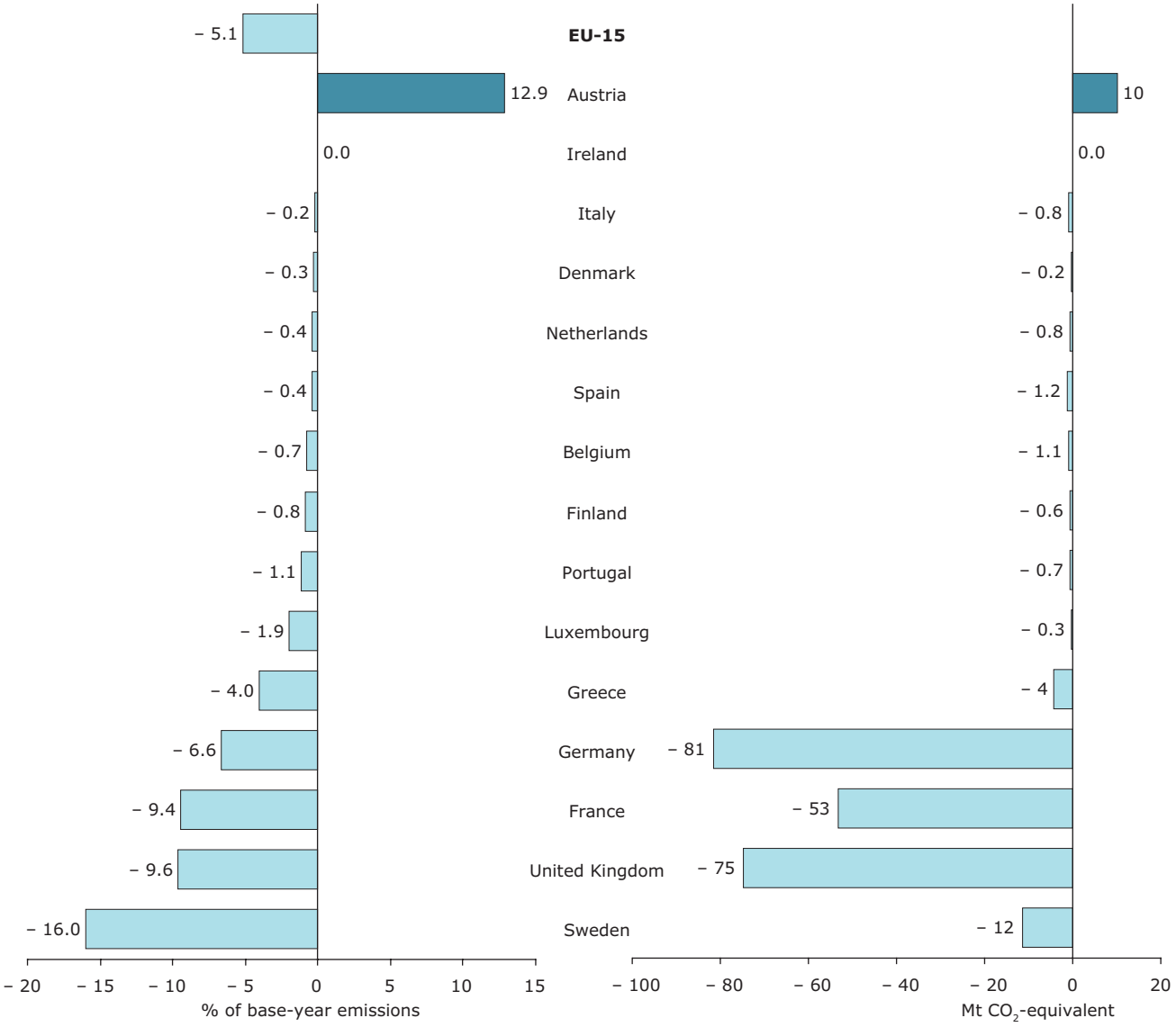
The other EEA member countries which have Kyoto targets (Iceland, Liechtenstein, Norway and Switzerland) and the EU candidate country Croatia, project that they will meet their target through a combination of domestic emission reductions, carbon sink removals and use of the Kyoto mechanisms.

In 2009 the progress of EU-15 Member States towards their targets was assessed, for the first time, by focusing on projections of their non-ETS emissions. In the future, new indicators with a focus on these non-ETS emissions will be used to track the annual progress of Member States towards their targets.

The EU-27 is making good progress towards its 2020 emission reduction target of – 20 % and the implementation of planned additional measures is expected to bring domestic emissions down to 14 % below 1990 levels.

The EU-27 is estimated to have reduced domestic greenhouse gas emissions by approximately 10.7 % between 1990 and 2008. The EU-27 is more than halfway through achieving its unilateral target of – 20 % by 2020, accounting for domestic emission reductions only. Full implementation of the planned additional measures is expected to bring EU-27 domestic emissions down to 14 % below 1990 levels by 2020, thus potentially delivering almost three quarters of EU's unilateral 2020 commitment through domestic measures only (Figure ES.4). These projected domestic emission reductions in the EU-27 could be larger if more than the current 11 Member States had accounted

Figure ES.3 Projected gap between EU-15 GHG emissions and Kyoto units (emission rights) during the Kyoto commitment period 2008–2012



Note: EU-15 figure in absolute terms (– 217 Mt CO_2-equivalent) not represented due to significantly higher scale.
Countries are ranked by increasing absolute gap between their 2008–2012 projected emissions in the sectors not covered by the EU ETS and their corresponding Kyoto target.
Projections from most Member States, including Austria, do not fully reflect the effects of the economic recession.

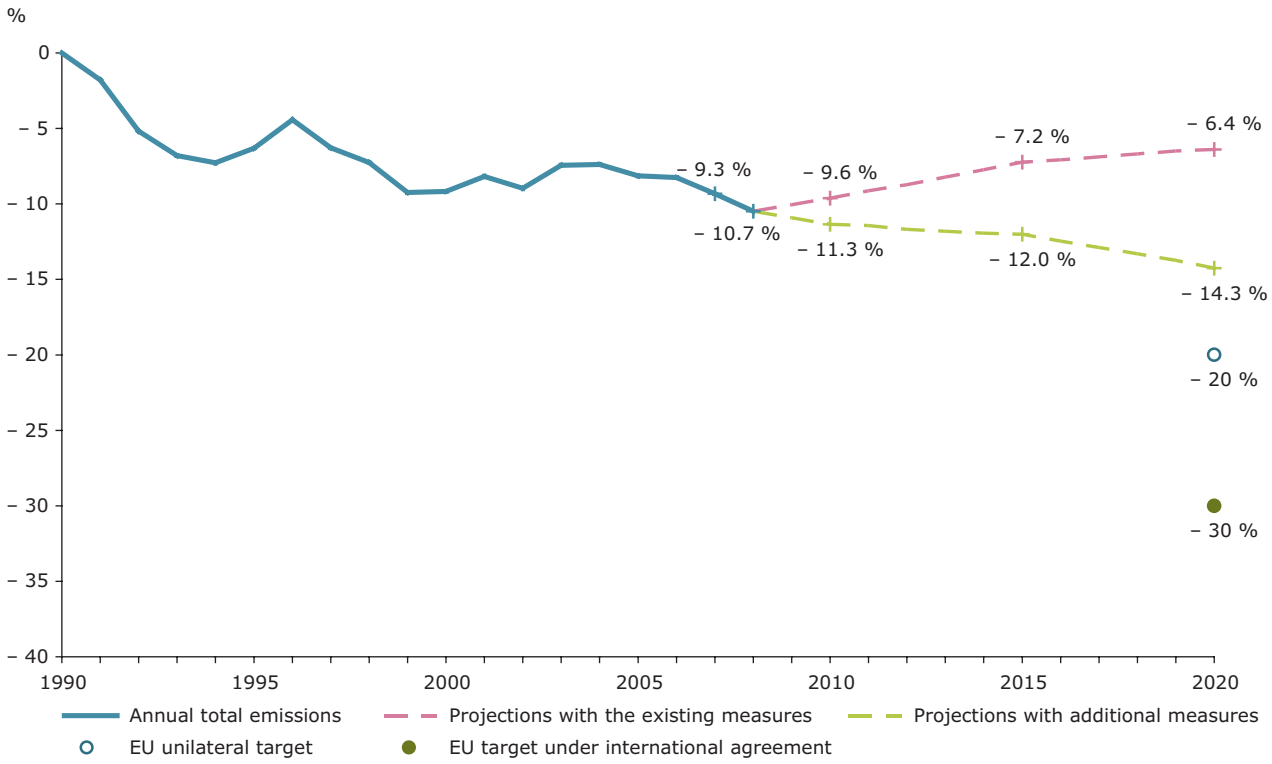
Source: EEA, 2009.

for the effects of the EU climate change and energy package in their projections of domestic emissions by 2020. In addition, the potential use of flexible mechanisms in the period 2013–2020, in line with the EU climate and energy package, could further reduce EU-27 emissions.

In the sectors not covered by the EU ETS, additional measures addressing energy use (energy performance of buildings) and transport (modal shift, biofuels and car efficiency) are expected to play an important role in meeting the national 2020 targets. In the agriculture sector, very little emission reductions are projected from both existing and additional measures for 2010 and 2020. Agriculture is the sector where the least absolute and relative reductions are expected, despite contributing 9 % of the EU-27 total emissions in 2007.

Quantitative estimates from Member States so far lack consistency and completeness to allow an accurate quantification of savings at the EU level, in particular for newly adopted EU policies. The European Commission estimates that eco-efficiency requirements of energy-using products, the inclusion of aviation in EU ETS, the strategy for CO_2 from cars and new requirements on fuel quality will bring important emission reductions by 2020. In addition, part of the reduction towards the 2020 targets could be achieved through use of flexible mechanisms both in the trading and in the non-trading sectors, as foreseen in the climate and energy package.

Figure ES.4 EU-27 GHG emission trends and projections to 2020



Note: Emissions from international aviation, although included in the 2020 target, are not taken into account in this figure (past trends, projections and targets).

Source: EEA, 2009.

1 Introduction

1.1 Objective

This eighth annual report presents an assessment of progress of European countries towards limiting their anthropogenic emissions of greenhouse gases, achieving their emission targets under the Kyoto Protocol and achieving the reduction objectives of the European Union for 2020. The report analyses both actual progress, based on greenhouse gas emissions trends between 1990 and 2007, and projected progress, based on projections of future GHG emissions, compared with targets under the Kyoto Protocol.

The report supports and complements the annual progress report of the European Commission to the Council and European Parliament, which is required under Council 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 (the EU Monitoring Mechanism) and its implementing provisions (Commission Decision 2005/166/EC of 10 February 2005 laying down rules implementing Decision No 280/2004/EC of the European Parliament and of the Council concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol). It also supports the Fifth National Communication from the European Community under the UN Framework Convention on Climate Change (UNFCCC), due for submission before 1 January 2010.

1.2 Scope

The report covers:

- the European Community (EC);
- the 27 Member States of the European Union (EU), which are all members of the European Environment Agency (EEA);
- the five other EEA member countries (Iceland, Liechtenstein, Norway, Switzerland and Turkey);
- Croatia, which is, with Turkey, an EU candidate country for which accession negotiations have been opened ([2]).

This assessment is most detailed for the pre-2004 Member States (EU-15). These are covered by the 'EU burden-sharing agreement' which lays down differentiated emission limits for each of the 15 Member States, with the aim of ensuring that the EU-15 meets its overall reduction commitment under the Kyoto Protocol. Cyprus, Malta and Turkey ([3]) do not have a target under the Kyoto Protocol, but the limited available data are presented here.

1.3 Progress assessment

The assessment of actual progress, i.e. whether countries are currently on track towards their individual targets, is based on an analysis of their past greenhouse gas emissions from 1990 until 2007 or, when estimates are available, until 2008.

The assessment of projected progress, i.e. whether countries are projected to reach their targets under the Kyoto Protocol (2008–2012) or not, is based on available information reported by Member States as follows:

- 2007 greenhouse gas emissions or, when available, 2008 emissions estimates;
- projections by countries of their greenhouse gas emissions for the years 2010 and 2015 or, when available, for the full Kyoto period 2008–2012;

([2]) Accession negotiations have not been opened yet for the third EU candidate country (the former Yugoslav Republic of Macedonia).
([3]) Turkey acceded to the Kyoto Protocol on 5 February 2009.

- expected reductions from existing and planned domestic policies and measures ([4]);
- projected shortfall or surplus of allowances at national level by EU ETS operators by the end of the second trading period 2008–2012;
- expected CO_2 removals from carbon sink activities (land use, land-use change and forestry (LULUCF));
- intended use of the Kyoto flexible mechanisms at government level.

In addition, an assessment of EU-27 projected progress towards 2020 targets is provided, based on Member States projections for 2020.

1.4 Data sources

The countries covered by this report are subject to two main reporting requirements concerning greenhouse gas emissions. Each year, all must submit their annual GHG inventory under UNFCCC reporting requirement. In addition, under the EU Monitoring Mechanism, Member States must submit biannually to the European Commission new information on greenhouse gas projections and national programmes as well as on indicators to monitor and evaluate progress with policies and measures.

The data and analyses presented are mostly based on:

- the *Annual European Community GHG inventory report* ([5]) submitted to the UNFCCC in 2009 (1990–2007 emissions of the EU and of all Member States);
- the *Initial Report of the European Community* submitted to the UNFCCC in 2007 ([6]) and its subsequent review report by the UNFCCC published in 2008 ([7]), which determines the final assigned amounts for each Party to the Kyoto Protocol;
- the reports submitted by Member States to the European Commission for the assessment of projected progress towards meeting their emission limitation and reduction commitments, with descriptions of policies and measures (as required under the EU Monitoring Mechanism Decision);
- the Community Independent Transaction Log (CITL) for verified emissions under the EU Emission Trading Scheme, second national allocation plans (NAPs) and the subsequent European Commission decisions;
- EEA estimates of 2008 EU emissions ([8]) and estimates of 2008 emissions submitted by seven Member States.

Additional information was obtained from other documents, such as national communications to the UNFCCC. All data available up to mid May 2009 were included, although supplemental information, resubmissions due to corrections or comments were accepted at a later stage.

1.5 Main data updates compared to the 2008 report

Most of the data used for this analysis are new compared to the 2008 report, since all countries delivered 2009 GHG inventory reports to the UNFCCC and almost all EU Member States submitted new projection data in 2009 under EU reporting requirements.

While GHG inventories submitted under the UNFCCC cover a period until 2007, the analysis of GHG trends is for the first time complemented with an estimate by EEA and its ETC/ACC of recent (2008) EU-15 and EU-27 greenhouse gas emissions, based on additional data sources. In addition, seven Member States reported their own estimate of their 2008 greenhouse gas emissions, which were taken into account in the present report.

Most countries could not fully include the effects of the global recession in their GHG projections. This is because of the long delays necessary

([4]) Domestic policies and measures are those taking place within the national boundaries. Existing policies and measures are those for which one or more of the following applies: (a) national legislation is in force; (b) one or more voluntary agreements have been established; (c) financial resources have been allocated; (d) human resources have been mobilised; (e) an official government decision has been made and there is a clear commitment to proceed with implementation. Additional (planned) policies and measures are options under discussion with a realistic chance of being adopted and implemented in time to influence the emissions during the commitment period.
([5]) EEA, 2009a.
([6]) EEA, 2006.
([7]) UNFCCC, 2008.
([8]) These estimates are based mainly on ETS verified emissions; Eurostat statistics on energy supply and use, industrial output and agriculture, and emission factors from UNFCCC reporting.

Table 1.1 Overview of updated information submitted by Member States

Country	Update on emission inventory	Update on projections	Update on policies and measures	Update on past indicators	Update on projected indicators	Estimate of 2008 GHG emissions
Austria	2009	2009	2009	2009	2009	NA
Belgium	2009	2009	2009	2009	2009	NA
Bulgaria	2009	2009	2009	2009	2009	NA
Czech Republic	2009	2009	2009	2009	2009	NA
Cyprus	2009	2009	2009	2009	2009	NA
Denmark	2009	2009	2009	2009	2009	Available
Estonia	2009	2009	2009	2009	2009	NA
Finland	2009	2009	2009	2009	2009	Available
France	2009	2009	2009	2009	2009	NA
Germany	2009	2009	2009	2009	2009	Available
Greece	2009	2009	2009	2009	2009	Available
Hungary (*)	2009	2007	2008	2009	2008	NA
Ireland	2009	2009	2009	2009	2009	NA
Italy	2009	2009	2009	2009	2009	Available
Latvia	2009	2009	2009	2009	2009	NA
Lithuania	2009	2009	2009	2009	2009	NA
Luxembourg	2009	2009	2009	2009	2009	Available
Netherlands	2009	2009	2009	2009	2009	NA
Malta	2009	2009	2009	2009	2009	NA
Poland	2009	2007	2008	2009	2008	NA
Portugal	2009	2009	2009	2009	2009	NA
Romania	2009	2009	2009	2009	2009	NA
Slovakia	2009	2009	2009	2009	2009	NA
Slovenia	2009	2009	2009	2009	2009	Available
Spain	2009	2009	2009	2009	2009	NA
Sweden	2009	2009	2009	2009	2009	NA
United Kingdom	2009	2009	2009	2009	2009	NA
Total 2009 updates (EU-15)	**15**	**15**	**15**	**15**	**15**	**6**
Total 2009 updates (EU-27)	**27**	**25**	**25**	**27**	**25**	**7**
Croatia	2009	2006	NA	NA	NA	NA
Iceland	2009	2006	NA	NA	NA	NA
Liechtenstein	2009	2006	NA	NA	NA	NA
Norway	2009	2009	2009	NA	NA	Available
Switzerland	2009	2009	NA	NA	NA	NA
Turkey	2009	2007	NA	NA	NA	NA
Total 2009 updates (all countries)	**33**	**27**	**26**	**27**	**25**	**8**

Note: The year listed in the columns refers to the latest submission, which has been used for the respective data.
NA stands for 'not available'.
(*) New information received in September 2009, not taken into account.

Source: EEA, 2009.

for determining GDP scenarios before running projection models that take these new parameters into account. Nevertheless, seven countries (Belgium, Czech Republic, Spain, Greece, Italy, Ireland and Lithuania and) reported that their projections do take these effects into account. In addition, several other countries reported additional projections that took the economic downturn into account, although they were not detailed enough or consistent with long-term projected trends, so were not included in the present analysis.

Almost all the information presented in this report was reported by countries in 2009 (Table 1.1). Only Poland did not report new emission projections. Hungary submitted new information in September 2009. Due to time constraints, only the information on the use of Kyoto mechanisms could be taken into account (not the projections). The information submitted by certain countries on past and projected indicators to monitor and evaluate progress with policies and measures was still incomplete.

Due to important emissions recalculations reported in Germany's 2009 GHG inventory report, the data set on emission projections was significantly inconsistent with past emission trends. Total and sectoral projected emissions were consequently adjusted by EEA to obtain consistency between past and projected emission trends. This adjustment did not affect the projected progress of Germany towards its target. Detailed information on the quality of projections reported by Member States, national GHG emission trends, projections, policies and measures, and methodologies (including references) is presented in Annex A.8.

2 Greenhouse gas emissions trends, 1990–2008

- Based on a recent EEA analysis, in 2008 EU-15 and EU-27 GHG emissions ([9]) reached their lowest level since 1990. Between 1990 and 2008, GHG emissions decreased by around 10.7 % in the EU-27 and by around 5.5 % in the EU-15.
- GHG emissions in the EU-27 represent around 12 % of global GHG emissions, excluding net CO_2 removals from land use, land-use change and forestry (LULUCF). Including global emissions from deforestation, the share would be around 11 %.
- An EU citizen emits an average of 10.2 t CO_2-equivalent every year, which is above the world average of approximately 6.7 t CO_2-equivalent per capita. Greenhouse gas emissions per capita vary widely among European countries.
- The EU-27 is one of the world's least emission intensive economies, with an emission intensity of 473 g CO_2 per euro of GDP in 2007. Emission intensities have declined in all EU-27 Member States between 1990 and 2007, with an average decline of 37 % for the EU-27 and 33 % in the EU-15.
- In the EU-27, the five EU-15 Member States emitting the most greenhouse gas are, by decreasing order: Germany, the United Kingdom, Italy, France and Spain and. In the EU-12, Poland emits the most GHG. In 2007, the EU-15 accounted for 80 % of all EU-27 emissions.
- Between 1990 and 2007, the largest absolute emission reductions took place in Germany, the United Kingdom and in most EU-12 Member States, while emissions increased most (in absolute terms) in southern EU-15 Member States (Spain, Italy, Greece and Portugal). The largest increase among all EEA member countries occurred in Turkey, where emissions doubled over the period.
- Energy-related GHG emissions represent 80 % of total GHG emissions in the EU-27. In the EU-27, most GHG is emitted by the production of electricity and heat, road transportation, fossil fuel combustion in households and in manufacturing industries, agriculture and the iron and steel industry. Carbon dioxide (CO_2) emissions account for 83 % of total GHG emissions, while methane (CH_4) and nitrous oxide (N_2O) represent each 8 % and 7 % respectively of total emissions.
- Between 2006 and 2007, GHG emissions decreased by 1.2 % in the EU-27 and by 1.6 % in the EU-15. This decrease was mainly due to large reductions in emissions from fuel combustion in households and services due to a warmer winter, and high fuel prices. This trend was dominated by reductions in Germany.
- Hydrofluorocarbons (HFCs) are the only greenhouse gases for which emissions have drastically increased between 1990 and 2007, due to the development of refrigeration and air conditioning.
- Between 1990 and 2007, EU-15 GHG emissions decreased by 4.3 %. They increased in the sectors energy supply (+ 1 %) and transport (+ 24 %). In all other main emitting sectors, greenhouse gas emissions decreased between 1990 and 2007 with the highest decrease in relative terms achieved in the waste sector (– 39 %).

2.1 Current greenhouse gas emission levels in Europe

Based on the information submitted in May 2009 under the UNFCCC, in 2007 the EU-27 emitted a total of 5 045 million tonnes CO_2-equivalent (Mt CO_2-equivalent) greenhouse gases, excluding net CO_2 removals from land use, land-use change and forestry (LULUCF) and emissions from international bunkers (international aviation and international

([9]) Unless otherwise noted, total GHG emissions do not include emissions from international bunkers (international aviation and maritime transport) and exclude removals from LULUCF (carbon sink activities).

maritime transport). Including international bunkers, these emissions were 5 360 Mt CO_2-equivalent. This represents the lowest emission level achieved in the EU-27 during the whole period 1990–2007.

Based on these data:

- the EU accounts for about 12.4 % of global GHG emissions. If emissions from deforestation were included, the share would fall to 10.9 %, since deforestation occurs mostly outside the EU ([10]);
- an EU citizen emits on average 10.2 t CO_2-equivalent, well above the world average of around 7 t CO_2-equivalent per capita;
- the European Union economy generates approximately 473 g CO_2-equivalent per euro of GDP, which is one of the lowest levels among the major GHG emitting countries worldwide ([11]).

In the EU-15, 2007 total GHG emissions were 4 052 Mt CO_2-equivalent, excluding LULUCF and emissions from international bunkers. This was 4 % lower than 1990 emissions and the lowest level recorded over the whole period 1990–2007. In the EU-12, GHG emissions were 993 Mt CO_2-equivalent. Although still 25 % lower than in 1990, this level is the highest recorded since 1999.

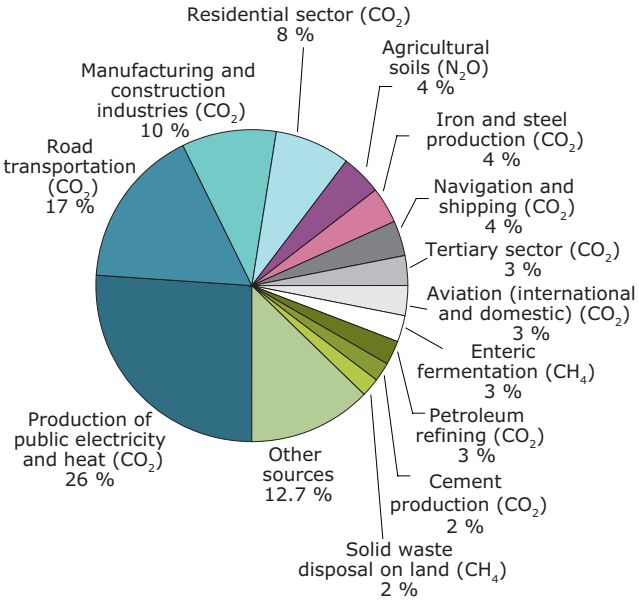
In August 2009, for the first time, the EEA published its own estimates of EU-wide total greenhouse gas emissions for the previous year ([12]). According to these estimates, the decreasing trend in EU greenhouse gas emissions continued in 2008. Based on these estimates, 2008 greenhouse gas emissions in the EU-27 stand approximately 10.7 % below the 1990 level while in the EU-15 they stand 5.5 % below 1990 levels and 6.2 % below the Kyoto base-year emissions.

Two activities are responsible for the largest shares of greenhouse gas emissions (Figure 2.1) the production of public electricity and heat from fossil fuel combustion by the energy industry and road transportation (freight and passengers). More details on the main drivers responsible for emission trends in theses sectors are presented in Chapter 1.

Energy-related emissions account for about 80 % of total greenhouse gas emissions in the EU-27 (81 % in the EU-15).

As a consequence of the role played by fossil fuel combustion, CO_2 is the predominant greenhouse gas emitted, accounting for 83 % of total GHG emissions (excluding LULUCF and international bunkers). About 93 % of this CO_2 originates from the combustion of fossil fuels, and the remaining 7 % from specific industrial processes (e.g. production of cement, chemicals, iron and steel). Methane (CH_4) and nitrous oxide (N_2O), mainly due to agriculture and waste management, account for about 8 % and 7 % respectively of total emissions, while fluorinated gases (F-gases) from industrial processes represent 2 % of total emissions (Figure 2.2).

Figure 2.1 Greenhouse gas emissions in the EU-27 by main source activity, 2007



Note: For detailed analysis of the key sources, cf. Annex A.1.

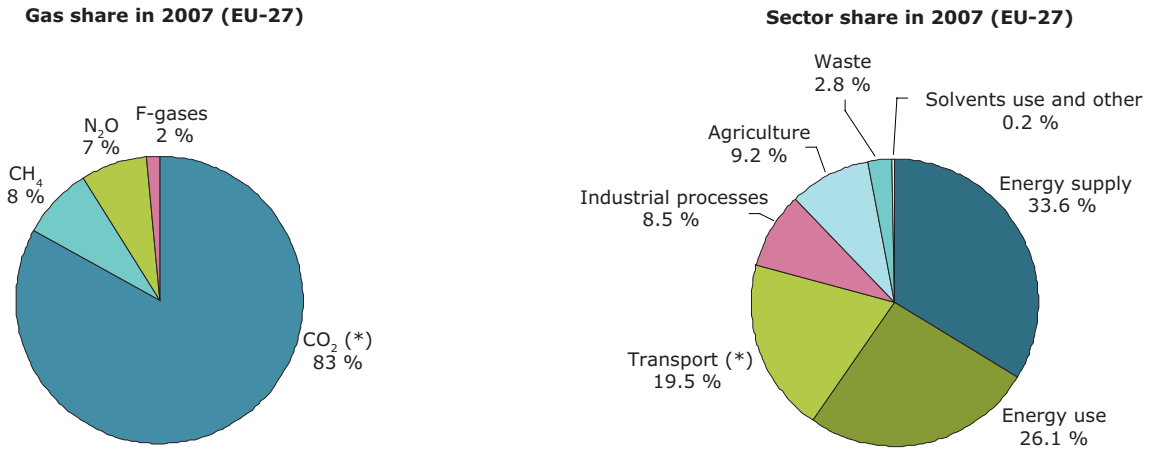
Source: EEA, 2009.

([10]) Source for world emissions: European Commission, Joint Research Centre (JRC)/Netherlands Environmental Assessment Agency (PBL). Emission Database for Global Atmospheric Research (EDGAR), release version 4.0. http://edgar.jrc.ec.europa.eu, 2009; source for EU-27 emissions: EEA, Annual European Community greenhouse gas inventory 1990–2007 and inventory report 2009 www.eea.europa.eu/publications/european-community-greenhouse-gas-inventory-2009.

([11]) Climate Analysis Indicators Tool (CAIT) Version 5.0. (Washington, DC: World Resources Institute, 2008).

([12]) Seven EU Member States (Denmark, Finland, Germany, Greece, Italy, Luxembourg and Slovenia), as well as Norway, also reported their own estimates of total GHG emissions in 2008. These estimates were used in the present assessment of these countries' progress towards their Kyoto targets.

Figure 2.2 Greenhouse gas emissions in the EU-27 by gas and sector, 2007

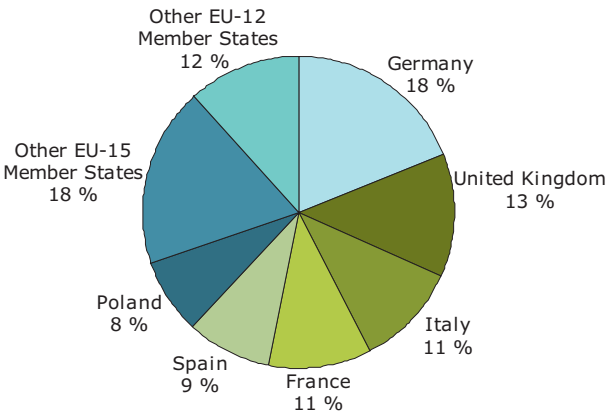


Note: * Emissions from international aviation and international maritime navigation, which are not covered by the Kyoto Protocol, are not included here. If included in the total, the share of CO_2 and the share of transport would reach 84 % and 24 % respectively of total EU-27 GHG emissions in 2007.

Source: EEA, 2009.

Eighty percent of total EU-27 GHG emissions are generated in the EU-15 (whilst the latter represents 79 % of the whole EU-27 population). The five largest GHG emitters in the EU-27 are all EU-15 Member States: Germany, the United Kingdom, Italy, France and Spain. Together, they account for more than 60 % of EU-27 GHG emissions (Figure 2.3). In the EU-12, Poland emits the most GHG. However, these six countries do not rank among the highest emitters per capita in the EU (Figure 2.8).

Figure 2.3 Greenhouse gas emissions in the EU-27 by main emitting country, 2007



Source: EEA, 2009.

Greenhouse gas emissions per capita show significant differences across European countries. Emissions per capita are correlated to the energy intensity (primary energy consumption per capita) and the energy mix (affecting the level of emissions by energy unit produced) of each country. Turkey, Latvia, Romania, and Sweden have the lowest GHG emissions per capita among all EEA member countries. This can be explained by low levels of final energy use per capita in these countries (Turkey having the lowest) ([13]). In addition, more than 55 % of the electricity produced in Latvia comes from hydropower, and in Sweden in 2007 it was almost 45 % (the same share for nuclear power). The relatively high levels of GHG emissions per capita observed in Luxembourg, Estonia, Ireland, Finland and Iceland can be explained by:

- the high level of 'road fuel exports' ([14]) from Luxembourg to neighbouring countries;
- the importance of the agriculture sector and related CH_4 and N_2O emissions in Ireland, and

([13]) EEA, 2008b.

([14]) Fuel bought in Luxembourg but burned outside the country by people and by truck drivers crossing the countries as well as by the relatively important cross-border commuting workforce (more than 25 % of the resident population), because of lower fuel taxes compared to neighbour countries. Luxembourg estimates that fuel exports could be responsible for up to 40 % of its total greenhouse gas emissions. Other countries, such as Austria and Ireland, also experience fuel tourism and road fuel export.

the relatively low share of renewable energy for energy supply;
- the severe climatic conditions requiring a significant use of energy per capita in Finland and Iceland, despite a significant use of renewable energy sources (and nuclear energy in Finland) for energy supply in both countries. In addition, Finland has an energy-intensive export industry, which raises per capita emissions;
- emission in Estonia is also highly dependent on climatic conditions: electricity generation from conventional power plants increased by 25 % between 2006 and 2007, which resulted in higher per capita emissions than in previous years.

The emissions intensity of a country, measured as the level of emission per unit of economic output (measured in GDP), reflect a country's:

- level of energy efficiency;
- overall economic structure (including the carbon content of goods imported and exported);
- carbon content of the energy consumed in the country.

Emission intensities differ greatly among EU Member States ([15]). The five Member States with the lowest emission intensities are all EU-15 Member States, while the seven Member States with the highest emission intensities are all EU-12 Member States (Figure 2.9). This regional difference could be explained by deindustrialisation and offshoring in the traditional (labour-intensive) manufacturing sectors affecting the majority of EU-15 Member States, transitions towards low-carbon economies, reflected to some extent in low levels of energy use per GDP ([16]) (the United Kingdom, Austria, Italy) and the share of renewable energy sources and nuclear energy in the fuel mix. Sweden and France have high shares of renewable and nuclear energy, while Austria relies strongly on hydropower; this results in the lowest levels of GHG emission per GDP in the EU. Liechtenstein, Switzerland and Norway have also relatively low emission intensities compared to other European countries. The importance of the low-carbon financial sector in the economies of Liechtenstein and Switzerland explains the relatively low emission intensities compared to other European countries. In Norway, the large share of hydropower for electricity production explains the low GHG emission intensity.

2.2 Greenhouse gas emission trends since 1990

2.2.1 2007–2008

Based on the recent EEA estimates, EU-27 greenhouse gas emissions in 2008 were about 1.5 % lower than in 2007, while they decreased by about 1.3 % in the EU-15. This decline in emissions in 2008 was due largely to lower CO_2 emissions from fossil fuel combustion in the energy, industry and transport sectors. The 2008 emission reductions reflect the effects of the global economic recession that began in 2008, which resulted in reduced industrial output and reduced energy consumption by industry, and correspondingly reduced freight transport. The reductions are also apparent in the verified emissions from the European Union Emission Trading Scheme (EU ETS) for 2008, where total EU-27 emissions decreased by 3.9 % between 2007 and 2008.

2.2.2 2006–2007

In 2007, EU emissions fell for the third consecutive year. Between 2006 and 2007, total GHG emissions in the EU-27 fell by 1.2 %. This overall decrease was caused by emission decreases in the EU-15 of 1.6 %, although emissions rose slightly by 0.4 % in the EU-12.

At the Member State level, 17 countries recorded a reduction in greenhouse gas emissions in 2007 compared to 2006 (Figure 2.5). About 40 % of the EU-27 net reduction was accounted for by Germany. This was largely the result of lower use of fossil fuels, mainly heating oil, in the residential sector.

The largest emission reduction in relative terms occurred in Denmark (– 6.2 %). High electricity production from wind (and less coal input to power stations) and a good hydro year in both Norway and Sweden contributed to this decline. Interestingly, in Germany and France emissions from transport decreased, and in Italy and the United Kingdom they stabilised.

Total GHG emissions increased most in Spain, Bulgaria and Greece. In all three countries, emissions from public electricity and heat

([15]) To eliminate the differences in price levels between countries, allow meaningful volume comparisons of GDP across European countries and benchmark country performance in a particular year, GDP at market prices is converted to purchasing power standard (PPS). The currency conversion rates both convert to a common currency and equalise the purchasing power of different currencies.
([16]) EEA, 2008b.

consumption were the main contributors. Spain continued its upward trend in greenhouse gas emissions. In 2007, the electricity output from nuclear power stations in this country was lower than expected — replaced by fossil fuels — and road transport demand increased. In relative terms, Estonia recorded the highest increase in emissions in 2007. This was due to a very steep increase in the use of coal for the production of heat and electricity (electricity generation from conventional thermal power plants rose by 25 %).

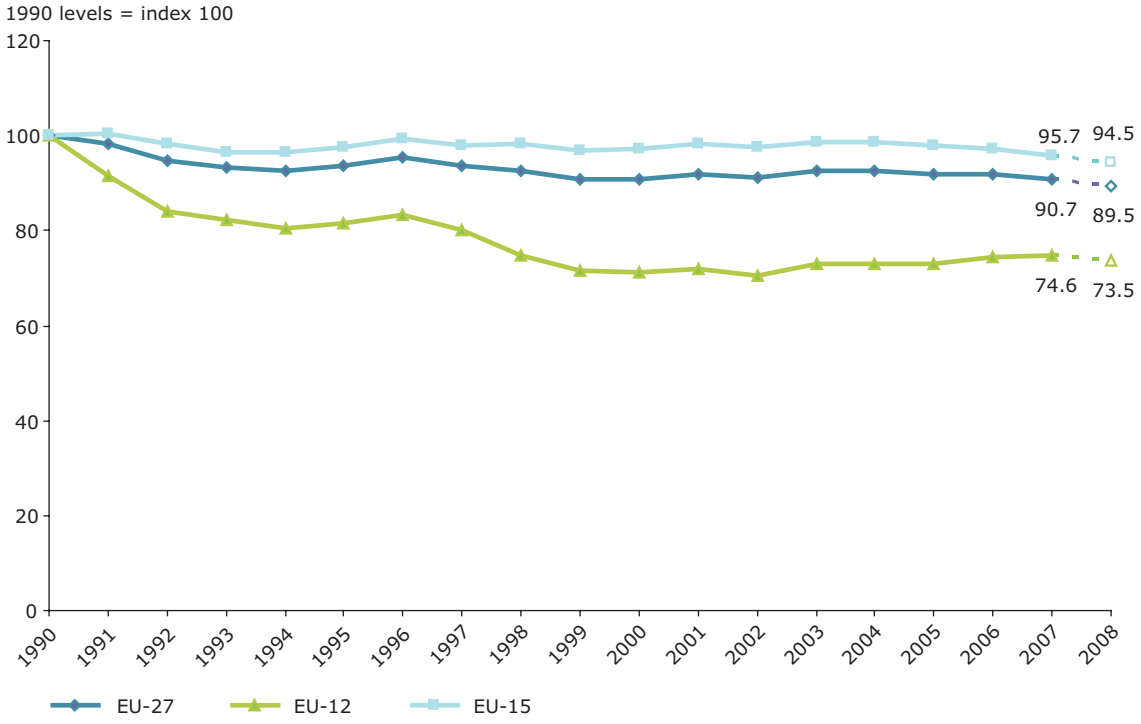
Switzerland experienced a sharp decrease in emissions between 2006 and 2007 (– 3.6 %) reaching the lowest level since 1997.

2.2.3 1990–2007

Between 1990 and 2007, total EU-27 GHG emissions (without LULUCF) decreased by 9.3 % (Figure 2.4). This overall change is the result of GHG emissions reductions of 4.3 % in the EU-15 and emission reductions of 25.4 % in the EU-12. A large part of these reductions took place during the 1990s (Figure 2.4). The overall EU GHG emission trend between 1990 and 2007 was dominated by the two largest emitters Germany and the United Kingdom, which together achieved GHG emission reductions equivalent to more than half of the absolute total emission reduction. Important absolute emissions reductions were also achieved by EU-12 Member States: Bulgaria, Czech Republic, Poland and Romania. This overall decrease was partly offset by the important emission increases in Spain and, to a lesser extent, Italy (Figures 2.6 and 2.7).

The trends in GHG emission relative to GDP in the EU indicate an overall decoupling of EU economies from emissions over time. Between 1990 and 2007, per GDP emissions decreased by 37 % in the EU-27 (GDP increase of 45 % while emissions decreased by 9 %) and by 33 % in the EU-15 (GDP increase of 44 % with a 4 % reduction in GHG emission). Emission intensities of EU-15 and EU-27 economies have been continuously decreasing since 1995, except in 1996–1997 and 2003–2004 (Figure 2.10). Between 1990 and 2007, remarkable increases in GDP occurred in parallel with significantly lower increases or even decreases in GHG emission, especially in Ireland, Latvia, Lithuania and the Slovak Republic. In 2007, the economies of most EU-12 Member States were more intensive in

Figure 2.4 Greenhouse gas emission trends in the EU-27, the EU-15 and the EU-12, 1990–2007 and 2008 estimates



Note: GHG emissions presented refer to total GHG emissions without LULUCF.

Source: EEA, 2009a.

Figure 2.5 Changes in greenhouse gas emissions in Europe, between 2006 and 2007

Note: GHG emissions presented refer to total GHG emissions without LULUCF.

Source: EEA, 2009.

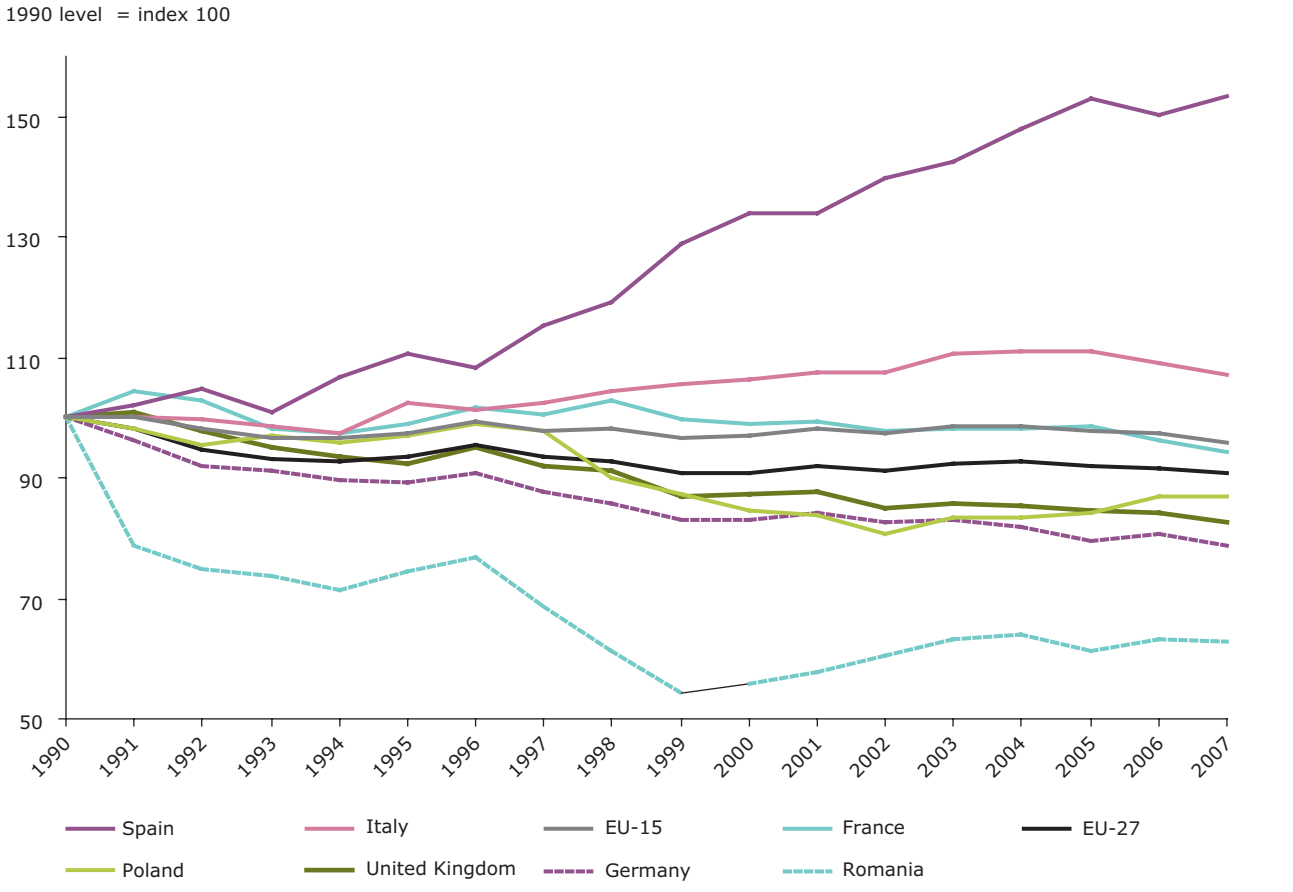
emissions than in EU-15 Member States (Figure 2.9, left graph). Turkey is the only EEA member country for which emission intensity increased between 1990 and 2007 (9 %).

GHG emission trends are also well decoupled from population growth at EU level: between 1990 and 2007, absolute GHG emissions in the EU-27 declined by 9.3 % while population grew by 5.3 %. Consequently, per capita emissions decreased by 14 % during the period (1.6 tonne CO_2-equivalent per capita). This decrease mostly occurred during the 1990s. Between 2000 and 2007, per capita emissions decreased by 5.1 % in the EU-15 while they rose by 7.1 % in the EU-12. Between 1990 and 2007, per capita GHG emissions increased most in Spain, Portugal, Cyprus and Malta. Of EEA member countries, Turkey experienced the largest increase (75 %). However in all these countries, per capita emissions have remained below the EU-27 average (except in Cyprus, which has now higher than average per capita emissions).

Total GHG emissions, emissions per GDP and per capita emissions are driven by a number of factors mostly affecting fossil fuel combustion, the main source of greenhouse gas emissions in Europe. The nature of these factors can be very diverse although some of these are interlinked (socio-economic, demographic, climatic, technological, structural, etc.), as the analysis of 1990–2007 GHG trends in Europe shows:

- EU-27 emissions decreased by 7 % between 1990 and 1998, due to the economic decline that affected mostly Eastern Europe during the early 1990s and a following period of restructuring. Heavily polluting and energy-intensive industries were closed and energy efficiency improvements in power and heating plants

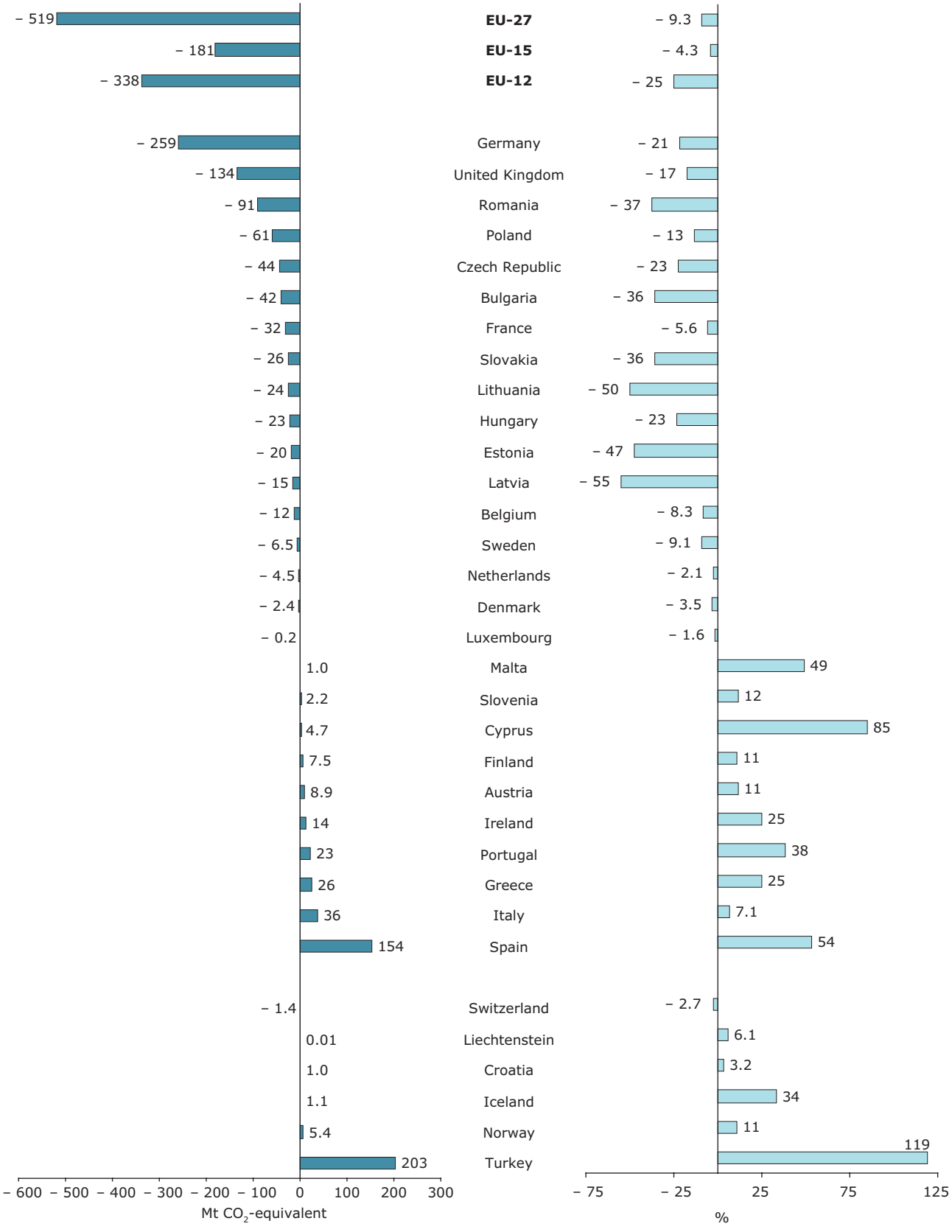
Figure 2.6 Greenhouse gas emission trends in the EU and main emitting Member States, 1990–2007



Note: GHG emissions presented refer to total GHG emissions without LULUCF.

Source: EEA, 2009.

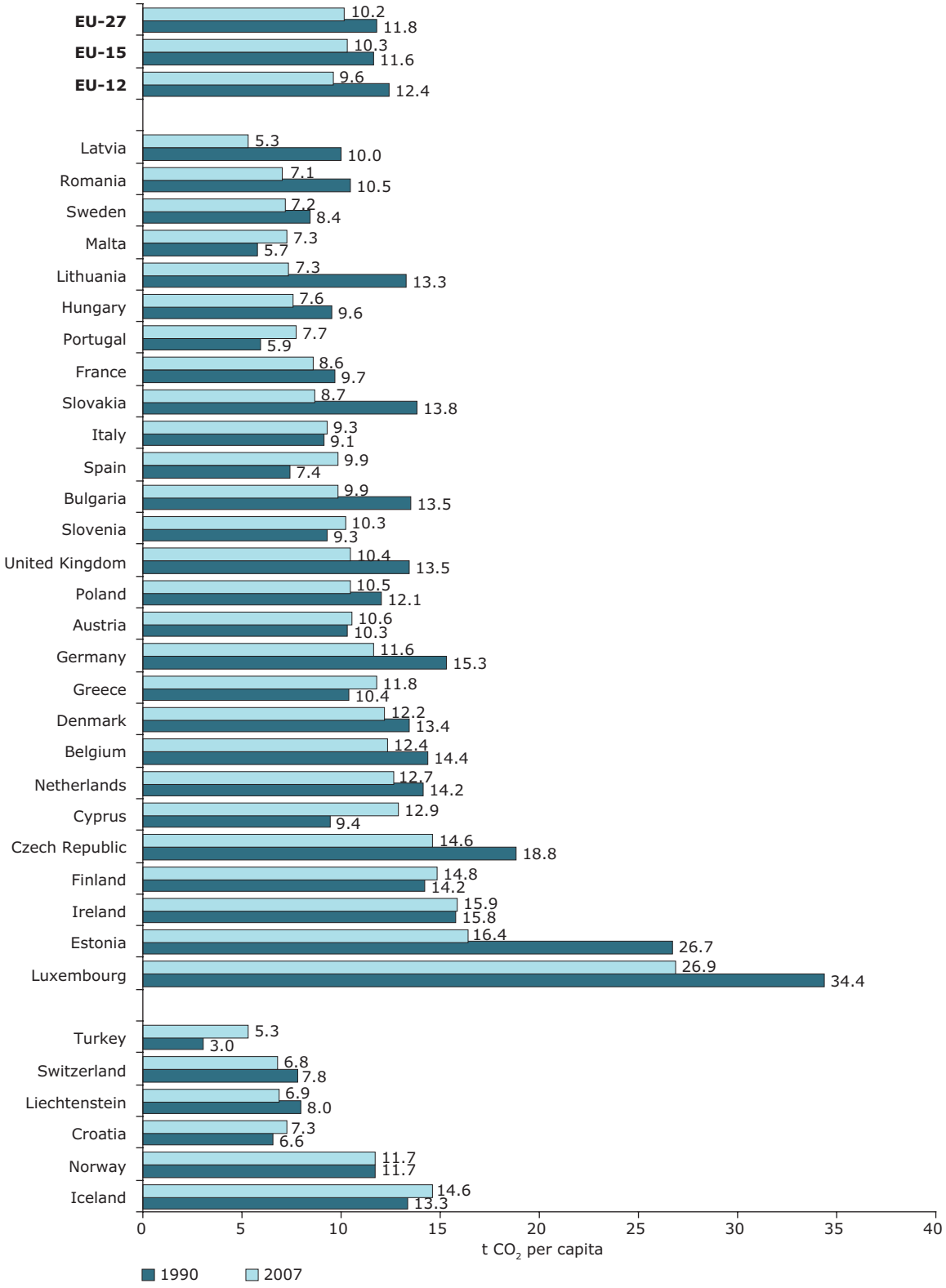
Figure 2.7 Changes in greenhouse gas emissions in Europe, 1990–2007



Note: GHG emissions presented refer to total GHG emissions without LULUCF.

Source: EEA, 2009.

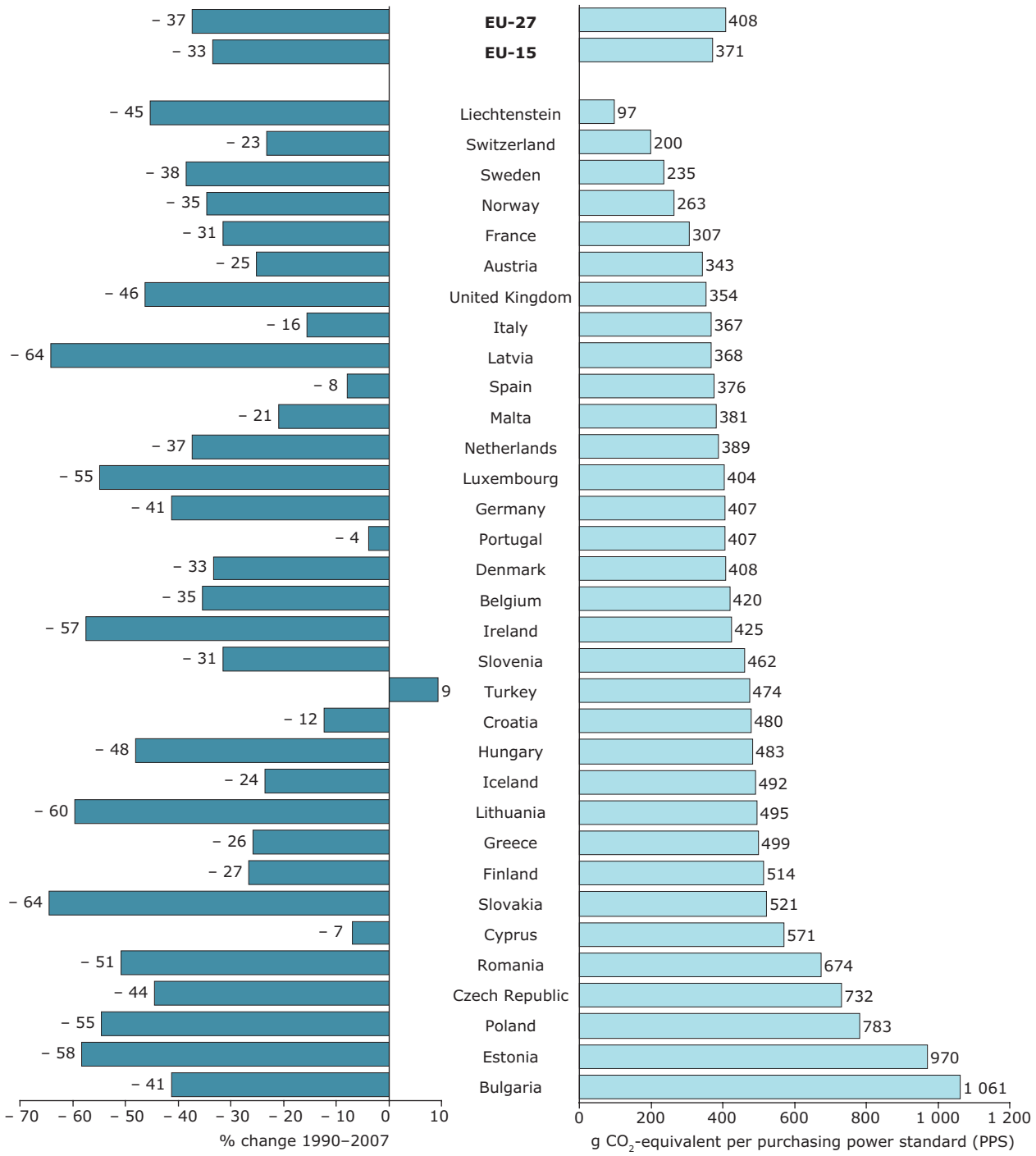
Figure 2.8 Greenhouse gas emissions per capita in Europe in 1990 and 2007



Note: For 1990 population data, the population of the French overseas territories (DOM) provided by the French statistical office was added to the total population of France *métropolitaine* provided by Eurostat. Post-1990 population data from Eurostat covers the whole French territory, including overseas territories.

Source: EEA 2009a; Eurostat.

Figure 2.9 Relative economic intensity of greenhouse gas emissions in Europe in 2007 (index EU-27 = 100) and change in the economic intensity of greenhouse gas emissions in Europe, 1990–2007



Note: The chart on the left shows the greenhouse gas economic intensity (i.e. greenhouse gases divided by GDP) for each country in 2007 relative to the EU-27. GDP here is measured in purchasing power standards (PPS). PPS in Liechtenstein were estimated from the purchasing power of the Swiss franc, using Eurostat national accounts, and estimates of GDP at current prices from the UN millennium indicators.
In the chart on the right, the starting year for the calculation of the change in the economic intensities of greenhouse gas emissions was 1990. Because of lack of GDP data, few exceptions apply: Estonia (1993), Slovak Republic (1992), Malta, Bulgaria and Hungary (1991), Croatia (1995). To be consistent, the reference year for greenhouse gas emissions in these countries is the same as for GDP.

Source: EEA, Eurostat, UN, and European Commission.

were achieved. Romania was responsible for about half of the total EU-27 change between 1990 and 1991. The emission reductions that took place in (former Eastern) Germany in the early 1990s accounted for a significant part of the reductions observed at EU-15 level. Important emission reductions also took place in France and the United Kingdom during that period, in particular in energy industries, manufacturing industries and other energy sectors. In the United Kingdom this reduction in emissions was due to a switch from solid fuels to gaseous fuels.

- In 1996, an emission increase in comparison to the previous year was recorded in most EU Member States. It was due to a particularly severe winter, which led to increased energy consumption from households for heating. In Italy, this emission peak from households was counterbalanced by a strong decrease in emissions from energy industries, which resulted in an overall decrease in total emission in Italy.
- Between 1996 and 1999, emissions in the EU-15 decreased, mainly due to reductions in emissions from chemical industries (adipic acid production) in the United Kingdom, Germany and France, and from production of halocarbons in the Netherlands and the United Kingdom. Emissions in Italy increased during this period, due to considerable increased emissions from the energy sector. Between 1997 and 1998, emission reductions in Poland were responsible for most of total EU-27 emission reductions. Emissions peaked in France in 1998, as all emissions from fuel combustion in the energy sector increased despite reduced emissions from chemical industries.
- Between 1999 and 2004, emission trends in the EU-15 and EU-12 were comparable (Figure 2.4). The overall increase in emissions was mainly driven by increasing energy consumption from final users. The hot summer in 2003 was responsible for high emissions because it reduced hydropower availability, which led to an increased output from thermal power production.
- Since 2004, final energy demand in the household sector and the tertiary sector in the EU-15 has been decreasing, which has resulted in decreasing total emissions. Germany, France, Belgium, Italy and the Netherlands made significant contributions to this overall EU-15 trend. On the other hand, emissions have been increasing since 2004 in the EU-12. This was mostly due to transport and industrial processes. These countries seem to be repeating the experience of countries like Ireland, Portugal and Spain, which, starting from a relatively low transport level, experienced high economic growth accompanied by strong growth in transport and related greenhouse gas emissions.

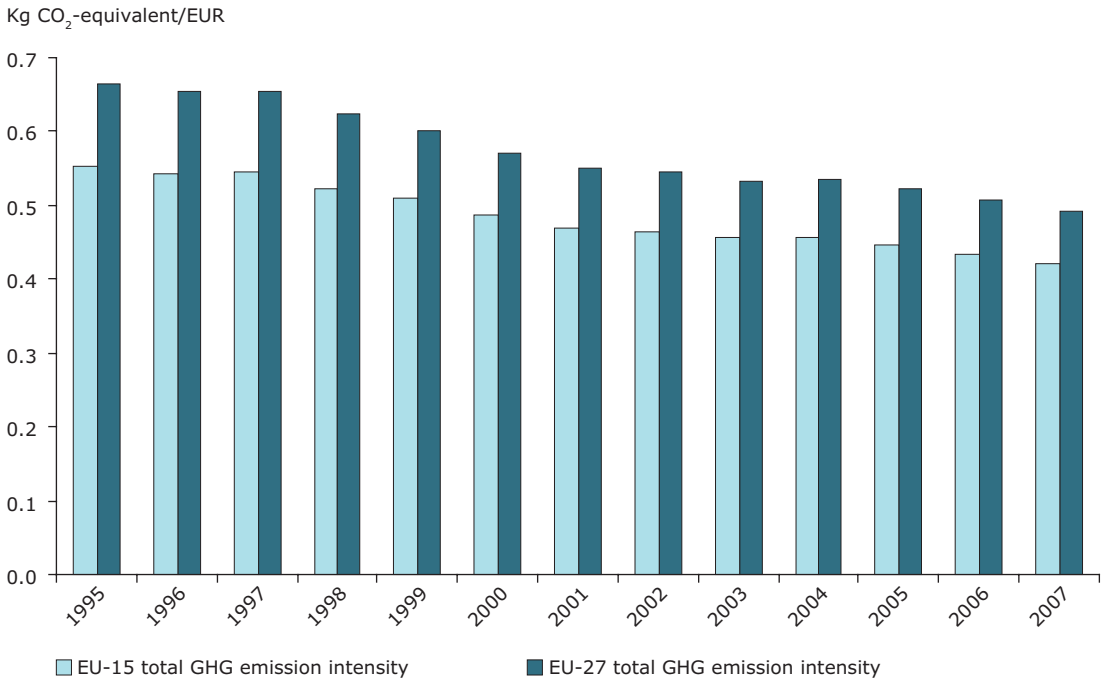
All the other EEA member countries except Switzerland have experienced an increase in their total GHG emissions between 1990 and 2007 (Figure 2.7), including a doubling of total emissions in Turkey during the period. This last increase is mainly attributed to the country's important demographic growth (+ 25 % over the period) and economic development. However, emissions per capita of 5.3 t CO_2-equivalent are still relatively low compared to other European countries. After a sharp decrease observed between 1990 and 1994, GHG emissions in Croatia have been increasing and in 2007 reached their highest level, 3 % above 1990 levels.

2.3 Trends by greenhouse gas

CO_2 represents more than 80 % of all greenhouse gas emission in the EU in 2007. Consequently, small relative trends result in significant changes in emissions, compared with other greenhouse gases. The decrease in total GHG emission observed between 2006 and 2007 in the EU-27 and in the EU-15 was almost exclusively due to a decrease in CO_2 emission (Figure 2.11). This decrease was mostly observed in the fossil fuel combustion for direct energy use by households and industry. CO_2 is the only greenhouse gas for which diverging trends were observed between EU-12 and EU-15 countries between 1990 and 2007 (Figure 2.12). During that period, the relative change in CO_2 emissions was smaller than for any other gas in the EU-27 and in the EU-15. However, CO_2 was still responsible for the largest decrease in absolute terms in the EU-27; this decrease mainly resulted from the economic downturn affecting EU-12 economies in the 1990s. This trend opposed the overall increase in CO_2 emissions that resulted from a period of strong economic development for some EU-15 economies, in particular Spain and Italy.

Fluorinated gases used in industrial processes represent only 1.5 % of EU total emissions in CO_2 equivalent. Nevertheless, in the short term (2006−2007) and the long term (1990−2007) they account for the largest relative variations in the EU. These trends are similar in the EU-15 and EU-27. While emissions of PFCs have decreased continuously, emissions of HFCs keep increasing. HFCs represent the only gases for which net

Figure 2.10 Change in greenhouse gas emissions intensities in the EU, 1995–2007



Note: GDP in constant (chain-linked volumes, reference year 2000 (at 2000 exchange rates). Values start only in 1995 because of missing data for 13 Member States (Belgium, Bulgaria, Cyprus, Czech Republic, Greece, Hungary, Ireland, Lithuania, Luxembourg, Malta, Poland, Portugal and Romania).

Source: Eurostat (http://epp.eurostat.ec.europa.eu/portal/page/portal/national_accounts/data/database#); EEA.

emission increases have been observed since 1990 in the EU-27 (up by more than 125 % in the 17-year period). This increase is due to the phase-out of ozone-depleting substances such as chlorofluorocarbons (CFCs) under the Montreal Protocol and the replacement of these substances with HFCs in the production of cooling devices such as air conditioning and refrigeration. The increase is also consistent with both warmer climatic conditions in Europe and higher comfort standards.

CH_4 emissions have been continuously declining in the whole EU since 1990, as a consequence of a decrease of coal mining and post-mining activities, as well as improved management of solid waste and waste landfills. CH_4 was actually responsible for the largest decrease in total GHG emissions in the EU-15 between 1990 and 2007.

N_2O emission reductions were relatively limited between 2006 and 2007 compared with other gases. Between 1990 and 2007, decreasing trends were observed, mainly due to the reduction in fertiliser use on agricultural soils and the decrease of emissions from nitric acid production. These decreases were partly offset by the introduction of catalytic converters for road transport.

2.4 Sectoral trends

2.4.1 2006–2007 trends

The main reductions of EU-27 emissions occurred in the residential/household and services sectors (included in the category 'Energy use (households and services)' in Figure 2.13). The residential sector represents one of the largest sources of greenhouse gas emissions in the EU.

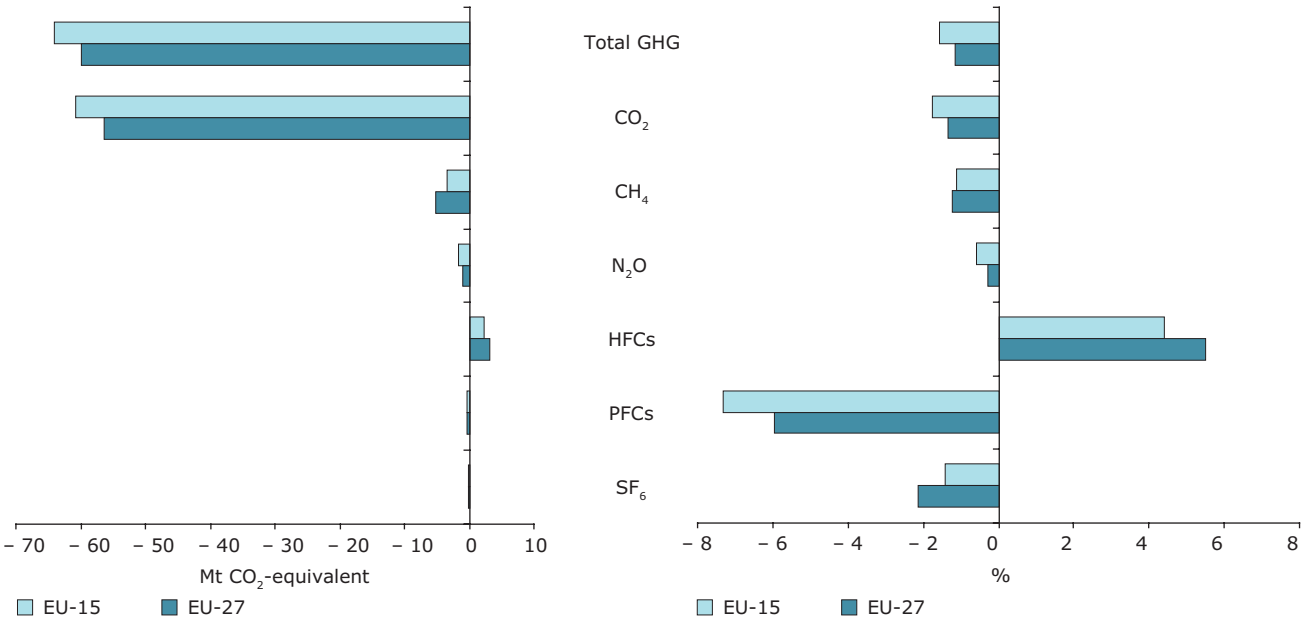
Lower CO_2 emission from households (– 55 Mt CO_2-equivalent) was the main cause of the decrease in total EU-27 GHG emissions in 2007 compared to 2006. This was the result of a combination of two factors:

- a change in fuel mix (higher share in biomass use compared to other energy sources), following a trend that has now been observed for several years;

- particular climatic and economic conditions in 2007 compared to 2006, which resulted in lower fuel sales and energy use for heating.

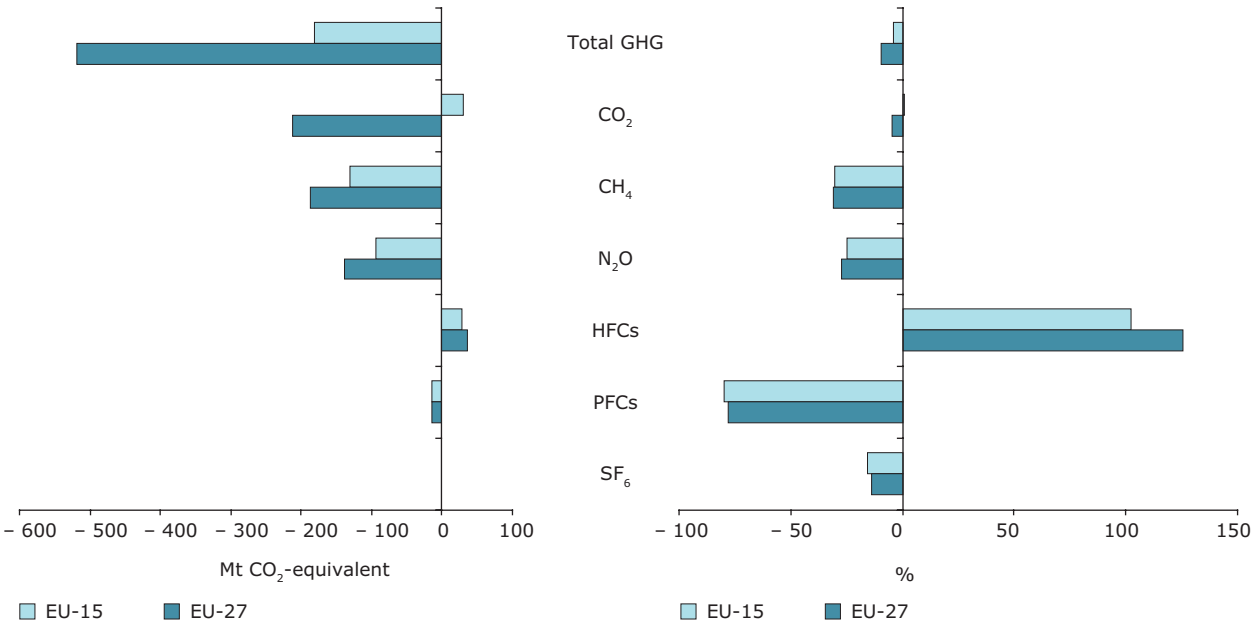
Germany seems to be the main contributor to the EU reduction in greenhouse gas emissions in 2007. This is largely due to a big decline in fuel use, mainly oil, and related CO_2 emissions from households; a sharp reduction in heating needs because of a warmer year; and the influence of price developments, including the decision to increase VAT. Similar developments, i.e. decreased heating needs because of a warmer

Figure 2.11 Changes in EU greenhouse gas emissions by gas, 2006–2007



Source: EEA, 2009.

Figure 2.12 Changes in EU greenhouse gas emissions by gas, 1990–2007



Source: EEA, 2009.

winter and fast price increases, were largely shared by all EU Member States (cf. Section 3.3.2).

Emissions from energy use in manufacturing industries also decreased in the EU-27, the decreasing trend of the EU-15 Member States offsetting the increasing trend of the EU-12 Member States.

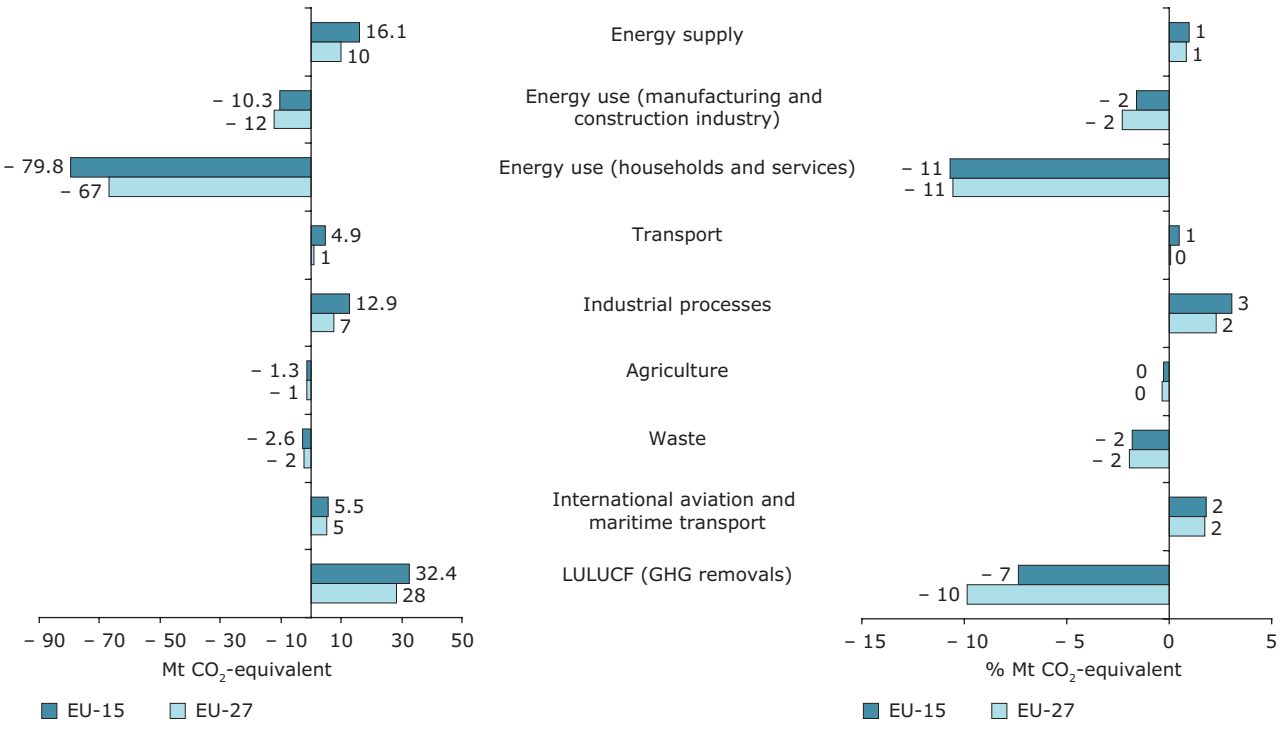
On the negative side, HFC emissions from refrigeration and air conditioning continued to increase (cf. Section 2.3). Similarly, road transport emissions increased again in 2007. Emissions from international aviation and maritime transport, currently not included in the national greenhouse gas totals under the UNFCCC and Kyoto Protocol, also continued to rise, increasing by 1.8 % in the EU-27. Emissions from international aviation (including intra-EU flights) rose by 3.7 Mt CO_2-equivalent and those from international shipping by 1.8 Mt CO_2-equivalent. EU greenhouse gas emissions from international aviation are lower than for international maritime transport but are growing significantly more rapidly. The average annual EU-27 growth rates since 1990 were 4.5 % and 2.9 %, respectively. Together, the two sectors currently account for about 6 % of total greenhouse gas emissions.

Carbon sinks removed also less CO_2 in 2007 than in 2006.

2.4.2 1990–2007 trends

Socio-economic changes and selective measures taken to reduce GHG emissions can influence the contribution of a specific sector to total GHG emissions. However, between 1990 and 2007, the ranking of the main sectors has not changed and the percentage contribution to total GHG emissions (including international bunkers and excluding LULUCF) has only changed moderately in the EU-27. Transport is still by far the sector with the largest increase in GHG emissions, both in absolute and relative terms, both including and excluding the fast-rising emissions from international bunkers (Figure 2.14). There was no other sector in which an emission increase could be observed during the period in the EU-27. However in the EU-15, emissions from energy industries increased by 1 %. This picture at a much-aggregated level hides some important differences within one main sector. The apparent decreasing trend in emissions from industrial processes is in fact the result of a very large increase in HFC emissions from refrigeration and air conditioning equipment and decreases in other GHG

Figure 2.13 Changes in EU-15 and EU-27 emissions and removals by sector, 2006–2007



Source: EEA, 2009.

Table 2.1 Sources responsible for the largest changes in GHG emissions in the EU, 2006–2007

Source category	EU-27	EU-15
	Mt CO_2–equivalent	
Public electricity and heat production (CO_2 from 1A1a)	+ 15.0	+ 10.7
Road transport (CO_2 from 1A3b)	+ 5.3	+ 1.7
Cement production (CO_2 from 2A1)	+ 4.5	+ 2.0
Consumption of halocarbons (HFC from 2F)	+ 4.0	+ 3.1
Manufacture of solid fuels (CO_2 from 1A1c)	+ 3.6	+ 1.0
Fugitive emissions (CH_4 from 1B)	– 3.1	– 2.2
Iron and steel production (CO_2 from 1A2a + 2C1)	– 3.8	– 2.2
Manufacturing industries (excl. iron and steel) (energy-related CO_2 from 1A2 excl. 1A2a)	– 4.7	– 8.2
Households and services (CO_2 from 1A4)	– 79.1	– 66.8
Total change 2006–2007	**– 59.8**	**– 64.0**

Note: The source categories correspond to the nomenclature defined by the IPCC in its guidelines for estimating and reporting greenhouse gas emissions under the UNFCCC.

Source: EEA, 2009.

Table 2.2 Sources responsible for the largest changes in GHG emissions in the EU, 1990–2007

Source category	EU-27	EU-15
	Mt CO_2-equivalent	
Road transport (CO_2 from 1A3b)	+ 200.7	+ 156.9
Consumption of halocarbons (HFC from 2F)	+ 60.7	+ 54.2
Production of halocarbons HFC from 2E)	– 25.6	– 25.6
Manufacture of solid fuels (CO_2 from 1A1c)	– 34.9	– 38.5
Enteric fermentation (CH_4 from 4A)	– 35.6	– 13.3
Iron and steel production (CO_2 from 1A2a+2C1)	– 47.7	– 32.1
Adipic acid production (N_2O from 2B3)	– 50.9	– 50.0
Public electricity and heat production (CO_2 from 1A1a)	– 58.8	+ 79.4
Fugitive emissions (CH_4 from 1B)	– 66.8	– 45.8
Agricultural soils (N_2O from 4D)	– 67.0	– 32.8
Solid waste disposal (CH_4 from 6A)	– 68.2	– 64.4
Manufacturing industries (excl. iron and steel) (energy-related CO_2 from 1A2 excl. 1A2a)	– 137.5	– 66.7
Households and services (CO_2 from 1A4)	– 141.1	– 84.2
Total change 1990–2007	**– 518.7**	**– 180.9**

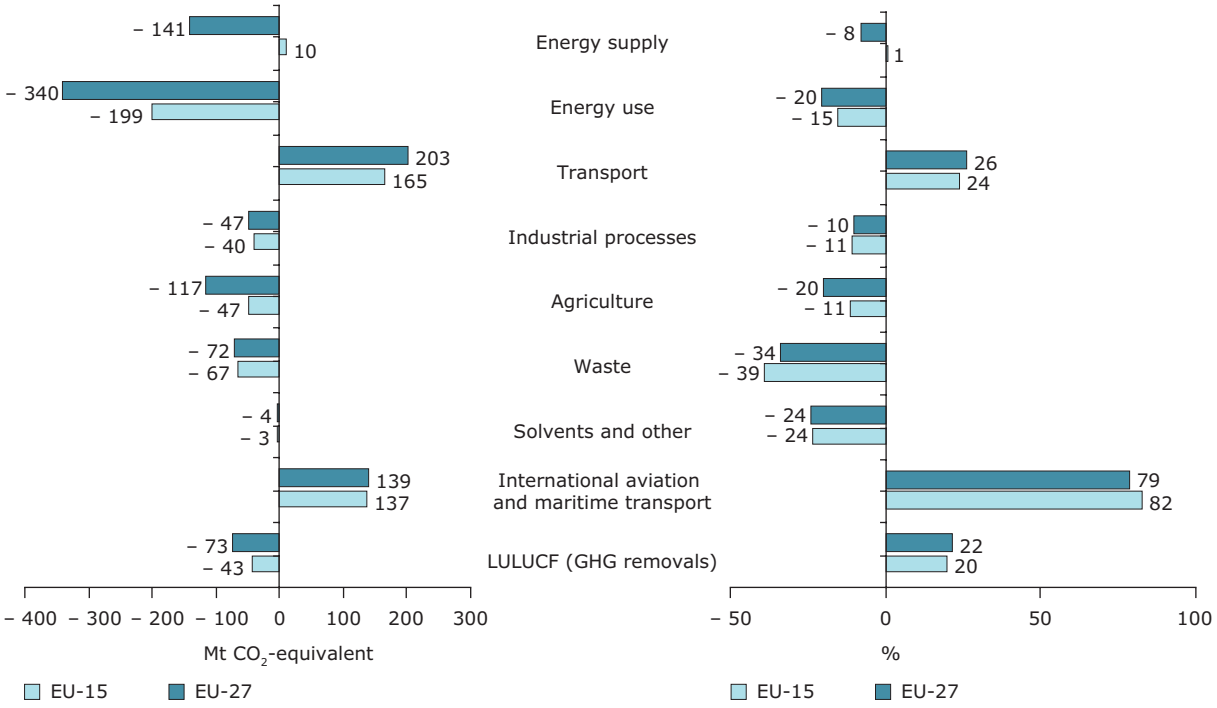
Note: As the table only presents the emission sources that have increased/decreased by more than 20 Mt CO_2-equivalent, the sum for each country grouping EU-27/EU-15 does not necessarily match the total change listed at the bottom of the table.

Source: EEA, 2009.

emissions from industrial sectors such as the chemical industry and the metal production industry (Table 2.2). The largest relative reduction in GHG emissions was achieved in the waste sector, with a relative reduction of 34 % (Figure 2.14). This reduction was mainly a result of decreased organic carbon content in the landfill waste, decreased amount of waste disposal on land and the installation of landfill gas recovery on all new sites as required by the EU Landfill Directive (Directive 1999/31/EC).

Emission removals from land use, land-use change and forestry (LULUCF) have increased in the EU-15 and the EU-27. This means that carbon sink activities removed more GHG emissions from the atmosphere in 2007 than they did in 1990.

Figure 2.14 Changes in EU-15 and EU-27 emissions and removals by sector, 1990–2007



Source: EEA, 2009.

3 Main drivers of GHG emission trends

- Between 1990 and 2007, greenhouse gas emissions in Europe have been driven upward by many factors, including increasing production of public electricity and heat by thermal plants, both in absolute terms and in comparison with other sources; economic growth in manufacturing industries; increasing transport demand for passengers and freight; increasing share of road transport compared to other transport modes; increasing household size; and demographic growth.
- During the same period, significant emission reductions have been achieved, driven by, for example, the economic downturn affecting eastern Member States in the 1990s; energy efficiency improvements (in particular by industrial end users and energy industries); fuel efficiency improvements in vehicles; a shift from coal to less polluting fuels (in particular gas and biomass) for the production of electricity and heat; higher fuel prices; a shift from petrol to diesel road vehicles; and increasing average temperatures in Europe.

3.1 Overview for the energy and transport sectors

GHG emissions related to the combustion of fossil fuels for energy use (energy and transport sectors) represent more than 80 % of the total greenhouse gas emissions in Europe. This chapter focuses on the factors affecting these emission trends. It does not explore in detail the links between these drivers and the effects of the policies and measures implemented in the EU to reduce GHG emissions (cf. Chapter 6).

Sectoral emission trends can be analysed by decomposition, which identifies the contribution of the main drivers to the overall trends. Based on the decomposition analyses carried out by the EEA on several sub-sectors of the energy sector (public electricity and heat production, energy use from manufacturing industries, energy use from households and energy use for transport), the main drivers of CO_2 emission trends between 1990 and 2007 in Europe can be identified (Table 3.1):

- emissions are driven upward mainly due to increasing demand for electricity and heat, economic growth in manufacturing industries and increasing transport demand;
- emission reductions have been achieved by important energy efficiency improvements, the fuel shift from coal or oil to gas and fuel efficiency improvements in vehicles.

Some of the drivers presented in Table 3.1 are detailed into the following categories:

- 'public electricity and heat production' corresponds to the combustion of fossil fuels by energy industries to produce electricity or heat, that will later be consumed by end users (other industries, households, services, etc.);
- 'manufacturing and construction industries' and 'households (residential sector)' correspond to the combustion of fossil fuels directly by end users to generate electricity or heat.

3.2 Energy supply (public electricity and heat, oil refining)

EU-27 greenhouse gas emissions from energy industries decreased by 8 % between 1990 and 2007. However, despite efficiency improvements in the sector, emissions have increased by 1 % in the EU-15 between 1990 and 2007, driven by increasing demand for electricity. Energy-related GHG emissions have been targeted by a number of EU policies addressing the promotion of cogeneration (Directive 2004/8/EC), the promotion of renewable energy sources for electricity production (Directive

Table 3.1 Main drivers of CO_2 emission trends in the energy sector (including transport)

Driving forces		Emission change, 1990–2007 (Mt CO_2-equivalent)	
		EU-27	EU-15
Negative drivers (increase in GHG emissions)	Increasing demand for electricity and heat	354	336
	Economic growth in manufacturing industry	258	183
	Increasing transport demand	240	230
	Freight	91	91
	Passengers	148	139
	Increasing share of road transport (compared to other modes)	111	51
	Freight	85	44
	Passengers	27	7
	Increasing size of households	72	55
	Demographic growth	22	27
Positive drivers (decrease in GHG emissions)	Energy efficiency improvements	– 623	– 352
	Manufacturing industry	– 342	– 161
	Public electricity and heat production (energy industry)	– 243	– 163
	Households	– 39	– 28
	Shift from coal/oil to gas for electricity and heat production	– 214	– 214
	Public electricity and heat production	– 109	– 128
	Manufacturing industry	– 58	– 50
	Households	– 48	– 34
	Improved fuel efficiency of vehicles	– 139	– 117
	Passenger cars	– 90	– 89
	Freight	– 49	– 29
	Increasing share of biomass	– 112	– 77
	Public electricity and heat production	– 50	– 43
	Manufacturing industry	– 33	– 24
	Households	– 29	– 10
	Increasing share of thermal plants for electricity and heat supply	– 62	– 15
	Households	– 50	– 49
	Public electricity and heat production	– 11	78
	Manufacturing industry	– 1	– 44
	Shift to diesel vehicles	– 19	– 17
	Passengers	– 11	– 10
	Freight	– 8	– 7
	Warmer average temperatures	– 15	– 15

Source: EEA, 2009 (cf. Sections 3.2, 3.3 and 3.4).

2001/77/EC) and the taxation of energy products (Directive 2003/96/EC).

Public electricity and heat production was the single greatest source of CO_2 emissions in 2007, contributing 28 % to total GHG emissions in the EU-27 (25 % in the EU-15). The decomposition analysis (Figure 3.1) shows that for the EU-15, during the period 1990–2007, the increasing output from plants to produce public electricity and heat and — to a lesser extent — the shift towards thermal power production was partly offset by fuel efficiency gains and a shift from coal to gas. The shift towards biomass had a smaller, but still positive effect. A large part of the efficiency gains and the fuel shift occurred in the 1990s. Since 2000, a marked shift towards thermal power and heat production can be observed, which means that thermal power plants mostly cover increased energy demand.

A notable difference between the EU-15 and EU-27 is that in the EU-27 the share of thermal power and heat production did not increase from 1990 to 2007. This is mainly due to a strong decline in district

heat production and a shift towards nuclear power production in the new Member States. In addition, efficiency improvements in the EU-27 before 2000 gave more results in the EU-12, due to the economic restructuring.

Sharp changes in annual emissions can also be caused by fluctuations in the energy system due to climatic variations (in particular in Mediterranean and Nordic countries).

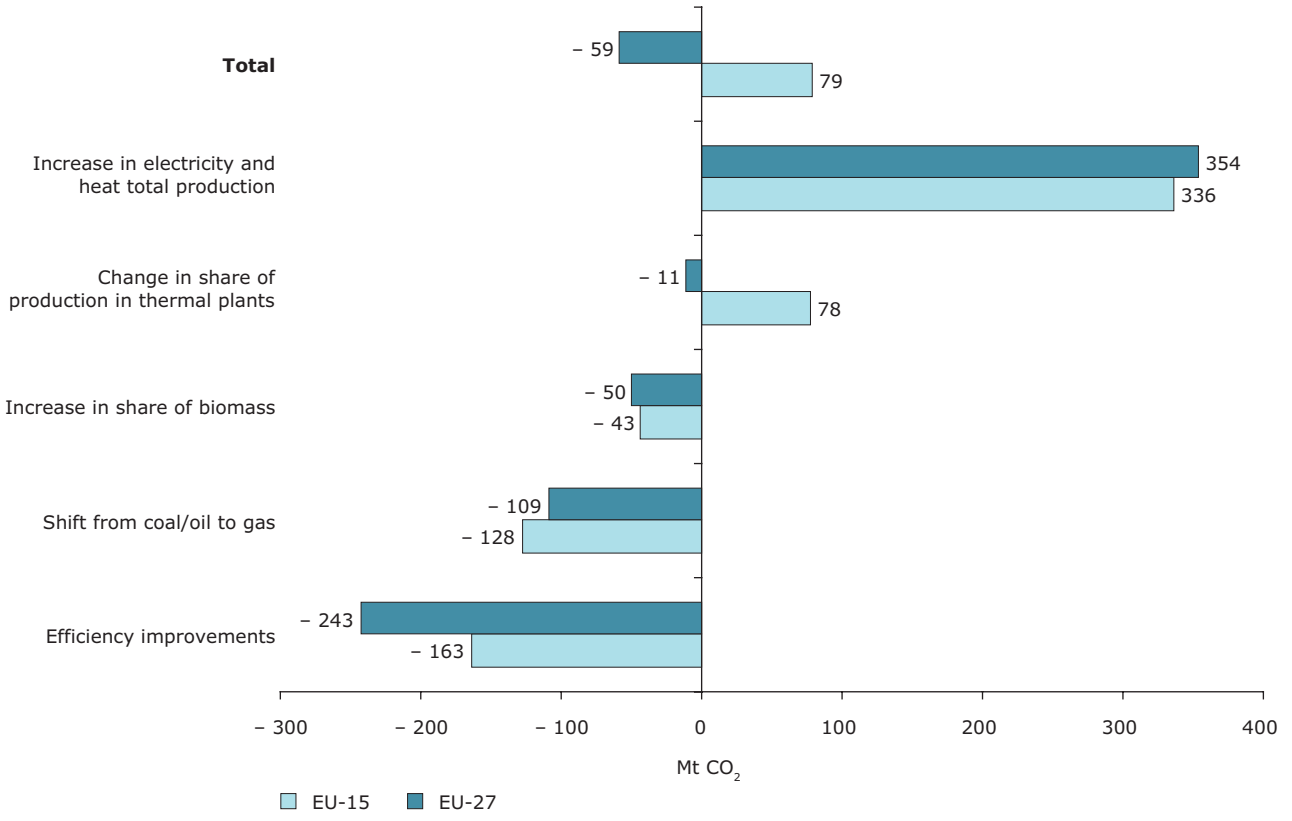
3.3 Energy use (direct fuel combustion), excluding the transport sector

EU-27 greenhouse gas emissions from energy use have fallen by 20 % since 1990. Energy users can be split into two main categories: industrial users (in particular manufacturing and construction industry) and households.

3.3.1 Manufacturing and construction industries

CO_2 emissions resulting from fuel combustion in manufacturing industries amount to 13 % of total GHG emissions, but have decreased by 22 % since 1990. The main reasons for the decrease are improvements in final energy efficiency and — to a much lesser extent — the fuel shift from coal to gas (Figure 3.2). Final energy efficiency has been constantly improving since 1990, whereas most of the shift from coal to gas was achieved before 2000. The main differences between the EU-15 and EU-27 analyses are:

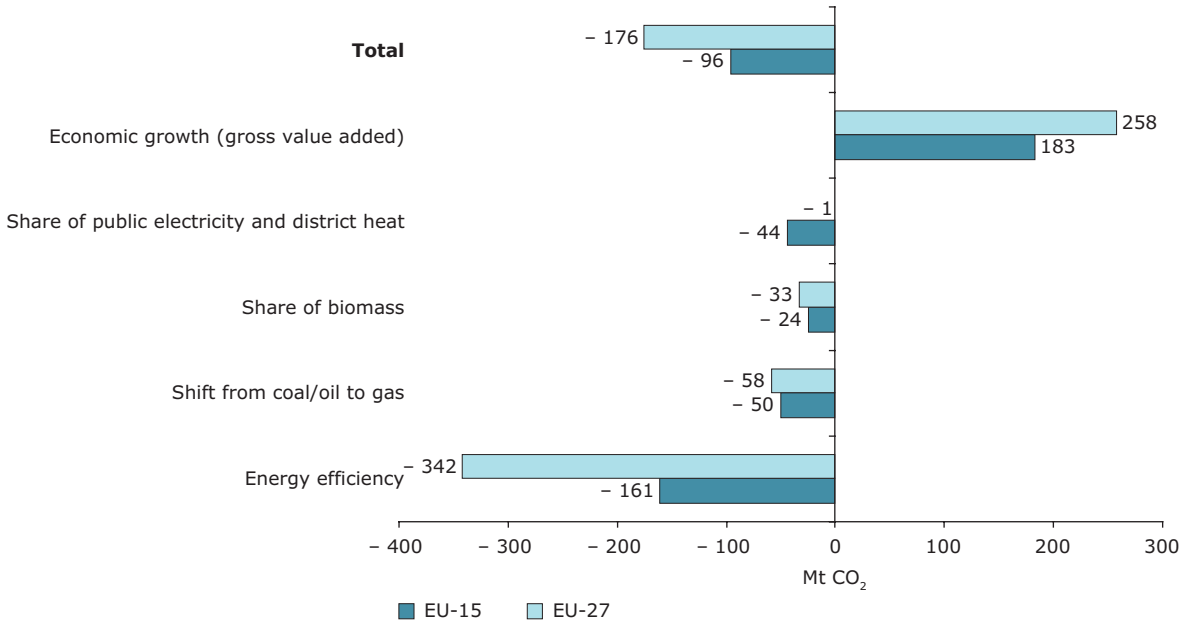
Figure 3.1 Main drivers of CO_2 emission trends from public electricity and heat production in the EU-27 and EU-15, 1990–2007



Note: The bars with positive values indicate factors that cause an increase in emissions; the bars with negative values indicate factors that have a reducing effect.
Aggregating all five effects provides the actual emission changes.
'Change in share of production in thermal plants' describes the effect resulting from changes in the share of thermal plants in the total production of electricity and heat (including production by end users such as industries and households).
'Efficiency improvements' describes the effect resulting from changes in the amount of fuel used in public power and heat plants per unit of electricity and heat produced.
'Increase in share of biomass' describes the effect resulting from increases in the share of biomass in total fuel used in public power and heat plants.
'Shift from coal/oil to gas' describes the effect resulting from the shift to less-carbon-intensive fossil fuels in public power plants.

Source: EEA 2009a, Eurostat.

Figure 3.2 Main drivers of CO_2 emission trends from manufacturing and construction industries in the EU-27 and EU-15, 1990–2007



Note: The bars with positive values indicate factors that cause an increase in emissions; the bars with negative values indicate factors that have a reducing effect.
Aggregating all five effects provides the actual emission changes.
'Economic growth' relates to the growth in manufacturing industry, measured in change of gross value added.
'Share of public electricity and district heat' describes the effect resulting from changes in the share of public electricity and district heat in total final energy consumption. Consumption of public electricity and consumption of heat by industry or households cause emissions that are accounted for by the sector public electricity and heat production.
'Share of biomass' describes the effect resulting from changes in the share of biomass used in total fuel use.
'Shift from coal/oil to gas' describes the effect resulting from the shift to less-carbon-intensive fossil fuels in public power plants.
'Energy efficiency' describes the effect resulting from changes in final energy consumption (including electricity and district heating) per unit of gross value added (EUR million).

Source: EEA, 2009a; Eurostat.

- the efficiency improved much more in the new Member States due to the economic restructuring;
- the share of public electricity and heat consumption in industry decreased in the 1990s in the EU-12 (as opposed to the EU-15), which contributed to increasing emissions in the industry sector.

3.3.2 Households (residential sector)

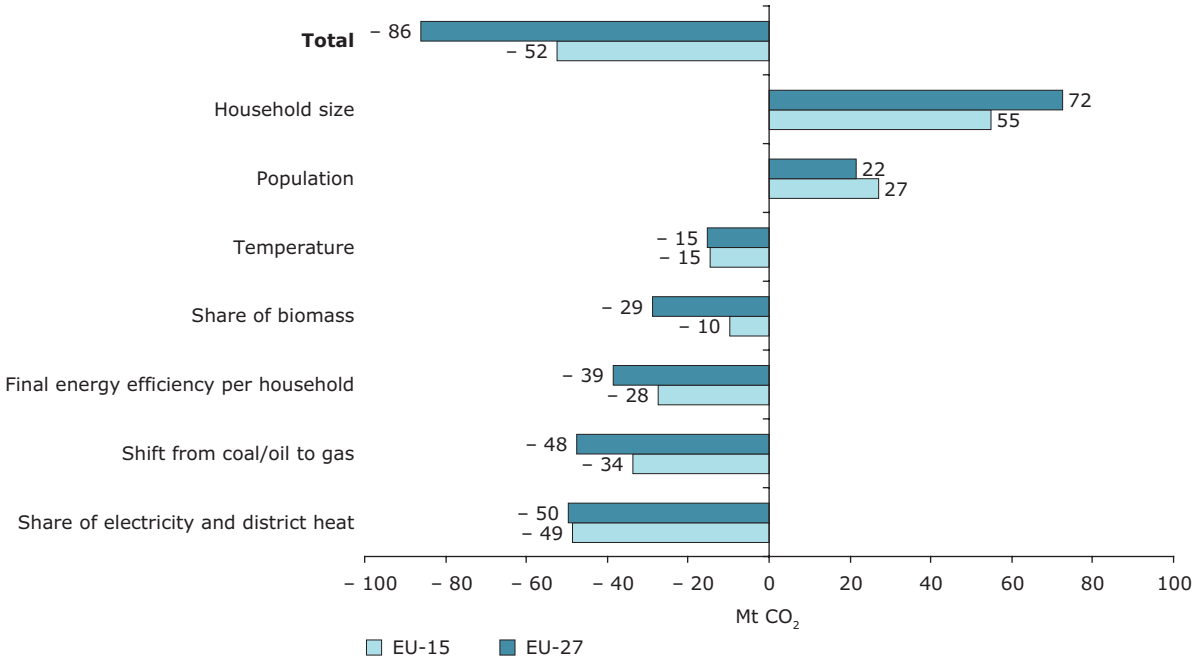
CO_2 emissions from fuel combustion in households (mainly for heating purposes) accounted for 8 % of total GHG emissions in 2007 in the EU-27. These emissions have been decreasing since 1990 in both the EU-27 and the EU-15. Households and services actually constituted the largest source of CO_2 emission reductions in the EU-27 between 1990 and 2007 (Table 2.1).

During the period 1990–2007, the increasing share of electricity and district heating in final energy consumption, the shift from coal to oil or gas and the final energy efficiency per household resulted in significant lowering of emissions (Figure 3.2). Smaller improvements resulted from increased use of biomass (wood for heating). Fuel prices can also have an influence on annual variations in these emissions.

Share of public electricity and district heating
The main factor responsible for the decrease in emissions from households (increasing share of electricity and district heating) is in fact purely methodological and does not necessarily imply an overall reduction in total GHG emissions from the total use of energy by households and services: greenhouse gases stemming from households only include emissions resulting from direct

fuel combustion. They do not include indirect emissions from electricity production and district heating (accounted for in the category 'public electricity and heat production'). GHG emissions related to the production of electricity and district heating finally used by households and services

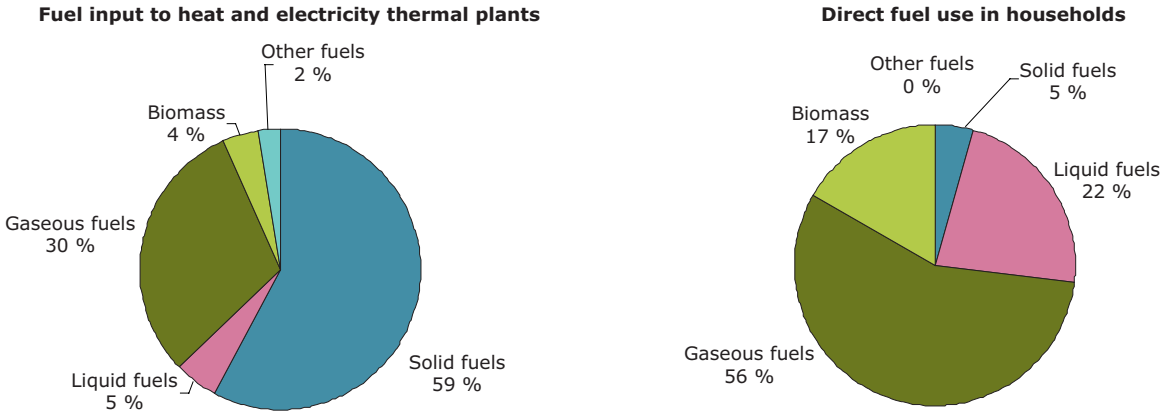
Figure 3.3 Main drivers of CO_2 emission trends from households in the EU-27 and EU-15, 1990–2007



Note: The bars with positive values indicate factors that cause an increase in emissions; the bars with negative values indicate factors that have a reducing effect. Aggregating both effects provides the actual emission changes. Final energy efficiency describes the effect resulting from changes in final energy consumption (including electricity and district heating) per household.
Share of electricity and district heat describes the effect resulting from changes in the share of electricity and district heat in total final energy consumption. Note that, depending on the energy mix, electricity and heat consumption in industry/households cause emissions in the public electricity and heat production sector.
Share of biomass describes the effect resulting from changes in the share of biomass used in total fuel use.
Shift from coal/oil to gas describes the effect resulting from the shift to less-carbon-intensive fossil fuels in households.

Source: EEA, 2009a; Eurostat.

Figure 3.4 Fuel mix in thermal power stations and for direct use in households in the EU-27, in 2007



Source: EEA, 2009a.

are attributed to the energy industry sector, not to households. As an example, the good performance of the Nordic countries and Austria can be partly explained by increased use of district heating. As (centralised) district heating replaces heating boilers in households, an increase in the share of district heating reduces direct CO_2 emissions from households but increases emissions reported under the sector 'public electricity and heat production'. Despite compensating factors such as the high efficiency of district heating plants, and combined heat and power (CHP) plants, the overall effect on GHG emissions is not necessarily positive, since coal represents almost 60 % of the average fuel input to thermal power stations in Europe, the share of biomass being much lower (Figure 3.4) while coal represents less than 5 % of the average fuel input for direct heating in households.

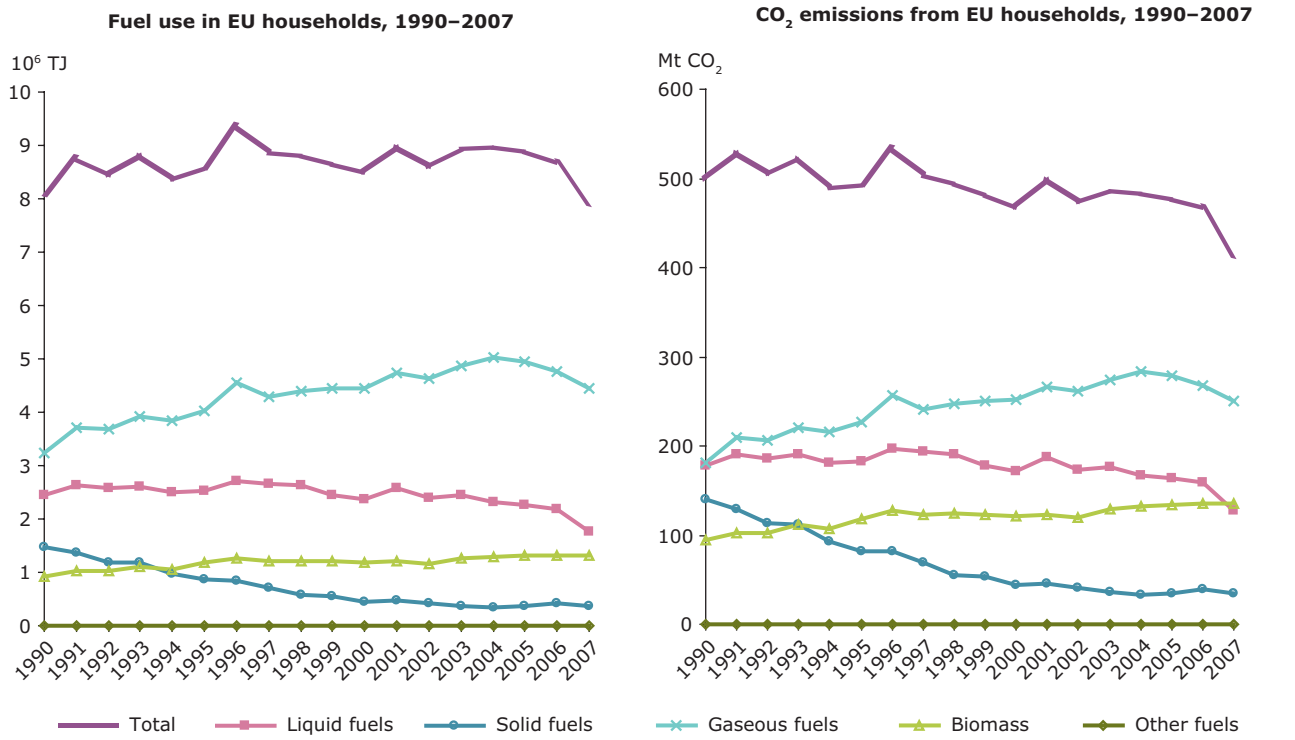
Fuel mix for direct fuel use

Gas is the most widely used fuel in European households, representing more than half of all the fuel input in 2007, followed by oil and biomass. However, the use of both gas and oil has been strongly declining in the past years, particularly in 2007, while the use of biomass has been slightly but steadily increasing (Figure 3.5).

Gas emits less CO_2 than coal and liquid fuels for the same unit of energy produced ([17]). CO_2 emissions from the burning of biomass with energy recovery (e.g. for heat) are considered carbon neutral in the reporting under the IPCC/UNFCCC ([18]) and therefore are not included in national greenhouse gas emission totals.

In 2007, consumption of liquid fuels and coal together decreased more than consumption of gas. In parallel, the use of biomass has remained constant. The share of fuels emitting more CO_2 was therefore reduced in the total energy use by households, which led to reduced CO_2 emissions

Figure 3.5 Energy use, by fuel, for direct heating and related CO_2 emissions in households



Source: EEA, 2009.

([17]) In 2007, average implied emission factors for coal, liquid fuels and gas were, respectively: 96 t CO_2/TJ, 72 t CO_2/TJ and 56 t CO_2/TJ.

([18]) An unsustainable use of biomass — i.e. harvesting outpacing annual re-growth — would be reflected in the LULUCF sector as a loss of biomass stock.

from that source. The steady increase in biomass for heating in European households has *de-facto* reduced CO_2 emissions by an amount proportional to the fossil fuel input substituted.

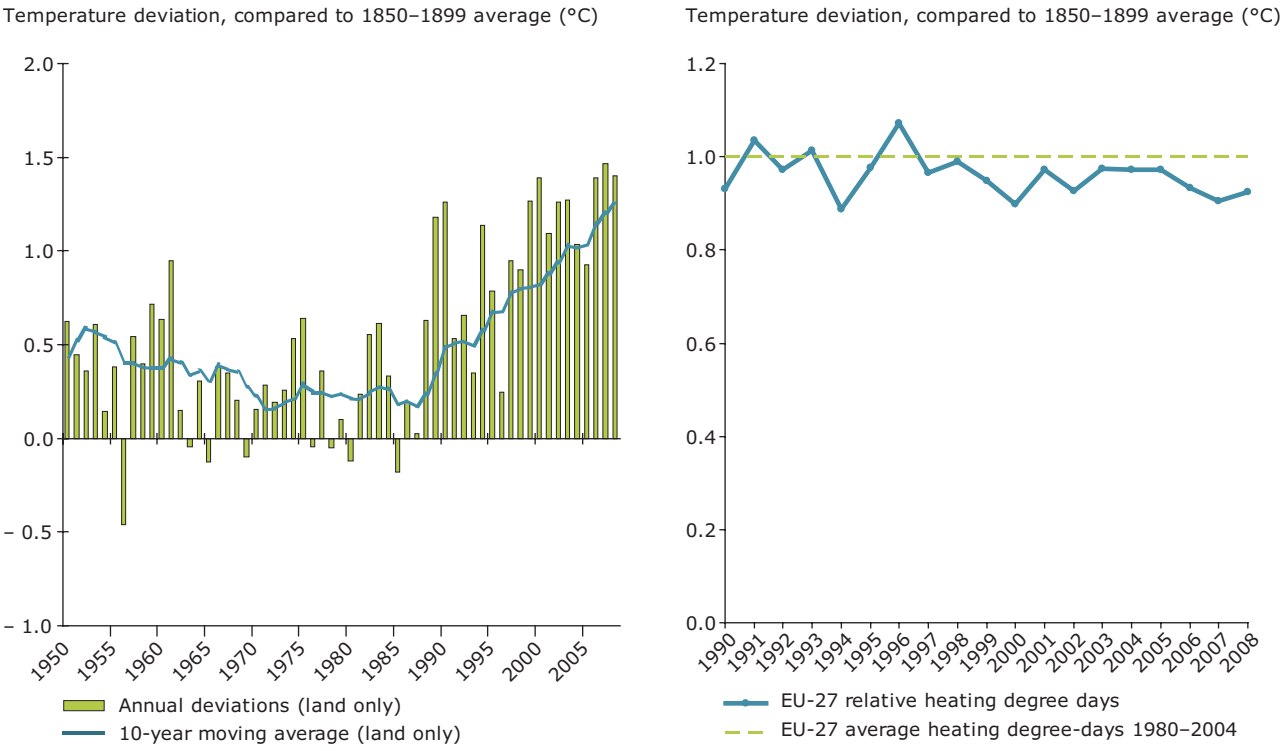
This change in the fuel mix, pooled with an overall decrease in energy use by households, has resulted in an even larger decrease in CO_2 emissions from households.

Climatic conditions

In general, CO_2 emission from households shows considerable annual fluctuations, due to the variations in climatic conditions, in particular annual temperature fluctuations. For example, 2007 was a warmer year in Europe than 2006, which was already between 1 and 1.5 degrees warmer than pre-industrial mean temperatures (Figure 3.6). Mean land surface temperature is increasing globally, including in Europe, and has done so particularly in the last 30–40 years. In addition to this phenomenon, winter temperatures in Europe have been increasing at a faster pace than summer temperatures. Current heat demand in Europe is below the long-term average heat demand (Figure 3.6). The number of heating degree days, an indication of heat demand based on outdoor temperatures, has been decreasing since 2004 in all EU Member States.

Between 2006 and 2007, the reduction in heating demand in Germany was one of the largest in the EU: this had a substantial impact on total heat demand in Europe. This heating demand reduction could be explained by high energy prices (affected by an increase in value added tax) and energy efficiency measures in this country. The decrease in Germany's emissions significantly influenced the overall EU-15 and EU-27 trends in GHG emissions from households and, consequently, total emissions.

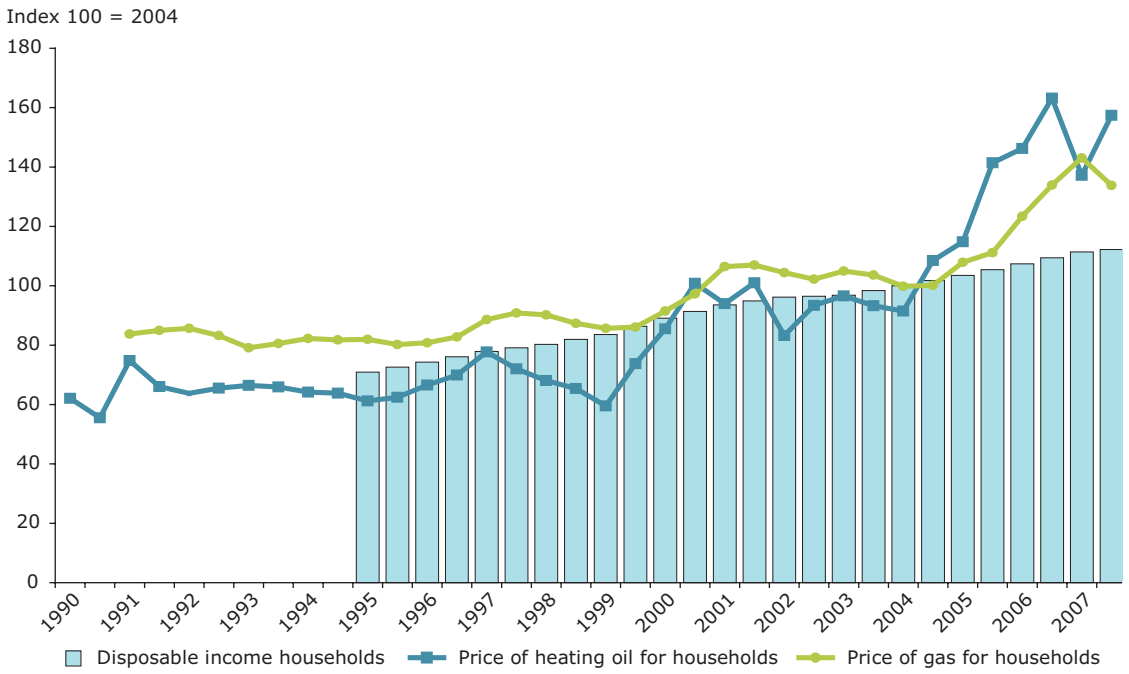
Figure 3.6 Average temperatures in Europe and relative heating degree days in EU-27



Note: Average temperatures: the source of the original data is the Climatic Research Unit of the University of East Anglia. The annual deviations of the European mean annual temperature shown in the chart have been adjusted from the initial data to be relative to the period 1850–1899, to better monitor the EU objective not to exceed 2 °C above pre-industrial values. Over Europe, average annual temperatures during the real pre-industrial period (1750–1799) were very similar to those during 1850–1899. Europe is defined as 35° to 70° north, – 25° to 30° east, plus Turkey (35° to 40° north, 30° to 45° east). The resulting temperature anomalies were obtained using KNMI's climate explorer.

Source: EEA, based on CRU HadCRU3 and CRUTEM3 datasets; Eurostat.

Figure 3.7 Household income and heating fuel prices in EU-27, 1990–2007



Note: The EU trend is based on available country data.

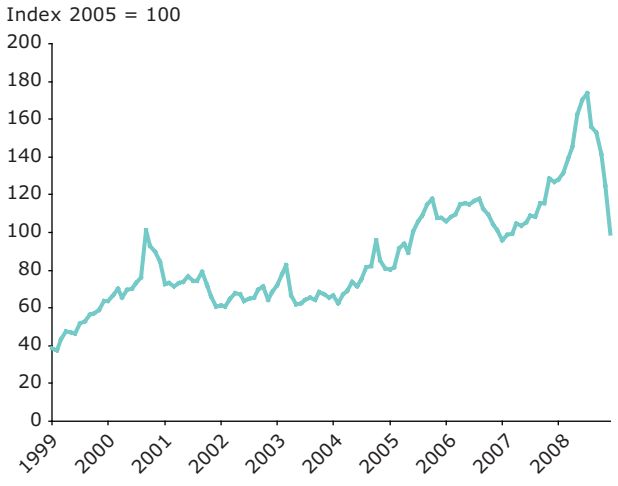
Source: Eurostat.

Fuel sales, fuel prices and fuel taxation

Fuel prices and purchase decisions by consumers may play an important role, since CO_2 emissions from direct combustion in households (as reported in national greenhouse gas inventories) are calculated based on fuel sales, not on actual consumption, although the two are obviously related. CO_2 emissions from households fell sharply in 2007 as a direct consequence of lower sales of fossil fuels, particularly oil and gas. The reduction in the sales of oil and gas for heating purposes in households in 2007 was primarily due to:

- favourable climatic conditions in 2007 (warmer winter), leading to a reduced heating demand;
- significant increases in fuel prices in 2007; important fuel stocks at the end of 2006 limited need for fuel purchases, in particular in Germany.

Figure 3.8 Consumer price index of (light) heating oil in Germany



Source: Statistische Bundesamt Deutschland, Wiesbaden, 2009.

Between 2004 and 2007, fuel prices increased very rapidly. This increase significantly outpaced the growth in gross disposable household incomes — most remarkably for oil (Figure 3.7). Large increases in fuel prices were observed in all Member States, particularly in Germany.

In the second half of 2006, prices for heating oil (Figure 3.8) were falling and the German government announced its decision to raise VAT from 16 % to 19 % starting in January 2007. This prompted consumers to stock up with heating oil at the end of 2006. Consequently, with a mild winter in 2007 and unusually high gas and oil prices at the end of 2007, consumers did not restock as much as they had in previous years. Thus, the consumer response to fuel prices variations and fiscal policy (VAT increase) in Germany resulted in much lower sales of heating oil

in 2007 compared to 2006, and consequently, to lower reported CO_2 emissions in the residential sector.

3.4 Transport

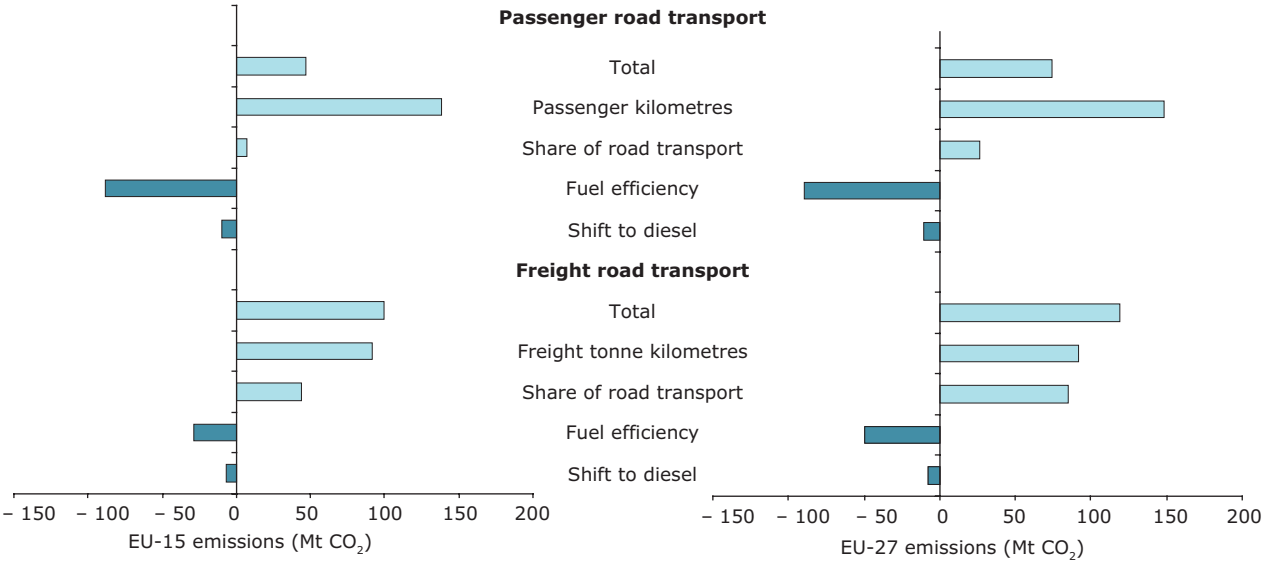
Transport is the sector in which the negative emission drivers (transport demand and increasing share of road transport) most outgrew the positive emission drivers (fuel efficiency and fuel shift).

Between 1990 and 2007, CO_2 emissions from transport rose by 29 % in the EU-27. This increase was observed for both passenger transport and freight transport. These increases were mainly due to growing transport demand, characterised by large increases in passenger kilometres and tonne kilometres (freight) (Figure 3.9). For passenger road transport, a relative decrease in the use of public transport is also noteworthy. Efficiency improvements in passenger cars have not been sufficient to counteract this trend. For freight road transport, an increased share of road freight transport as opposed to other transport modes supplemented the increased transport demand for goods. Modal shift is therefore taking place in the wrong direction, especially in the EU-12.

Bulgaria, Estonia, Germany and Lithuania are the only Member States that have managed to reduce their transport GHG emissions since 1990, with Germany showing by far the largest absolute reduction (– 11 Mt CO_2-equivalent). In Germany, this reduction was due to an increased share of diesel-powered cars, increasing fuel prices (including effects of the eco-tax) and the purchase of fuel outside Germany. Policies have been decided at EU level to tackle ever-increasing transport emissions. Such policies aim for example to promote use of biofuels (Directive 2003/30/EC), promote modal shift to rail (Directive 2001/12/EC) and an integrated European railway area (Commission Communication COM(2002)18 final), and provide better consumer information on cars.

The performance of the transport vis-à-vis environmental performance, including its impacts on climate change, is analysed in detail in the EEA annual report on transport and environment. The latest report ([19]) concludes that different policy initiatives hold plenty of options for synergies but some measures also risk of counteracting each other.

Figure 3.9 Main drivers of CO_2 emission trends from road transport (passenger and freight) in the EU-27 and EU-15, 1990–2007



Note: The bars with positive values indicate factors that cause an increase in emissions; the bars with negative values indicate factors that have a reducing effect. Aggregating both effects provides the actual emission changes.
Fuel shift describes the effect resulting from the shift to less carbon-intensive fossil fuels in transport including the shift towards biofuels.

Source: EEA, 2009a; Eurostat; European Commission, 2008.

([19]) EEA, 2009b.

4 Emission savings from policies and measures

- Based on the information provided by 26 Member States, over 56 % of policies implemented at national level were introduced in response to EU-level policies and 24 % more have been reinforced by them. The EU Emission Trading Scheme (EU ETS), the promotion of biofuels and the provision of consumer information (energy labelling) have been most influential to push adoption of new measures at national level. Overall, EU policies will be responsible for most of the policy-driven emission savings in Member States in 2010 and in 2020.
- Quantitative estimates from Member States lack consistency and completeness to allow an accurate quantification of savings at the EU level.

2010

- Member States anticipate that the EU ETS, Kyoto flexible mechanisms, the promotion of renewable energy sources, energy performance of buildings and internal energy market policies will contribute most to them meet their Kyoto targets. In relative terms, significant emission savings are expected in 2010, due to better waste management practices. The use of Kyoto mechanisms will remain supplemental to domestic action at EU-15 level.
- Further implementation of the RES-e Directive and the Directive on energy end-use efficiency and energy services might provide additional savings by 2010. A number of Member States expect relatively high emission reductions from the implementation of additional policies, which should be considered prudently given the short time lapse from now until 2010.
- Expected emission savings from domestic policies will be insufficient to offset the projected growth of emissions due to energy consumption between 2007 and 2010. Transport demand and share of road transport will also greatly counter the effects of measures addressing transport emissions over the period.

2020

- The largest emission reductions in 2020 are projected to occur in the transport and energy sectors. These savings will come from sector-specific responses (e.g. new RES directive, recast directive on energy performance of buildings) as well as cross-cutting measures, such as the revised EU ETS and the IPPC Directive.
- Successful implementation of additional measures in the energy use and transport sectors will be decisive in reversing projections of emissions growth between 2007 and 2020 under the existing measures.
- In the agriculture sector, very little emission reductions are projected from both existing and additional measures for 2010 and 2020. Agriculture is the sector where the least absolute and relative reductions are expected, despite a contribution to 9 % of the EU-27 total emissions in 2007.
- Most Member States have not quantified expected savings from certain recent policies and measures, which the European Commission estimates will bring important emission reductions in 2020 such as: eco-efficiency requirements of energy using products, inclusion of aviation in EU ETS, strategy for car CO_2 and Fuel Quality Directive. Only eleven Member States have so far taken into consideration elements of the new climate change and energy package adopted in 2009.
- Under the EU Effort Sharing Decision, the sectors not covered by the EU ETS across the EU-27 are required to reduce emissions by 10 % by 2020 compared to 2005 levels. Further implementation of measures will be required to achieve emission savings in sectors such as transport, heating in buildings, services and agriculture.

4.1 EU-level policies and measures addressing greenhouse gas emissions

In June 2000, the European Commission launched the first European Climate Change Programme (ECCP I), in which it identified a number of EU-wide common and coordinated policies and measures (CCPMs) to implement the Kyoto Protocol. These CCPMs have been adopted or are at an advanced stage of preparation. Most of these CCPMs take the form of directives, which must be transposed by Member States into national legislation, and Regulations, which are directly applicable in all Member States. Voluntary agreements between the European Commission and stakeholders are also used in specific areas.

The second ECCP (ECCP II), launched in October 2005, focused on reviewing the first ECCP I and exploring new policy areas. Specific areas for which additional emission reduction measures for 2008–2012 have been developed, include aviation and CO_2 and cars. Other policy areas addressed in ECCP II include adaptation and carbon capture and storage (CCS).

Following an agreement between the European Parliament and the European Council on a climate and energy package in December 2008, a set of legislative measures was adopted in June 2009, including a strengthened and expanded EU Emission Trading Scheme (EU ETS), national 2020 targets for emissions not covered by the EU ETS (Effort Sharing) and national 2020 targets for renewable energy.

Most CCPMs target the energy and transport sectors where absolute GHG reduction potentials are greatest. Table 4.1 provides a description of key common and coordinated policies and measures.

Table 4.1 Key common coordinated policies and measures

Sector	Issue	Description
Cross-cutting	Effort sharing	**Effort Sharing Decision**: Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020
	EU Emission Trading Scheme (EU ETS)	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 (**EU ETS Directive**: 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)
	Carbon capture and storage (CCS)	**CCS Directive**: Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006
	Kyoto Protocol project mechanisms	**Linking Directive**: 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
	Integrated pollution prevention and control (IPPC)	**IPPC Directive**: Directive 2008/1/EC EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (recast of Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control)

Sector	Issue	Description
	Green public procurement	Directive 2004/17/EC of the European Parliament and of the Council of 31 March 2004 coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts
Energy supply and use	Energy from renewable sources	**RES Directive**: Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (**RES-e Directive**: Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market, Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport)
	Energy end-use efficiency and energy services	Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC
	Use of biomass, renewable heat	**Biomass Action Plan**: Communication from the Commission on a Biomass Action Plan, COM(2005) 628 final (adopted in December 2005)
	Ecodesign of energy-using products	**Ecodesign Directive**: Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council
	Cogeneration (combined heat and power)	**Cogeneration Directive**: Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC
	Energy taxation	**Energy Taxation Directive**: Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity
	Trans-european energy networks (TEN-e) and internal energy markets	Decision No 1229/2003/EC of the European Parliament and of the Council of 26 June 2003 laying down a series of guidelines for trans-european energy networks and repealing Decision No 1254/96/EC Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in natural gas and repealing Directive 98/30/EC Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC Regulation (EC) 807/2004, Regulation (EC) 1228/2003
	Energy labelling	Commission Directive 2003/66/EC of 3 July 2003 amending Directive 94/2/EC implementing Council Directive 92/75/EEC with regard to energy labelling of household electric refrigerators, freezers and their combinations **Energy Labelling Directive**: Council Directive 92/75/EEC of 22 September 1992 on the indication by labelling and standard product information of the consumption of energy and other resources by household appliances
	Motor-driven systems	**Motor Challenge Programme**: European Commission voluntary programme launched in February 2003 to aid industrial companies in improving the energy efficiency of their electric motor-driven systems, focusing on compressed air, fan and pump systems
	Energy performance of buildings	**Energy Performance of Buildings Directive**: Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings
Sector	**Issue**	**Description**

	Large combustion plants	**LCP Directive**: Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants (recast of Council Directive 88/609/EEC of 24 November 1988 on the limitation of emissions of certain pollutants into the air from large combustion plants)
Transport	Emission performance of passenger cars	**Strategy for car CO_2**: Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles **Voluntary agreements with car manufacturers**: Commission Recommendations of 5 February 1999 and 13 April 2000 on the reduction of CO_2 emissions from passenger cars (voluntary agreement with car manufacturers from EU, Japan and Korea to reduce fleet average CO_2 emissions to 140 g/km by 2008/2009)
	Energy efficiency	Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles
	Transport fuels	**Fuel Quality Directive**: Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC
	Aviation	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
	HFC motor vehicle air conditioning	**MAC Directive**: Directive 2006/40/EC of the European Parliament and of the Council of 17 May 2006 relating to emissions from air-conditioning systems in motor vehicles and amending Council Directive 70/156/EEC
	Biofuels	**Biofuels Directive**: Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport
	Modal shift towards rail	**Rail Directives**: Directive 2007/58/EC of the European Parliament and of the Council of 23 October 2007 amending Council Directive 91/440/EEC on the development of the Community's railways and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure Railway Safety Directive: Directive 2004/49/EC of the European Parliament and of the Council of 29 April 2004 on safety on the Community's railways and amending Council Directive 95/18/EC on the licensing of railway undertakings and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification Directive 2004/50/EC of the European Parliament and of the Council of 29 April 2004 amending Council Directive 96/48/EC on the interoperability of the trans-european high-speed rail system and Directive 2001/16/EC of the European Parliament and of the Council on the interoperability of the trans-european conventional rail system
Industry	Fluorinated gases	F-gas regulation: Regulation (EC) No. 842/2006 of the European Parliament and of the Council of 17 May 2006 on certain fluorinated greenhouse gases
Sector	**Issue**	**Description**

Agriculture	Decoupling of support from production	**CAP reform — transition to single farm payment (SFP)**: Council Regulation (EC) No 1782/2003 of 29 September 2003 establishing common rules for direct support schemes under the common agricultural policy and establishing certain support schemes for farmers and amending Regulations (EEC) No 2019/93, (EC) No 1452/2001, (EC) No 1453/2001, (EC) No 1454/2001, (EC) No 1868/94, (EC) No 1251/1999, (EC) No 1254/1999, (EC) No 1673/2000, (EEC) No 2358/71 and (EC) No 2529/2001
Waste management	Landfill	**Landfill Directive**: Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste
	Waste Framework Directive	**Waste Framework Directive**: Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives
Forestry	Sustainable forest management	**EU Forest Action Plan**: Communication from the Commission to the Council and the European Parliament on an EU Forest Action Plan, COM(2006) 302 final (adopted on 15 June 2006)

Source: European Commission ECCP (2003), EC impact assessments.

4.2 Contribution of EU policies to greenhouse gas emission savings

CCPMs demonstrate the collective determination of the EU-27 to take action on climate change and they help to deal with competitiveness concerns of Member States. National policies and measures (PAMs) and EU CCPMs are closely linked, as European Directives require Member States to enact legislation to implement them (which European regulations and voluntary agreements do not). National PAMs in place in Member States can therefore result from the implementation of EU CCPMs, but can also be driven by specific national policy objectives that are not necessarily related to the EU-wide CCPMs. It is often difficult for Member States to attribute clearly expected savings from their PAMs to either national objectives or to EU CCPMs due to this close interaction.

Based the information provided by 26 Member States on the consequences of the implementation of CCPMs at national level ([20]), over 56 % of PAMs implemented at national level were introduced in response to the adoption of CCPMs and 24 % more have been reinforced by them (Table 4.2). Not all Member States reported on their implementation of CCPMs. The role of CCPMs in prompting the implementation of PAMs at a national level has been particularly strong in the EU-12, although the average number of PAMs implemented by Member State is higher in the EU-15. EU policies that have been most influential in terms of adoption of new PAMs at national level are the EU ETS, the promotion of biofuels and the provision of consumer information (energy labelling of appliances, labelling of cars, energy labelling for office equipment). CCPMs on energy using appliances (efficiency fluorescent lighting

Table 4.2 Contribution of CCPMs to the implementation of PAMs

	New national PAMs due to CCPMs	National PAMs reinforced by CCPMs	National PAMs already existing before CCPMs
EU-15	54 %	29 %	17 %
EU-12	63 %	13 %	24 %
EU-27	56 %	24 %	19 %

Source: EEA, 2009.

([20]) All EU-15 Member States and eleven EU-12 Member States (all apart from Malta) have provided information on linkages between national PAMs and CCPMs. Good quality information was provided.

and eco-design requirements for energy-using products) have been implemented in several EU-15 Member States but only in one Member State in the EU-12 so far. Further details on the linkages between CCPMS and national PAMs are provided in Annex 2.

In addition, the vast majority of policy-derived emission reductions projected by Member States are expected to come from PAMs associated with CCPMs (Table 4.3). In 2010, however, the further reductions Member States expect to achieve are primarily linked to additional PAMs that are not directly connected to CCPMs.

4.3 Quantified expected effects of policies and measures

4.3.1 Data source and methods used

Quantified expected effects of policies and measures are available from the European Commission and from Member States. The European Commission estimates correspond to total emission reduction potentials at EU-15 level for a limited number of CCPMs. Many estimates for 2010 savings date back to 2003. More up to date estimates for 2020 savings are available from the impact assessments prepared by the Commission for its recent legislative proposals. Most estimates from Member States were reported in 2009, but in general they lack consistency and completeness to allow a precise quantification of savings at EU level. Two methods are used to assemble Member State estimates of GHG savings from policies and measures:

- The impact of existing policies and measures at EU level is estimated using a bottom-up approach, which aggregates Member State estimates of the impact of individual policies and measures. The lack of completeness of quantified savings from existing policies and measures across Member States is likely to result in underestimated total savings at EU level.
- The impact of additional policies and measures at EU level is estimated using a top-down approach, which calculates the difference between emission projections under the two scenarios 'with existing measures' and 'with additional measures'. This method is more comprehensive than the bottom-up approach for additional measures, because several Member States do not quantify the expected impact of all additional measures. However, it cannot yet be applied to estimate the impacts of existing measures at EU level, because too few Member States provide emission projections under a counterfactual scenario 'without measures'.

The approaches must therefore be combined to provide the best available estimates of the expected impact of existing and additional policies and measures according to Member States. These approaches do not operate any distinction between savings due to the implementation of EU CCPMs and savings resulting from strictly national policies. More methodological information is available in Annex A.2. An analysis of the total emission savings from policies and measures for each Member State is presented in Annex A.2.

4.3.2 Quantified expected effects of policies and measures in 2010

The projected savings from individual PAMs estimated and reported by Member States indicate that, among all EU policies, the EU ETS, the promotion of renewable energy sources and the use of Kyoto mechanisms will contribute most to help Member States meet their Kyoto targets (Figure 4.1). These findings are roughly in line with earlier (2003) and more recent estimates from the European Commission, although significant differences can be observed in the magnitude of total savings. In addition, the Commission expects the IPPC Directive to deliver large GHG emission savings while Member States rather expect significant savings from policies aimed at developing the internal energy market.

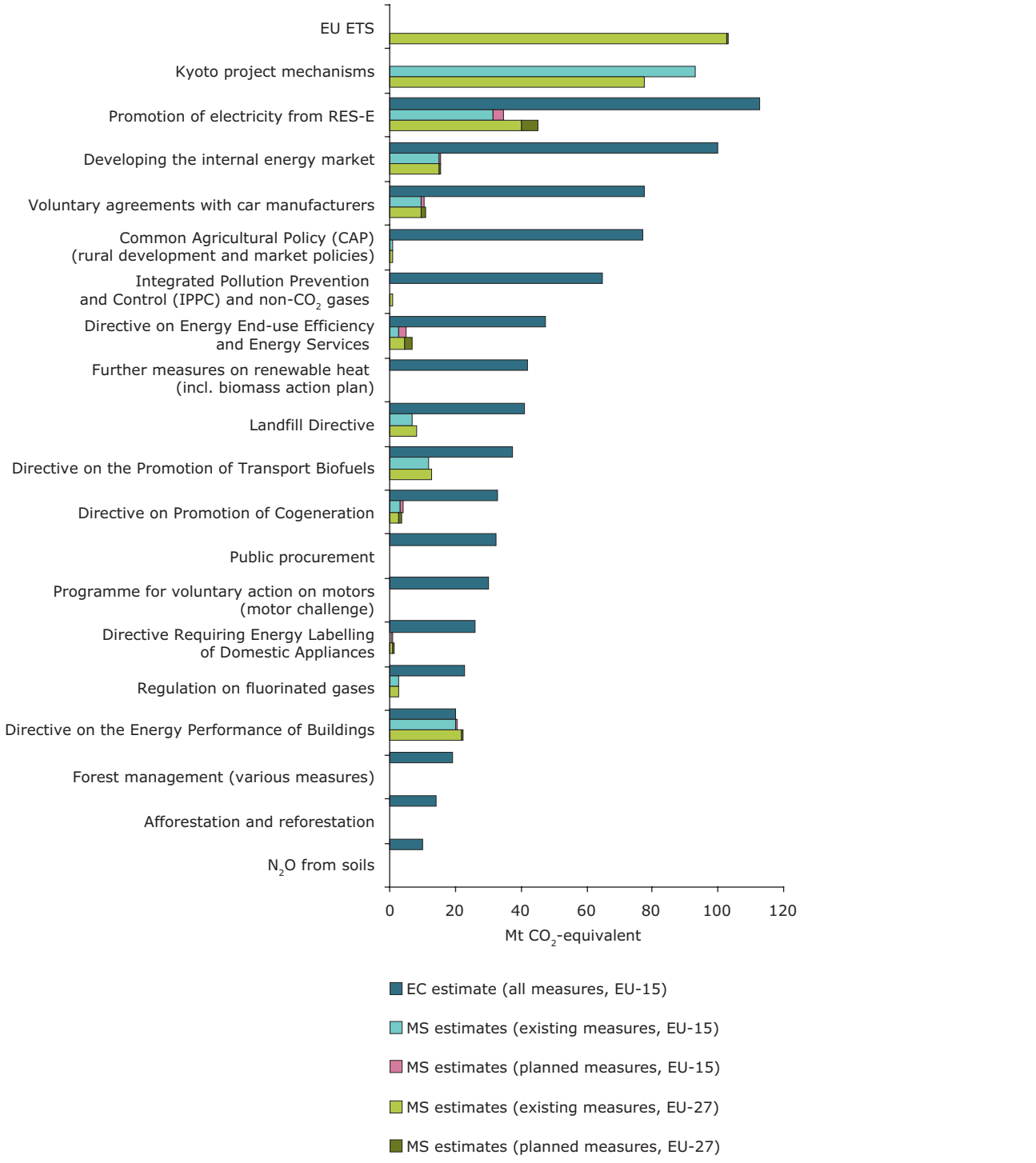
While most savings in 2010 are expected from policies and measures already implemented, significant savings are still expected from the further implementation of additional PAMs (Figure 4.2), in particular in the energy and transport sectors, such as the RES-e Directive and the Directive on Energy End-use Efficiency and Energy Services (Figure 4.1).

Table 4.3 Contribution of CCPMs to policy-driven emission savings in the EU-27

Year	WEM	WAM
2010	82 %	36 %
2020	76 %	66 %

Source: Data is derived using the bottom-up approach (see Annex A.2); EEA 2009, Policies and Measures database, 9 September 2009 extract (www.eea.europa.eu/themes/climate/pam).

Figure 4.1 EC and Member States estimates of emission reduction potential for main EU CCPMs in 2010 in EU-15 and EU-27



Note: All data are estimates of annual reduction, not cumulative savings. This figure does not reflect the planned release of assigned amount units into the market via international emissions trading by Hungary, to the value 16.5 Mt per annum (cf. Annex A.4).

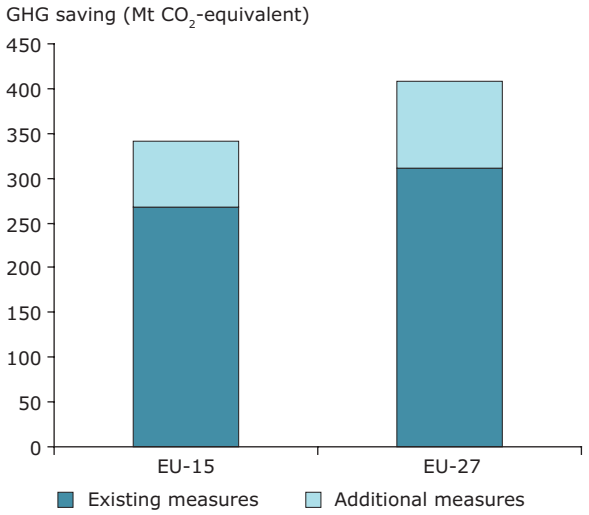
Source: European Commission ECCP, 2003; EC impact assessments, Member States' estimates (www.eea.europa.eu/themes/climate/pam), 2009 Member States' questionnaires on the use of flexible mechanisms.

Overall, measures targeting the energy supply sector are expected to deliver much larger savings than measures targeting energy consumption by households and industry in 2010, although absolute savings in both sectors are expected to be substantial (Figure 4.3). In relative terms, the contribution of energy measures targeting end-use sectors is not expected to be as strong as in the energy supply, waste and even transport sectors (Figure 4.4). Furthermore, despite policy-induced savings, emissions from energy use are still projected to grow by at least 2 % between 2007 and 2010 (Figure 4.5). However, only seven Member States managed to take the economic crisis into account in their projections, which means that emissions could be overall overestimated (cf. Section 7.6.1).

In addition to the energy and cross-cutting sectors, important reductions are also expected by Member States in the transport sector (Figure 4.3). CCPMs expected to reduce transport emissions include the voluntary agreements with car manufacturers and the directive on the promotion of transport biofuels. While policies in the transport sector are expected to contribute saving about 7 % of total emissions in 2010 (Figure 4.4), emissions in the transport sector are still projected to increase by 1 % from 2007 to 2010 in the EU-27 (Figure 4.5). This suggests that much of the reduction expected to occur by 2010 will actually compensate the otherwise rapidly increasing emissions in the transport sector, driven by rising transport demand and the increase share of road transport compared to other modes.

In relative terms, important emission reductions are also projected in the waste sector (Figure 4.4), although these are limited in absolute terms. These reductions will come from better waste management practices ([21]), in particular the Landfill Directive.

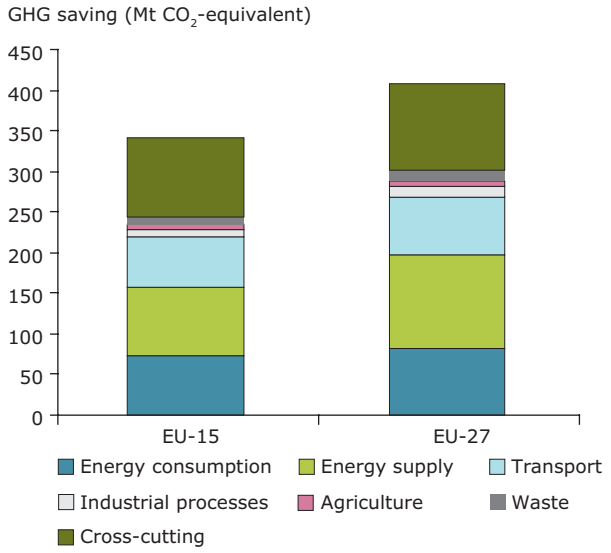
Figure 4.2 Absolute savings from existing and additional policies in 2010



Note: Absolute savings: total projected effect of existing (implemented or adopted) and additional (planned) policies and measures in 2010, compared to a counterfactual scenario where none of these measures would have been implemented.
All national policies and measures included, whether related or not to EU policies.
The lack of completeness of quantified savings from existing policies and measures across Member States is likely to result in underestimated total savings at EU level.

Source: Existing measures savings (bottom-up): EEA 2009, Policies and Measures database, 9 September 2009 extract (www.eea.europa.eu/themes/climate/pam); additional measures savings (top-down): 2009 Member States total emission projections; EEA 2008a for Hungary and Poland.

Figure 4.3 Sectoral savings from policies in 2010

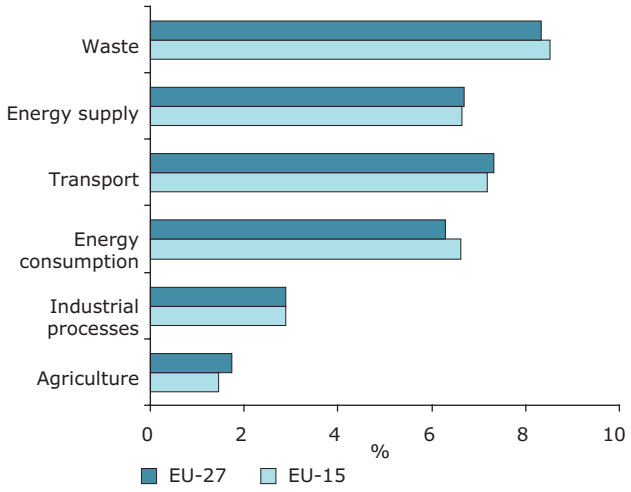


Note: Sectoral savings: projected effect of existing (implemented or adopted) and additional (planned) policies and measures in 2010 classified by sector, compared to a counterfactual scenario where none of these measures would have been implemented.
All national policies and measures included, whether related or not to EU policies.
The lack of completeness of quantified savings from existing policies and measures across Member States is likely to result in underestimated total savings at EU level.

Source: Existing measures savings (bottom-up): EEA 2009, Policies and Measures database, 9 September 2009 extract (www.eea.europa.eu/themes/climate/pam); additional measures savings (top-down): 2009 Member States total emission projections; EEA 2008a for Hungary and Poland.

([21]) EEA, 2008c.

Figure 4.4 Expected savings from implemented and planned policies in 2010 as a proportion of 2007 emissions, by sector



Note: All policies and measures included, whether or not related to EU policies.

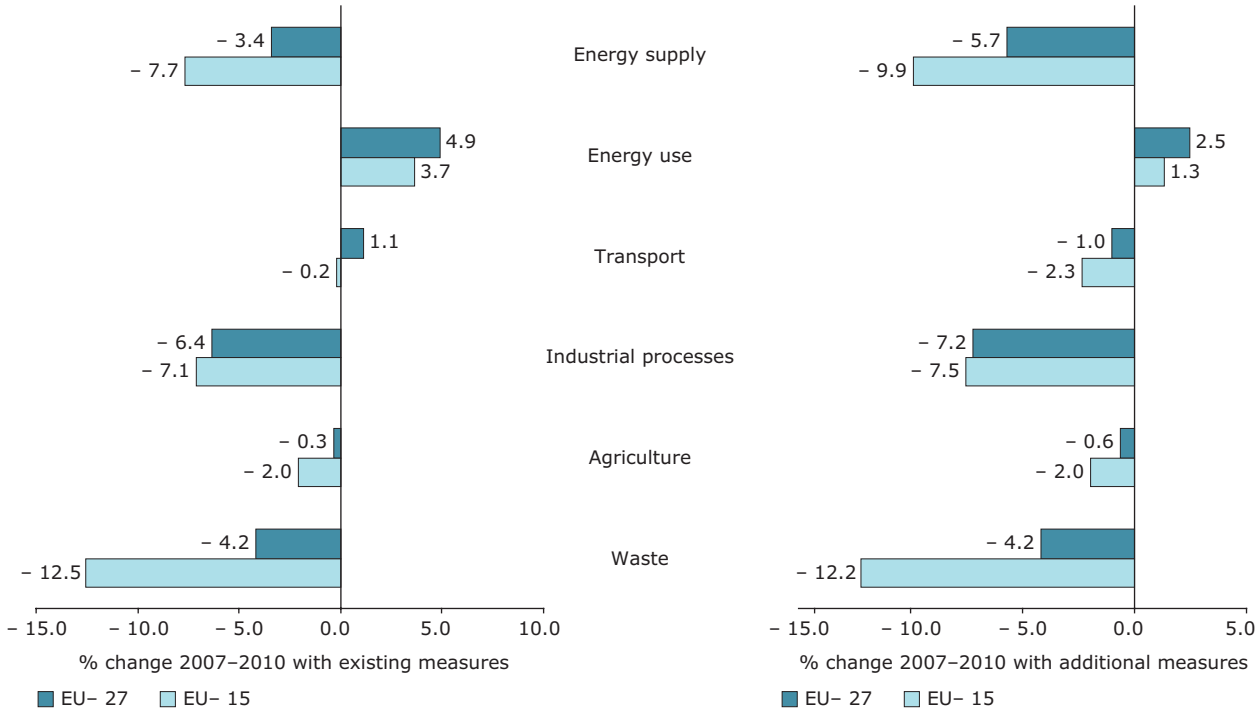
Source: Existing measures savings (bottom-up): EEA 2009, Policies and Measures database, 9 September 2009 extract (www.eea.europa.eu/themes/climate/pam); additional measures savings (top-down): 2009 Member States total emission projections; EEA 2008a for Hungary and Poland.

In contrast, emission reductions from agriculture are limited for 2010. Member States report almost no quantified GHG reductions expected from the Common Agricultural Policy and other policies to reduce N_2O emissions from soils, in contrast with Commission estimates.

The contribution of the industrial process sector also appears to be low compared to emissions from the sector. However, some savings allocated to cross-sectoral policies such as the EU ETS and the IPPC Directive, are not properly reflected in these sector-specific quantified emission reductions, while emission reductions between 2007 and 2010 are projected in this sector. The IPPC Directive and the regulation on F-gases are expected to deliver most emission savings in this sector.

Finally, Member States expect a large overall contribution of the Kyoto flexible mechanisms to meet their Kyoto targets (Figure 4.1, cf. Section 7.3.2). The emission savings expected to be generated by such mechanisms are still lower than the cumulated savings from the other domestic PAMs. Hence, the use of Kyoto mechanisms will remain supplemental to domestic action at EU-15 level.

Figure 4.5 Projected greenhouse gas emissions on a sectoral level in 2010 relative to 2007 emissions for EU-15 and EU-27



Note: In case a Member State did not provide sectoral projections, these were estimated based on total projections and the share of each sector in 2007 total emissions. Projections of emissions from international bunkers are not presented here due to the high number of Member States that did not provide projected data for this emission source.

Source: EEA, 2009.

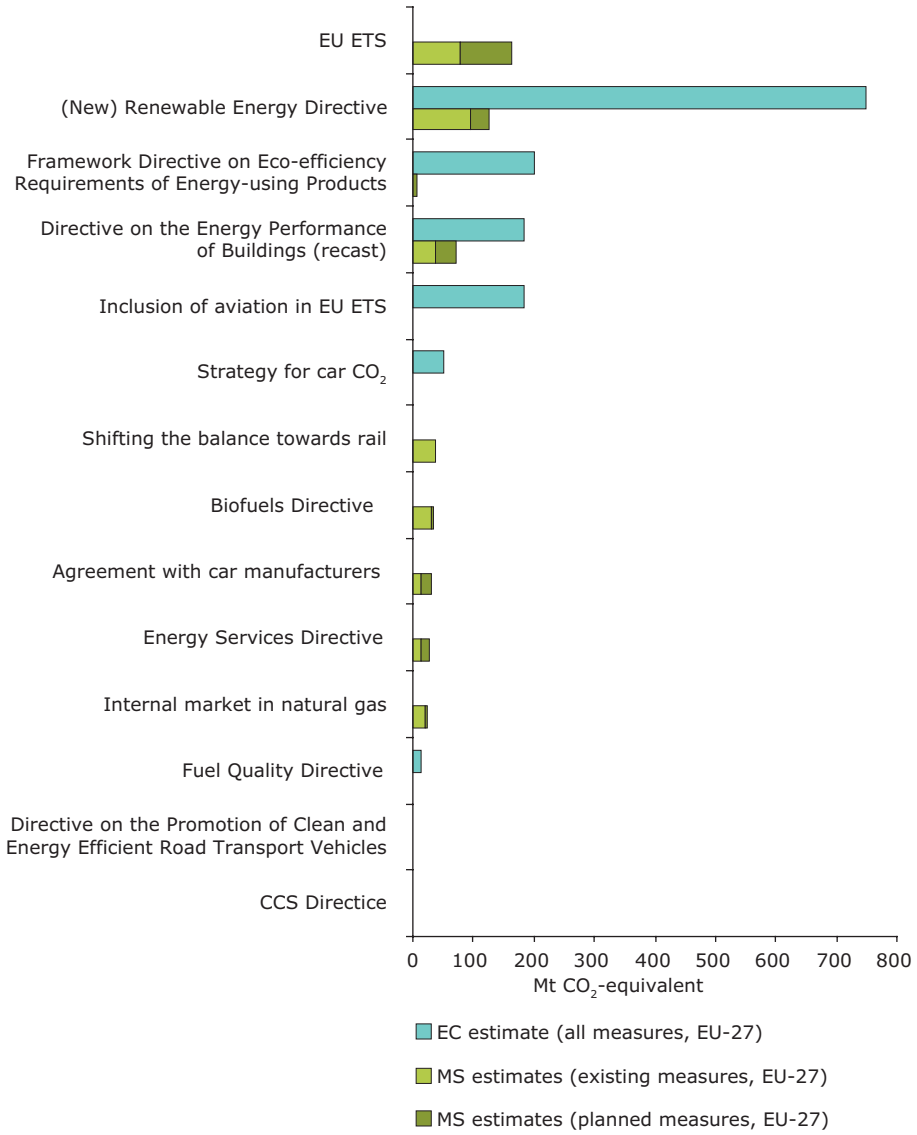
4.3.3 *Quantified expected effects of policies and measures in 2020*

Measures resulting from the implementation of EU policies in Member States are expected to contribute to most projected emissions savings from domestic policies and measures by 2020 (Table 4.3).

According to Member States projections, the RES-e Directive, the EU ETS Directive, the Energy Performance of Buildings Directive, the Rail Directives and the Biofuels Directive are the CCPMs already implemented which are expected to contribute most to total emission savings in 2020 (Figure 4.6). Germany, Greece, Italy, the United Kingdom and the Czech Republic expect considerable emission reductions in the energy supply sector due to the RES-e Directive until 2020.

Additional measures are expected to contribute a significant share towards the total projected savings from domestic policies and measures (Figure 4.7).

Figure 4.6 EC and Member States estimates of emission reduction potential for main EU CCPMs in 2020 in EU-27



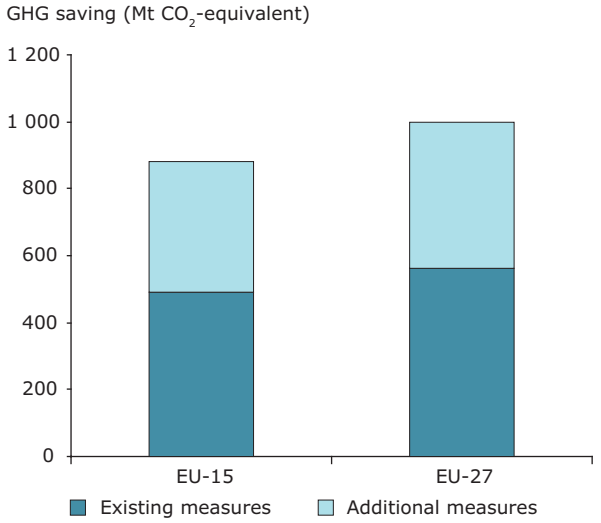
Note: All data are estimates of annual reduction, not cumulative savings. For policies where only cumulative figures are available, they have been divided by the number of years between when the policy effect starts and 2020. This has been the method used for the CCS Directive and Strategy for Car CO_2.

Source: European Commission ECCP (2003), EC impact assessments, Member States' estimates (www.eea.europa.eu/themes/climate/pam).

Revised legislation on renewable energy, buildings and the EU ETS is expected to deliver the majority of additional savings so far quantified for 2020. However, only eleven Member States have so far taken new EU policies, in particular elements of the new climate change and energy package adopted in 2009, into consideration. In addition to these policies, the European Commission expects the Framework Directive on eco-efficiency requirements of end-using products, the inclusion of aviation in the EU ETS and the Strategy for reduction of CO_2 from cars to have significant effects in 2020.

Emission reductions in the energy supply sector will have the greatest impact on total GHG emissions in the EU-15 and EU-27. Policies acting on emissions from the energy supply, energy use and transport sectors are expected to contribute most to total emission savings, both in absolute

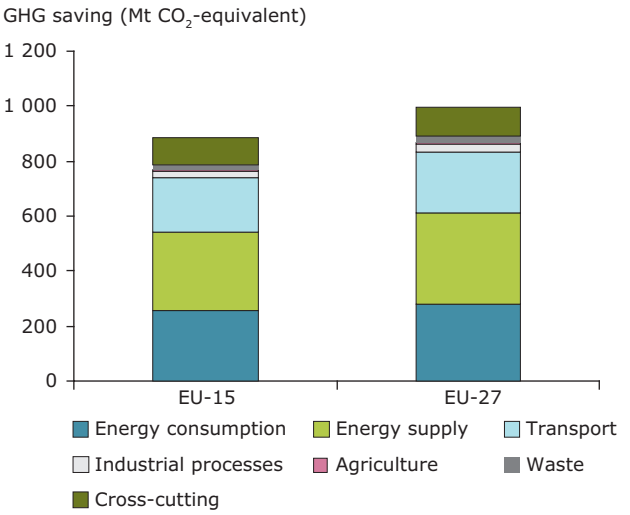
Figure 4.7 Savings from existing and additional policies in 2020



Note: Absolute savings: total projected effect of existing (implemented or adopted) and additional (planned) policies and measures in 2010, compared to a counterfactual scenario where none of these measures would have been implemented.
All national policies and measures included, whether related or not to EU policies.
The lack of completeness of quantified savings from existing policies and measures across Member States is likely to result in underestimated total savings at EU level.

Source: Existing measures savings (bottom-up): EEA 2009, Policies and Measures database, 9 September 2009 extract (www.eea.europa.eu/themes/climate/pam); additional measures savings (top-down): 2009 Member States total emission projections; EEA 2008a for Hungary and Poland.

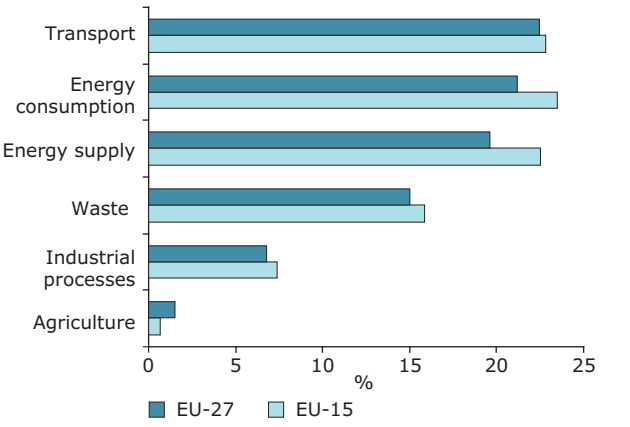
Figure 4.8 Sectoral savings from policies in 2020



Note: Sectoral savings: projected effect of existing (implemented or adopted) and additional (planned) policies and measures in 2010 classified by sector, compared to a counterfactual scenario where none of these measures would have been implemented.
All national policies and measures included, whether related or not to EU policies. The lack of completeness of quantified savings from existing policies and measures across Member States is likely to result in underestimated total savings at EU level.

Source: Existing measures savings (bottom-up): EEA 2009, Policies and Measures database, 9 September 2009 extract (www.eea.europa.eu/themes/climate/pam); additional measures savings (top-down): 2009 Member States total emission projections; EEA 2008a for Hungary and Poland.

Figure 4.9 Expected savings from implemented and planned policies in 2020 as a proportion of 2007 emissions



Note: All policies and measures included, whether or not related to EU policies.

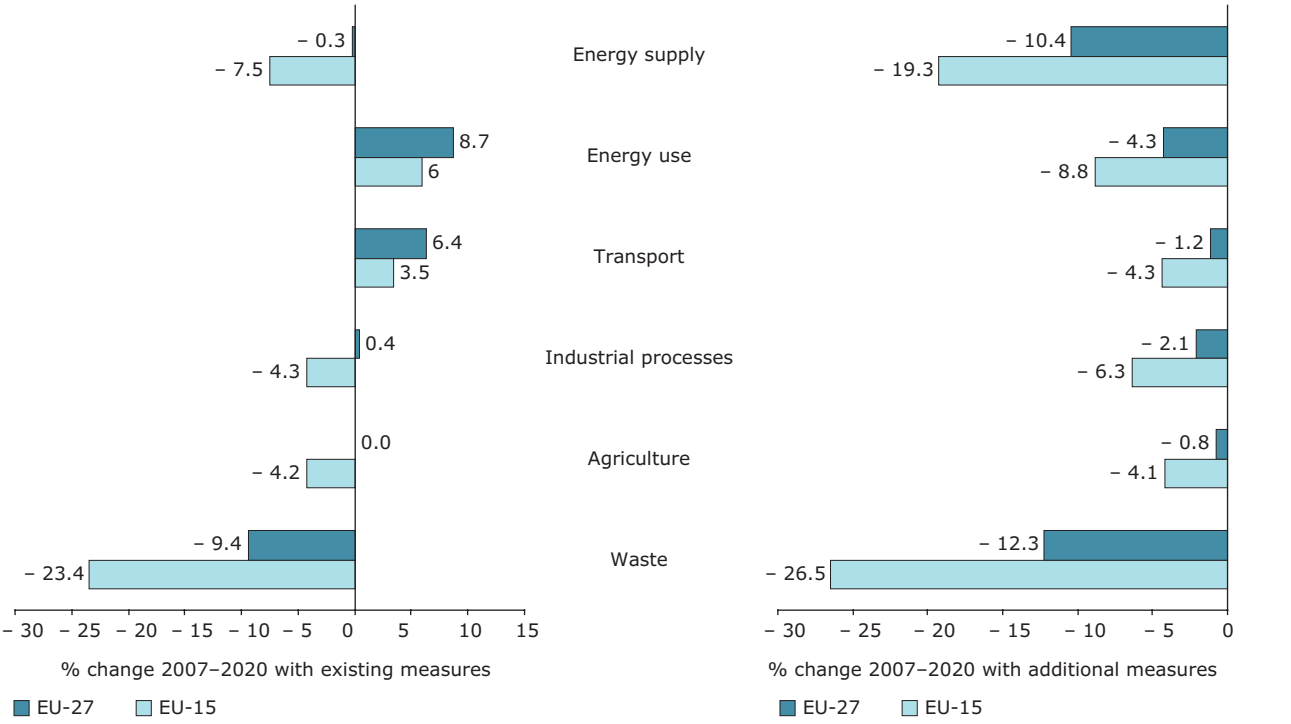
Source: Existing measures savings (bottom-up): EEA 2009, Policies and Measures database, 9 September 2009 extract (www.eea.europa.eu/themes/climate/pam); additional measures savings (top-down): 2009 Member States total emission projections; EEA 2008a for Hungary and Poland.

terms (Figure 4.8) and in comparison with these sectors' respective emissions in 2007 (Figure 4.9). However, emissions due to energy use by the residential and industry sectors and emissions from transport are expected to increase if no additional measures are implemented (Figure 4.10). Successful implementation of additional measures in these sectors will therefore be decisive to reverse these expected emission trends.

As in 2010, agriculture is the sector where the least savings are expected in 2020, both in absolute terms (Figure 4.8) and in comparison with this sector's 2007 emissions (Figure 4.9).

Under the EU Effort Sharing Decision, the sectors not covered by the EU ETS across the EU are required to reduce emissions by 10 % by 2020 compared to 2005 levels. Further new measures will be required in the non-trading sectors such as transport, heating in buildings, services and agriculture if these sectors are to contribute equally to the 2020 Effort Sharing Decision target for the EU-27 (Figure 4.10).

Figure 4.10 Projected greenhouse gas emissions on a sectoral level in 2020 relative to 2007 emissions for EU-15 and EU-27



Note: In case a Member State did not provide sectoral projections, these were estimated based on total projections and the share of each sector in 2007 total emissions. Projections of emissions from international bunkers are not presented here due to the high number of Member States that did not provide projected data for this emission source.

Source: EEA, 2009.

5 Emission trading scheme, promotion of renewable electricity and promotion of biofuels in the EU

The European Union Emission Trading Scheme (EU ETS)

- The EU ETS covers more than 40 % of total greenhouse gas emissions in the EU. Some 913 installations (corresponding to 8 % of all installations in the EU ETS) emit more than 80 % of all ETS emissions, which corresponds to a third of the total EU-27 greenhouse gas emissions.
- Through the second national allocation plans for the period 2008–2012, Member States have fixed the overall contribution that the EU ETS will provide towards reaching burden-sharing or Kyoto targets at national level.For the second trading period, the European Commission has enforced stricter caps than for the first trading period. This lead to a relative stabilization of carbon prices in the second trading period.
- For the second trading period, the European Commission has enforced stricter caps than for the first trading period. This lead to a relative stabilization of carbon prices in the second trading period.
- In 2008, verified emissions were 10 % higher than allocated allowances. For the first time, operators of emission trading installations surrendered substantial amount of credits from CDM and JI projects, representing approximately 30 % of the average maximum use of such credits allowed per year.
- From 2013 onwards the revised EU ETS will deliver an emission reduction of – 21 % compared to emission levels in 2005.

Promotion of electricity produced from renewable energy sources (RES)

- Since 1990 gross electricity generation from RES in Europe grew significantly in absolute terms, with an increase of about 60 % between 1990 and 2007.
- However, compared with other energy sources, the contribution from renewable energy remains limited. In 2007, only three Member States (Denmark, Germany and Hungary) had reached their indicative renewable electricity targets for 2010 and 22 Member States were less than half way towards meeting their target. It is now becoming clear that the EU will not meet its 2010 indicative target of 21 % electricity produced from renewable energy sources.
- Substantial further efforts will be required from Member States to achieve the 2020 targets. Improvements to national support schemes and the ongoing integration of the internal market should facilitate growth of renewable electricity but most Member States still need better, active policies to ensure growth occurs.
- A high carbon price would stimulate development of electricity generation from RES.

Promotion of biofuels for transport

- Energy consumption in the transport sector depends almost exclusively on imported fossil fuels (oil). The sector is forecast to grow more rapidly than any other up to 2020 and beyond.
- To meet the 2010 EU target of 5.75 % of renewable energy in the transport sector by 2010, the consumption of biofuel and other renewable fuels in EU-27 would need to more than double by 2010. Germany is the only Member State that has reached, and even exceeded, its 2010 target and is progressing well towards its 2020 target.
- To meet the 2020 EU target of 10 % renewable energy use in the total final consumption of petrol, diesel, biofuels for road and rail, and electricity for transport, the consumption of biofuel and other renewable fuels in EU-27 would need to more than quadruple by 2020.
- Biofuel production contributes to an increase in the geographical coverage and intensity of agricultural production in the EU, which can have both positive and negative environmental effects. The new RES Directive includes sustainability criteria covering minimum requirements regarding greenhouse gas savings, prevention of damage from land-use change and reporting on a wide range of environmental and social issues.

5.1 The European Union Emission Trading Scheme (EU ETS)

5.1.1 Background

The EU Emission Trading Scheme (ETS) was established by Directive 2003/87/EC (the Emission Trading Directive) and entered into force 1 January 2005. It covers CO_2 emissions from large stationary sources including power and heat generators, oil refineries and installations for the production of ferrous metals, cement, lime, glass and ceramic materials, and pulp and paper. A first trading period covered the years 2005–2007, followed by a second trading period corresponding to the Kyoto compliance period 2008–2012. Since 2008, N_2O emissions of nitric acid production may also be opted into the scheme. Until now only the Netherlands decided to include these installations, with Austria also coming in this year (formal adoption still pending due to new comitology procedures, other Member States are planning to follow. In 2007, these sectors accounted for approximately 43 % of the EU's total greenhouse gas emissions. Other sectors (e.g. residential, transport, agriculture and waste) or greenhouse gases (CH_4 and F-gases) are not covered by the current scheme but the aviation sector will be covered starting from the 1 January 2012. Under the ETS, operators receive emission allowances from their government based on national allocation rules (e.g. using benchmarks, historic emissions or projected emissions). An amount equivalent to the verified emissions has to be surrendered by the end of April each year. Operators holding more allowances than necessary to cover their verified emissions may either sell unneeded allowances to other operators in the EU who are in need of more allowances, or keep them for future years. Directive 2004/101/EC (the Linking Directive) allows operators to buy credits from joint implementation (JI) or clean development mechanism (CDM) projects (see Section 5.2.1) and to bring them, to a limited extent, into the EU ETS to fulfil their obligations.

Under the Emission Trading Directive, Member States prepared national allocation plans (NAPs) for both the first (2005–2007) and second (2008–2012) trading periods, which were submitted for approval by the Commission. The allocation plans include the total quantity of allowances that will be available during a trading period, along with the rules for allocating these allowances to operators, amongst others. By June 2005, the Commission had accepted all 25 NAPs for the first trading period and by December 2007, the Commission had finalised its assessment of the 27 NAPs for the second trading period (2008–2012). Since 2008, three countries not belonging to the EU have been participating in the scheme: Norway, Iceland and Liechtenstein. Their NAPs are assessed by the EFTA surveillance authority.

Through the second national allocation plans for the period 2008–2012, Member States have fixed the overall contribution that the EU ETS will provide towards reaching burden-sharing or Kyoto targets at national level (cf. Section 7.2.2).

The EU ETS was reviewed recently to help the EU achieve stricter emissions targets agreed by EU Heads of State in March 2007, i.e. to cut overall greenhouse gas emissions by 20 % compared to 1990 levels by 2020, with a view to increase this to 30 % in the event a satisfactory international agreement is reached in Copenhagen in December 2009. The Directive 2009/29/EC lays down the amendment to the Emission Trading Directive covering the period after 2013. The main differences to the previous two trading periods are that an EU-wide cap will replace the current 27 national caps, and that more than half of the allowances will be auctioned instead of given out for free. A linear reduction factor has been defined so that, in the 20 % reduction scenario, the EU-wide cap will decline by 1.74 % annually as of 2013, to meet the 2020 target.

5.1.2 First and second trading period (2005–2007, 2008)

While total EU-25 emissions declined by 1.5 % in the period 2005–2007, emissions in the ETS rose by 2.1 %. On average 10 559 installations participated in the first trading period. These installations, which received on average emission allowances for 2 107 Mt CO_2 per year, emitted 2 071 Mt CO_2 per year (2 % less than total allowances) ([22]). Almost two thirds of all installations are classified as combustion installations ([23]) and are responsible for 70 % of overall

([22]) At the time of writing the CITL data did not include any information for Iceland, also no 2008 data for Cyprus and Malta. For Bulgaria verified emissions data is provided, but no information on allocation is available.

([23]) The 'combustion installations' sector contains installations for the public supply of heat and electricity as well as installations in various industrial sectors. Depending on Member States and individual circumstances combustion installations belonging to the industrial sector (e.g. a heat plant in a paper mill) are either included in the sector 'combustion installations' or in the respective industrial sector (e.g. 'production of pulp and paper').

emissions. The next largest types of installation are mineral oil refineries, production units for iron and steel and for cement clinker or lime, which are each responsible for 7–9 % of total emissions. The other six sectors under the ETS contribute together the remaining 6 % of EU ETS emissions.

More than 80 % of all ETS emissions are due to only 8 % of all installations (Figure 5.1). This small group of 913 installations, each of which emits more than 500 kt CO_2 per year, represents a third of the total EU GHG emissions. On the other hand, 70 % of all installations, emitting less than 50 kt CO_2 each per year, have a 5 % share of overall emissions covered by the EU ETS.

A more detailed analysis for 2008 shows large differences amongst sectors and countries. Total verified emissions were higher than allocations in half of countries (Austria, Denmark, Estonia, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Norway, Poland, Slovenia, Spain and the United Kingdom). This is in contrast to the first trading period, where only in four countries the emissions surpassed the allocation. Overall companies in the EU ETS were short in 2008 by 221 Mt (allocated amounts vs. verified emissions). The total amount of confirmed emissions from EU ETS installations in the EU-27 ([24]) in 2008 was 2 052 Mt CO_2, 3 % lower than the 2 118 million tonnes recorded for 2007 in the same countries.

Table 5.1 Key figures of the Emission Trading Scheme for 2005 to 2007 and for 2008

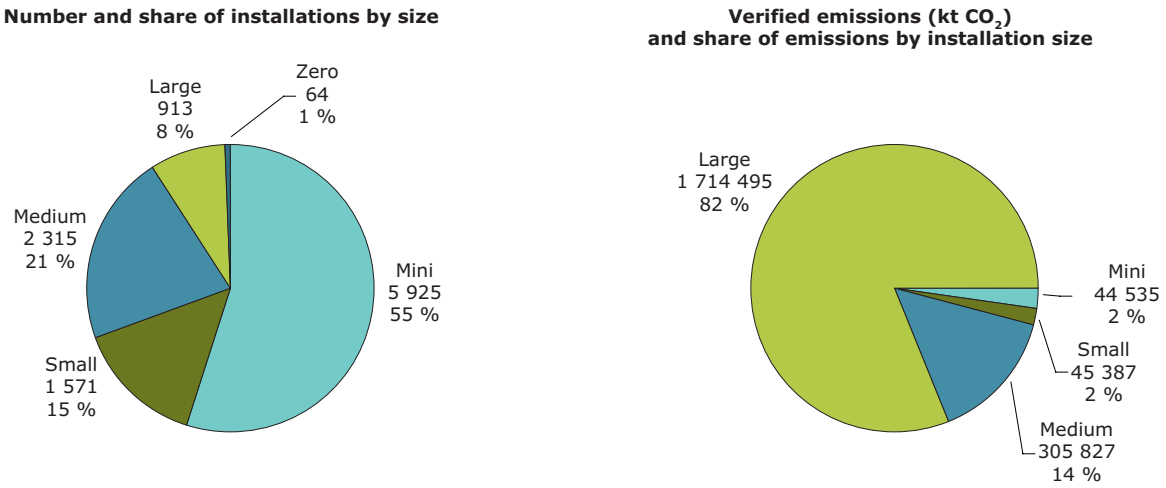
	Number of installations [a])		Allocated allowances		Verified emissions		Difference between allocated allowances and verified emissions	
	2005–2007 [b])	2008	2005–2007	2008	2005–2007	2008	2005–2007	2008
			(1 000 EUA [c]))		(kt CO_2-equivalent)			
1 Combustion installations	6 938	7 127	1 469 934	1 239 245	1 490 293	1 505 656	– 1 %	– 18 %
2 Mineral oil refineries	148	147	159 619	152 265	150 626	154 119	6 %	– 1 %
3 Coke ovens	20	21	22 789	22 527	20 857	20 989	9 %	7 %
4 Metal ore roasting or sintering	20	28	25 248	21 928	17 209	17 643	47 %	24 %
5 Pig iron or steel	229	234	155 631	184 695	131 478	132 967	18 %	39 %
6 Cement clinker or lime	531	549	193 715	206 798	186 884	188 933	4 %	9 %
7 Glass including glass fibre	412	432	22 495	23 865	20 497	22 705	10 %	5 %
8 Ceramic products by firing	1 140	1 055	18 118	18 061	14 821	13 333	22 %	35 %
9 Pulp, paper and board	798	807	37 138	37 898	29 769	31 435	25 %	21 %
99 Other activity opted-in	323	395	2 424	2 093	9 038	22 465	– 73 %	– 91 %
All installations	**10 559**	**10 795**	**2 107 111**	**1 909 376**	**2 071 472**	**2 110 245**	**2 %**	**– 10 %**

Note: [a]) A good indicator whether an installations is participating in the scheme in a given year is that it has emissions and/or allocation in that year, therefore only these installations are included in the number of installations.
[b]) All 2005–2007 values are averages over the three years. For this analysis installations have been included if allocated allowances or verified emissions have been published for each year. With this attribute the average values are not the same as in last year's report, where averages have been calculated in a different way.
[c]) European Union Allowance.

Source: Community independent transaction log (CITL), 29 April 2009/26 May 2009 ([25]).

([24]) Excluding Bulgaria, Malta and Cyprus due to registry problems or failure to notify all verified emissions.
([25]) The Community Independent Transaction Log, administered by the European Commission, is provided for the purpose of recording the issue, transfer and cancellation of allowances to and from EU member states. Data included in this report is based on the CITL released on 29 April 2009 for the years 2005 to 2007 and on 26 May 2009 for the year 2008. The data contained in the CITL is undergoing constant changes due to, e.g. installations entering or leaving the EU ETS, addition of missing information, correction of emission reports or inaccurate data in national registries and court decisions on the allocation decisions. In most cases these changes are small and will have no significant effect on the overall analysis. However, in specific cases changes may be of larger scale.

Figure 5.1 Share and number of installations and emissions by size of installation (kt CO_2), 2008



Note: Zero: emitters with verified zero emissions; mini: emitters below 25 kt CO_2/year; small: emitters of 25 to 50 kt CO_2/year; medium: emitters of 50 to 500 kt CO_2/year; large: emitters over 500 kt CO_2/year. For seven installations, the size is unknown.

Source: CITL, 29 April 2009/26 May 2009.

Norway decided to already auction a larger part of allowances in the second trading period: not being an EU Member State, it was not limited to the maximum amount of 10 % auctioning defined in the Emission Trading Directive. On the other hand, also in 2008 in four countries allocation exceeded verified emissions by more than 10 % (Lithuania, Luxembourg, Romania and the Slovak Republic). In Liechtenstein, Luxembourg and the Slovak Republic, not a single sector had to purchase allowances.

There is a clear difference between allocation to combustion installations and to industrial sectors. Many countries have decided to reduce free allocation to the power producers, as they have passed on the opportunity cost for the EUA to consumers via the electricity prices even though they had received a free allocation (so-called windfall-profits). Consequently, operators of combustion installations had to purchase additional allowances in 2008 in 19 countries. Nevertheless, in seven countries the sector could sell excess allowances (the Czech Republic, France, Latvia, Liechtenstein, Lithuania, Luxembourg and the Slovak Republic).

Overall, in 2008 the free allocation to industrial sectors exceeded their emissions in all countries except Austria and Slovenia. The sectors with the highest allocation compared to emissions are the production of pig iron and steel (39 % excess allowances) and the manufacture of ceramics (35 % excess allowances). A part of the over-allocation of the iron and steel sector can be explained by the fact that in some countries the blast furnaces also received a free allocation for CO_2 that is transferred from the iron and steel sector to combustion installations. This transfer can influence the assessment of whether the installations are long or short. But probably a large part of the over allocations in the industrial sectors can be explained by the strong economic slowdown in 2008, which hit industrial sectors proportionately stronger than the economy as a whole.

Whereas metal is roasted and sintered in eight countries, installations in only four countries had to purchase additional allowances. In contrast, pulp, paper and board is produced in most participating countries and in all of them except Denmark operators benefited from a generous allocation compared to actual emissions. In Romania and the Slovak Republic, the allocation was about three times higher than the level of emissions.

The category 'Other activities opted-in' includes all installations that are opted in under Article 24 of the Trading Directive. In practice, the activity of an installation listed in this sector is often not clear. In addition, the value for EU 27 and all countries is misleading, as for over 90 % of the emissions in the sector, allocation data was not yet published.

In many ways, the first trading period, from 1 January 2005 until 31 December 2007, can be seen as a trial phase, taking into account that the EU ETS is the first multinational emission trading scheme of this magnitude. Only limited information was available

Table 5.2 Allowances compared with verified emissions by sector and by Member State, 2008

	Combustion installations	Mineral oil refineries	Coke ovens	Metal ore roasting or sintering	Pig iron or steel	Cement clinker or lime	Manufacture of glas	Manufacture of ceramics	Pulp, paper and board	Other activity opted-in	Total 2008	Average 2005–2007
Austria	– 11	– 3	8	3	– 2	– 14	– 6	18	10	0	– 6	0
Belgium	– 23	2			59	4	16	37	20	3521	0	10
Bulgaria	No allocation data available											
Cyprus	No 2008 data available											8
"Czech Republic"	7.3	0			5	– 5	18	22	57		6.8	15
Denmark	– 12	3			– 34	15	1	13	– 13	– 100	– 10	6
Estonia	– 14					4	4	64	1		– 14	41
Finland	– 6	– 5			13	21	7	8	9	2	0	13
France	3	– 7	74	55	6	10	13	26	66		5	17
Germany	– 30	3	– 39		76	3	5	37	12		– 18	3
Greece	– 15	– 1		6	49	11	11	55	9		– 9	0
Hungary	– 12	– 10	– 1	– 4	– 1	2	18	32	53	0	– 8	15
Iceland	No 2008 data available											
Ireland	– 7	6				17	42	89			– 2	– 12
Italy	– 7	– 20			21	8	4	61	8	0	– 4	– 8
Latvia	4				15	– 4	98	57	19	45	6	41
Liechtenstein	6										6	
Lithuania	47	– 5				11	18	41	14		23	80
Luxembourg	20				34	16	1				19	23
Malta	No 2008 data available											9
Netherlands	– 18	– 2			64	29	– 7	0	16		– 8	9
Norway	– 82	5			5	25	– 1	6	12	18	– 61	
Poland	– 2	3	9	– 15	– 2	5	4	7	18	104	– 2	15
Portugal	– 4	10			64	6	15	79	6		1	10
Romania	– 2	29		54		24	32	17	177		11	7
Slovakia	33	9			22	21	12	74	208	84	26	21
Slovenia	– 6				– 7	– 21	14	4	9		– 7	– 2
Spain	– 23	8	16	– 6	60	24	23	50	20		– 6	– 9
Sweden	– 55	6		– 6	80	11	2	– 8	60	– 73	4	16
United Kingdom	– 29	7	17		14	26	26	53	14	4	– 19	– 16
EU-15	– 21	– 2	7	3	44	11	11	42	20	6	– 10	– 1
EU-27	– 17	– 1	7	24	39	9	5	36	21	– 93	– 9	2
All countries	**– 18**	**– 1**	**7**	**24**	**39**	**9**	**5**	**35**	**21**	**– 91**	**– 10**	**2**

Notes: A positive sign indicates that verified emissions (2005/2007 average) were lower than freely allocated allowances (i.e. the sector was 'long'). A negative sign indicates a short sector.
Averages for 2005 to 2007 are not identical with the figures provided in last years report since averages have been calculated in a different way.
The data presented in this table shows the levels of free allocation and emissions as included in the CITL. The fact that some operators transfer CO_2 emissions from one installation to another (e.g. from blast furnaces to power plants using blast furnace

Source: CITL, 29 April 2009/26 May 2009.

on historic emissions for individual installations during the drafting and assessment of the first national allocation plans, as independently verified data was not available. In addition, the set up of the scheme, which included national allocation plans, led to a situation where national governments were under strong pressure from business associations to draft NAPs that were favourable for business.

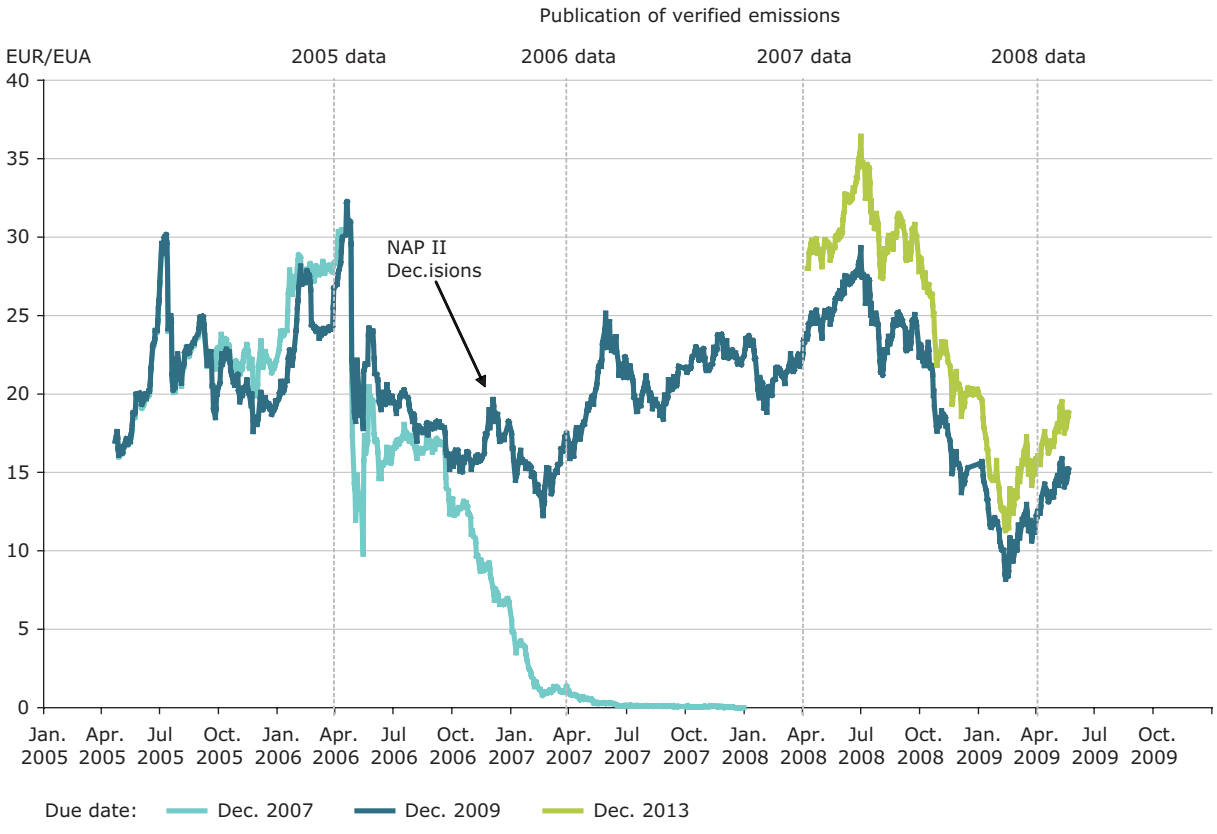
The limited maturity of the new market was also visible in the volatile development of prices for EUAs. The price for one tonne of CO_2 started at around EUR 7 per EUA, rose to a maximum of approximately EUR 30 per EUA mainly due to limited liquidity in the market, and dropped sharply after the publication of the first verified emissions in April 2006 to below EUR 10 per EUA. The warm winter of 2006–2007 confirmed that overall emissions would be less than allocations and the EU carbon market for the period 2005–2007 would remain long because of the impossibility to bank unused allowances from the first to the second phase; as a result the price dropped to below EUR 1 per EUA in spring 2007 (see Figure 5.2).

Until the end of 2006, the prices for EUAs for both trading period were of a comparable magnitude. With the Commission's decision on the set of national allocation plans for the second trading period it became clear, that even though allowances of the first trading period lost their value due to the excess of free allocation, the situation would be different in the second trading period. Prices decoupled and the value of 2009 EUAs rose up to a maximum of EUR 25 in August 2008. Due to the economic crisis, the production of industrial products and consequently the emissions fell in autumn and winter 2008. Since the beginning of 2009, the prices for EUA have started to rise again, their current value being around EUR 14. The publication of emission data for 2008 in April 2009 has had no disruptive effect on the allowance price, as the possibility of banking between the second and third trading period ensures that overall scarcity up to 2020 is maintained.

5.1.3 Use of JI and CDM by operators

As part of the second NAPs, Member States had to set a limit on the maximum use of project-based credits by operators. The project-based mechanisms played

Figure 5.2 EU ETS future contract prices 2005–2009



Source: European Climate Exchange (www.ecx.eu), 22 May 2009.

no major role in the first trading period of the ETS, mainly due to low allowance prices in 2006 and 2007 and the outstanding link between the EU registries system and the Independent Transaction Log of the Kyoto Protocol (ITL) ([26]). The use of CDM and JI is expected to gain importance in the second trading period. The use of credits generated by forestry activities through Kyoto mechanisms is not allowed within the EU ETS.

In total, up to 279.4 million certified emission reductions (CERs) ([27]) or emission reduction units (ERUs) ([28]) may be used per year by ETS installations from all Member States except Estonia in the second trading period (Table 5.3). This corresponds to 13.4 % of the EU-wide cap for the second trading period. Thus, the use of the flexible mechanisms by operators in the second trading period may be in theory more than three times the absolute emission reductions from 2005 levels required by all ETS installations, which is about 80 Mt CO_2 per year ([29]). This permitted use of JI and CDM by operators is also 3 times higher than the intended use of Kyoto Mechanisms by EU-15 Member States at government level, which amounts to 93.1 Mt CO_2-equivalent per year In effect, this means that, in total, operators under the EU ETS do not necessarily have to reduce their emissions but could offset completely excess emissions through the acquisition of emission reduction units. In fact, if CDM and JI were used up to the extent allowed, CO_2 emissions by ETS installations could increase in the second trading period by 6.8 % or 152.2 Mt CO_2 per year ([30]) above the verified emissions in 2005/2007 (including additional emissions from installations that are only in the second trading period covered under the ETS). However, the limits for the use of JI and CDM credits represent an upper boundary and they may not be completely used, in the period from 2008 to 2012. Furthermore, the reviewed ETS directive allows operators to use the total number of CDM and JI credits that was allowed to them initially in the period from 2008 to 2012 in the total period from 2008 to 2020. Lastly, the economic crisis results in lower emissions, which reduces the need to buy CDM and JI credits.

In 2008, 4 % of the emissions equal to 2 110 Mt CO_2 were covered by CERs and ERUs. Most certificates (81.7 million) originated from project in non-Annex 1 countries, i.e. the developing world (CERs). Only one operator, a British power station, surrendered ERUs (0.5 million ERUs originating from New Zealand). If the maximum use of CERs and ERUs is distributed to the five years of the trading period, 278 million certificates could be used per year; in 2008, nearly 30 % of this amount was surrendered.

The highest share of credits from flexible mechanisms compared to total surrendered units was registered in Spain (11 %) followed by Slovenia (9 %), Slovak Republic (8 %), Lithuania (8 %), Hungary (6 %) and Germany (5 %). Only in two countries, Liechtenstein and Estonia, no CERs or ERUs were surrendered at all. The national sector with the highest use of CERs in 2008 was the production of pulp, paper and board in France (26 %) followed by the German production of pig iron and steel (20 %).

In absolute figures most credits from flexible mechanisms were used for compliance by operators in Germany (23.7 million) and Spain (18.3 million), those two countries accounted together for 51 % of the CERs used (see Figure 5.3).

5.2 Promotion of electricity produced from renewable energy sources

5.2.1 Electricity produced from renewable energy sources

Since 1990 gross electricity generation from renewable energy sources (RES) in Europe grew significantly with an increase of about 60 % between 1990 and 2007. The share of RES in electricity generation in Europe rose from 13 % in 1990 to 17 % in 2007 (Figure 5.4).

Although hydro power remains the biggest sector, its share in electricity generation from RES has been decreasing steadily from 93 % in 1990 to 61 % in 2007. Sweden, France, Austria and Italy are the Member States with the highest electricity generation from hydro power plants.

Biomass and wind power have become the two other main sectors with respectively 18 % and 19 % of the electricity generation from RES in 2007, with wind

([26]) The ITL is operated by the UNFCCC secretariat. The link between the CITL and the ITL only operates during the Kyoto period.
([27]) CERs apply to emission reductions under the CDM.
([28]) ERUs apply to emission reductions under the JI.
([29]) In 2005 the emissions of all installations covered by the EU-eTS were about 2 190 Mt (including the new scope and opt-outs that entered the EU-eTS in 2008 that equal to about 85 Mt). The emissions in 2008 were about 2 110 Mt. The difference is equal to 80 Mt.
([30]) (– 127.2 + 279.4).

Table 5.3 Limit on the use of CDM and JI by EU ETS operators

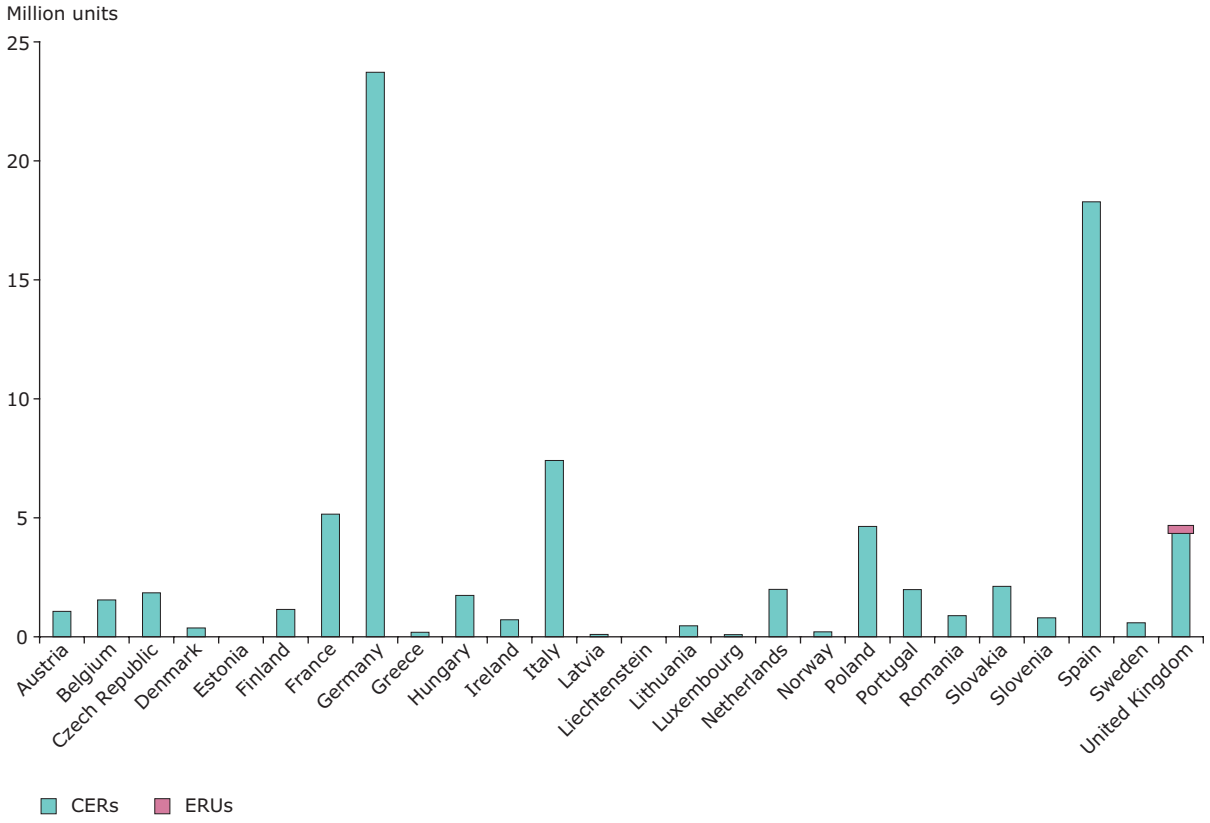
Member State	2007 total GHG emissions	Share of EU ETS in total GHG emissions in 2007	Difference between base-year and Kyoto or burden-sharing target	Intended use of flexible mechanisms at government level	2008–2012 EU ETS cap	CDM/JI limit for EU ETS operators	
	Mt CO_2-equivalent	%	Mt CO_2-equivalent/year			%	Mt CO_2-equivalent/year
Austria	88.0	36	– 10.3	9.0	30.7	10.0	3.1
Belgium	131.3	40	– 10.9	4.4	58.5	8.4	4.9
Bulgaria	75.8	52	– 10.6		42.3	12.6	5.3
Cyprus	10.1	53	No target [a])		5.5	10.0	0.5
Czech Republic	150.8	58	– 15.5		86.8	10.0	8.7
Denmark	66.6	44	– 14.6	4.2	24.5	17.0	4.2
Estonia	22.0	70	– 3.4		12.7	0.0	0.0
Finland	78.3	54	0.0	1.4	37.6	10.0	3.8
France	531.1	24	0.0		132.8	13.5	17.9
Germany	956.1	51	– 258.8		453.1	20 [e])	90.6
Greece	131.9	55	26.7		69.1	9.0	6.2
Hungary	75.9	35	– 6.9	– 16.5 [b])	26.9	10.0	2.7
Ireland	69.2	31	7.2	3.6	22.3	10.0	2.2
Italy	552.8	41	– 33.6	17.1	201.6	15.0	30.2
Latvia	12.1	24	– 2.1		3.4	10.0	0.3
Lithuania	24.7	24	– 4.0		8.8	20.0	1.8
Luxembourg	12.9	20	– 3.7	3.7	2.5	10.0	0.2
Malta	3.0	67	No target [a])		2.1	tbd	tbd
Netherlands	207.5	38	– 12.8	13.0	87.5	10.0	8.8
Poland	398.9	53	– 33.8		208.5	10.0	20.9
Portugal	81.8	38	16.2	4.8	34.8	10.0	3.5
Romania	152.3	46	– 22.3		75.9	10.0	7.6
Slovakia	47.0	52	– 5.8		32.6	7.0	2.3
Slovenia	20.7	44	– 1.6	1.0 [c])	8.3	15.8	1.3
Spain	442.3	42	43.5	31.8	152.3	20.0	30.5
Sweden	65.4	29	2.9	2 [d])	22.8	10.0	2.3
United Kingdom	636.7	40	– 97.0		246.2	8.0	19.7
EU-27	**5 045.4**	**43**	**– 451.1**	**77.6**	**2 090.1**	**13.4**	**279.4**

Notes: tbd = to be determined

[a]) Cyprus and Malta are non-Annex I Parties to the Kyoto Protocol and do not have an emissions target for the period 2008–2012.
[b]) Hungary is the only country which has reported quantified projections of AAU selling.
[c]) Slovenia plans to acquire units either through project mechanisms or on the carbon market but has not yet decided on the exact quantity. The value depends on the actual development of emissions, especially in the transport sector.
[d]) Sweden intends to achieve its Kyoto target without the use of flexible mechanisms but has made the necessary preparations to use them if necessary. Sweden intends to acquire 2 Mt CO_2-equivalent per year through the Swedish CDM and JI programme. This figure has not been considered in the target assessment for Sweden and EU-15.
[e]) The German national allocation law contains a figure of 22 %, which relates to the allowances allocated free of charge, rather than the total.

Source: EEA GHG data viewer and CITL, 8 July 2009; European Commission; Questionnaires and projection reports submitted under the EC greenhouse gas Monitoring Mechanism; MS comments to draft report.

Figure 5.3 Credits from CDM and JI surrendered for 2008



Note: No data on surrendered units was available for Bulgaria, Cyprus, Iceland and Malta.

Source: CITL, 26 May 2009.

power having a high growth rate of 20 % between 2006 and 2007 in Europe. The Member States with the highest generation of electricity from wind turbines are Germany, Spain and to a lesser extent Denmark, but wind power is increasing significantly in all European Member States. Germany, Finland, Sweden and the United Kingdom have the biggest electricity generation from biomass in Europe.

Geothermal power remains marginal with a share of about 1 % that remained constant since 1990. Geothermal power in Europe is concentrated in Italy, while the other Member States have no or only marginal geothermal power production.

Although it remains marginal in Europe, solar power has been growing steadily since 1998 although with a decreasing annual growth rate since 2006 (growth rate of 42 % between 2006 and 2007 compared to 98 % between 2004 and 2005). In 2007, solar power provided 0.7 % of electricity generation from RES in Europe. Over 95 % of solar power originates from Germany and Spain, with a strong growing trend in other countries such as Portugal between 2006 and 2007.

5.2.2 Share of RES in electricity consumption and progress towards 2010 targets

Increasing the production of electricity from renewable energy sources in the European Union improves energy security, mitigates greenhouse gas emissions as well as regional and local pollutants from the power sector, whilst it increases the European Union's competitiveness in renewable energy technologies. For these reasons, in 2001 the European Union set a target to source 21 % of electricity from renewable energy sources by 2010 (Directive 2001/77/EC ([31])). Each Member State has a national indicative target for electricity production

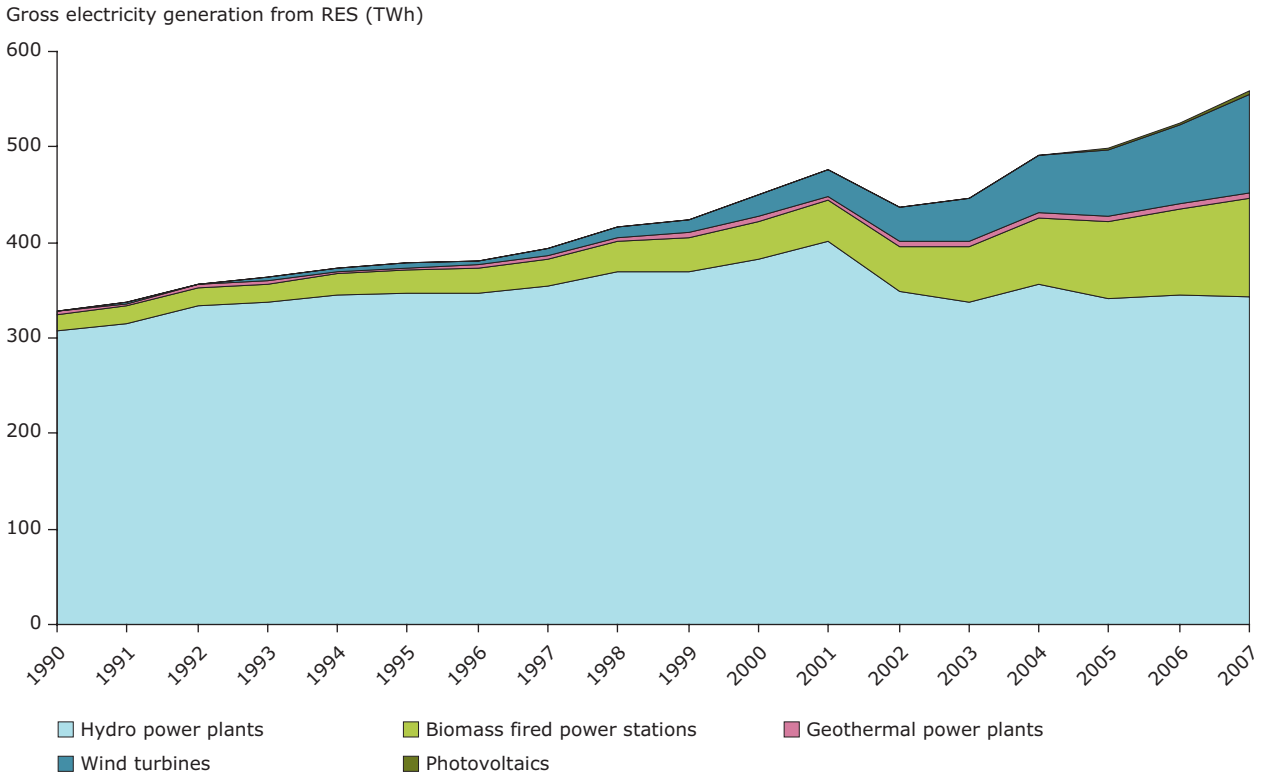
([31]) Directive 2001/77/EC of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market.

from renewable energy sources which contributes towards the overall target (Figure 5.5). Member States are free to choose their preferred support mechanism in order to achieve their target. Member States operate 27 different support schemes using various policy tools including: feed-in tariffs, premium systems, green certificates, tax exemptions, obligations on fuel suppliers, public procurement policy and, research and development. The support schemes differ partly because support has traditionally been linked to other national priorities and because national electricity markets still have very different characteristics and remain nationally segmented.

Since the adoption of Directive 2001/77/EC, the Community has set targets and tried to remove barriers to encourage the growth in the proportion of electricity produced from renewable energy sources. This contribution has risen from roughly 13 % in 2001 to 16 % in 2007, but under the new directive on renewable energy ([32]) it is expected it will need to be doubled, to over 30 % for the EU, to reach its overall renewable energy target of 20 % by 2020. Member States are required to provide regular reports on their progress towards the 2010 targets. The last progress report published by the European Commission in 2009 ([33]) and the 2007 data (Figure 5.5) present the following key progress:

- To reach the 2010 target the EU must increase the share of electricity from renewable energy sources from 13 % in 2001 to 21 % in 2010. In 2007, it stands at 15.6 %, which equates to about 35 % of progress needed to reach the 2010 target. However, the average progress between 2006 and 2007 in Europe has been very limited (average increase of about 2 % in EU-27 between 2006 and 2007).
- Between 2006 and 2007, Lithuania, Poland, Spain and the United Kingdom made the biggest progress towards their 2010 target and Denmark

Figure 5.4 Gross electricity generation from RES in EU-27 (GWh), 1990–2007



Source: Eurostat, June 2009.

([32]) Directive 2009/28/EC of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.
([33]) Commission Staff Working Document, The Renewable Energy Progress Report, Brussels, 24.04.2009, SEC(2009) 503 final.

actually reached its target in 2007. Hungary and Germany had reached their target in 2006 already, or in fact exceeded it, and continued to increase their shares of RES significantly in 2007.

- The share of electricity from renewable energy sources in Austria, France, Italy, Latvia, Portugal, Romania, the Slovak Republic and Slovenia was lower in 2007 than in 2001. Moreover, between 2006 and 2007 Bulgaria, the Czech Republic, Greece, Italy, Latvia, the Netherlands, Romania and Slovenia showed a reduction in their proportional contribution from RES. Therefore, these Member States need to do more to reverse their downward trends.
- In 2007, three Member States had reached their targets (Germany, Hungary and Denmark) and 22 Member States were less than half way towards meeting their 2010 target for electricity from renewable energy sources, with some still very unlikely to meet them (e.g. the United Kingdom, the Slovak Republic, the Czech Republic). Five countries had still more than half way to go in meeting their targets (Cyprus, Estonia, Greece, Malta and Poland). Overall, several Member States are unlikely to meet their 2010 targets.

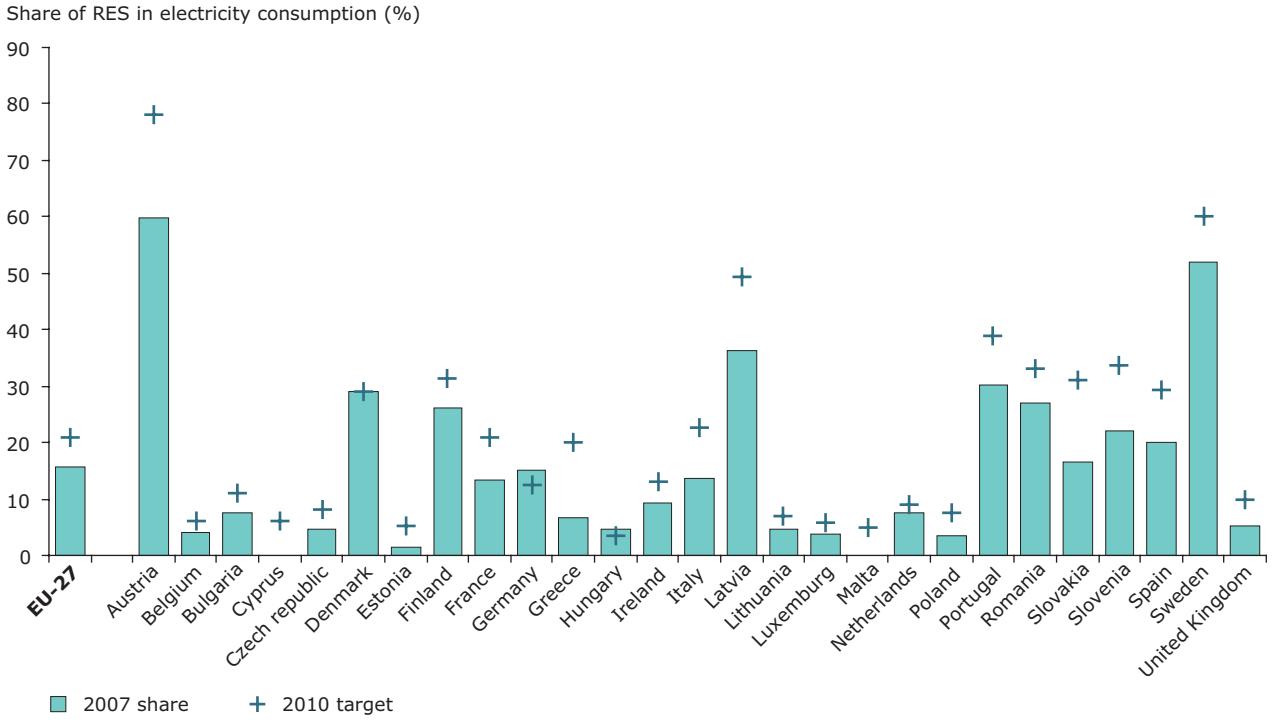
In 2009, the Commission noted that the EU was not on track to meet its 21 % electricity from renewable energy sources target, predicting that an 18–19 % share of electricity from renewable sources would be achieved by 2010. This prediction was based on Member States' progress against their national indicative targets up to 2005. The evolution observed in 2006 and 2007 is likely to confirm this prediction.

The Commission still expects all Member States to bring forward policies in order to meet their national indicative target. Indeed, given the new targets established for 2020 (details in Section 5.3), the 2010 targets act as a necessary minimum interim sectoral target. Improvements to national support schemes and the ongoing integration of the internal market should facilitate growth of renewable electricity but most Member States still need better, active policies to ensure growth occurs.

5.2.3 Share of RES in final energy consumption and progress towards 2020 targets

In 1997, the European Commission White Paper, 'Energy for the future, renewable sources of energy'

Figure 5.5 2007 share of RES in EU-27 total electricity consumption (%) and 2010 indicative targets



Source: Eurostat, June 2009.

sets an indicative target of 12 % renewable energy sources in total energy consumption in 2010. In 2006, the contribution of RES towards final energy consumption in Europe is only 9.2 %.

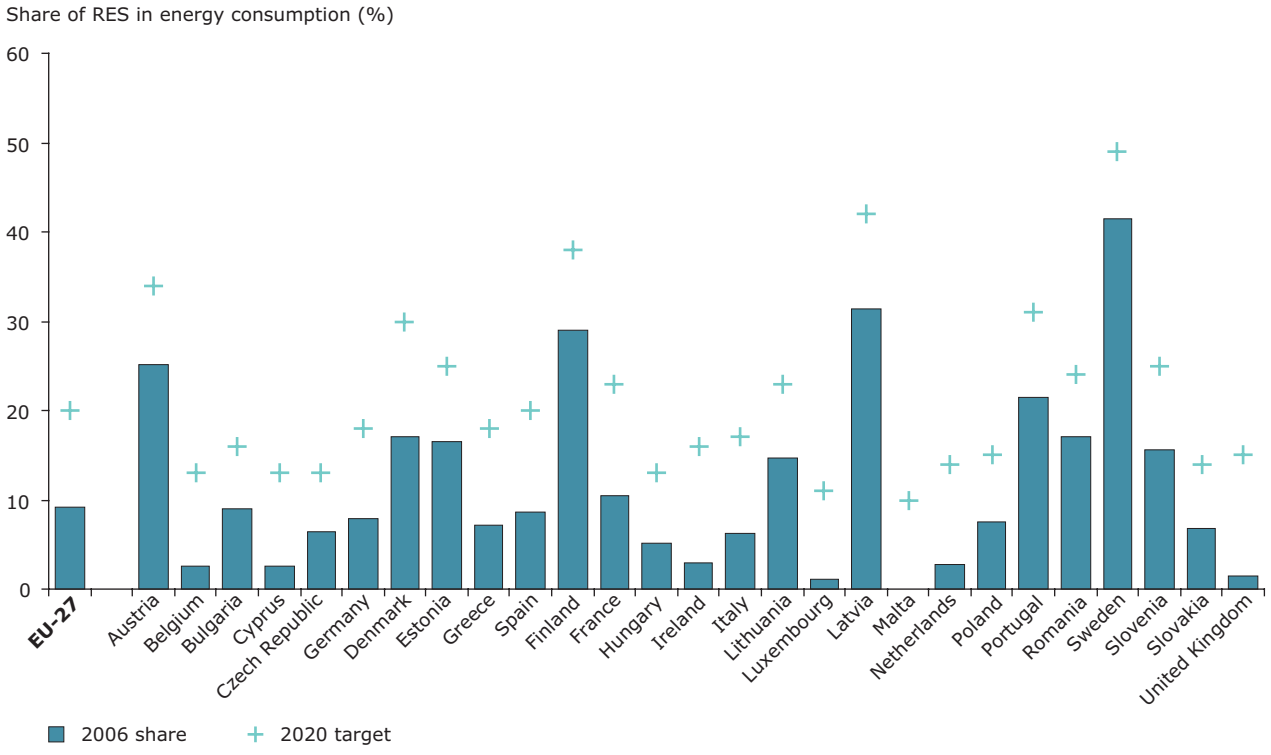
In 2009, the European Parliament and Council adopted a new directive on the promotion of the use of energy from renewable sources that sets a mandatory target of 20 % of energy to come from renewable sources in Community consumption by 2020. It also sets mandatory national targets consistent with the European target (Figure 5.6). Although the directive does not set any specific target for the use of RES in the electricity sector, it is estimated that the contribution of RES towards total electricity consumption should increase to over 30 % by 2020 to reach the 20 % RES energy target.

Between 2005 and 2006, the share of RES in final energy consumption in the EU-27 increased slowly with a few Member States showing a reduction in the contribution from RES. Other Member States like Germany, Hungary, the United Kingdom and Belgium showed significant increases between 2005 and 2006. Substantial further efforts will be required to achieve the 2020 targets.

5.2.4 Estimated GHG emissions reduction

Increasing the use of renewable energy sources has great potential for the reduction of CO_2 emissions from the energy sector. The RES directive is identified by the EC and the Member States as one of the CCPM with the biggest emission reduction potential in 2010 and 2020. However, estimates from the two sources differ greatly, mainly because not all EU Member States report quantified GHG emission savings (see details in Section 4.3.1). The European Commission estimates that the RES-e Directive is expected to provide an annual GHG emissions savings of 100–125 Mt CO_2-equivalent annually by 2010. Member States estimate savings from their national RES-e policies implementing the EU RES-e Directive to be about 30 Mt CO_2-equivalent in 2010, with savings coming predominantly from existing measures in the EU-15 and from additional measures in EU-27. By 2020, the Member States expect higher annual savings from their RES-e policies to levels of about 80 Mt CO_2-equivalent. As in 2010, the EU-15 Member States expect their savings to originate primarily from existing measures, while EU-12 Member States expect all savings to originate from additional measures.

Figure 5.6 Share of RES in final energy consumption (%) in EU-27 in 2006 compared to 2020 targets



Source: DG TREN Statistics, June 2009.

5.3 Promotion of biofuels for transport

Energy consumption in the transport sector depends almost exclusively on imported fossil fuels (oil). The sector, crucial to the functioning of the whole economy, is forecast to grow more rapidly than any other until 2020 and beyond. The importance and the vulnerability of the transport sector require that action be taken rapidly to reduce its malign contribution to sustainability and the insecurity of Europe's energy supply. The Community does this with a wide range of measures, covering emissions reductions, energy efficiency measures, green public procurement rules in transport, and with the promotion of renewable energy sources for the transport sector.

The Directive 2003/30/EC ([34]) sets targets (2 % by 2005 and 5.75 % by 2010) and guidelines for the development of biofuels for transport in Europe ([35]). Progress towards the objectives of this directive is assessed on two dimensions:

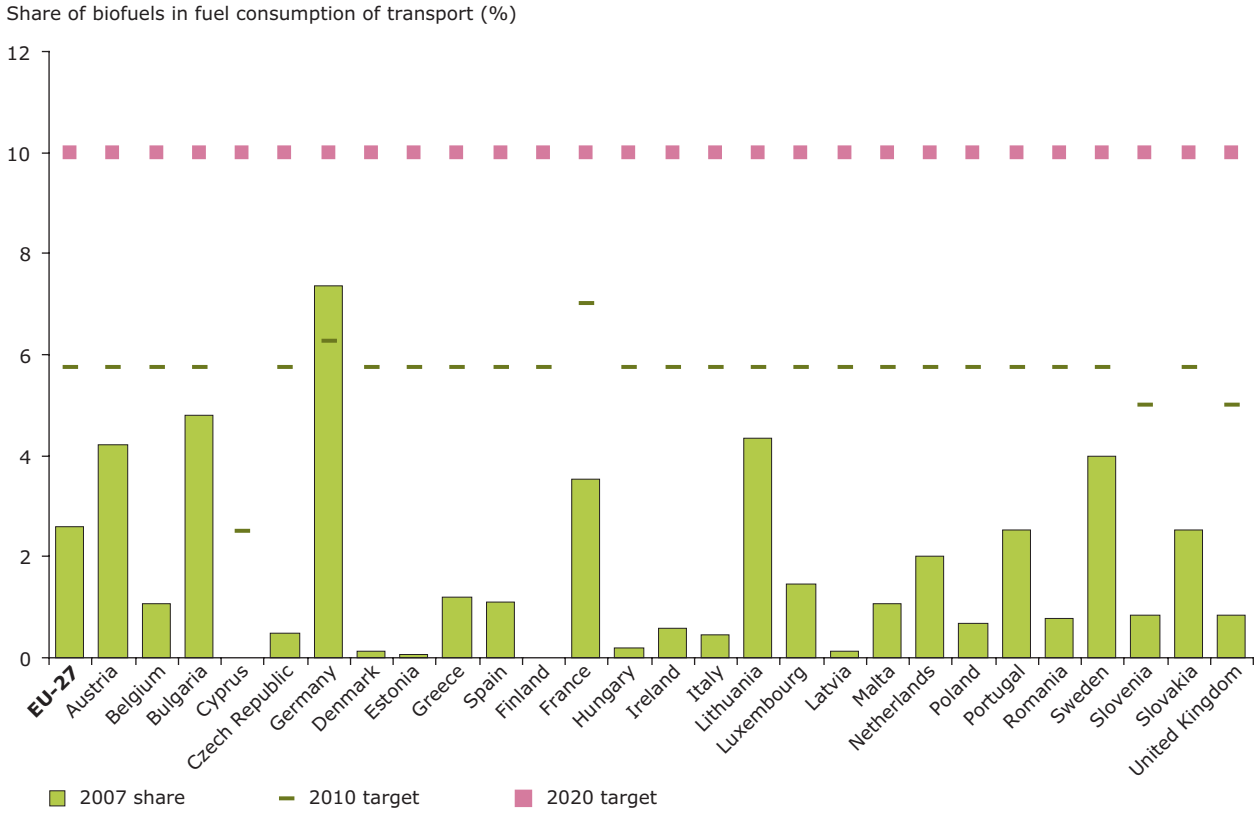
- progress in the use of biofuels and other renewable fuels in the Member States;
- progress on the environmental and economic impacts of biofuels.

5.3.1 Progress towards 2010 and 2020 targets and sustainability impacts

Under Directive 2003/30/EC, Europe established the goal of reaching a 5.75 % contribution of renewable energy towards total consumption in the transport sector by 2010 (Figure 5.7). No indicative targets by Member States were specified in the directive. Following the entry into force of the directive, Member States had to indicate the level of their national indicative targets by 2005 and 2010 and report on their progress every year.

Under the new directive on the promotion of renewable energy , the target rises to a minimum 10 % in every Member State in 2020 (Figure 5.7).

Figure 5.7 Share of biofuels in fuel consumption for transport (%) in EU-27 in 2007 compared to 2010 and 2020 targets



Source: Member States 2006 and 2007 reports, and EurObserver Biofuels Barometer for some 2007 data.

([34]) Directive 2003/30/EC of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport.
([35]) Biofuels is defined as a subset of biomass, referring to liquid or gaseous fuel for transport produced from biomass.

The 10 % target is formulated as the ratio between renewable energy consumption in transport and the total final consumption of petrol, diesel, biofuels for road and rail transport, and electricity for transport. Biofuels cover electricity or hydrogen from renewable energy sources, or 1st or 2nd generation biofuels. The new directive on renewable energy also aims to ensure that the use of biofuels in the EU is sustainable, that it generates a clear and net GHG saving and has no negative impact on biodiversity and land use. This reinforces the dimensions of environmental and economic impacts in the 2003 Directive.

The last progress report published by the European Commission in 2009 and the 2007 data (see Figure 5.7) present the following key progress in the use of biofuels in Europe:

- In 2007, 8.1 million tonnes oil-equivalent (Mtoe) (2.6 %) of the total fuel consumed in transport in the EU was from biofuels. Biodiesel accounted for 75 % of this amount and 26 % of this biodiesel was imported. Bioethanol represented 15 % of renewable fuels in transport and 31 % of this bioethanol was imported. The remaining 10 % was made up from pure vegetable oil consumed in Germany, Ireland and the Netherlands and biogas consumed in Sweden.
- Austria, Germany, France, the Netherlands, Spain, Sweden and the United Kingdom were the largest biofuel consumers in 2007, using close to 90 % of the total biofuels employed for transport in Europe.
- To meet the European target by 2010, the consumption of biofuel and other renewable fuels in EU-27 would need to more than double by 2010 and quadruple by 2020.
- Germany is the only Member States that has reached, and even exceeded its 2010 target and is progressing well towards its 2020 target.

The following key progress on the environmental and economic impacts of biofuels has been presented by the European Commission in 2009 ([36]):

- Biofuel production contributes to increasing the extent and intensity of agricultural production in the EU. This can have both positive and negative environmental effects. In particular, increased pressure on the use of land with high biodiversity value and soil carbon stock may be expected, together with a higher incentive to use more fertiliser per hectare. On the other hand, land abandonment should slow down, particularly in disadvantaged and environmentally sensitive rural regions. Under the new Renewable Energy Directive, economic operators and Member States will be required to report in more detail on the land-use changes and other environmental impacts from increased production of biofuels. Sustainability criteria are included in the new Renewable Energy Directive, covering minimum requirements for greenhouse gas savings, requirements to avoid damaging land-use change and reporting requirements covering a wide range of environmental and social issues.
- The assessment of the economic impacts of biofuels covers the following dimensions:
  - Costs: the introduction of biofuels remains more costly than other CO_2-abatement technologies in other sectors, but with today's technologies, it remains one of the few available solutions to curb the growing CO_2 emissions of the transport sector.
  - Security of supply: this has been one of the two principal reasons for adopting the EU targets for renewable energy use in transport, alongside the greenhouse gas benefits. In 2007, the use of biofuels in the EU replaced 1 593.1 million litres of petrol and 7 729.9 million litres of diesel. Currently that represents less than 3 % of the total EU fuel consumption in road transport.
  - Employment and GDP: in 2007, a study from the European Commission's Joint Research Centre (JRC) ([37]) showed that achieving the EU's 10 % renewable transport fuel target by 2020 would create additional employment estimated at EUR 1.8 billion in distributed salaries over the 2007–2020 period.
  - Development and external relations: it is likely that the growing biofuels demand will be met in part through imports. The rise in demand for biofuels and current biofuel support policies have sometimes been suggested as key factors in food price increases. In order to respond to the food price concerns and to create additional safeguards against possible negative impacts, the newly established biofuels sustainability scheme in the Renewable Energy Directive

([36]) For more details, see EEA report 'Maximising the environmental benefits of Europe's bioenergy potential': www.eea.europa.eu/publications/technical_report_2008_10.
([37]) Biofuels in the European Context: facts, uncertainties and recommendations, JRC working paper, December 2007.

contains a set of monitoring and reporting requirements, including food price and food availability impacts in the EU and third countries, which are significant sources of biofuel imports into the EU.

- Research and innovation: in the European Commission's Seventh Framework Programme for research and technological development, EUR 59 million have been allocated for biofuels in the first two calls in 2007 and 2008.

5.3.2 Estimated GHG emissions reduction

Increasing the use of biofuels is expected to have a significant potential for the reduction of CO_2 emissions from the energy sector. The European Commission estimates that the Biofuels Directive is expected to provide an annual GHG emissions savings of 35–40 Mt CO_2-equivalent annually by 2010. In its 2009 Renewable Energy Progress Report, the European Commission estimates that from an environmental perspective the current net greenhouse gas savings achieved in the European Union from biofuels marketed and consumed during 2006 and 2007 amounted to 23.8 Mt CO_2-equivalent. This takes into account the estimated impact of associated land use change, bearing in mind that most EU biofuel consumption has been fulfilled through the re-use of recently abandoned agricultural land or through slowing down the rate of land abandonment.

Member States estimate savings from their national biofuels policies implementing the EU biofuels directive to about 10 Mt CO_2-equivalent in 2010, with savings coming predominantly from existing measures in both the EU-15 and EU-27. By 2020, the Member States expect higher annual savings from their biofuels policies to levels of about 25–30 Mt CO_2-equivalent. As in 2010, the savings are expected to originate primarily from existing measures.

Member States estimates are significantly lower than the European Commission estimates because not all EU Member States report quantified GHG emission savings.

6 Actual progress towards Kyoto targets

- The EU-15 was approximately 6.2 % below its base-year emissions in 2008. During the latest five-year period for which GHG data is available (2004–2008), EU-15 emissions were on average 3.9 % below base-year level, compared to an 8.0 % reduction commitment under the Kyoto Protocol, which remains to be achieved during the period 2008–2012.
- This average would have been substantially lower without the large absolute gaps observed between actual domestic emission levels and burden-sharing targets in Italy and Spain.
- France, Germany, Greece, Sweden and the United Kingdom have already reached greenhouse gas emission levels below their burden-sharing targets. If these Member States manage to keep their emissions below their burden-sharing targets or further reduce them, they will not need to rely on acquiring extra Kyoto units from the Kyoto Protocol's flexible mechanisms.
- A similar situation can be observed in Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and the Slovak Republic, where emissions are far below Kyoto targets.
- For the remaining ten EU-15 Member States and for Slovenia, the planned domestic actions will not be enough to reduce national GHG emission below their burden sharing targets.

6.1 Emission targets under the Kyoto Protocol and the burden-sharing agreement

Under the Kyoto Protocol, the EU-15 has taken on a common commitment to reduce emissions between 2008 and 2012 by 8 % on average, compared to base year emissions. Within this overall target, differentiated emission limitation or reduction targets have been agreed for each of the 15 pre-2004 Member States under an EU accord known as the 'burden-sharing agreement' (Figure 6.1, cf. Annex A.3).

The EU-27 does not have a Kyoto target, since the Protocol was ratified before the 12 new Member States became EU Member States .Therefore the EU-12 Member States have individual targets under the Kyoto Protocol (apart from Cyprus and Malta, which do not have targets).

Of the additional EEA member countries, Iceland, Liechtenstein, Norway and Switzerland have individual targets under the Kyoto Protocol. Croatia also has an individual target. Turkey acceded to the Kyoto Protocol in February 2009 but, like Cyprus and Malta, has no commitment under the Kyoto Protocol.

The principles of compliance under the Kyoto Protocol are explained in more detail in Section 7.2.

6.2 Progress to Kyoto targets based on latest available statistics

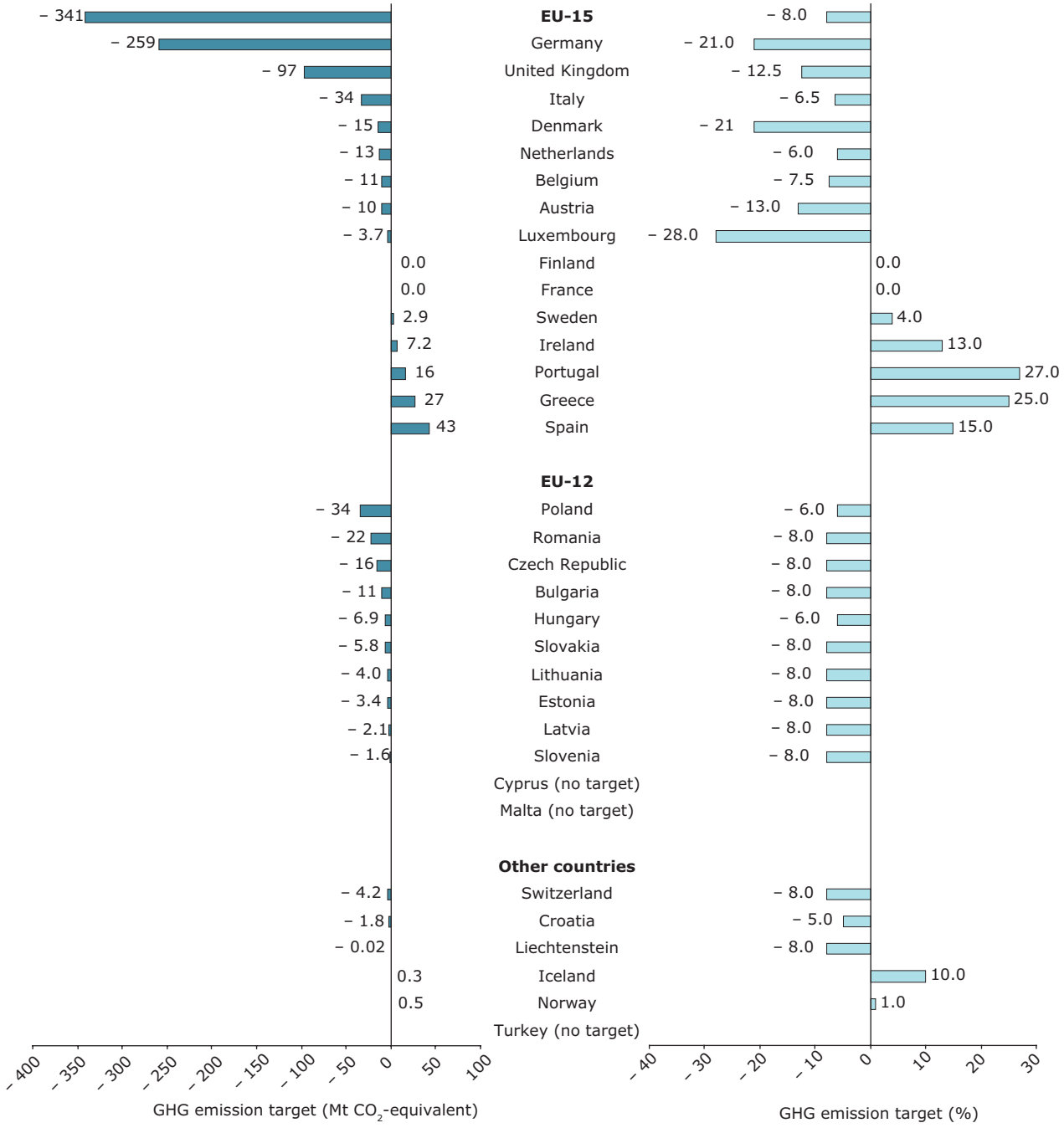
6.2.1 Actual progress by Member States

An indication of the progress already achieved by a country, or Party, towards its target can be obtained by comparing the country's GHG emissions during the latest five-year period for which data is available and its initial assigned amount for the commitment period 2008–2012. For most countries, the five-year period considered for the comparison was 2003–2007. In the case of Denmark, Finland, Germany, Greece, Italy, Luxembourg, Norway, Slovenia and the EU-15, for which 2008 emission estimates were available, 2004–2008 average emissions were used.

The indication provided by this comparison should be interpreted with care, as it does not take into account any possible modification of the initial target possibly foreseen by countries, as allowed under the Kyoto Protocol, through carbon sink removals and use of the Kyoto mechanisms (cf. Section 7.2). This assessment only indicates the current progress achieved so far through domestic emission reductions.

An overview of the current progress achieved in Europe indicates a more favourable situation for

Figure 6.1 Greenhouse gas emission targets in Europe under the Kyoto Protocol (2008–2012) relative to base-year emissions



Note: In Commission Decision 2006/944/EC, determining the respective emission levels allocated to the Community and each of its Member States under the Kyoto Protocol, the respective emission levels were expressed in t CO_2-equivalent. In connection with Council Decision 2002/358/EC, the Council of Environment Ministers and the Commission have, in a joint statement, agreed to take into account inter alia the assumptions in Denmark's statement to the Council Conclusions of 16–17 June 1998 relating to base-year emissions in 2006. In 2006, it was decided to postpone a decision on this until after all Community and Member State initial reports have been reviewed under the Kyoto Protocol.
Croatia's base-year emissions include an additional 3.5 Mt CO_2-equivalent, in accordance with Decision 7/CP.12 of the Conference of the Parties under the UNFCCC.

Source: UNFCCC; EEA.

EU-12 Member States than for the EU-15. Nine of the ten EU-12 Member States with a Kyoto target have already reached emission levels well below their respective Kyoto targets for a number of years, due to the reductions that took place in the 1990s. In the EU-15, only five Member States find themselves in this favourable situation.

Ten EU-15 Member States (Austria, Belgium, Denmark, Finland, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain), Slovenia, in addition to Iceland, Liechtenstein, Norway and Switzerland, need to achieve further emission reductions from domestic policies and measures and/or make use of Kyoto mechanisms and/or removals from carbon sink activities, in order to meet their respective target (Figure 6.2, left; Table 6.1).

6.2.2 Actual progress by EU-15

Based on a 2009 EEA estimate, in 2008, total greenhouse gas emissions in the EU-15 were 6.2 % below the base-year level. This is the lowest emission level by the EU-15 since 1990.

During the latest five-year period for which greenhouse gas information is available (2004–2008), average emissions in the EU-15 were 3.9 % below the base-year level. This also represents the lowest five-year average achieved since 1990, which reflects the continuous decreasing trend observed in the EU-15 in the last four years. This average would have been substantially lower without the large absolute gaps observed between actual domestic emission levels and burden-sharing targets in Italy and Spain (Figure 6.2, right).

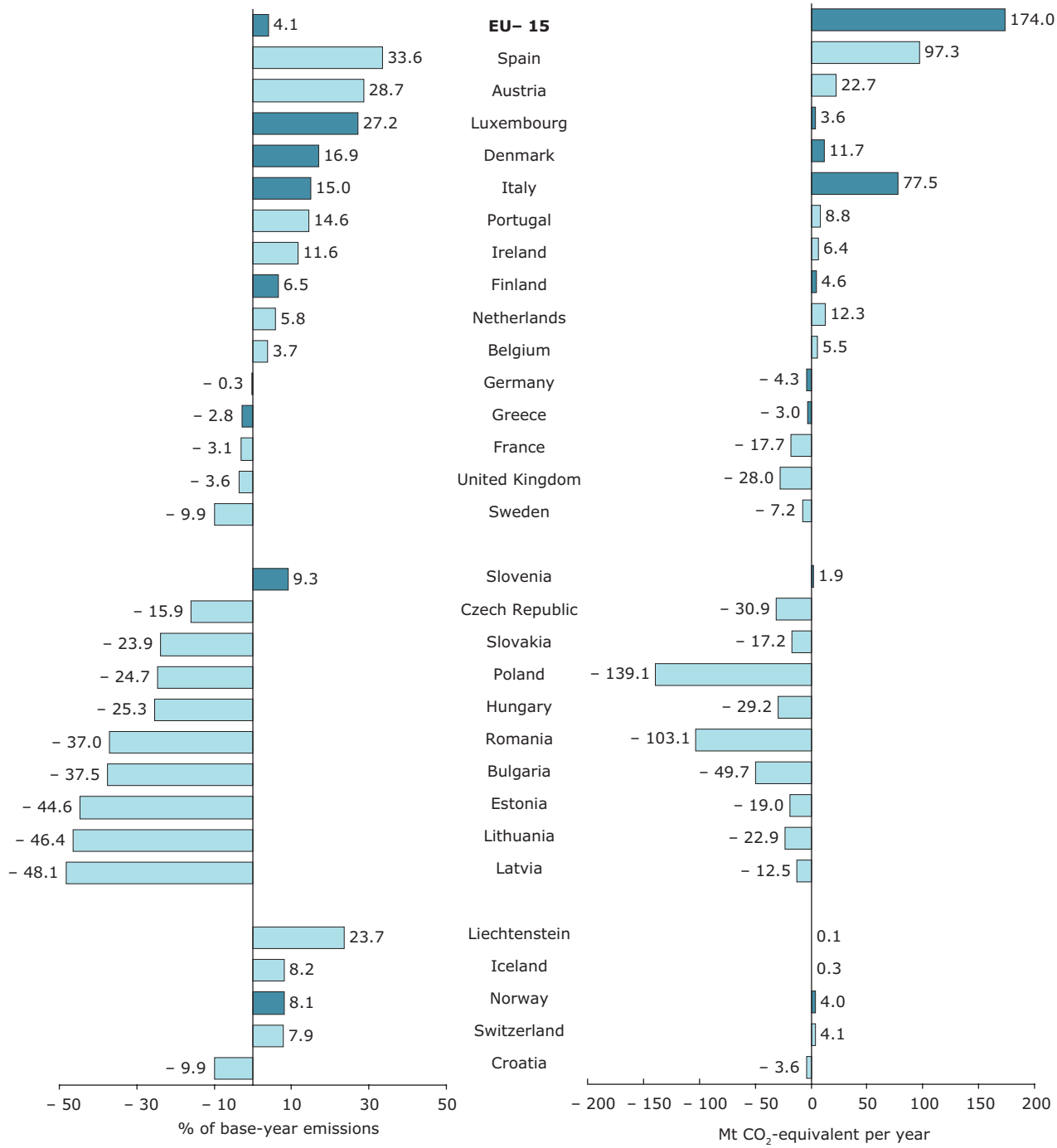
Table 6.1 Current progress towards Kyoto or burden-sharing targets

Country grouping	Party to the Kyoto Protocol with current average emissions lower than target	Party to the Kyoto Protocol with current average emissions higher than target
EU-15 Member States	• France • Germany • Greece • Sweden • United Kingdom	• EU-15 • Austria • Belgium • Denmark • Finland • Ireland • Italy • Luxembourg • Netherlands • Portugal • Spain
EU-12 Member States	• Bulgaria • Czech Republic • Estonia • Hungary • Latvia • Lithuania • Poland • Romania • Slovakia	• Slovenia
Other EEA member countries, EU candidate country	• Croatia	• Iceland • Liechtenstein • Norway • Switzerland

Note: Current average emissions represent average emissions in the period 2003–2007 except for the EU-15, Denmark, Finland, Germany, Greece, Italy, Luxembourg and Slovenia, where average emissions in the period 2004–2008 estimates are available.
Average emissions are compared to the initial Kyoto or burden-sharing target (initial assigned amount units) for the Kyoto commitment period 2008–2012. The possible use of Kyoto mechanisms and removals from carbon sinks are not taken into account in this table.

Source: EEA, 2009.

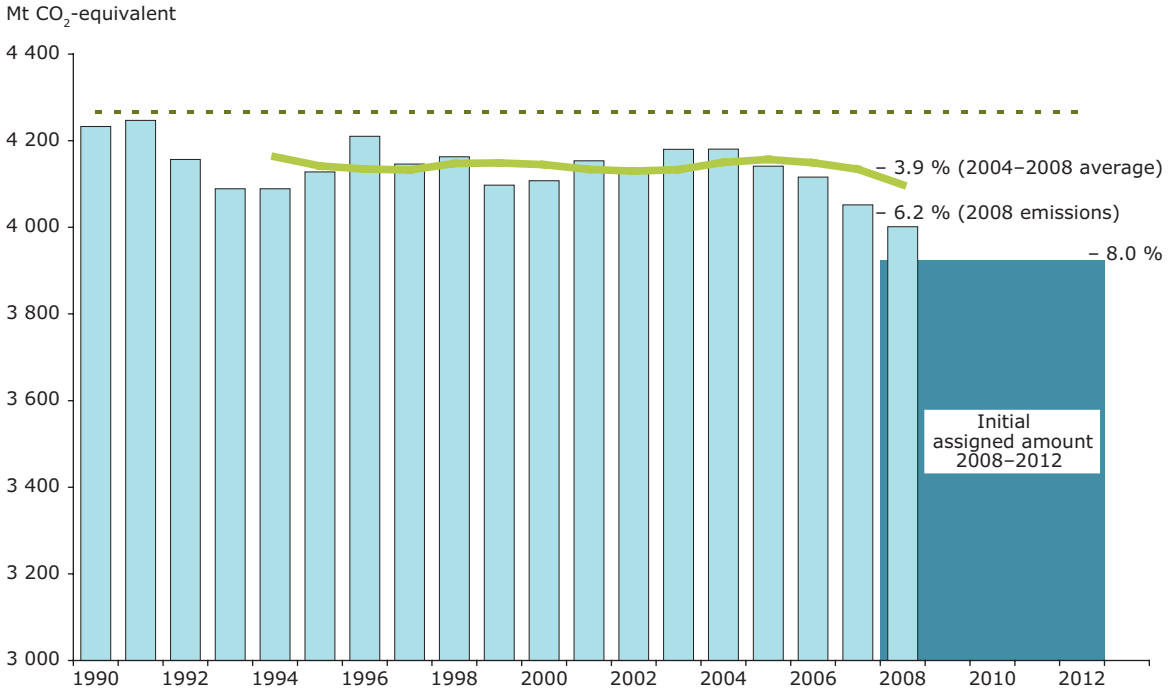
Figure 6.2 Gap between average annual emissions in 2003–2007 (or 2004–2008) and initial assigned amounts in Europe



Note: A negative value indicates that the country for which 2003–2007 or 2004–2008 average emissions are already below its 2008–2012 target.
The dark blue bars indicate Member States for which the 2004–2008 average was used, based on these countries' estimates of 2008 emissions. The same applies to the EU-15 values.
Countries are sorted by regional grouping (EU-15, EU-12, non-EU countries) and ranked by increasing gap (in absolute figures) between their total GHG emissions and their Kyoto target (assigned amount units), without use of carbon sinks and Kyoto mechanisms.

Source: EEA, 2009.

Figure 6.3 Current progress towards EU-15 Kyoto target



Note: The rolling five-year average plot for a year Y corresponds to the average of the last five years (Y-4 to Y).
2008 emissions and 2004–2008 average based on 2009 EEA estimate 2.2.1.
Achievement of a commitment under the Kyoto Protocol requires reducing emissions to a level lower than an assigned amount (total quantity of Kyoto units). Kyoto commitments can also be met by increasing this assigned amount through the use of Kyoto mechanisms and carbon sink removals.

Source: EEA, 2009.

If the 8 % reduction target of the EU-15 was to be reached only by means of domestic emission reductions, the EU-15 would need to further reduce its five-year average emissions by an additional 4.1 % by 2012, compared to base-year levels. However, this gap may also be filled by using Kyoto mechanisms and accounting for removals through carbon sink activities (cf. Section 7.3.2).

7 Projected progress towards Kyoto targets

Progress of the EU-15

- If all the domestic emission reductions projected by EU-15 Member States occur, based on measures already implemented in Member States, greenhouse gas emissions in the EU-15 will be reduced to 6.8% below the Kyoto base year. A number of Member States anticipate implementing additional measures in order to further reduce emissions by 2012. In this instance, EU-15 emissions in the period 2008–2012 would be 8.5 % below base-year emissions. This reduction is particularly dependent on the combined emission reductions expected in the main emitting countries (France, Germany, Spain and the United Kingdom).
- To comply with their objectives under the Kyoto Protocol, all Parties must ensure that their total greenhouse gas emissions over the five-year commitment period 2008–2012 are less than or equal to their assigned amount (the total quantity of emission rights — or Kyoto units). The initial assigned amount for the EU-15 for the full five-year period 2008–2012 is equivalent to 19.6 Gt CO_2-equivalent. Under the Kyoto Protocol, this assigned amount can be increased as a result of the use of Kyoto flexible mechanisms and accounting for carbon sink removals by Member States.
- The European Union Emission Trading Scheme (EU ETS), which requires operators of certain industrial installations to meet emission caps during 2008–2012, is expected to result in important reductions of domestic EU emissions. In addition, EU ETS operators may also acquire emission allowances or project-based credits (CDM/JI units). It is estimated that such acquisitions would increase the EU-15's assigned amount by approximately 1.4 % of EU-15 base-year levels.
- CO_2 removals from the atmosphere due to enhancement of carbon sinks (e.g. through improved forest management) are expected to generate emission rights (removal units or RMUs) equivalent to 1.0 % of base-year levels.
- The planned use of Kyoto flexible mechanisms (acquisition of Kyoto units from other parties to the Kyoto Protocol) by ten Member States to cover the shortfall between expected emissions in 2008–2012 and their total assigned amounts is expected to generate Kyoto units equivalent to 2.2 % of EU-15 base-year levels. Spain and Italy are expected to make a significant contribution to the overall anticipated increase of the EU-15's assigned amount.
- Overall, if all existing and planned additional measures are fully implemented in a timely manner, the EU-15 could over-achieve its Kyoto target by an average 217 Mt CO_2-equivalent per year over the Kyoto period, which represents 5.1 % of base-year emissions. This represents the difference between EU-15 projected emissions over 2008–2012 (8.5 % below the base-year) and the EU-15 total assigned amount, expected to be increased from the initial level 8 % below the base year to a level 3.4 % below the base year.
- The projected achievement of its Kyoto target by the EU-15 relies on each single EU-15 Member State achieving its own burden-sharing target through domestic emission reductions, enhancement of carbon sinks and use of Kyoto mechanisms. Should any EU-15 Member State miss its own target, the EU-15 would need to rely on the use of surplus Kyoto units from other Member States at the end of the commitment period in order to fill any shortfall.

Effects of the EU ETS and of the recession on Kyoto compliance

- The introduction of the EU ETS and the finalisation of the second national allocation plans by Member States have fixed the overall contribution that the EU ETS will provide towards reaching burden-sharing or Kyoto targets at national level. Therefore governments must focus on reducing emissions in the sectors not covered by the EU ETS (for example the transport, residential and agriculture sectors).

- Although the economic downturn is likely to trigger lower greenhouse gas emissions in most sectors, it is now only the emission reductions in the non-ETS sectors that are needed in order for Member States to comply with their Kyoto or burden-sharing targets. Success here will determine the extent to which governments will need to use the Kyoto mechanisms to achieve their targets.
- Many Member States have not yet fully factored in the impacts of the recent economic downturn. Thus in the short-term the projected emission estimates are likely to have been generally overestimated by Member States. In contrast, the economic downturn may limit the amount of public funds available for purchasing Kyoto units originally planned by countries.

Progress of Member States

- France, Germany, Greece, Sweden and the United Kingdom expect that they will maintain emission levels below their burden-sharing targets with the existing measures in place. Further emission reductions from additional domestic policies and measures, along with CO_2 removal from carbon sink activities, are projected to lead to over-achievement of the burden-sharing targets for these countries. These countries will thus not need to rely on acquiring extra Kyoto units to meet their targets.
- The planned domestic actions in the ten remaining EU-15 Member States will not be sufficient to reduce national GHG emission below their burden sharing targets. Nine of these Member States expect to meet their target through planned domestic action, carbon sink activities and use of Kyoto mechanisms.
- Only Austria does not expect to reach its burden-sharing target under current arrangements. Domestic emission reductions, the use of Kyoto mechanisms as currently planned and emission removals from carbon sink activities will not suffice to meet the target. However, the projections reported by Austria do not reflect the current economic downturn, and recent GDP growth estimates are much lower than those that Austria has used in their projections.
- Compared to the EEA analysis from 2008, Denmark, Italy and Spain are now expected to reach their burden-sharing target. Denmark has now reported updated projections that take into account recent measures in the energy sector. Italy now expects higher CO_2 removal from carbon sinks than last year. Spain now expects a more intensive use of the Kyoto flexible mechanisms. The EU ETS, which was not fully factored in the 2008 EEA analysis, will also play an important role in bringing additional allowances or CDM/JI credits to these countries — thereby increasing their assigned amount.
- In the EU-12, the emissions reductions achieved since 1990 are so large that, despite expected the emission increases from current levels, all Member States with a Kyoto target expect to meet or over-achieve their Kyoto targets. Slovenia is the only EU-12 Member State which anticipates that it will need to use the Kyoto mechanisms to meet its target. Cyprus and Malta do not have a target under the Kyoto Protocol.
- The other EEA member countries which have Kyoto targets (Iceland, Liechtenstein, Norway and Switzerland) and the EU candidate country Croatia, project that they will meet their target through a combination of domestic emission reductions, carbon sink removals and use of the Kyoto mechanisms.
- The progress of EU-15 Member States towards their targets was assessed, for the first time this year, by focusing on projections of their non-ETS emissions. In the future, new indicators with a focus on these non-ETS emissions will be used to track the annual progress of Member States towards their targets.

7.1 Projections of total EU-15 emissions

Based on the projections from Member States, total EU-15 emissions are projected to continue to decrease until 2010, in line with the observed trend since 2004 (Figure 7.1). Due to the important emission reductions expected by 2010, the rolling five-year average of EU-15 emissions is projected to decrease until 2012 under both scenarios 'with existing measures' ([38]) (WEM) and 'with additional measures' ([39]) (WAM).

With the measures already adopted or implemented only, emissions are projected to decrease until 2010,

([38]) Projections 'with existing measures' represent a 'business-as-usual' scenario where only policies and measures that have been already adopted or implemented are considered.
([39]) Projections 'with additional measures' represent a scenario where all the planned measures are considered to be fully implemented in a timely fashion.

and then increase until 2015. As a consequence, average emissions levels (five-year rolling average) will reach a level 6.9 % below the base-year levels by 2012.

Assuming timely adoption, implementation and full efficiency of additional measures by Member States, EU-15 emissions in the WAM scenario will decrease much faster than under the WEM scenario to be about 9 % below base-year levels in 2010. From 2010 onwards, emissions should continue decreasing, although more slowly than before. Consequently, average emission levels (over rolling five-year periods) are projected to decrease down to 8.5 % below base-year emissions by 2012.

Therefore according to the projections from Member States, additional measures would bring an average reduction from the scenario with existing measures equivalent to 1.6 percent of base-year emissions for the period 2008–2012. Under these conditions, the rolling average of EU-15 emissions over the five previous years is projected to pass the symbolic level of 8 % reduction below base year in 2012.

7.2 Tracking progress towards Kyoto targets and role of the EU ETS

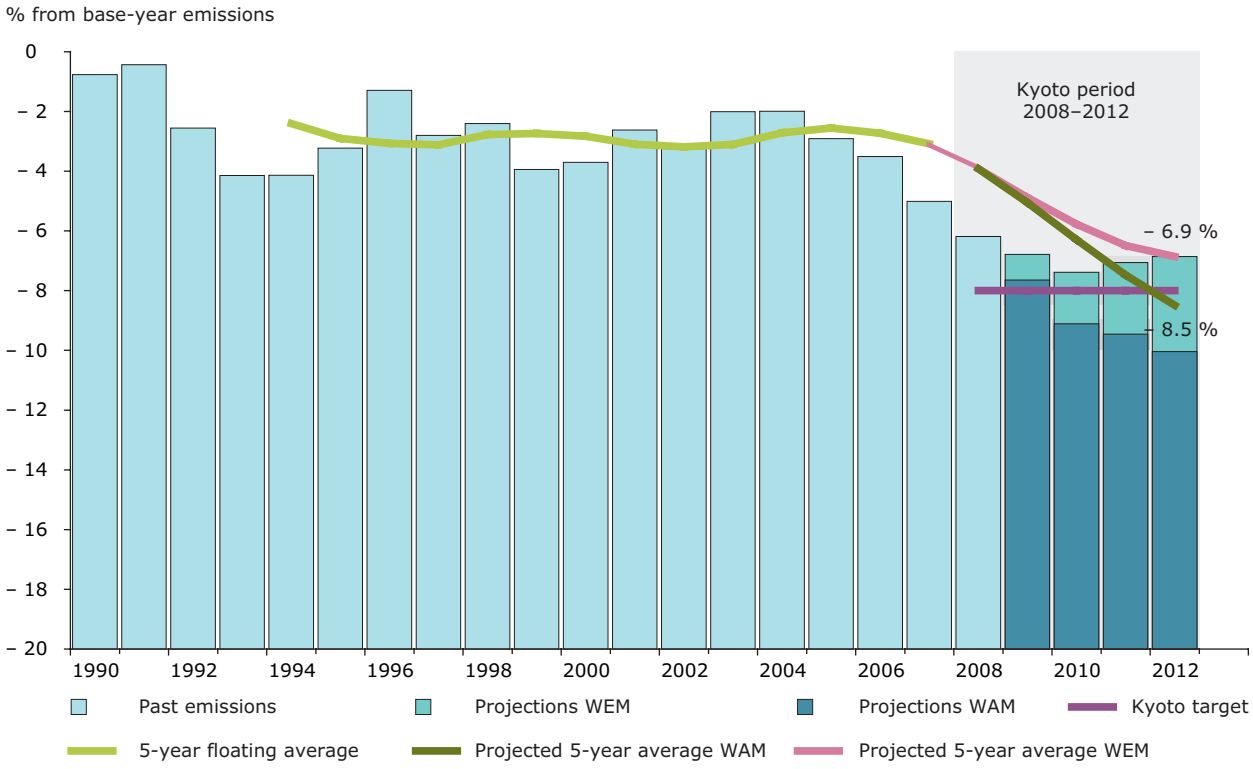
7.2.1 *Achieving 2008–2012 objectives: the 'Kyoto compliance equation'*

To comply with its objective under the Kyoto Protocol, a Party must limit its total greenhouse gas emissions during the five years of commitment period 2008–2012 to a level equal or below its assigned amount, which is the total quantity of Kyoto units (emission rights) it possesses. One Kyoto unit corresponds to 1 tonne of CO_2-equivalent.

Each Party's assigned amount is equal to:

- an initial assigned amount, determined according to the Party's base-year emissions and

Figure 7.1 Projected emission scenarios in the EU-15



Note: 2008 emissions based on 2009 EEA estimate. EU-15 projections are based on the sum of EU-15 Member States' annual emission projections. When no projection for a specific year was available from a Member State, emissions were estimated by EEA based on an interpolation between historic emissions (2007 or 2008 estimate), 2010 projections, 2015 or 2020 projections).
The projections assume full efficiency of existing and additional policies and measures, as reported by Member States.

Source: EEA, 2009.

its Kyoto target. This initial assigned amount is measured in assigned amount units (AAUs);
- *plus/minus* any additional Kyoto units that the Party has acquired from or transferred to other Parties through the Kyoto mechanisms (CERs from clean development mechanism projects, ERUs from joint implementation projects or AAUs from emission trading between governments);
- *plus/minus* any additional Kyoto units that the Party has issued/cancelled for net removals/emissions from a LULUCF activity (RMUs).

To comply with its Kyoto obligations, a Party needs to satisfy a 'Kyoto compliance equation', which can be summarised as follows:

'2008–2012 total GHG emissions' ≤ 'total Kyoto units'

With: 'total Kyoto units' = 'initial assigned amount (AAUs)' + 'use of flexible mechanisms (AAUs + CERs + ERUs)' + 'carbon sink removals (RMUs)'

Therefore to achieve its target, a Party can act on two sides of the 'compliance equation':

- *emissions side:* limiting or reducing its own emissions by acting at national level;
- *assigned amount side:* increasing its assigned amount, by acquiring additional Kyoto units at international level and by further enhancing CO_2 removals from carbon sink activities.

Compliance of EU-15 Member States under the internal EU burden-sharing agreement relies on the same principles, with each Member State's initial assigned amount being determined according to its individual burden-sharing target, instead of the – 8 % reduction target of the whole EU-15 under the Kyoto Protocol.

After final emissions have been reported for the commitment period in 2014, Parties to the Kyoto Protocol will have 100 days to undertake final transactions necessary to achieve compliance with their commitment (the 'true-up period'). The final Kyoto compliance assessment will therefore be done towards the end of 2014.

7.2.2 *Contribution of the EU ETS to help Member States achieving their targets*

The EU ETS is a domestic EU policy which aims at achieving cost-efficient emission reductions by setting emission targets to operators of installations in the EU (cf. Section 5.1). Operators have the choice between reducing their own emissions or purchasing carbon allowances (or CDM/JI credits) on the European carbon market, whenever this is more cost-effective. Member States projections indicate that the EU ETS is the domestic policy projected to deliver the most significant reductions in the EU (cf. Chapter 6).

The EU ETS is also linked to the flexible mechanisms under the Kyoto Protocol (cf. Annex A.4). Any transfer of allowances under the EU ETS eventually also leads to a transfer of AAUs under the Kyoto Protocol between Member States. An ETS allowance serves the purpose of proving compliance under the EU ETS whereas an AAU can be used by a Member State itself for compliance under the Kyoto Protocol. Projecting progress towards compliance for Member States, including the use of flexible mechanisms under the Kyoto Protocol, therefore requires also incorporating the effects of the EU ETS.

To comply with their Kyoto obligations, the EU-15 and Member States must satisfy the following equation:

'2008–2012 total GHG emissions'
≤
'initial assigned amount' + 'use of flexible mechanisms at government level'
+ 'carbon sink removals' + 'net balance of allowances under the EU ETS'
With: 'net balance of allowances under the EU ETS' = '2008–2012 GHG emissions covered by the EU ETS' – '2008–2012 emission cap in the EU ETS'

The assessment of EU-15 progress towards its 8 % reduction target using this method is presented in Section 7.4.

Following the introduction of the EU ETS and the finalisation of the second national allocation plans, Member States have determined national caps for the emissions from sectors covered by the EU ETS for the first commitment period of the Kyoto Protocol. By doing so, Member States have fixed the overall contribution of the EU ETS towards reaching their burden-sharing or Kyoto target. Consequently, they have also assigned themselves a new 'non-ETS target', equivalent to their initial assigned amount reduced by the ETS cap they have determined. Governments must therefore reach their Kyoto targets through emission reductions from policies and measures addressing the sectors not covered by the EU ETS and/or through flexible mechanisms.

Once national caps have been fixed for the sectors covered by the EU ETS, emission levels in these

sectors result in the trading of allowances at EU ETS level, but do not influence the Kyoto achievement of a Member State ([40]), since EU ETS operators are legally bound to surrender to their government an amount of allowances equivalent to their emissions (Figure 7.2).

The progress of a Member State towards its individual Kyoto target can therefore be assessed by comparing its 'non-ETS emissions' with its respective 'non-trading target' (Section 7.3), as reflected in the following equation:

'2008–2012 GHG emissions not covered by the EU ETS'
≤
'initial assigned amount' + 'use of flexible mechanisms at government level'
+ 'carbon sink removals' – '2008–2012 emission cap in the EU ETS'

Such assessment highlights the further efforts that some Member States need to undertake at national level to meet their target, by tackling primarily non-ETS emissions.

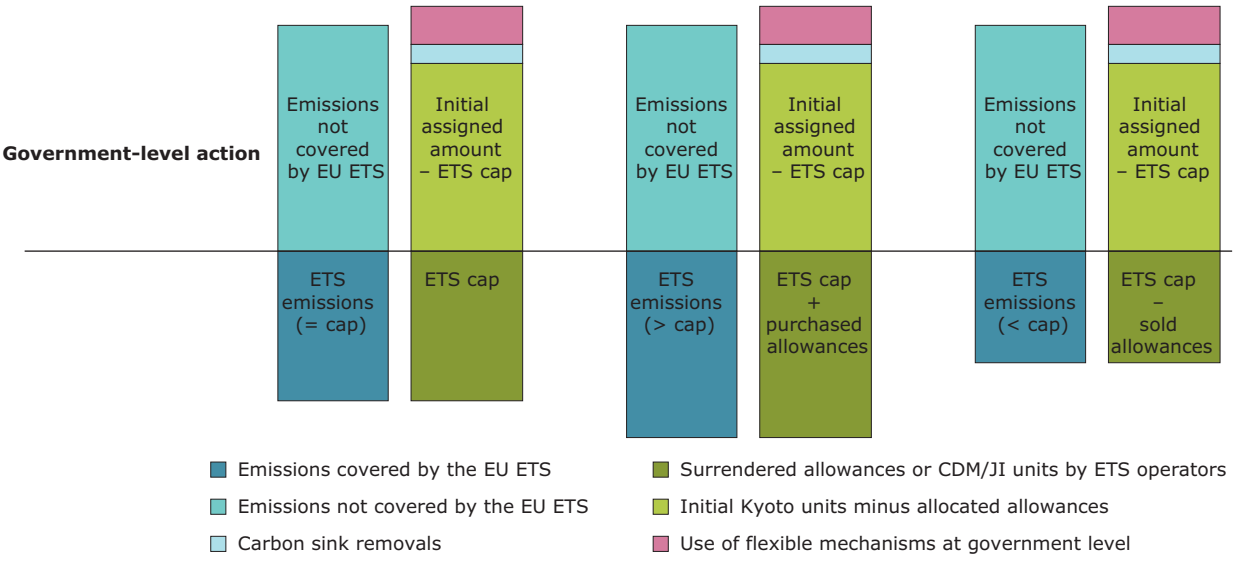
7.3 Progress towards 'non-ETS targets' in the EU-15

7.3.1 *Projections of emissions not covered by the EU ETS*

In this section, projected emissions in the sectors not covered by the EU ETS are projected with 'non-trading' targets at domestic level only, i.e. without considering potential use of Kyoto mechanisms or carbon sinks. Member States 'non-trading targets' for the first commitment period of the Kyoto Protocol depend on:

- the initial assigned amount fixed for each Party, based on its emissions in the base year and the target agreed under the Kyoto Protocol (or the EU burden-sharing agreement). It is not subject to any further change (cf. Annex A.3);

Figure 7.2 Effort split between ETS and non-ETS emissions to achieve Kyoto compliance



Note: All bars represent positive quantities of emissions or allowances. The ETS cap establishes the division of effort between the sectors covered by the EU ETS and those which are not, to achieve Kyoto targets at national level (left section). Whatever EU ETS emissions are in comparison with their cap (equal, higher or lower), operators have to surrender an equivalent quantity of allowances to their government in order to fulfil with their legal obligations.
Governments must therefore achieve compliance under the Kyoto Protocol by reducing or limiting emissions that are not covered by the EU ETS, with the possibility to use flexible mechanisms and carbon sink removals.

Source: EEA, 2009.

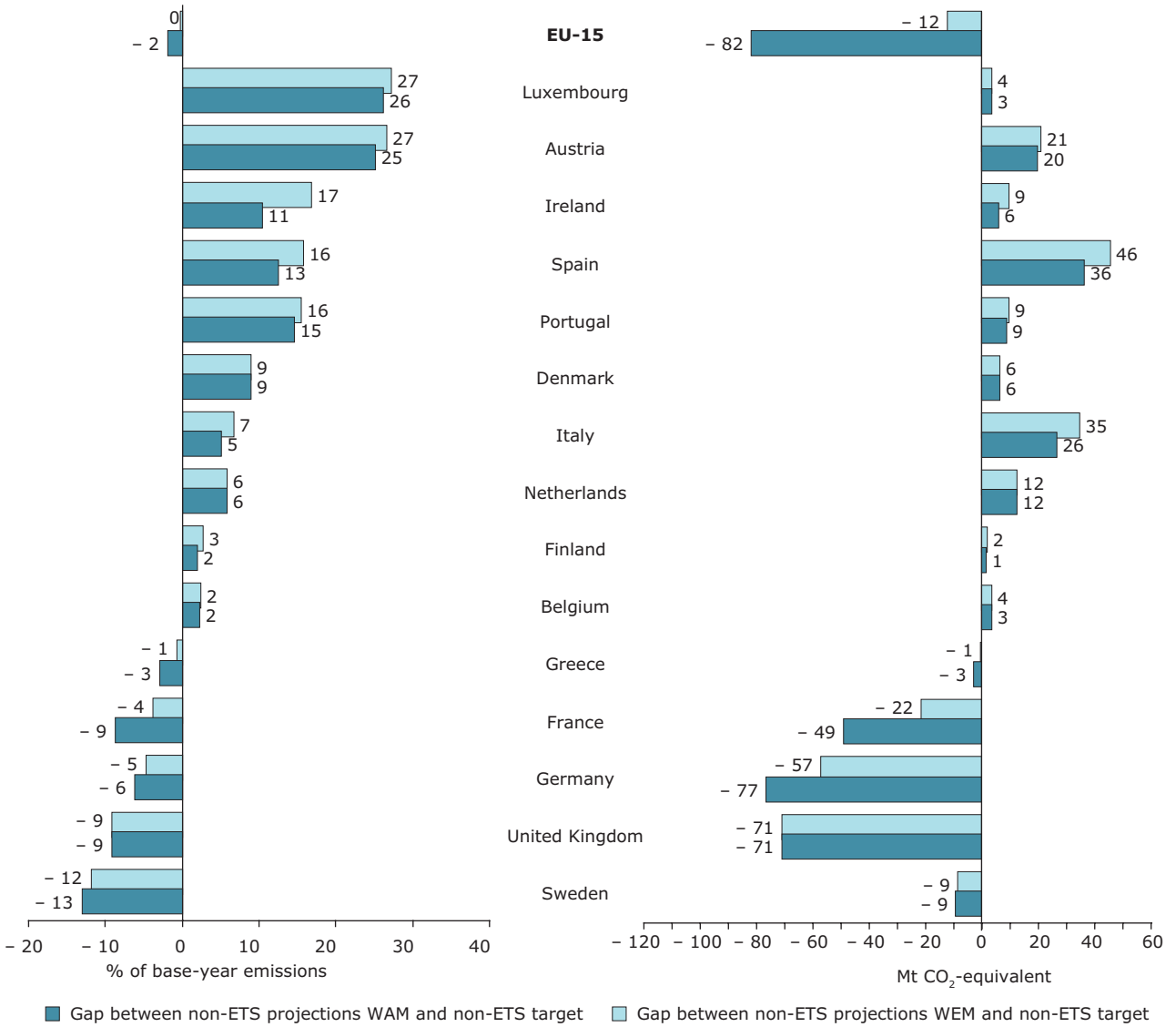
([40]) There is one exception to this rule: allowances remaining in the new entrants reserve at the end of the trading period that are not sold to the market might be used to achieve the national Kyoto target. Most Member States have not yet decided whether they intend to use any remaining allowances in the reserve or auction them. The present assessment assumes that all EUAs will be used by the trading sector and not transferred back to national governments.

- the 2008–2012 emission caps, corresponding to the total quantities of allowances attributed to the EU ETS sector according to the national allocation plans (NAPs) for the second trading period (2008–2012), including new entrants reserves.

Five EU-15 Member States (France, Germany, Greece, Sweden and the United Kingdom) project that domestic policies and measures will be sufficient to meet their burden-sharing targets. France expects significant emission reductions from the implementation of planned additional measures.

For the ten remaining EU-15 Member States, the implementation of domestic policies and measures (existing and additional) will not be sufficient to meet their burden-sharing targets (Figure 7.3). Thus these countries will have to consider further increasing their assigned amount by acquiring additional Kyoto units at international level and by enhancing their CO_2-removing carbon sinks (cf. Section 7.3.2). In relative terms, Austria, Ireland and Luxembourg project the largest gap to burden-sharing targets. In absolute emission levels, the gaps to targets are largest for Austria, Italy and Spain.

Figure 7.3 Gaps between projections of non-ETS emissions and non-ETS targets at domestic level



Note: Member States are ranked by increasing absolute gap between their non-ETS emissions and non-ETS targets. The non-ETS targets do not account for possible use of Kyoto mechanisms and carbon sink removals.

Source: EEA, 2009.

The projected national emission levels could be significantly affected by the economic recession, leading to more limited emission increases or deeper emission reductions (cf. Section 7.6.1).

GHG emission trends and projections in the EU-15 rely mainly on developments in the main emitting Member States: France, Germany, Italy, Spain, and the United Kingdom (cf. Section 2.1). Therefore, it is crucial that the projected emission reductions in these countries materialise through efficient implementation of both existing and additional policies in order to cut domestic EU-15 greenhouse gas emissions.

The overall assessment of projected emission trends at EU-15 level looks promising, since domestic emissions in the non-ETS sectors at EU-15 level are expected to decrease below the non-trading target. However this does not mean that the EU-15 will achieve its Kyoto target through domestic emission reductions only, since ten Member States will have to rely on other means to achieve their targets (use of flexible mechanisms, CO_2 removals from carbon sink activities).

7.3.2 *Use of Kyoto mechanisms and removals from carbon sink activities*

Member States' assigned amounts (and subsequently their 'non-trading targets') can be modified by:

- the use of the Kyoto mechanisms at government level (joint implementation, clean development mechanism, international emission trading): information on the projected use of such mechanisms is reported by EU Member States in a specific questionnaire under the EU Monitoring mechanisms (cf. Annex A.4).
- the expected CO_2 removals from carbon sink activities, under Articles 3.3 and 3.4 of the Kyoto Protocol (cf. Annex A.5).

Kyoto mechanisms

As an additional means of meeting commitments under the Kyoto Protocol, Parties have the possibility to use three market-based mechanisms to lower the overall costs of achieving emission targets for the commitment period 2008–2012: project-based mechanisms (joint implementation (JI), clean development mechanism (CDM)) and international emission trading, 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. Use of these mechanisms must be 'supplemental to domestic action' to achieve the Kyoto Protocol targets. The intended use of Kyoto mechanisms, as reported by Member States, is outlined in Table 4.2.

Information on AAU sales or purchases under international emission trading has not been communicated by Member States under the Monitoring Mechanism Decision, with the exception of Hungary which reported net sales of AAUs. Yet, some of this information is available from publicly available sources, based on official governmental communication. According to the latest information available from such sources ([41]), at least 11 AAU transactions have been concluded since 2008 and 12 more are currently under negotiation, involving a total of 14 Member States. These transactions correspond to a total exchange of more than 135 million AAUs (an average 27 million AAUs per year). All these transactions involve the selling of AAUs by EU-12 Member States (the Czech Republic, Estonia, Hungary, Latvia, Poland and the Slovak Republic) and/or the purchase of AAUs by EU-15 Member States (Austria, Belgium, Finland, Ireland, Italy, the Netherlands, Portugal and Spain). In general, few specific details have been provided by countries regarding the price of the AAUs sold and the spending of proceeds from AAU trading on green investment schemes. This information is not included in the present assessment because it was not reported under the Monitoring Mechanism, but it would usefully complement the present analysis.

Further information on Kyoto mechanisms is available in Annex A.3.

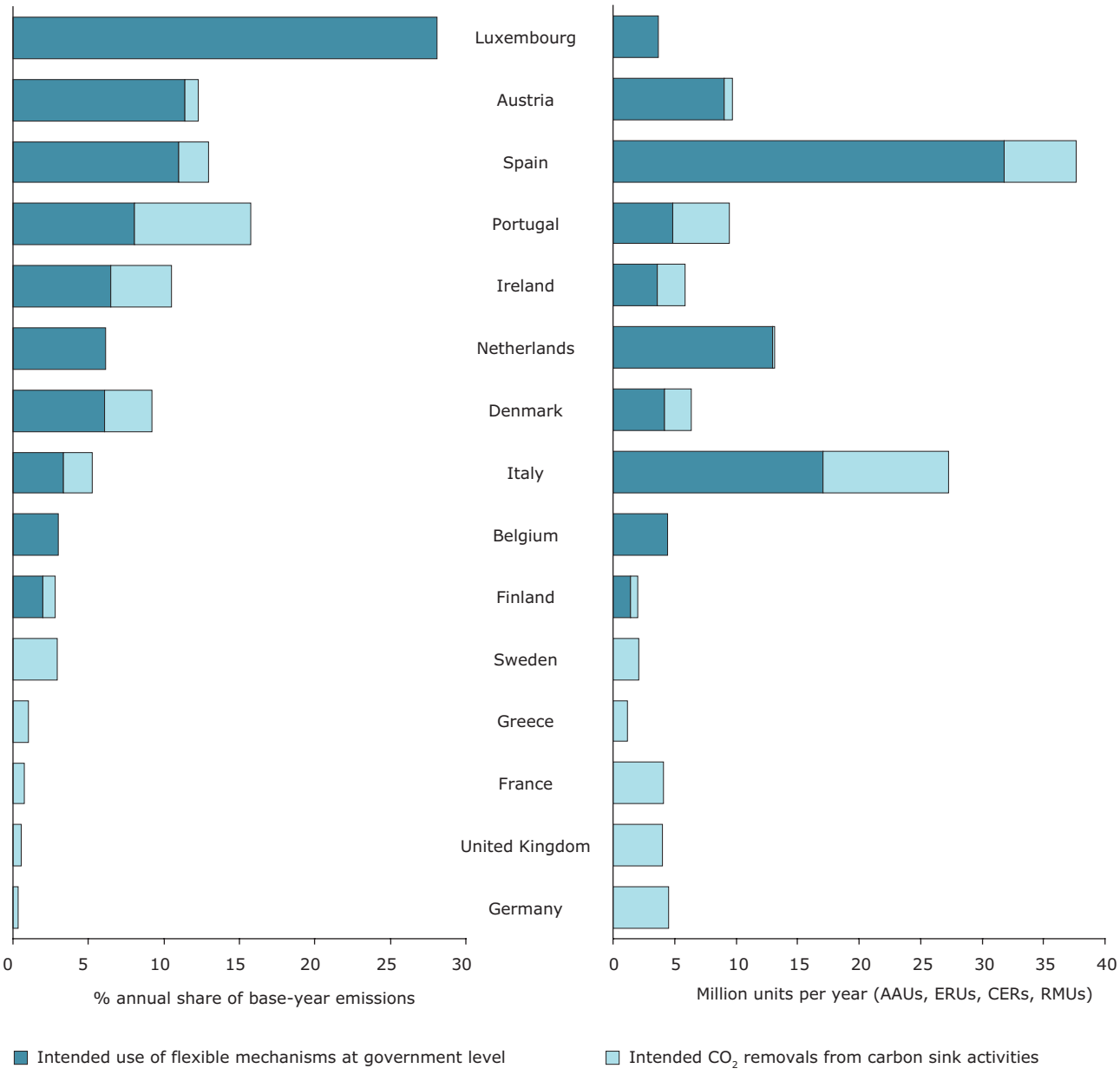
Carbon sinks

In addition to policies and measures targeting sources of greenhouse gas emissions, Member States can also use policies and measures to protect their existing terrestrial carbon stocks (e.g. through reduced deforestation, devegetation, forest degradation, and land degradation) and to further enhance terrestrial carbon stocks (e.g. increasing the area or carbon density of forests by afforestation and reforestation, rehabilitating degraded forests, altering the management of forest and agricultural lands to sequester more carbon in biomass and soil). These land use, land-use change and forestry (LULUCF) activities include:

([41]) www.pointcarbon.com/news/cdmjiaau/.

- afforestation, reforestation and deforestation (mandatory activities covered by Article 3.3 of the Kyoto Protocol), which encompass land which have been subject to direct, human-induced conversion from a forested to a non-forested state, or vice versa;
- forest management, cropland management, grazing land management and revegetation

Figure 7.4 Projected contributions of the EU ETS, Kyoto mechanisms and carbon sinks on the overall change of assigned amounts



Note: These figures present relative and absolute projected changes in assigned amounts (Kyoto units) (annual averages of assigned amounts for the commitment period 2008–2012).
Countries are ranked according to their projected use of Kyoto mechanisms (as a share of base-year emissions).
The Kyoto mechanism data presented here are based on information officially reported by Member States, which does not necessarily include all known sales and purchases of AAUs under international emission trading.

Source: EEA, 2009.

(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 use.

Parties must account for net emissions or removals for each activity during the commitment period by issuing RMUs (removal units) in the case of GHG removals from carbon sinks (e.g. afforestation) or cancelling Kyoto units in the case of net GHG emissions from carbon sinks. LULUCF activities can therefore be used to compensate emissions from other sources.

Further information on carbon sinks is available in Annex A.4.

Projected use of Kyoto mechanisms and carbon sinks
The information reported by Member States indicates that at least ten EU-15 Member States (Austria, Belgium, Denmark, Finland, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain) project to increase their assigned amount by using the Kyoto mechanisms (Figure 7.4). Austria, Luxembourg and Spain foresee a considerable use of these. CO_2 removals from carbon sink activities are expect to benefit to 12 EU-15 Member States, making the most significant contributions in Portugal.

At EU-15 level, Spain and Italy will be significant contributors to increasing the EU-15's assigned amount by the use of Kyoto mechanisms at government level (excluding possible transfer of AAUs under international emission trading). Carbon sink removals projected in Italy are also the largest in absolute terms in the whole EU.

7.3.3 Progress towards Kyoto targets

A comparison of projected non-ETS emissions during the commitment period and non-ETS targets for each Member State indicates that all but one Member State, Austria, expect that they will meet their target (Figure 7.5). Based on the projections submitted by EU-15 Member States and their assessment by the EEA:

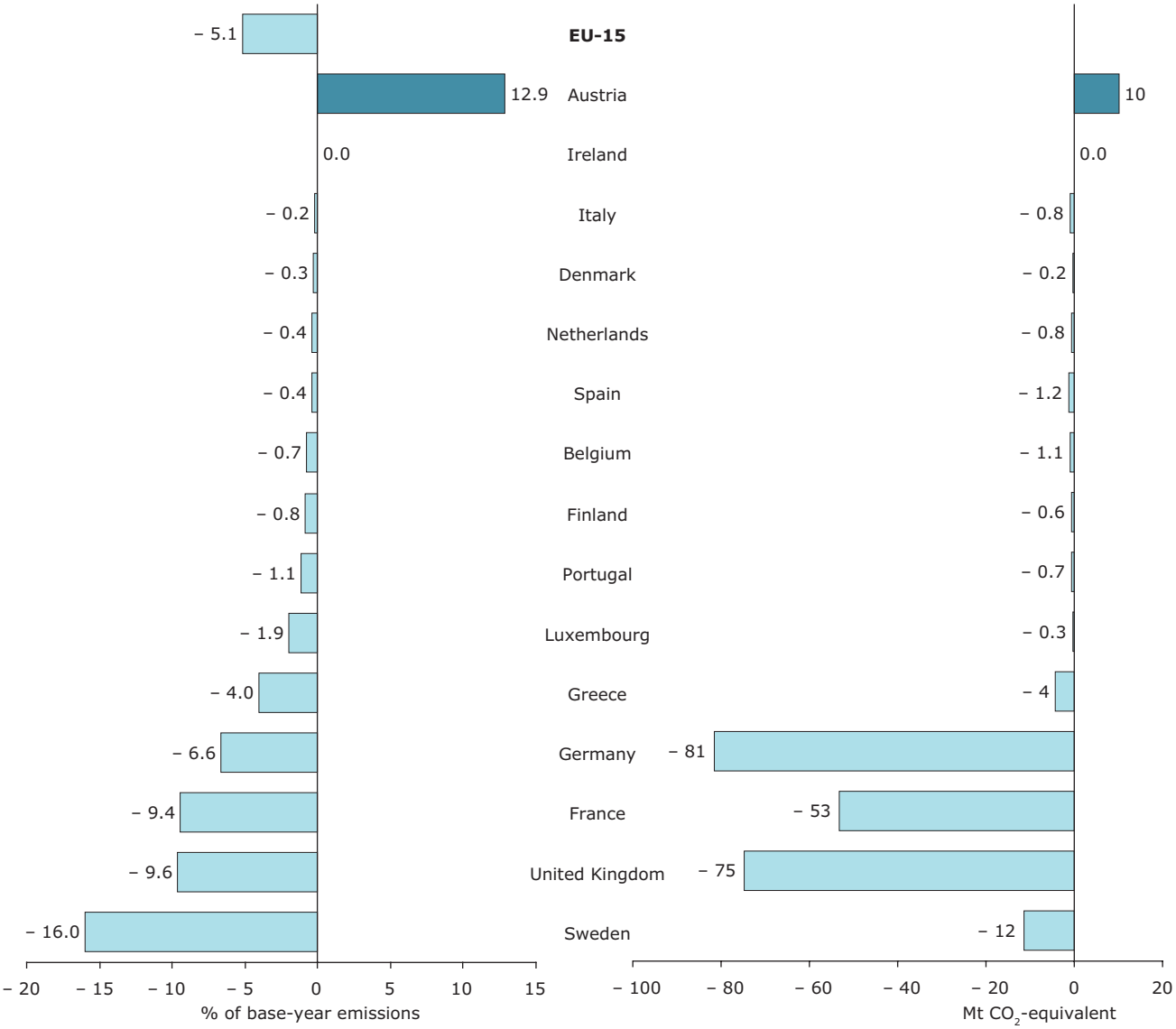
- France, Germany, Greece, Sweden and the United Kingdom will overachieve their burden-sharing target with the existing measures in place and no use of flexible mechanisms will be required. All of these countries have already achieved emission levels below their respective burden-sharing target. These countries also project further emission reductions from domestic policies and measures and carbon sink activities. The large amounts of surplus AAUs projected by France, Germany and the United Kingdom will play an important role in the discussion on the EU-15 achievement of its overall target.
- Belgium, Finland, Ireland, Luxembourg, the Netherlands and Portugal expect that they will meet their burden-sharing target by adopting and implementing the policies and measures they have planned, obtaining CO_2 removals from carbon sink activities or acquiring Kyoto units from other Parties through the Kyoto mechanisms.
- Denmark, Italy and Spain also project that they will reach their burden-sharing target, which was not the case in 2008. This may be due to the EU ETS, which was not fully factored in the 2008 analysis. Furthermore, compared to 2008, Denmark has now reported new projections taking into account recent measures in the energy sector, Italy expect higher CO_2 removal from carbon sinks than last year and Spain expects now a more intensive use of the flexible mechanisms.
- Austria does not expect to reach its burden-sharing target under current arrangements. The small further reduction expected from implementing additional measures, the use of Kyoto mechanisms as currently planned and emission removals from carbon sink activities will not suffice to meet the target. However, these projections do not reflect the current economic downturn, and recent GDP growth estimates are much lower than what Austria has used in their projections. Compared to the projections used in the 2008 assessment, the projected savings from additional measures have been drastically reduced. The use of Kyoto mechanisms as currently planned and expected emission removals from carbon sink activities will not suffice to meet their target.

7.4 Progress of the EU-15 towards its Kyoto target

EU-15 GHG emissions are anticipated to be well below the total assigned amounts by the end of the commitment period, due to:

- the combined emission reductions expected in EU-15 Member States, in particular in three of the main emitting countries (France, Germany and the United Kingdom). Full delivery of all expected emission reductions would bring total EU-15 emissions 6.8 % below base year with the existing measures and down to 8.5 % with implementation of the additional measures

Figure 7.5 Projected gaps between emissions and Kyoto units in Europe



Note: EU-15 figure in absolute terms (– 217 Mt CO_2-equivalent) not represented due to significantly higher value compared to chosen scale.
Countries ranked by decreasing relative gap between their total 2008–2012 projected non-ETS emissions and their non-ETS Kyoto target.
Projections from most Member States, including Austria, do not fully reflect the effects of the economic recession

Source: EEA, 2009.

planned. This represents an important change compared to the assessment made in 2008 (EEA, 2008a), where domestic emissions with existing and with additional measures were projected to be 3.3 % and 6.9 % below base-year emissions, respectively. This change is the consequence of a strong increase in expected savings under existing measures, while expected savings from additional measures were reduced.

- The anticipated net purchase of EU allowances and project-based emission credits by EU ETS operators in the EU-15, representing approximately 1.4 % of base-year emissions. This effect was not fully reflected in the 2008 analysis.
- CO_2 removals from the atmosphere due to enhancement of carbon sinks (e.g. forest management) being expected to generate RMUs equivalent to 1.0 % of base-year levels (1.3 % according to the projections reported in 2008).
- The use of flexible mechanism planned by 10 Member States to cover the gap left between their emissions and their assigned amount

levels (purchase of CERs, ERUs and AAUs), accounting for 2.2 % of base-year emissions (a decrease from the 3.0 % reported in 2008).

Aggregated data at EU level indicate that if emission reductions from existing domestic policies and measures (business as usual) are fully reached, the EU-15 could apparently achieve its target with only one of three options (additional measures, carbon sinks or Kyoto mechanisms). This is not the case in practice, because some Member States will need to make use of these three options, sometimes altogether, in order to achieve their own burden-sharing target.

If all the potential reductions and unit transfers were fully achieved, the difference between average EU-15 emissions (8.5 % below the base year) and the total assigned amount during 2008–2012 (3.4 % below the base year) would reach 217 Mt CO_2-equivalent, or 5.1 % of base-year emissions (Figure 7.6). This over-achievement relies on an assumption regarding the use of surplus AAUs by EU-15 Member States at the end of the commitment period (cf. Section 7.5).

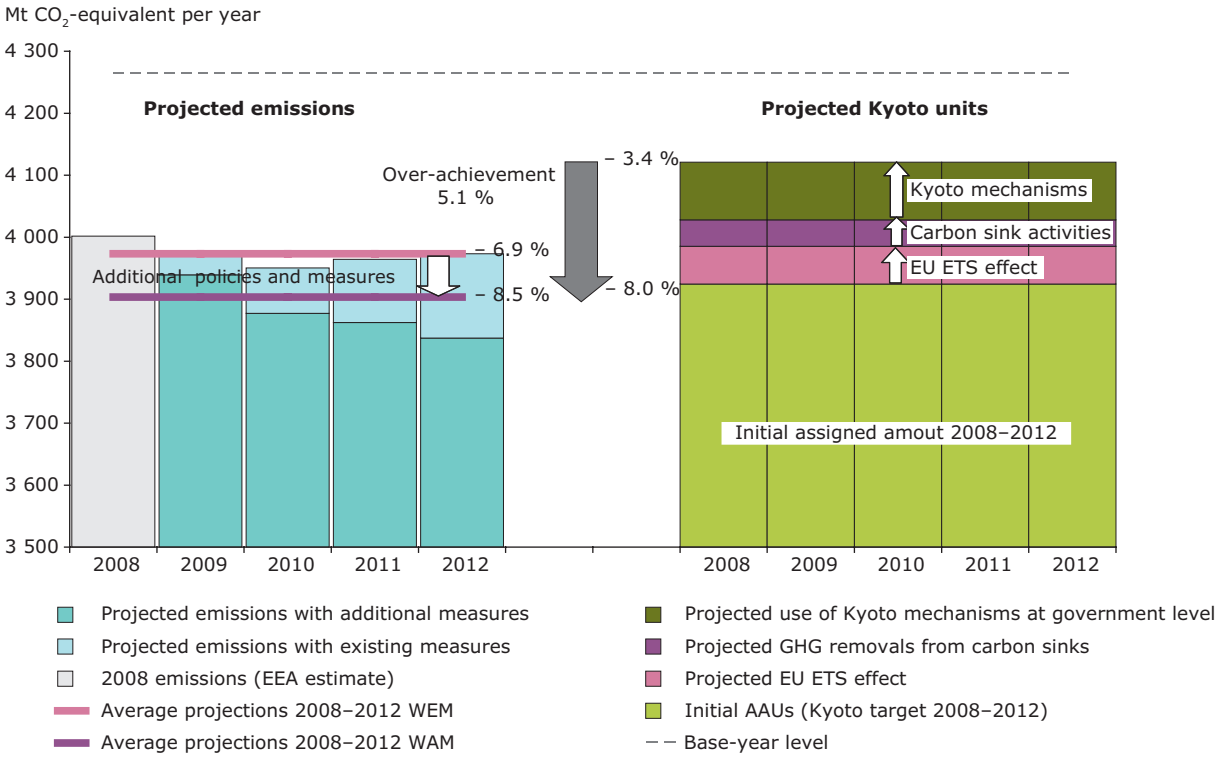
Compared to the 2008 analysis, the overall situation for the EU-15 improved on two aspects: current levels of domestic emissions are getting closer to the target than they have ever been since 1990, while overall the extent to which the EU-15 is projected to over-achieve its target has increased from 3.3 % to 5.1 % (as a share of base-year emissions).

7.5 Progress of non-EU-15 European countries

In the EU-12, emissions are expected to increase from current levels. However, all Member States which have a Kyoto target expect to meet or over-achieve their Kyoto targets. Slovenia is the only EU-12 Member States which anticipates it will need to use the Kyoto mechanisms to meet its target. Cyprus and Malta do not have Kyoto targets.

The other EEA member countries which have a Kyoto target (Iceland, Liechtenstein, Norway and Switzerland) and Croatia project that they will meet their target through domestic emission reductions,

Figure 7.6 Projected progress towards EU-15 Kyoto target



Note: The left section presents the projected emissions considering domestic measures (existing and additional) shown as average 2008–2012 emissions (lines) and annual emissions (bars). The right section shows the assigned amount units and the contribution of the EU ETS, carbon sink activities and the use of Kyoto mechanisms.

Source: EEA, 2009.

carbon sink removals and use of the Kyoto mechanisms.

7.6 Uncertainties affecting the overall assessment of progress

The projections prepared by Member States are based on a number of assumptions regarding socio-economic parameters (population, GDP, fuel prices, carbon prices, etc.) and on expected effects of the policies implemented or planned to reduce greenhouse gas emissions.

7.6.1 Potential effects of the economic recession

As mentioned in Chapter 2, GHG emissions are sensitive to economic parameters and the economic crisis affecting global economy has direct impacts on current GHG emission trends, as for example lower household consumption and lower industrial output generate less resource and energy use, which reduces emissions compared to normal economic circumstances. This recession can be expected to have an important influence in future developments of GHG emissions, in particular in the short term, and might also differ between countries.

Knowing whether Member States have taken into account in their projection assumptions on the new economic conditions resulting from the crisis constitutes a particularly important element to qualify and interpret these projections, in particular 2010 projections.

Projection models use gross domestic product as a parameter to reflect past and projected economic growth. Including the effects of the economic crisis in projections necessitates disposing of recent GDP forecasts and scenarios provided by national ministries of economy or finance or national agencies. Once it became clear that the economic crisis was global and affecting all sectors of the economy, it was difficult for many Member States to update their greenhouse gas emissions projections before Spring 2009, when these had to be submitted. Consequently, a limited number of Member States (Belgium, the Czech Republic, Greece, Ireland, Italy, Lithuania and Spain) indicate that they have managed to include the effects of the economic crisis in their greenhouse gas emissions projection scenarios, although to different extents.

All Member States except Cyprus and Hungary provide the underlying GDP growth assumptions (2005, 2010, 2015 and 2020). The European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN) updated its annual macro-economic database (AMECO) in April 2009. This includes short-term economic forecasts for all EU Member States. Based on these two data sources, average 2007–2010 annual growth rates were calculated for each country (Figure 7.7). A comparison of the two sets reveals striking differences:

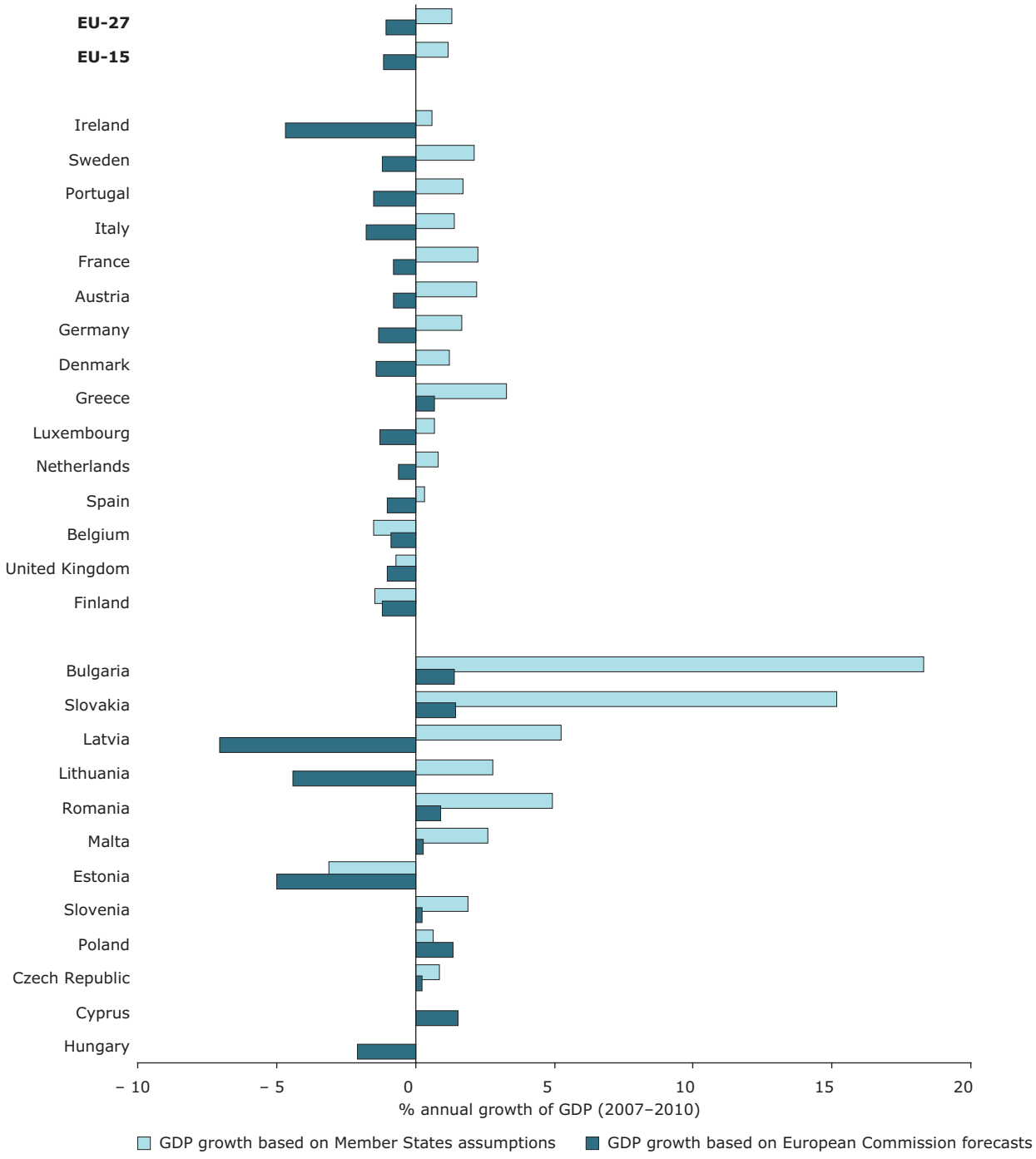
- all Member States' assumptions on GDP are more optimistic than DG ECFIN forecasts, except in Belgium, Finland and Poland.
- Member States assumptions imply a positive GDP growth for EU-15 and EU-27 between 2007 and 2010, while European Commission forecasts indicate economic recession. The difference between average annual growths from the two data sets is equal to 2.4 % per year. It is therefore likely that 2010 GHG projections for the EU are overestimated;.
- all EU-15 Member States except Belgium, Finland and the United Kingdom assume positive GDP growth between 2007 and 2010 while European Commission forecasts indicate only such trend for Greece. This result is particularly striking for Ireland, Italy and Spain, which have all indicated that their projections included the effects of the crisis but project positive GDP growth. However, Spain and Ireland project a very low GDP growth;
- the largest differences between the two estimates are observed in EU-12 Member States, in particular in Bulgaria, Latvia and the Slovak Republic. In the case of Latvia, the projected trends are also opposite.

Given the differences between these GDP growth estimates and the relatively high importance of GDP forecasts for projected greenhouse gas emissions, it is likely that the level of greenhouse gas emissions, in the short-term, have been generally overestimated in the projections by Member States.

In particular, emissions in EU-12 Member States (Bulgaria, Latvia, Lithuania, and the Slovak Republic) could be overestimated due to very optimistic assumptions on GDP, before the economic crisis affected these countries. It is however not possible to quantify the extent of this overestimation. Besides, other parameters are used in projection models so the effect of optimistic GDP assumptions could be counterbalanced by more pessimistic assumptions on other parameters having an inverse effect.

Although the economic downturn is likely trigger lower national greenhouse gas emissions, it is important to note that it is the emission reductions

Figure 7.7 Comparison between Member States assumptions and European Commission forecasts regarding annual GDP growth 2007–2010



Note: Annual growth rate = (GDP2010/GDP2007)1/3-1.
Member States are grouped by region (EU-15, EU-12) and ranked according to the decreasing gap between the two estimates of average annual growth rate 2007–2010.
European Commission forecasts: GDP from AMECO provided in 2000 constant prices. Short-term economic forecasts produced by DG ECFIN, under its own responsibility, twice a year.
Member States assumptions: GDP provided by Member States for 2005 and 2010, in 2000 constant prices, except for France, the Netherlands and the United Kingdom (not defined), Germany and Ireland (2005 prices) and Belgium (other). The 2007 GDP values were estimated by EEA, based on 2005 values reported by countries and 2005–2007 growth rates based on AMECO data.
No 2010 GDP assumptions available for Cyprus and Hungary. The 2010 GDP for EU-27 was estimated using 2005 GDP values for these two countries.

Source: EEA; DG ECFIN (AMECO).

in the non-EU ETS sectors that may help Member States complying with their burden-sharing targets. A recession-induced reduction of greenhouse gas emissions in the EU ETS sectors will result in additional allowances for operators in the ETS as compared to a 'non recession scenario'. These extra emission allowances will not be at the disposal of 'their' governments for Kyoto compliance. In other words, the recession will reduce equally emissions in the EU ETS and the amount of allowances that will have to be surrendered to governments, which in theory should lead to a nil effect.

In addition to its likely effects on the development of GHG emissions, the economic crisis may also affect the second part of the 'Kyoto compliance equation': the accounting of assigned amounts. Governments' decisions to purchase additional Kyoto units under the Kyoto flexible mechanisms may be affected by:

- less need to use the Kyoto mechanisms, since more emission reductions will be achieved domestically (which is what will happen at the level of EU ETS operators, where lower emissions than expected will result in less allowances to surrender);
- a potentially lower availability of public funds to that effect, as a consequence of the recession. In that respect, it is a positive sign that Spain, one of the EU-15 Member States encountering most difficulty to achieve its burden-sharing target, has factored the economic recession into its projections on GHG emissions as well as on the use of Kyoto mechanisms.

7.6.2 *Effects of future EU policies (climate and energy package)*

GHG projection scenarios reflect the expected quantified effects of policies and measures that are or will be implemented to reduce emissions. Short-term but more importantly, long-term projections should reflect all major policies that will result in emission savings. However, only 11 Member States (Belgium, Cyprus, the Czech Republic, Finland, Greece, Germany, Ireland, Italy, Luxembourg, Portugal and Romania, which represent altogether 46 % of 2007 EU-27 emissions) reported that they had — to some extent — taken into account in their projections the new EU 2020 targets and the subsequent package of measures to reduce emissions. These measures may also have an effect on short-term emissions, as the package includes annual emission targets applicable as soon as 2013. GHG projections from the majority of Member States do not yet reflect all the additional policies and measures that will be implemented and are therefore to some extent overestimated.

7.6.3 *Implications of target over-delivery by some Member States*

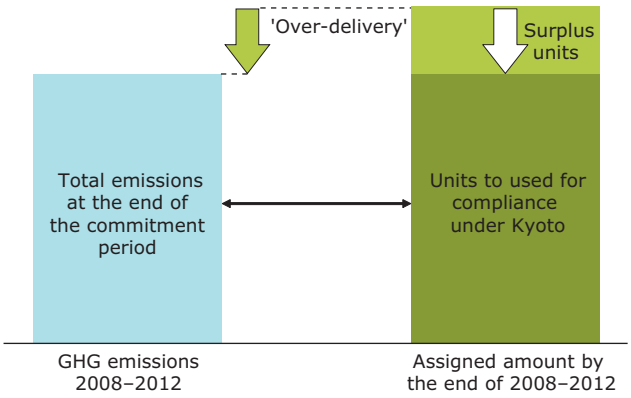
A Member State who would limit or reduce its domestic emissions below its total assigned amount would hold an amount of unused AAUs (or other unit types) by the end of the commitment period. Such over-deliveries with domestic policies and measures alone are projected by France, Germany, Greece, Sweden and the United Kingdom, with the largest surplus AAUs in the EU-15 anticipated by France, Germany and the United Kingdom. Most EU-12 Member States also project large amounts of surplus AAUs (Figure 7.8).

By the end of the commitment period, a Kyoto unit held by a Party within its national registry can be:

- transferred to another Party's registry (e.g. under international emission trading),
- 'retired', i.e. used towards meeting a Kyoto or burden-sharing commitment,
- cancelled, i.e. this unit would not be further transferred or used towards meeting a Kyoto or burden-sharing commitment.

In addition, the Kyoto Protocol allows Parties holding surplus units by the end of the commitment period to request that these units (except RMUs) be carried over to the subsequent commitment period, subject to applicable rules. Without limitation, such banking may have considerable negative effects on the environmental integrity of a future climate agreement and on the comparability of efforts among Annex I Parties.

Figure 7.8 Concept of target over-delivery and surplus assigned amount



Source: EEA, 2009.

If surplus AAUs held by an EU-15 Member State by the end of the commitment period were retired or transferred, to be subsequently retired, either to another EU-15 Member State or to the European Community, the EU-15 would benefit from these AAUs and would be able to fill any shortfall of units left by any Member State not able to meet its burden-sharing target.

If surplus AAUs held by an EU-15 Member State by the end of the commitment period were transferred to another Party outside the EU-15, cancelled ([42]) or possibly banked, the EU-15 would not be able to benefit from these units for its compliance and the extent of the over-delivery currently projected would be subsequently reduced.

In a hypothetical situation where no EU-15 Member State would make available any surplus Kyoto unit to the EU-15 for its compliance, the EU-15 would have to rely on each single EU-15 Member State achieving its own burden-sharing target. This would put the EU-15 situation at higher risk, since any Member State policy or measure would have to deliver the full projected emission reduction. Taking the current projections into account, the EU-15 would be left with an annual deficit of 10.2 million units (0.2 % of base-year emissions), equivalent to the deficit of Kyoto units currently projected in Austria. The EU-15 would therefore be unable to reach its target.

Tracking and measuring the achievements of policies and measures in terms of emission reductions will become increasingly important, in particular in the sectors not covered by the EU ETS, since any failure in the delivery of these measures will have to be compensated by the acquisition of additional assigned amounts through Kyoto mechanisms. The Kyoto mechanisms will, in practice, act as a safety valve since Parties, under the Kyoto Protocol, can undertake final transactions necessary to comply with their commitment during a 100-day period after 2012 emissions have been reported (in 2014).

7.7 Future methodological improvements to track progress

Until 2008, the EEA has monitored the progress of Member States towards reaching their commitments under the Kyoto Protocol by comparing projected emissions with Kyoto or burden-sharing targets. The intended use of flexible mechanisms and carbon sink removals were considered as further emission reductions and were therefore accounted for on the emissions side of the compliance equation.

Some of the weaknesses of this approach have been addressed in this year's assessment:

- a clear separation between GHG emissions and assigned amounts has been introduced in order to better reflect the legal principles of compliance under the Kyoto Protocol;
- instead of considering 2010 projections as representative of emissions during the full commitment period 2008–2012, annual emissions during the period have been estimated. When available, 2008 GHG estimates have been taken into account to estimate these 2008–2012 GHG projections, in order to take into account the latest GHG emission trends available. These 2008 estimates also represent the first historic data of the commitment period used in the assessment;
- since Member States' overall targets have in effect been translated into 'non-trading targets', the assessment of their projected progress towards their targets has focused on their emissions in the sectors not covered by the EU ETS.

Several issues nevertheless remain to be addressed in future assessments:

- projections normally have a mid- to long-term time horizon and might not be suitable for short-term analysis;
- any failure in the delivery of policies and measures in terms of emission reductions in the sectors not covered by the EU ETS will have to be compensated by the acquisition of additional assigned amounts through Kyoto mechanisms. Better tracking and measuring these effective domestic achievements, as well as the use of Kyoto mechanisms, instead of solely relying on projections, will therefore become increasingly important;
- as emission trading has begun, it is important that progress towards reaching the commitment also includes information on purchased or sold AAUs, CERs or ERUs from Member States' accounts in the national registries.

([42]) For example, the Government of the United Kingdom has repeatedly stated that it reserves the right to retain or cancel surplus units in order to meet domestic policy commitments.

- in 2010, official data for the first years of the commitment period will be available (in particular information from national registries), which will make possible an analysis of real instead of projected performance;
- the special accounting rules under the Kyoto Protocol in the LULUCF sector are not taken into account in all Member State projections but are crucial to the target assessment.

To address these issues, the EEA and its ETC/ACC is in the process of developing a set of new indicators, in close cooperation with Member States and the European Commission, to assess the progress of EU-15 and its Member States towards meeting their Kyoto targets in a more complete and comprehensive way. Three different indicators are under preparation:

1. An indicator comparing EU-15/Member States' emissions during the commitment period with their Kyoto or burden-sharing targets, to answer the question, 'Where do EU-15/Member States stand today with regard to their Kyoto target?'.
2. An indicator comparing EU-15/Member States' emissions of the sectors not included in the EU ETS during the commitment period with their 'non-trading sector target' (Kyoto or burden-sharing target minus the EU ETS cap for 2008–2012). This should reflect the transfer of Member States' overall target into a non-ETS-based target, due to the assignment of emission caps to EU ETS operators for the second trading period 2008–2012. This should help resolve the question, 'Where do EU-15/Member States stand in their efforts to achieving their Kyoto target by reducing emissions in the sectors not included in the EU ETS?'.
3. An indicator looking into the future, which compares historic emissions and EEA projections of emissions from the non-ETS sectors with the permissible emissions for these sectors during the commitment period, in answer to the question, 'What is the projected progress of EU-15/Member States towards their targets by the end of the first commitment period?'

The three indicators complement each other but are not able to reflect the effects of new policies and measures and time-delayed effects of decisions already taken. Consequently, these indicators will not provide a final determination of the Kyoto compliance of a country but will rather describe a country's position in relation to the Kyoto target at a given point in time.

8 EU progress towards 2020 targets

- The EU-27 is estimated to have reduced domestic greenhouse gas emissions by approximately 10.7 % between 1990 and 2008. The EU-27 is more than halfway through achieving its unilateral target of – 20 % by 2020, accounting for domestic emission reductions only.
- Full implementation of the planned additional measures is expected to bring EU-27 domestic emissions down to 14 % below 1990 levels by 2020, thus potentially delivering almost three quarters of EU's unilateral 2020 commitment through domestic measures only. These projected domestic emission reductions in the EU-27 could be larger if more than the current 11 Member States had accounted for the effects of the EU climate change and energy package in their projections of domestic emissions by 2020. In addition, the potential use of flexible mechanisms in the period 2013–2020, in line with the EU climate and energy package, could further reduce EU-27 emissions.
- In the sectors not covered by the EU ETS, additional measures addressing energy use (energy performance of buildings) and transport (modal shift, biofuels and car efficiency) are expected to play an important role to meet the national 2020 targets.

8.1 Projections of total emissions

EU-27 GHG emissions reached in 2007 a level 9.3 % below 1990 levels. EEA estimates, published in August 2009, indicate that EU-27 greenhouse gas emissions decreased further in 2008 and now stand 10.7 % below the 1990 level. This is more than halfway to the unilateral target of a 20 % reduction of greenhouse gas emissions by 2020 compared to 1990 levels.

The two projections scenarios for 2020 reported by Member States ('with existing measures' (WEM) and 'with additional measures 'WAM') diverge widely. With the existing measures in place, EU-27 greenhouse gas emissions are projected to continuously increase from 2008 levels until 2010, 2015 and 2020, to reach a level 6.0 % below 1990 emissions in 2020 (close to the level recorded in 1993). If the additional measures currently planned by Member States are adopted and fully implemented, the decrease observed in EU-27 emissions since 2004 could actually further continue until 2010, 2015 and 2020, down to a level 14 % below 1990 emissions (Figure 8.1). This would be 6 percentage points higher than the 20 % target level set unilaterally by the EU Council but part of the reduction towards the target could be achieved through use of flexible mechanisms both in the trading and in the non-trading sectors, as foreseen in the EU climate and energy package.

Only 11 EU-27 Member States (Belgium, the Czech Republic, Cyprus, Finland, Germany, Greece, Ireland, Italy, Luxembourg, Portugal and Romania) ([43]) have to some extent taken into account in their projections the effects on domestic emissions of the measures included in the EU energy and climate change package (cf. Section 7.6.2).

Projection trends differ significantly between countries (Figure 8.2). Six Member States project that their emissions will increase until 2020 if the planned additional measures are not implemented. Eight other Member States as well as Iceland and Turkey project that their emissions will increase until 2020 despite the implementation of all existing and planned additional measures.

([43]) Together these Member States represented 46 % of total EU emissions in 2007.

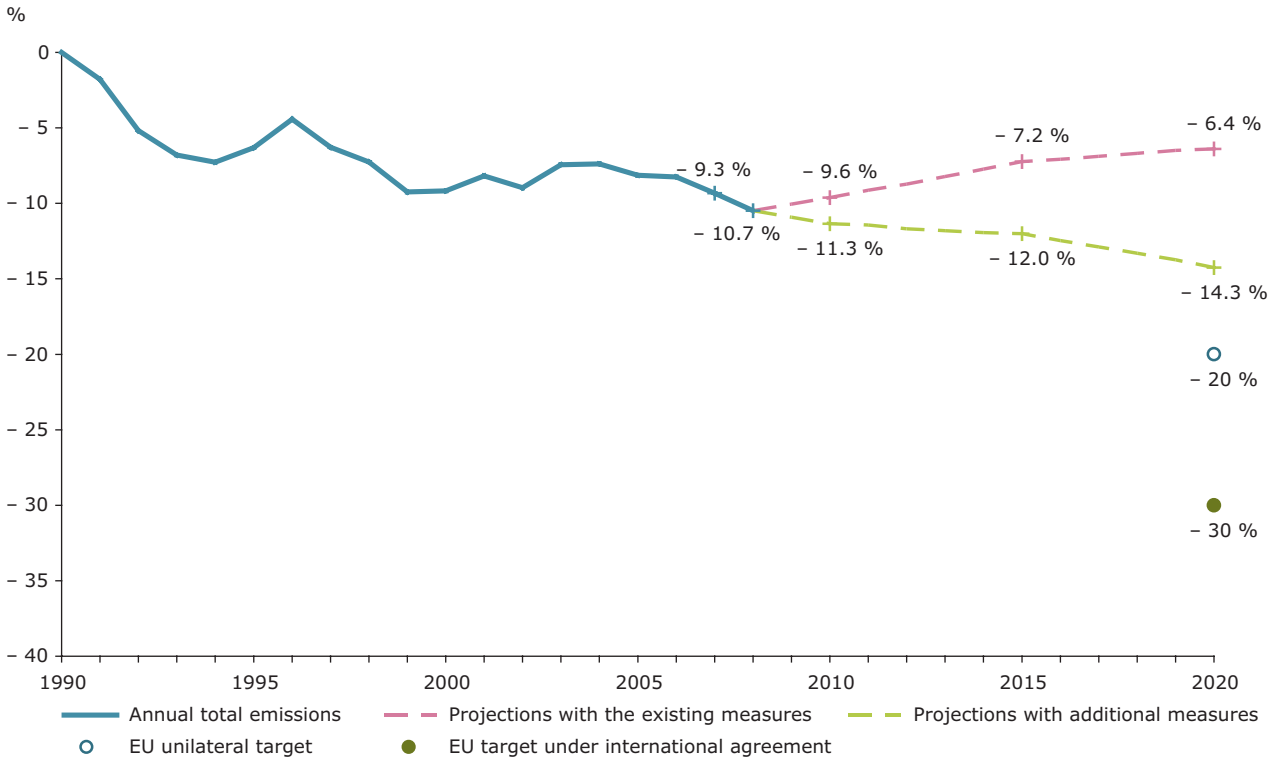
8.2 Projections of emissions not covered by the EU ETS

There are no projections covering specifically the 'non-trading sector' for 2020. However, the sectoral projections presented in Section 4.3.3 provide a good indication of how emissions in certain non-trading sectors are currently expected to evolve until 2020.

In particular, the projections concerning transport and energy use, which account for the major part of the non-trading sector, underline the importance of implementing effectively the planned measures to achieve actual emission reductions. In particular, Austria, Italy, Germany and the United Kingdom expect notable reductions from the implementation of the Directive on the Energy Performance of Buildings (2002/91/EC). Among the EU-12 Member States, the Czech Republic, Cyprus and Hungary expect the largest reductions from this EU policy. Spain and Hungary expect strong reductions in transport emissions until 2020 by achieving a shift from road to rail. Germany, Italy and the United Kingdom expect a marked effect of the Biofuels Directive until 2020. The agreements with car manufacturers are also expected to contribute to further emission reductions in the transport sector, although these agreements have been superseded by new EU legislation targeting passenger car emissions.

Chapter 4 and Annex A.2 provide more details on the expected effects of EU and national policies and measures in Member States and by sector.

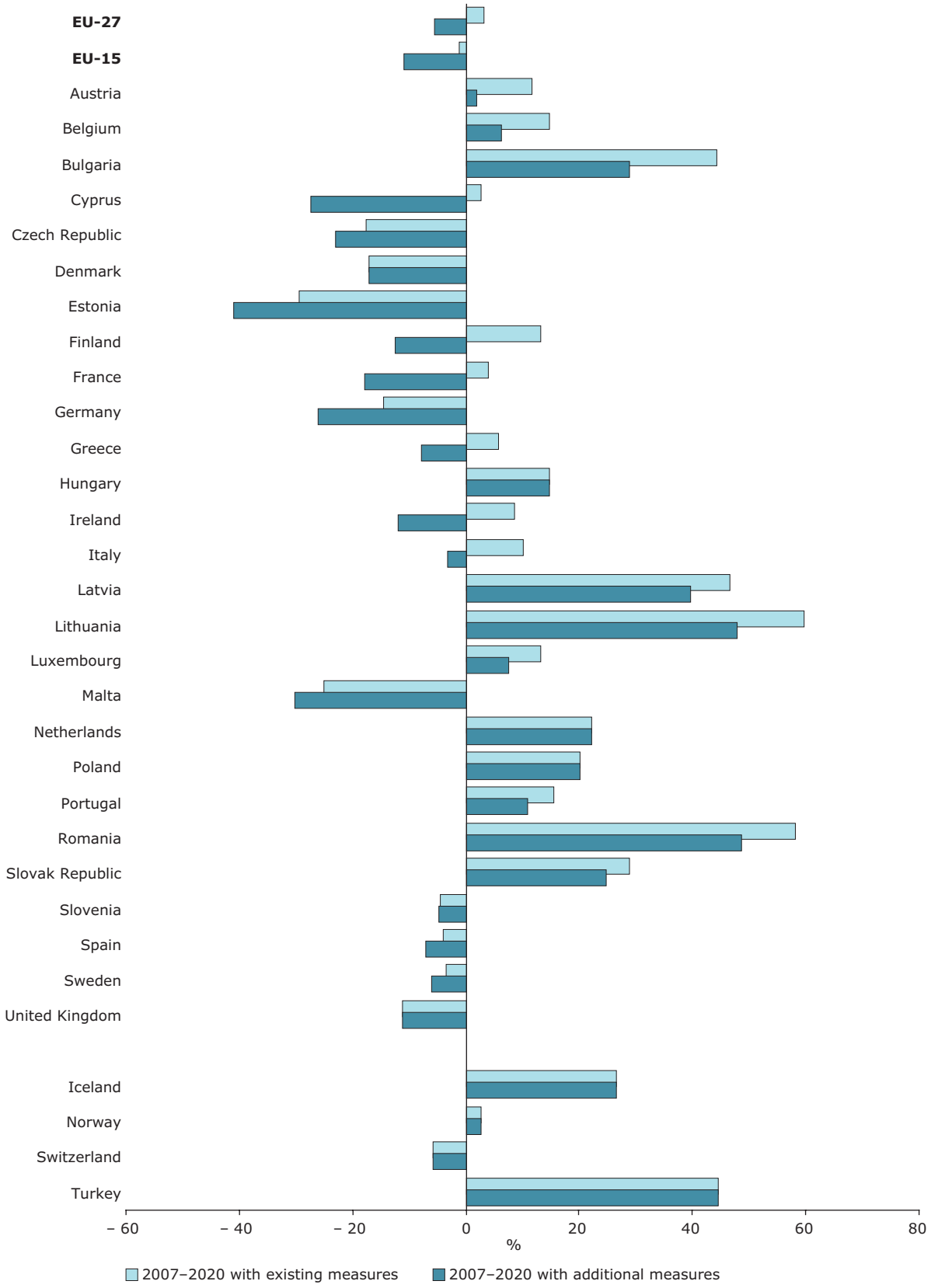
Figure 8.1 EU-27 GHG emission trends and projections to 2020



Note: Emissions from international aviation, although included in the 2020 target, are not taken into account in this figure (past trends, projections and targets).

Source: EEA, 2009.

Figure 8.2 Projected GHG trends in Europe 2007–2020



Note: No 2020 projections available from Croatia and Liechtenstein.
Emissions from international aviation and international maritime transport not included.

Source: EEA, 2009.

9 Sources of information

Country	Type (*)	Source of information	Date of submission (**) or publication	New information since 2008
Austria	R	GHG projections and assessment of policies and measures in Austria, Reporting under Decision 280/2004/EC,March 2009	12 March 2009	Yes
	T	Reporting template v4.2	12 March 2009	Yes
	Q-KM	Questionnaire on Kyoto Mechanism	16 March 2009	Yes
	Q-S	Questionnaire on the use of carbon sinks	1 April 2009	Yes
Belgium	R	Report by Belgium for the assessment of projected progress under 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	21 May 2009	Yes
	T	Reporting template v4.2	21 May 2009	Yes
	Q-KM	Part of report	21 May 2009	Yes
	Q-S	Part of report	21 May 2009	Yes
Denmark	R	Projections of greenhouse gas emission 2007 to 2025, NERI Technical Report No. 703, 2009	3 March 2009	Yes
	R	Denmark's update on climate policies and measures and greenhouse gas projections	3 March 2009	Yes
	Q-S	Annex 5 of submission	3 March 2009	Yes
	Q-KM	Annex 6 of submission	3 March 2009	Yes
Finland	T	Reporting template	13 March 2009	Yes
	R	Reporting of Policies and Measures under Article 3(2) of Decision 280/2004/EC Finland	13 March 2009	Yes
	R	Reporting of Policies and Measures under Article 3(2) of Decision 280/2004/EC Finland	27 March 2009	Yes
	T	Reporting template v4.2	27 March 2009	Yes
	Q-KM	Questionnaire on Kyoto Mechanism	27 March 2009	Yes
	Q-S	Questionnaire on the use of carbon sinks	27 March 2009	Yes
France	T	Reporting template	May 2009	Yes
	R	Rapport de la France au titre du paragraphe 2 de l'article 3 de la décision n°280/2004/CE du Parlement Européen et du Conseil du 11 février 2004	26 May 2009	Yes
	Q-KM	Questionnaire on Kyoto Mechanism	May 2009	Yes
	Q-S	Questionnaire on the use of carbon sinks	May 2009	Yes
Germany	T	Reporting template	15 May 2009	Yes
	R	Projektionsbericht 2009 gemäß Entscheidung 280/2004/EG	15 May 2009	Yes
	Q-KM	Questionnaire on Kyoto Mechanism	15 May 2009	Yes
Greece	T	Reporting template	20 March 2009	Yes
	R	Information under article 3(2) of the Decision 280/2004/EC Related to 'GHG emissions projections'	20 March 2009	Yes
	T	Reporting template	15 May 2009	Yes
	Q-KM	Part of report	20 March 2009	Yes
	Q-S	Part of report	20 March 2009	Yes
	R	Information under article 3(2) of the Decision 280/2004/EC Related to 'GHG emissions projections'	15 May 2009	Yes

Country	Type (*)	Source of information	Date of submission (**) or publication	New information since 2008
Ireland	T	Reporting template	13 May 2009	Yes
	R	Ireland's Greenhouse Gas Emission Projections 2008–2020	13 May 2009	Yes
	Q-S	Questionnaire on the use of carbon sinks		
	Q-KM	Questionnaire on Kyoto Mechanism	4 April 2009	Yes
Italy	T	Reporting template	8 April 2009	Yes
	R	2009 Italy climate policy progress report submitted to the European commission pursuant to decision no 280/2004/EC, article 3(2)	8 April 2009	Yes
Luxembourg	T	Reporting template	16 August 2009	Yes
	R	Projected Greenhouse Gas Emissions in Luxembourg and Assessment of Policies and Measures	16 August 2009	Yes
Netherlands	O	Data on projections	15 May 2009	Yes
	R	2009 Climate Policy Progress Report of the Netherlands; Submitted to the European Commission pursuant to Decision No 280/2004/EC, Article 3(2), by the Ministry of Housing, Spatial Planning and Environment of the Netherlands, in 2009	15 May 2009	Yes
Portugal	T	Reporting template	22 May 2009	Yes
	R	Portuguese Report under Article 3(2) of Decision no. 280/2004/EC Concerning a Mechanism for Monitoring Community Greenhouse Gas Emissions and for Implementing the Kyoto Protocol	22 May 2009	Yes
	Q-KM	Part of report		
Spain	T	Reporting template	12 March 2009	Yes
	R	Comunicación de España a la Comisión Europea Artículo 3.2. (a), (b), (c) y (d) de la Decision 280/2004/CE	12 March 2009	Yes
	Q-S	Questionnaire on the use of carbon sinks	12 March 2009	Yes
	Q-KM	Questionnaire on Kyoto Mechanism	12 March 2009	Yes
Sweden	T	Reporting template	12 March 2009	Yes
	R	Report for Sweden on assessment of projected progress in accordance with Article 3.2 under Council Decision No 280/2004/EC on a Mechanism for Monitoring Community Greenhouse Gas Emissions and for implementing the Kyoto Protocol	12 March 2009	Yes
	T	Reporting template	15 May 2009	Yes
	Q-KM	Questionnaire on the use of carbon sinks	12 March 2009	Yes
	Q-S	Questionnaire on Kyoto Mechanism	12 March 2009	Yes
United Kingdom	T	Reporting template	15 May 2009	Yes
	R	The United Kingdom's report to the European Commission made under Decision 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	15 May 2009	Yes
Bulgaria	T	Reporting template	30 March 2009	Yes
	R	Bulgarian National Report under Article 3(2) of Decision 280/2004/EC	30 March 2009	Yes
	Q-KM	Questionnaire on Kyoto Mechanism	30 March 2009	Yes
Cyprus	R	National Projections of Greenhouse Gases, Emissions Policies and Measures for the Reduction of Greenhouse Gases Emissions 2009 Submission	15 May 2009	Yes
Czech Republic	T	Reporting template	11 May 2009	Yes
	R	Reporting under Article 3.2 of the Decision No 280/2004/EC	11 May 2009	Yes

Country	Type (*)	Source of information	Date of submission (**) or publication	New information since 2008
Estonia	T	Reporting template	13 March 2009	Yes
	R	Report pursuant to Article 3(2) of Monitoring Decision	13 March 2009	Yes
	Q-KM	Questionnaire on Kyoto Mechanism	13 March 2009	
	Q-S	Questionnaire on the use of carbon sinks	8 May 2009	
	T	Reporting template	8 May 2009	Yes
	R	Report pursuant to Article 3(2) of Monitoring Decision	8 May 2009	Yes
Hungary		Submission under MM, pursuant to Art. 3(2) of Decision No 280/2004/EC	2007	No
		2005 report pursuant to Directive 2001/77/EC	February 2006	No
		Fourth National Communication on climate change under the UNFCCC	2006	No
Latvia	T	Reporting template	13 May 2009	Yes
	R	Latvijas progresa ziņojums saskaņā ar Eiropas Parlamenta un padomes lēmumu Nr. 280/2004/EK par monitoringa mehānismu attiecībā uz siltumnīcefekta izraisošo gāzu emisiju un par Kioto protokola īstenošanu Kopienā	13 May 2009	Yes
	Q-KM	Part of report		
	Q-S	Part of report		
Lithuania	T	Reporting template	13 March 2009	Yes
	R	Policies & Measures and Projections of Greenhouse Gas Emissions in Lithuania	13 March 2009	Yes
	T	Reporting template	14 May 2009	Yes
	R	Policies & Measures and Projections of Greenhouse Gas Emissions in Lithuania	14 May 2009	Yes
Malta	T	Reporting template	16 March 2009	Yes
	R	Malta's Biennial Report on Policies and Measures and Projected Greenhouse Gas Emissions 2009	16 March 2009	Yes
	Q-KM	Information on Kyoto Protocol Mechanisms	16 March 2009	Yes
	T,R	Resubmission	14 May 2009	
Poland		Submission under MM, pursuant to Art. 3(2) of Decision No 280/2004/EC	June 2007	No
		2007 report pursuant to Directive 2001/77/EC	December 2007	No
		Fourth National Communication on climate change under the UNFCCC	December 2006	No
Romania	R	Romania's 2009 Report for the assessment of projected progress under Decision no 280/2004/EC of the European Parliament and of the Council concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol	14 March 2009	Yes
	Q-KM	Part of report	14 March 2009	Yes
Slovakia	T	Reporting template	13 March 2009	Yes
	R	Slovak Republic Biennial Report Part I 2009 pursuant to the Article 3(2) of Decision No 280/2004/EC concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto protocol	13 March 2009	Yes
	Q-KM	Information provided in report	15 May 2009	Yes
	Q-S	Information provided in report	15 May 2009	Yes
	R	Slovak Republic Biennial Report Part I 2009 pursuant to the Article 3(2) of Decision No 280/2004/EC concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto protocol	15 May 2009	Yes

Country	Type (*)	Source of information	Date of submission (**) or publication	New information since 2008
Slovenia	R	Poročilo R Slovenije Evropski Komisiji o oceni napredka skladno s členom 3.2 odločbe 280/2004/ES, ki vzpostavlja mehanizem spremljanja emisij TGP evropske skupnosti ter izvajanja Kjotskega protokola	6 August 2009	Yes
	T	Reporting template	6 August 2009	No
	Q-KM	Questionnaire on Kyoto Mechanism	6 August 2009	
	Q-S	Questionnaire on the use of carbon sinks	6 August 2009	
Croatia	NC	Second, third and fourth National communication on climate change under the UNFCCC	November 2006	No
Iceland	NC	Fourth National Communication on climate change under the UNFCCC	March 2006	No
	R	Report on Demonstrable Progress under the Kyoto Protocol	March 2006	No
	O	UNFCCC country profile on Iceland	2005	No
Liechtenstein	NC	Fourth National Communication on climate change under the UNFCCC	7 April 2006	No
	R	Report on Demonstrable Progress under Article 3.2 of the Kyoto Protocol submitted to the UNFCCC	25 September 2006	No
	O	'Review 08 list of measures', update on policies and measures submitted to the UNFCCC	May 2008	No
	O	'CDM Highlights 52' monthly newsletter of the German GTZ Climate Protection Programme	September 2007	No
	O	National Climate Strategy for Liechtenstein	September 2007	No
	O	Personal Communications from the Office of Environmental Protection	June and July 2008	No
Norway	O	Projections	29 May 2009	Yes
Switzerland	O	Personal Communications from the Federal Department of the Environment, Climate Unit	May 2009	Yes
	O	Several Press Releases	2008 and 2009	Yes
Turkey	NC	First National Communication on Climate change under the UNFCCC	January 2007	No

Note: (*) R = Report, T = reporting Template, Q-KM = Questionnaire on Kyoto Mechanisms, Q-S = Questionnaire on the use of carbon sinks, NC = National Communication, O = Other documents.
(**) Date of submission refers to the date of upload to the Reportnet Central Data Repository and considers only the first submission received, later additions or resubmissions are not listed.
(CDR): http://rod.eionet.europa.eu/obligations/385.

Source: EEA, 2009.

10 Glossary of terms and abbreviations

AAU	Assigned amount unit. A Kyoto unit representing an allowance to emit one metric tonne of carbon dioxide equivalent (CO_2-equivalent). AAUs are created (issued) up to a level of a Party's initial assigned amount.
ACEA	European Automobile Manufacturers Association (EU-wide agreement with ACEA automobile manufacturing industries)
Annex I	The annex to the UNFCCC specifying which developed country Parties and other Parties to the UNFCCC have committed themselves to limiting anthropogenic emissions and enhancing their greenhouse gas 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 authorization 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.
CAP	Common Agricultural Policy
CCPMs	Common and coordinated policies and measures at EU level
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	Certified emission reduction. A Kyoto unit representing an allowance to emit one metric tonne of CO_2-equivalent. CERs are issued for emission reductions from CDM project activities.
CFCs	Chlorofluorocarbons

CH_4	Methane
CHP	Combined heat and power
CITL	Community independent transaction log
CO_2	Carbon dioxide
CO_2-equivalent	Carbon dioxide-equivalent
Commitment period	The time frame in which the Kyoto Protocol's emission limitation and reduction commitments apply. The first commitment period is 2008–2012.
COP	Conference of the Parties to the United Nations Framework Convention on Climate Change
CRF	Common reporting format
Domestic	Pertaining to a country's or group of countries' own emissions or internal action to reduce emissions
DNA	Designated national authority
DTPI	Distance-to-target-path indicator
ECCP	European Climate Change Programme
EEA	European Environment Agency
EC	European Community
EMAS	Eco-management and audit scheme
ETC/ACC	European Topic Centre on Air and Climate Change
ERU	Emission reduction unit. A Kyoto unit representing an allowance to emit one metric tonne of CO_2-equivalent. CERs are issued for emission reductions or emission removals from JI project activities by converting an equivalent quantity of the Party's existing AAUs or RMUs.
EU-12	Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, the Slovak Republic, Slovenia
EU-15	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, the United Kingdom
EU ETS	European Union Emission Trading Scheme
EUA	European Union allowance
F-gases	Fluorinated gases
GDP	Gross domestic product
GHG	Greenhouse gas
HCFCs	Hydrochlorofluorocarbons

HFCs	Hydrofluorocarbons
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.
IPPC	Integrated pollution prevention and control
ITL	International transaction log. An electronic data system, administered by the UNFCCC secretariat, which monitors and tracks Parties' transactions of Kyoto units.
JAMA	Japanese Automobile Manufacturers Association
JI	Joint implementation. A Kyoto Protocol mechanism that allows Annex I Parties to purchase emission allowances from projects in other Annex I Parties that reduce or remove emissions. The emission allowances from JI projects are called emission reduction units (ERUs).
KAMA	Korean Automobile Manufacturers Association
KP	Kyoto Protocol
LULUCF	Land use, land-use change and forestry. A GHG inventory sector subject to specific accounting rules.
MoU	Memorandum of understanding
Mt	Mega (million) tonnes
MS	Member State
N_2O	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 in accordance with the Kyoto Protocol rules.
Non-Annex I Parties	Parties not included in Annex I to the UNFCCC
PAMs	Policies and measures
PFCs	Perfluorocarbons
RES	Renewable energy sources
RMU	Removal unit. A Kyoto unit representing an allowance to emit one metric tonne of CO_2-equivalent. RMUs are issued for emission removals from LULUCF activities under Article 3, paragraphs 3 and 4.
Retirement	The transfer of a unit to a retirement account to be used towards meeting a Party's Kyoto commitment.
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
WAM	With additional measures
WEM, WM	With existing measures, with measures

11 References

EEA, 2006. *The European Community's initial report under the Kyoto Protocol, Report to facilitate the calculation of the assigned amount of the European Community pursuant to Article 3, paragraphs 7 and 8 of the Kyoto Protocol, Submission to the UNFCCC secretariat.* EEA Technical report No 10/2006, European Environment Agency.

EEA, 2008a. *Greenhouse gas emission trends and projections in Europe 2008, Tracking progress towards Kyoto targets*. EEA Report No 5/2008, European Environment Agency.

EEA, 2008b. *Energy and environment report 2008*. EEA Report No 6/2008, European Environment Agency.

EEA, 2008c. *Better management of municipal waste will reduce greenhouse gas emissions*. EEA Briefing No 1/2008, European Environment Agency.

EEA, 2009a. *Annual European Community greenhouse gas inventory 1990–2007 and inventory report 2009, Submission to the UNFCCC Secretariat*. EEA Technical report No 4/2009, European Environment Agency.

EEA, 2009b. *Transport at a crossroads. TERM 2008: indicators tracking transport and environment in the European Union*. EEA report No 3/2009, European Environment Agency.

IEA, 2008. *CO_2 emissions from fuel combustion, Edition 2008*. International Energy Agency.

IPCC 1996. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*.

Statistisches Bundesamt Deutschland, Preismonitor des Statistischen Bundesamtes, http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/Internet/DE/Content/Statistiken/Zeitreihen/WirtschaftAktuell/Preismonitor/Energie/Ueberschrift__Energie,templateId=renderPrint.psml), downloaded June 17th, 2009.

UNFCCC, 2008. *Report of the review of the initial report of the European Community*. United Nations Office at Geneva.

12 Summary of greenhouse gas emission trends and projections in Europe

Table 12.1 Historic greenhouse gas emissions and 2008–2012 targets

Country	Unit	Kyoto base-year	1990	2007	2008 (b)	2003–2007 average	2004–2008 average (b)	2008–2012 Kyoto target
Austria	Mt CO_2-equivalent	79.0	79.0	88.0	-	91.4	-	68.8
	% from base year			11.3 %	-	15.7 %	-	– 13.0 %
Belgium	Mt CO_2-equivalent	145.7	143.2	131.3	-	140.3	-	134.8
	% from base year			– 9.9 %	-	– 3.8 %	-	– 7.5 %
Denmark	Mt CO_2-equivalent	69.3	69.1	66.6	63.5	68.5	66.5	54.8
	% from base year			– 3.9 %	– 8.4 %	– 1.1 %	– 4.1 %	– 21.0 %
Finland	Mt CO_2-equivalent	71.0	70.9	78.3	70.8	78.4	75.7	71.0
	% from base year			10.3 %	– 0.3 %	10.4 %	6.5 %	0.0 %
France	Mt CO_2-equivalent	563.9	562.6	531.1	-	546.2	-	563.9
	% from base year			– 5.8 %	-	– 3.1 %	-	0.0 %
Germany	Mt CO_2-equivalent	1 232.4	1 215.2	956.1	944.3	981.9	969.3	973.6
	% from base year			– 22.4 %	– 23.4 %	– 20.3 %	– 21.3 %	– 21.0 %
Greece	Mt CO_2-equivalent	107.0	105.6	131.9	130.5	130.9	130.7	133.7
	% from base year			23.2 %	22.0 %	22.3 %	22.2 %	25.0 %
Ireland	Mt CO_2-equivalent	55.6	55.4	69.2	-	69.3	-	62.8
	% from base year			24.5 %	-	24.6 %	-	13.0 %
Italy	Mt CO_2-equivalent	516.9	516.3	552.8	540.7	566.7	560.8	483.3
	% from base year			6.9 %	4.6 %	9.7 %	8.5 %	– 6.5 %
Luxembourg	Mt CO_2-equivalent	13.2	13.1	12.9	12.4	12.9	13.1	9.5
	% from base year			– 1.9 %	– 5.9 %	– 1.8 %	– 0.8 %	– 28.0 %
Netherlands	Mt CO_2-equivalent	213.0	212.0	207.5	-	212.6	-	200.3
	% from base year			– 2.6 %	-	– 0.2 %	-	– 6.0 %
Portugal	Mt CO_2-equivalent	60.1	59.3	81.8	-	85.2	-	76.4
	% from base year			36.1 %	-	41.6 %	-	27.0 %
Spain	Mt CO_2-equivalent	289.8	288.1	442.3	-	430.6	-	333.2
	% from base year			52.6 %	-	48.6 %	-	15.0 %
Sweden	Mt CO_2-equivalent	72.2	71.9	65.4	-	67.9	-	75.0
	% from base year			– 9.3 %	-	– 5.9 %	-	4.0 %
United Kingdom	Mt CO_2-equivalent	776.3	771.1	636.7	-	651.3	-	679.3
	% from base year			– 18.0 %	-	– 16.1 %	-	– 12.5 %
EU-15 (a)	Mt CO_2-equivalent	4 265.5	4 232.9	4 052.0	4 001.1	4 134.0	4 098.2	3 924.3
	% from base year			– 5.0 %	– 6.2 %	– 3.1 %	– 3.9 %	– 8.0 %

Table 12.1 Historic greenhouse gas emissions and 2008–2012 targets (cont.)

Country	Unit	Kyoto base-year	1990	2007	2008 (b)	2003–2007 average	2004–2008 average (b)	2008–2012 Kyoto target
Bulgaria	Mt CO_2-equivalent	132.6	117.7	75.8	-	72.3	-	122.0
	% from base year			– 42.8 %	-	– 45.5 %	-	– 8.0 %
Cyprus (a)	Mt CO_2-equivalent	-	5.5	10.1	-	9.8	-	-
	% from 1990			85.3 %	-	-	-	-
Czech Republic	Mt CO_2-equivalent	194.2	194.7	150.8	-	147.8	-	178.7
	% from base year			– 22.4 %	-	– 23.9 %	-	– 8.0 %
Estonia	Mt CO_2-equivalent	42.6	41.9	22.0	-	20.2	-	39.2
	% from base year			– 48.3 %	-	– 52.6 %	-	– 8.0 %
Hungary	Mt CO_2-equivalent	115.4	99.2	75.9	-	79.3	-	108.5
	% from base year			– 34.2 %	-	– 31.3 %	-	– 6.0 %
Latvia	Mt CO_2-equivalent	25.9	26.7	12.1	-	11.4	-	23.8
	% from base year			– 53.4 %	-	– 56.1 %	-	– 8.0 %
Lithuania	Mt CO_2-equivalent	49.4	49.1	24.7	-	22.5	-	45.5
	% from base year			– 49.9 %	-	– 54.4 %	-	– 8.0 %
Malta (a)	Mt CO_2-equivalent	-	2.0	3.0	-	2.9	-	-
	% from 1990			49.0 %	-	-	-	-
Poland	Mt CO_2-equivalent	563.4	459.5	398.9	-	390.5	-	529.6
	% from base year			– 29.2 %	-	– 30.7 %	-	– 6.0 %
Romania	Mt CO_2-equivalent	278.2	243.0	152.3	-	152.9	-	256.0
	% from base year			– 45.3 %	-	– 45.0 %	-	– 8.0 %
Slovak Republic	Mt CO_2-equivalent	72.1	73.3	47.0	-	49.1	-	66.3
	% from base year			– 34.8 %	-	– 31.9 %	-	– 8.0 %
Slovenia	Mt CO_2-equivalent	20.4	18.6	20.7	21.3	20.3	20.6	18.7
	% from base year			1.8 %	4.8 %	– 0.3 %	1.3 %	– 8.0 %
EU-27	Mt CO_2-equivalent	-	5 564.0	5 045.4	4 971.2	5 113.0	5 077.2	-
	% from 1990			– 9.3 %	– 10.7 %	-	-	-
Croatia	Mt CO_2-equivalent	36.0	31.4	32.4	-	30.7	-	34.2
	% from base year			– 10.1 %	-	– 14.9 %	-	– 5.0 %
Iceland	Mt CO_2-equivalent	3.4	3.4	4.5	-	4.0	-	3.7
	% from base year			34.9 %	-	18.2 %	-	10.0 %
Liechtenstein	Mt CO_2-equivalent	0.2	0.2	0.2	-	0.3	-	0.2
	% from base year			6.1 %	-	15.7 %	-	– 8.0 %
Norway	Mt CO_2-equivalent	49.6	49.7	55.1	53.8	54.2	54.1	50.1
	% from base year			10.9 %	8.4 %	9.2 %	9.1 %	1.0 %
Switzerland	Mt CO_2-equivalent	52.8	52.7	51.3	-	52.7	-	48.6
	% from base year			– 2.9 %	-	– 0.1 %	-	– 8.0 %
Turkey (a)	Mt CO_2-equivalent	-	170.1	372.6	-	320.1	-	-
	% from 1990			119.1 %	-	-	-	-

Note: Emissions from international aviation and international maritime transport and emissions/removals from LULUCF are excluded.
(a) Cyprus, Malta, the EU-27 and Turkey have no target under the Kyoto Protocol, and therefore no legal base year. In this table, 1990 emissions are taken as reference emissions for Cyprus, Malta, the EU-27 and Turkey.
(b) Estimates of 2008 national emissions provided by Member States. 2008 emissions of the EU-15 and EU-27 estimated by EEA.

Source: EEA, 2009.

Table 12.2 Projected progress towards Kyoto and burden-sharing targets in the EU-15

		Kyoto units (annual average for 2008–2012)					
Country	**Unit**	**Initial assigned amount (Kyoto target)**	**ETS cap**	**Non-ETS target (initial assigned amount – ETS cap)**	**Intended use of Kyoto mechanisms by governments**	**Intended CO_2 removals from carbon sink activities**	**Non-ETS target, including Kyoto mechanisms and carbon sinks**
Austria	Million units	68.8	30.7	38.1	9.0	0.7	47.8
	Share of base-year emissions	87.0 %	38.8 %	48.2 %	11.4 %	0.9 %	60.4 %
Belgium	Million units	134.8	58.5	76.3	4.4	0.0	80.7
	Share of base-year emissions	92.5 %	40.1 %	52.4 %	3.0 %	0.0 %	55.4 %
Denmark	Million units	54.8	24.5	30.3	4.2	2.2	36.7
	Share of base-year emissions	79.0 %	35.3 %	43.7 %	6.1 %	3.2 %	52.9 %
Finland	Million units	71.0	37.6	33.4	1.4	0.6	35.4
	Share of base-year emissions	100.0 %	52.9 %	47.1 %	2.0 %	0.8 %	49.9 %
France	Million units	563.9	132.8	431.1	0.0	4.1	435.2
	Share of base-year emissions	100.0 %	23.5 %	76.5 %	0.0 %	0.7 %	77.2 %
Germany	Million units	973.6	453.1	520.5	0.0	4.5	525.1
	Share of base-year emissions	79.0 %	36.8 %	42.2 %	0.0 %	0.4 %	42.6 %
Greece	Million units	133.7	69.1	64.6	0.0	1.1	65.8
	Share of base-year emissions	125.0 %	64.6 %	60.4 %	0.0 %	1.1 %	61.5 %
Ireland	Million units	62.8	22.3	40.5	3.6	2.2	46.4
	Share of base-year emissions	113.0 %	40.1 %	72.9 %	6.5 %	4.0 %	83.4 %
Italy	Million units	483.3	201.6	281.6	17.1	10.2	308.9
	Share of base-year emissions	93.5 %	39.0 %	54.5 %	3.3 %	2.0 %	59.8 %
Luxembourg	Million units	9.5	2.5	7.0	3.7	0.0	10.7
	Share of base-year emissions	72.0 %	18.9 %	53.1 %	28.1 %	0.0 %	81.2 %
Netherlands	Million units	200.3	87.5	112.8	13.0	0.1	125.9
	Share of base-year emissions	94.0 %	41.1 %	52.9 %	6.1 %	0.1 %	59.1 %
Portugal	Million units	76.4	34.8	41.6	4.8	4.7	51.1
	Share of base-year emissions	127.0 %	57.9 %	69.1 %	8.0 %	7.7 %	84.9 %
Spain	Million units	333.2	152.3	180.9	31.8	5.8	218.6
	Share of base-year emissions	115.0 %	52.6 %	62.4 %	11.0 %	2.0 %	75.4 %
Sweden	Million units	75.0	22.8	52.2	0.0	2.1	54.4
	Share of base-year emissions	104.0 %	31.6 %	72.4 %	0.0 %	3.0 %	75.4 %
United Kingdom	Million units	679.3	246.2	433.1	0.0	4.0	437.1
	Share of base-year emissions	87.5 %	31.7 %	55.8 %	0.0 %	0.5 %	56.3 %
EU-15	Million units	3 924.3	1 576.3	2 348.0	93.1	42.4	2 483.5
	Share of base-year emissions	92.0 %	37.0 %	55.0 %	2.2 %	1.0 %	58.2 %

Table 12.2 Projected progress towards Kyoto and burden-sharing targets in the EU-15 (cont.)

		Greenhouse gas emissions (annual average for 2008–2012)					
Country	**Unit**	**Non-ETS projections WEM**	**Non-ETS projections WAM**	**Gap between non-ETS projections (WEM) and target**	**Gap between non-ETS projections (WAM) and target**	**Gap between non-ETS projections (WEM) and target, including Kyoto mechanisms and carbon sinks**	**Gap between non-ETS projections (WAM) and target, including Kyoto mechanisms and carbon sinks**
Austria	Mt CO_2-equivalent	59	58	21	20	11	10
	Share of base-year emissions			26.6 %	25.1 %	14.3 %	12.9 %
Belgium	Mt CO_2-equivalent	80	80	4	3	-1	-1
	Share of base-year emissions			2.5 %	2.3 %	– 0.6 %	– 0.7 %
Denmark	Mt CO_2-equivalent	36	36	6	6	-0.2	-0.2
	Share of base-year emissions			8.9 %	8.9 %	– 0.3 %	– 0.3 %
Finland	Mt CO_2-equivalent	35	35	2	1	0.0	-1
	Share of base-year emissions			2.7 %	2.0 %	– 0.1 %	– 0.8 %
France	Mt CO_2-equivalent	410	382	-22	-49	-26	-53
	Share of base-year emissions			– 3.8 %	– 8.7 %	– 4.6 %	– 9.4 %
Germany	Mt CO_2-equivalent	463	444	-57	-77	-62	-81
	Share of base-year emissions			– 4.7 %	– 6.2 %	– 5.0 %	– 6.6 %
Greece	Mt CO_2-equivalent	64	61	-0.7	-3	-2	-4
	Share of base-year emissions			– 0.7 %	– 2.9 %	– 1.8 %	– 4.0 %
Ireland	Mt CO_2-equivalent	50	46	9	6	4	0.0
	Share of base-year emissions			16.8 %	10.5 %	6.3 %	– 0.0 %
Italy	Mt CO_2-equivalent	316	308	35	26	7	-1
	Share of base-year emissions			6.7 %	5.1 %	1.4 %	– 0.2 %
Luxembourg	Mt CO_2-equivalent	11	10	4	3	-0.1	-0.3
	Share of base-year emissions			27.2 %	26.2 %	– 0.9 %	– 1.9 %
Netherlands	Mt CO_2-equivalent	125	125	12	12	-1	-1
	Share of base-year emissions			5.8 %	5.8 %	– 0.4 %	– 0.4 %
Portugal	Mt CO_2-equivalent	51	50	9	9	-0.1	-1
	Share of base-year emissions			15.6 %	14.6 %	– 0.2 %	– 1.1 %
Spain	Mt CO_2-equivalent	227	217	46	36	8	-1
	Share of base-year emissions			15.8 %	12.6 %	2.8 %	– 0.4 %
Sweden	Mt CO_2-equivalent	44	43	-9	-9	-11	-12
	Share of base-year emissions			– 11.9 %	– 13.0 %	– 14.8 %	– 16.0 %
United Kingdom	Mt CO_2-equivalent	362	362	-71	-71	-75	-75
	Share of base-year emissions			– 9.1 %	– 9.1 %	– 9.6 %	– 9.6 %
EU-15	Mt CO_2-equivalent	2 336	2 266	-12	-82	-148	-217
	Share of base-year emissions			– 0.3 %	– 1.9 %	– 3.5 %	– 5.1 %

Source: EEA, 2009.

Table 12.3 Projected progress towards EU greenhouse gas targets

	Mt CO_2-equivalent per year	% change from base-year	share of base-year emissions	% change from 1990
EU-15 ([a])				
Base-year emissions	4 265.5	0.0 %		
Emission projections with existing measures	3 973	– 6.9 %		
Emission projections with additional measures	3 903	– 8.5 %		
Initial assigned amount (Kyoto target)	3 924.3	– 8.0 %	92.0 %	
Intended use of Kyoto mechanisms by governments	93.1		2.2 %	
Projected CO_2 removals from carbon sink activities	42.4		1.0 %	
Trading of allowances and credits by operators in the EU ETS	61.2		1.4 %	
Total assigned amount (Kyoto target), including Kyoto mechanisms and carbon sinks	4 120.9	– 3.4 %	96.6 %	
Gap between projections (WEM) and Kyoto target	49		1.1 %	
Gap between projections (WAM) and Kyoto target	– 21		– 0.5 %	
Gap between projections (WEM) and Kyoto target, including Kyoto mechanisms and carbon sinks	– 148		– 3.5 %	
Gap between projections (WAM) and Kyoto target, including Kyoto mechanisms and carbon sinks	– 218		– 5.1 %	
EU-27				
1990 emissions	5 564.0			0.0 %
2007 emissions	5 045.4			– 9.3 %
2008 estimated emissions	4 971			– 10.7 %
2010 projections with existing measures	5 029			– 9.6 %
2010 projections with additional measures	4 933			– 11.3 %
2015 projections with existing measures	5 161			– 7.2 %
2015 projections with additional measures	4 896			– 12.0 %
2020 projections with existing measures	5 208			– 6.4 %
2020 projections with additional measures	4 771			– 14.3 %
2020 unilateral reduction target ([b])	4 451			– 20.0 %

Note: ([a]) Except for the base-year emissions, the numbers presented for the EU-15 correspond to annual averages for the period 2008–2012. Emissions from international aviation and international maritime transport, not covered by the Kyoto Protocol, are excluded.
([b]) Emissions from international aviation, although formally included in the 2020 target, are not taken into account in this table (past emissions, projections and target).

Source: EEA, 2009.

Table 12.4 Projected progress towards Kyoto targets in other EEA member countries and EU candidate country Croatia

	Croatia		Iceland		Liechtenstein	
	Mt CO_2-equivalent per year	**% change from base year**	**Mt CO_2-equivalent per year**	**% change from base year**	**Mt CO_2-equivalent per year**	**% change from base year**
Base-year emissions	36.0		3.4		0.2	
Kyoto target	34.2	– 5.0 %	3.7	10.0 %	0.2	– 8.0 %
Emission projections with existing measures	35.3	– 1.9 %	3.5	3.4 %	0.2	3.9 %
Emission projections with additional measures	31.4	– 12.8 %	3.5	3.4 %	0.2	3.8 %
	Mt CO_2-equivalent per year	**Share of base-year emissions**	**Mt CO_2-equivalent per year**	**Share of base-year emissions**	**Mt CO_2-equivalent per year**	**Share of base-year emissions**
Initial assigned amount (Kyoto target)	34.2	95.0 %	3.7	110.0 %	0.2	92.0 %
Intended use of Kyoto mechanisms by governments	0.0	0.0 %	0.0	0.0 %	0.0	0.0
Projected CO_2 removals from carbon sink activities	1.0	2.7 %	Not available	Not available	Not available	Not available
Trading of allowances and credits by operators in the EU ETS	Not applicable	Not applicable	Not applicable	Not applicable	not available	not available
Total assigned amount (Kyoto target), including Kyoto mechanisms and carbon sinks	35.2	97.7 %	3.7	110.0 %	0.3	109.4 %
Gap between projections (WEM) and Kyoto target	1.1	3.1 %	– 0.2	– 6.6 %	0.0	11.9 %
Gap between projections (WAM) and Kyoto target	– 2.8	– 7.8 %	– 0.2	– 6.6 %	0.0	11.8 %
Gap between projections (WEM) and Kyoto target, including Kyoto mechanisms, carbon sinks and trading of EU ETS allowances	0.1	0.4 %	– 0.2	– 6.6 %	0.0	– 5.6 %
Gap between projections (WAM) and Kyoto target, including Kyoto mechanisms, carbon sinks and trading of EU ETS allowances	– 3.8	– 10.5 %	– 0.2	– 6.6 %	0.0	– 5.6 %

Table 12.4 Projected progress towards Kyoto targets in other EEA member countries and EU candidate country Croatia (cont.)

	Norway		Switzerland	
	Mt CO_2-equivalentper year	**% change from base year**	**Mt CO_2-equivalent per year**	**% change from base year**
Base-year emissions	49.6		52.8	
Kyoto target	50.1	1.0 %	48.6	– 8.0 %
Emission projections with existing measures	56.3	13.5 %	50.5	– 4.3 %
Emission projections with additional measures	56.3	13.5 %	50.5	– 4.3 %
	Mt CO_2-equivalentper year	**Share of base-year emissions**	**Mt CO_2-equivalent per year**	**Share of base-year emissions**
Initial assigned amount (Kyoto target)	50.1	101.0 %	48.6	92.0 %
Intended use of Kyoto mechanisms by governments	6.2	0.0	2.0	3.8 %
Projected CO_2 removals from carbon sink activities	0.0	0.0 %	0.7	1.3 %
Trading of allowances and credits by operators in the EU ETS	6.0	12.1 %	Not applicable	Not applicable
Total assigned amount (Kyoto target), including Kyoto mechanisms and carbon sinks	62.3	125.6 %	51.3	97.1 %
Gap between projections (WEM) and Kyoto target	6.2	12.5 %	1.9	3.7 %
Gap between projections (WAM) and Kyoto target	6.2	12.5 %	1.9	3.7 %
Gap between projections (WEM) and Kyoto target, including Kyoto mechanisms, carbon sinks and trading of EU ETS allowances	– 6.0	– 12.1 %	– 0.8	– 1.5 %
Gap between projections (WAM) and Kyoto target, including Kyoto mechanisms, carbon sinks and trading of EU ETS allowances	– 6.0	– 12.1 %	– 0.8	– 1.5 %

Note: Except for the base-year emissions, the numbers presented correspond to annual averages for the period 2008–2012. Emissions from international aviation and international maritime transport, not covered by the Kyoto Protocol, are excluded.

Source: EEA, 2009.

13 Country profiles

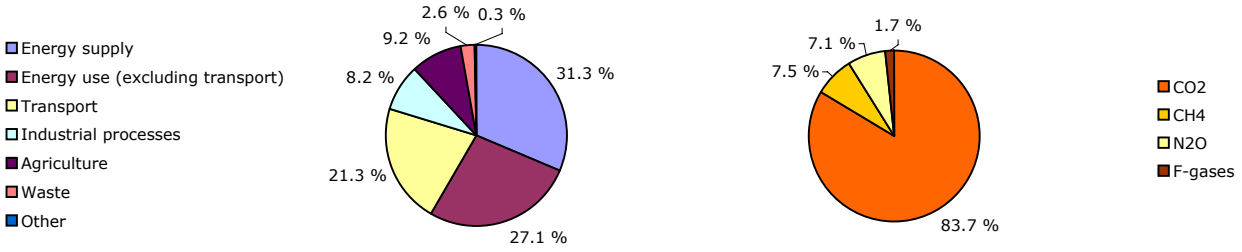
Country profiles have been prepared for each EEA member country. The country profiles present key data on trends in greenhouse gas emissions over the period 1990–2007 and projections of greenhouse gas emissions for the Kyoto commitment period 2008–2012 and for 2020, with additional data on the EU ETS for 2006–2008. All data made available by member countries up to mid May 2009 is included. The country profiles also include brief assessments of past trends (1990–2007, 2006–2007) and progress toward Kyoto targets (where applicable). These assessments have been prepared by member countries in some cases and are supplemented by independent EEA analysis.

GHG trends and projections in the EU-15

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	4 232.9	4 116.0	4 052.0	*4 001.1*	Mt CO_2-eq.	n.a.	n.a.
GHG from international bunkers [4]	166.0	297.7	302.8	n.a.	Mt CO_2-eq.	n.a.	n.a.
GHG per capita	11.6	10.6	10.3	*10.1*	t CO_2-eq. / capita	n.a.	n.a.
GHG per GDP [5]	604	420	403	*395*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	76.1 %	80.6 %	80.3 %	*80.5 %*	%		
EU ETS verified emissions [6]		1 653.4	1 666.5	1 621.1	Mt CO_2-eq.	n.a.	n.a.
Share of EU ETS verified emissions in total GHG		40.2 %	41.1 %	*40.5 %*	%		
ETS verified emissions compared to annual allowances [7]		1.6 %	2.1 %	7.9 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 180.9	– 4.3 %	– 64.0	– 1.6 %	*– 231.8*	*– 5.5 %*	*– 50.8*	*– 1.3 %*
GHG per capita	– 1.3	– 10.8 %	– 0.2	– 2.1 %	*– 1.5*	*– 12.5 %*	*– 0.2*	*– 1.9 %*
EU ETS verified emissions [9]			13.1	0.8 %			– 45.4	– 2.7 %

Assessment long-term trend of total GHG (1990-2007)

Decreases in emissions were observed in all sectors except transport and the production of public heat and electricity. The emission reductions that took place in (former Eastern) Germany in the early 1990s account for a significant part of the reductions observed at EU-15 level. Important emission reductions also took place in France and the United Kingdom during that period, in particular in energy industries, manufacturing industries and other energy sectors. In the United Kingdom this reduction in emissions was due to a switch from solid fuels to gaseous fuels. Between 1996 and 1999, emissions further decreased, mainly due to reductions in emissions from chemical industries and from production of halocarbons. This overall decrease was partly offset by the important emission increases in Spain and, to a lesser extent, Italy. Between 1999 and 2004, emissions increased, mainly driven by increasing energy consumption by final users. Since 2004, final energy demand in the household sector and the tertiary sector has been decreasing, which has resulted in decreased total emissions.

Assessment short-term trend of total GHG (2006-2007)

Emissions fell for the third consecutive year in 2007. About 40 % of the EU-15 net reduction was accounted for by Germany. This was largely the result of lower use of fossil fuels, mainly heating oil, in the residential sector. The largest emission reduction in relative terms occurred in Denmark, due to increased electricity imports and high electricity production from wind (and less coal input to power stations) and a good hydro year in both Sweden and Norway. Emissions from transport decreased in Germany and France, and stabilised in Italy and the United Kingdom. Emissions increased most in Spain and Greece, mainly due to increased emissions from public electricity and heat consumption. In Spain, the electricity output from nuclear power stations was lower than expected (due to less rainfall) and had to be replaced by fossil fuels, and road transport demand increased. Based on the recent EEA estimates, EU-15 greenhouse gas emissions in 2008 were about 1.3 % lower than in 2007, a fourth year of consecutive decrease. This decline was due largely to lower CO2 emissions from fossil fuel combustion in the energy, industry and transport sectors and reflects the first effects of the global economic recession.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	EEA report on greenhouse gas emission trends and projections in Europe

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary EEA estimate of total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

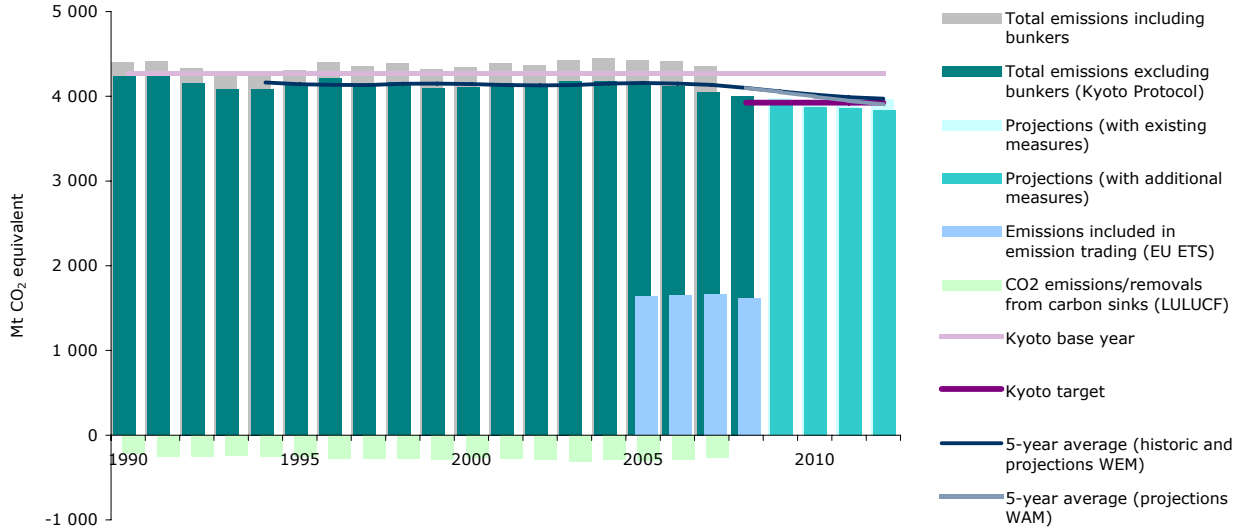
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

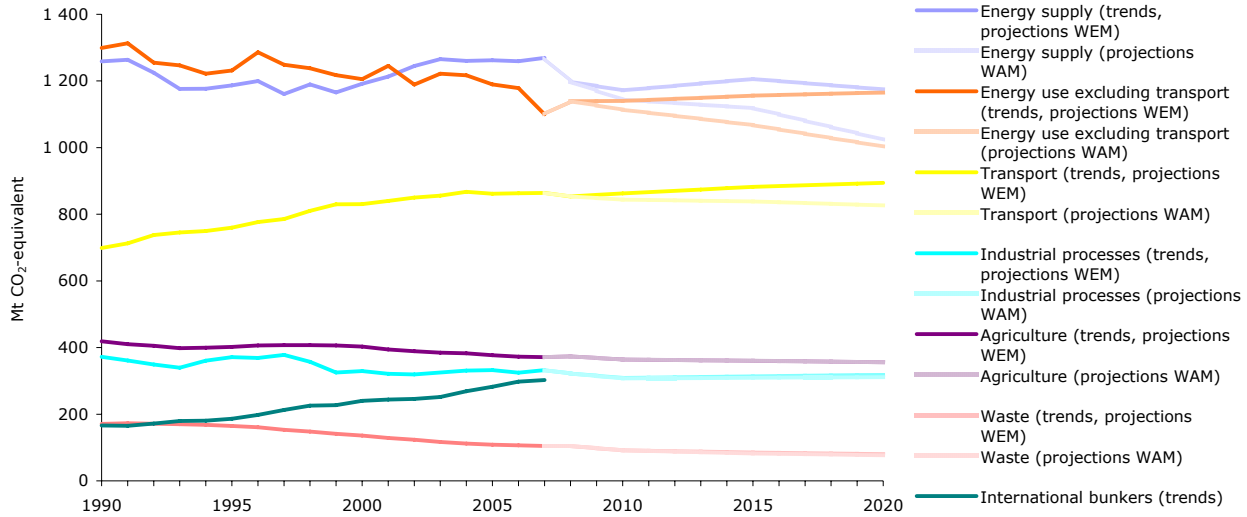
GHG trends and projections in the EU-15

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

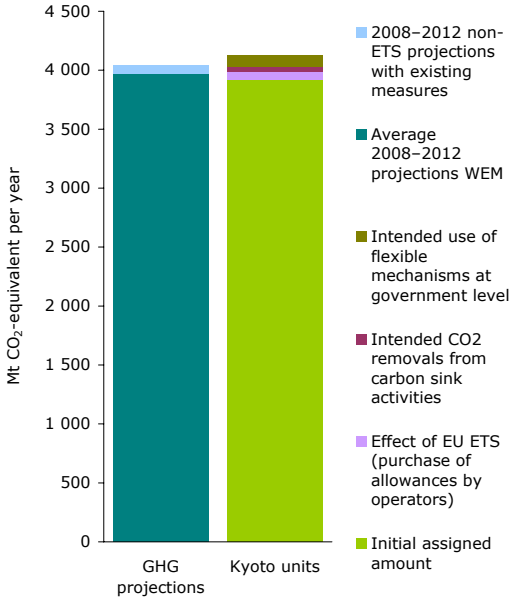


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	4 265.5	
Kyoto target (initial assigned amount 2008–2012)	3 924.3	92.0 %
Total GHG over 2004–2008	4 098.2	96.1 %
Intended use of flexible mechanisms by governments	93.1	2.2 %
Projected CO_2 removals from carbon sink activities	42.4	1.0 %
Projected trading of allowances and credits by operators in the EU ETS	61.2	1.4 %
Kyoto target, including Kyoto mechanisms, carbon sinks and trading of allowances by operators in the EU ETS	4 120.9	96.6 %
Projected emissions with existing measures (WEM)	3 973.0	
Projected emissions with additional measures (WAM)	3 903.4	
Gap between projections WEM and target, including Kyoto mechanisms, carbon sinks and trading of EU ETS allowances	– 147.9	– 3.5 %
Gap between projections WAM and target, including Kyoto mechanisms, carbon sinks and trading of EU ETS allowances	– 217.6	– 5.1 %

Assessment of projected progress towards Kyoto targets

In the EU-15, average emissions over the period 2004–2008 were 3.9 % lower than the base-year level, above the burden-sharing target of – 8 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through trading of EU allowances by operators under the EU emission trading scheme, which covers approximately 41 % of total emissions. Projections from Member States concerning emissions in the sectors not covered by the EU ETS indicate that these could be reduced below their 'non-ETS' target. In addition, ten EU-15 Member States intend to use the Kyoto mechanisms to reach their own burden-sharing target. The EU-15 could therefore over-achieve its Kyoto target by an average 217 Mt CO2-equivalent per year over the Kyoto period if all existing and planned additional measures are fully implemented in a timely manner and if Member States use Kyoto mechanisms and enhance carbon sinks as planned. This represents a 5.1 % overachievement beyond the 8 % Kyoto target.

Comparison of projected emissions with Kyoto units for the period 2008–2012

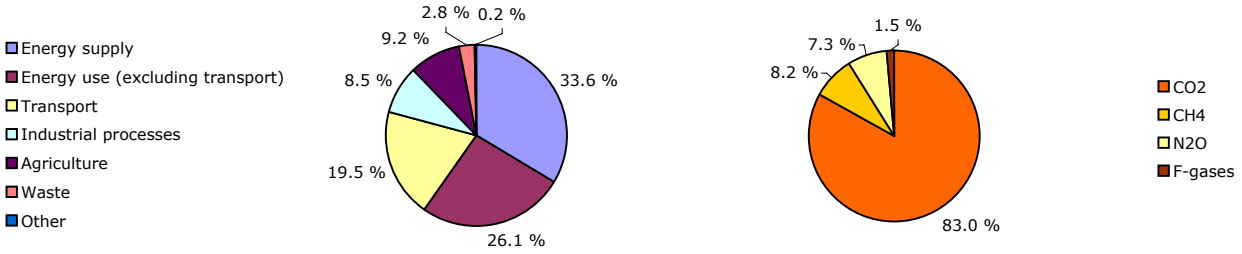


GHG trends and projections in the EU-27

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	5 564.0	5 105.2	5 045.4	*4 971.2*	Mt CO_2-eq.	n.a.	n.a.
GHG from international bunkers [4]	176.2	309.5	315.1	n.a.	Mt CO_2-eq.	n.a.	n.a.
GHG per capita	11.8	10.4	10.2	*10.0*	t CO_2-eq. / capita	n.a.	n.a.
GHG per GDP [5]	755	492	473	*462*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	n.a.	n.a.	n.a.	*n.a.*	%		
EU ETS verified emissions [6]		2 035.7	2 164.7	2 090.9	Mt CO_2-eq.	n.a.	n.a.
Share of EU ETS verified emissions in total GHG		39.9 %	42.9 %	*42.1 %*	%		
ETS verified emissions compared to annual allowances [7]		– 1.7 %	0.5 %	7.4 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 518.7	– 9.3 %	– 59.8	– 1.2 %	*– 592.9*	*– 10.7 %*	*– 74.2*	*– 1.5 %*
GHG per capita	– 1.6	– 13.6 %	– 0.2	– 1.6 %	*– 1.8*	*– 15.3 %*	*– 0.2*	*– 2.0 %*
EU ETS verified emissions [9]			129.1	6.3 %			– 73.9	– 3.4 %

Assessment long-term trend of total GHG (1990-2007)

The overall decrease in emissions reflects emissions reductions of 4.3 % in the EU-15 and emission reductions of 25.4 % in the EU-12. A large part of these reductions took place during the 1990s, due to the economic decline that mostly affected Eastern Europe during the early 1990s and a following period of restructuring. Heavily polluting and energy–intensive industries were closed and energy efficiency improvements in power and heating plants were achieved. The overall emission trend between 1990 and 2007 was dominated by the two largest emitters Germany and the United Kingdom, which together achieved GHG emission reductions equivalent to more than half of the absolute total emission reduction. Important absolute emissions reductions were also achieved by EU-12 Member States: Bulgaria, Czech Republic, Poland and Romania. This overall decrease was partly offset by the important emission increases in Spain and, to a lesser extent, Italy.

Assessment short-term trend of total GHG (2006-2007)

Emissions fell for the third consecutive year in 2007. While EU-15 decreased by 1.6 %, emissions rose slightly by 0.4 % in the EU-12. Overall, 17 Member States recorded a reduction in greenhouse gas emissions in 2007 compared to 2006. A large proportion of the EU-27 net reduction came from Germany, as a result of lower use of fossil fuels, mainly heating oil, in the residential sector. Emissions from transport decreased in Germany and France, and stabilised in Italy and the United Kingdom. Total GHG emissions increased most in Spain, Bulgaria and Greece. In all three countries, emissions from public electricity and heat consumption were the main contributors. In relative terms, Estonia recorded the highest increase in emissions in 2007. This was due to a very steep increase in the use of coal for the production of heat and electricity (electricity generation from conventional thermal power plants rose by 25 %). Based on the recent EEA estimates, EU-27 greenhouse gas emissions in 2008 were about 1.5 % lower than in 2007. This decline was due largely to lower CO2 emissions from fossil fuel combustion in the energy, industry and transport sectors and reflects the first effects of the global economic recession.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	EEA report on Greenhouse gas emission trends and projections in Europe

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary EEA estimate of total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

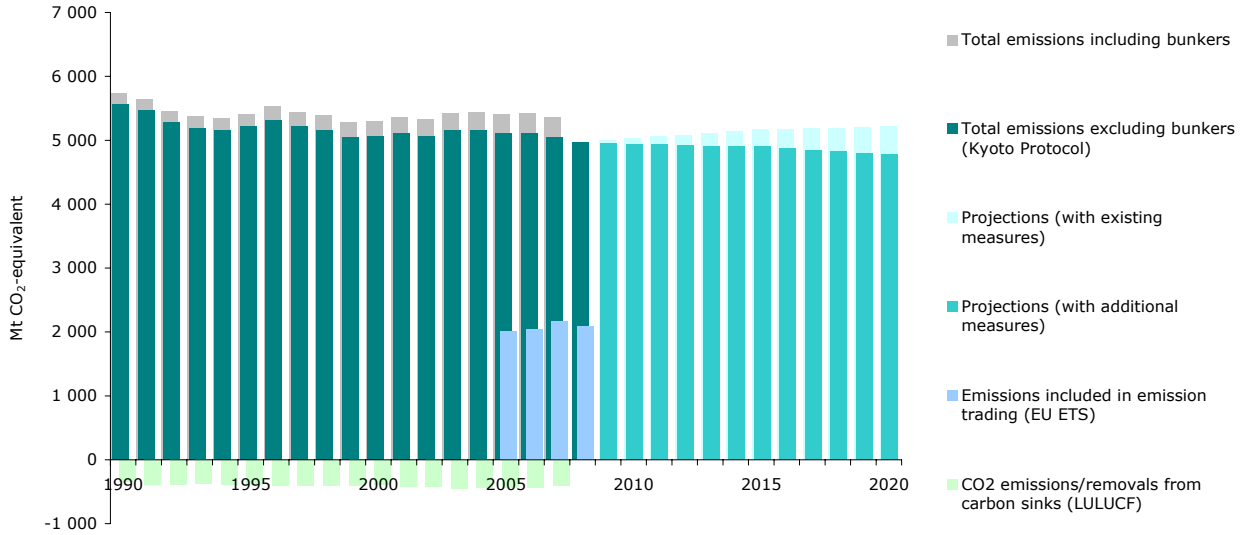
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

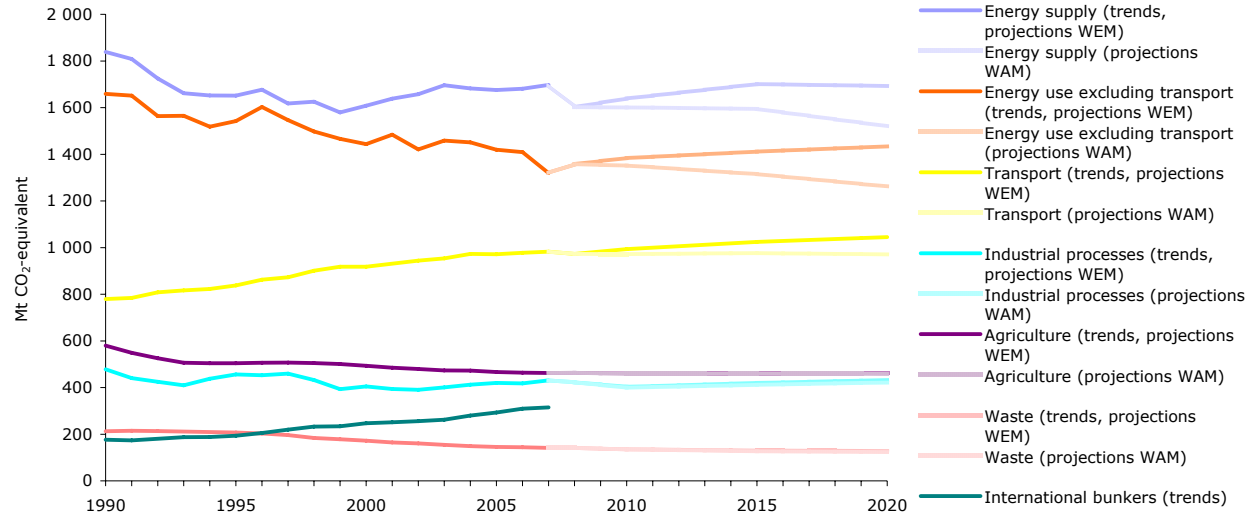
GHG trends and projections in the EU-27

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target

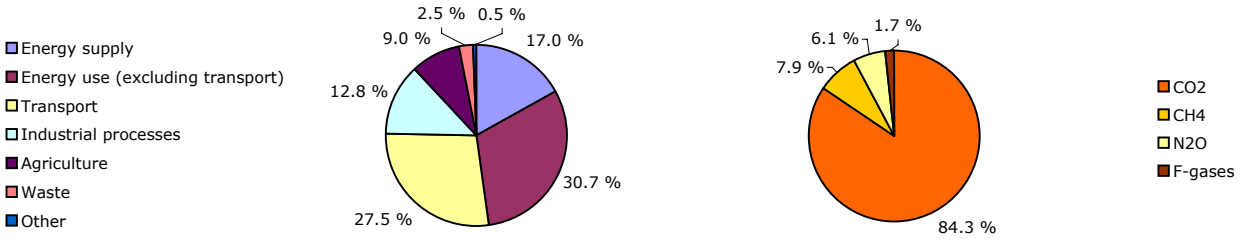
The EU-27 does not have a target under the Kyoto Protocol. In 2007, total emissions were 9.3 % lower than the 1990 level. In the 2008, emissions were estimated to be 10.7 % below the 1990 level. Projections for 2020 indicate that with the implementation of all planned measures, emissions could be further reduced to a level 14.3 % below 1990.

GHG trends and projections in Austria

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	79.0	91.5	88.0	*n.a.*	Mt CO_2-eq.	12	9
GHG from international bunkers [4]	0.9	2.1	2.2	n.a.	Mt CO_2-eq.	15	14
GHG per capita	10.3	11.1	10.6	*n.a.*	t CO_2-eq. / capita	12	9
GHG per GDP [5]	489	393	366	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	1.4 %	1.8 %	1.7 %	*n.a.*	%		
EU ETS verified emissions [6]		32.4	31.8	32.0	Mt CO_2-eq.	14	10
Share of EU ETS verified emissions in total GHG		35.4 %	36.1 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 0.8 %	– 2.9 %	6.2 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	8.9	11.3 %	– 3.6	– 3.9 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	0.3	2.5 %	– 0.5	– 4.3 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			– 0.6	– 2.0 %			0.3	0.8 %

Assessment long-term trend of total GHG (1990-2007)

Emissions increased in the early 1990s, largely driven by road transport and, to a lesser extent, industry (in particular iron and steel production and energy supply). High emissions from transport are partly due to relatively low fuel prices, which encourage fuel tourism from neighbouring countries. Between 1990 and 2007, CO2 emissions increased by 19.5 %, mainly due to increased emissions from transport. CH4 emissions decreased by 24.3 % mainly due to lower emissions from solid waste disposal; N2O emissions decreased by 12.9 % due to lower emissions from agricultural soils and from the chemical industry. HFC emissions were 37 times higher in 2007 than in the 1990, whereas PFC and SF6 emissions decreased by 83 % and 19 % from 1990.

Assessment short-term trend of total GHG (2006-2007)

The period between 2006 and 2007 saw a reduction of greenhouse gas emissions by 3.9 %. The key driver for this trend was the mild weather in 2007: the number of heating days decreased by 9 % compared to 2006. The resulting lower heating demand mainly affected emissions from residential heating and energy industries. In addition, an increase in renewable energy production resulted in 10 % lower emissions from energy industries in 2007 as compared to 2006. Decreased emissions from (mainly residential) heating is also due in part to a significant decrease in sales of liquid fuel, possibly due to leftover stocks of heating oil due to the milder weather in 2006 compared to 2005.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	[Deutsch] www.umweltbundesamt.at/publikationen/publikationssuche/publikationsdetail/?&pub_id=1800

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

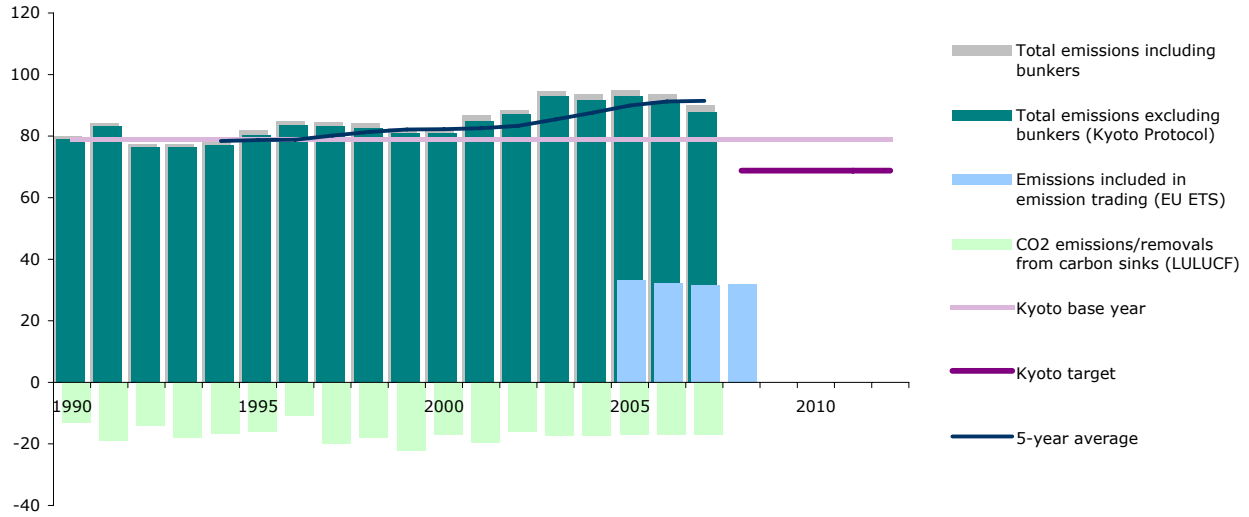
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

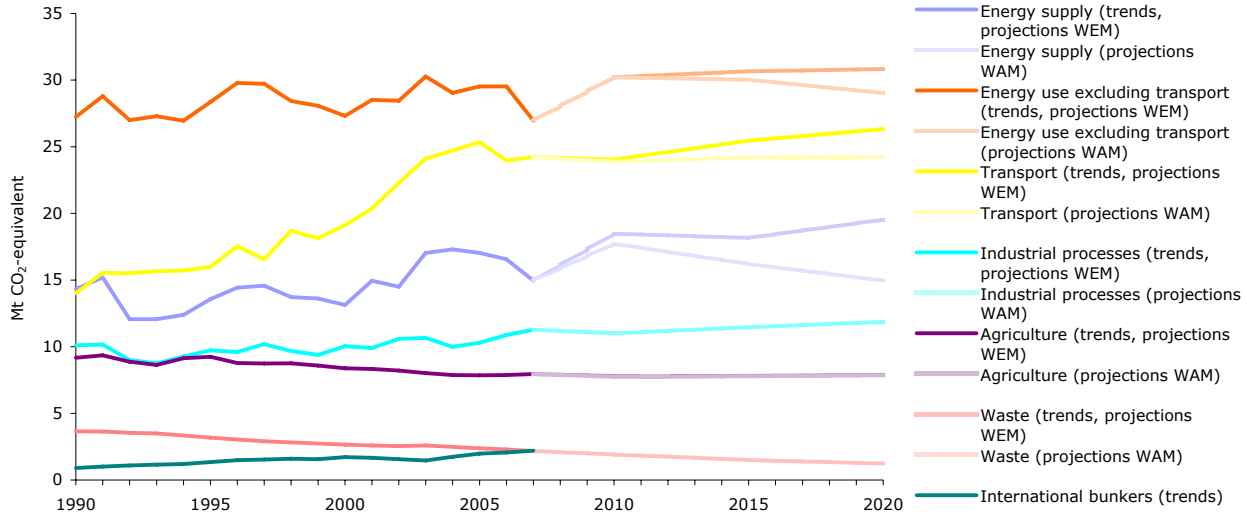
GHG trends and projections in Austria

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

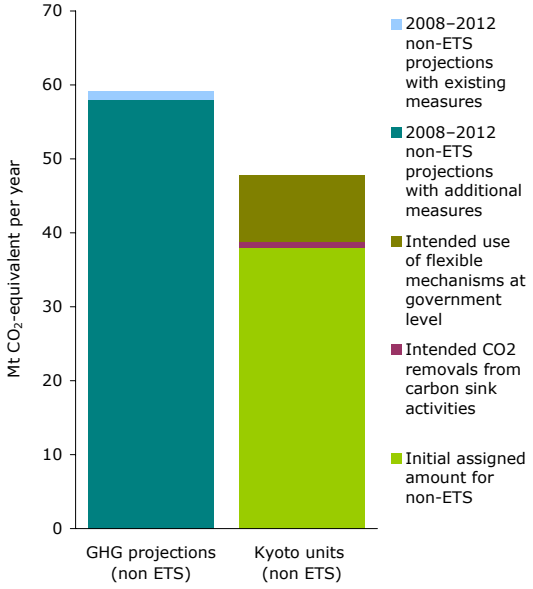


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	79.0	
Kyoto target (initial assigned amount 2008–2012)	68.8	87.0 %
Total GHG over 2003–2007	91.4	115.7 %
Implied target for the sectors not included in the EU ETS	38.1	
Intended use of flexible mechanisms by governments	9.0	11.4 %
Projected CO_2 removals from carbon sink activities	0.7	0.9 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	47.8	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	59.1	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	57.9	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	11.3	14.3 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	10.2	12.9 %

Assessment of projected progress towards Kyoto target

In Austria, average emissions over the period 2003–2007 were 15.7 % higher than the base-year level, still significantly above the burden-sharing target of – 13 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 36 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to remain significantly higher than the 'non-ETS' target, despite the implementation of additional measures, projected removals from carbon sink activities and the large intended use of Kyoto mechanisms by the government. As with some other Member States, projections from Austria do not reflect, however, the effects of the economic recession.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012

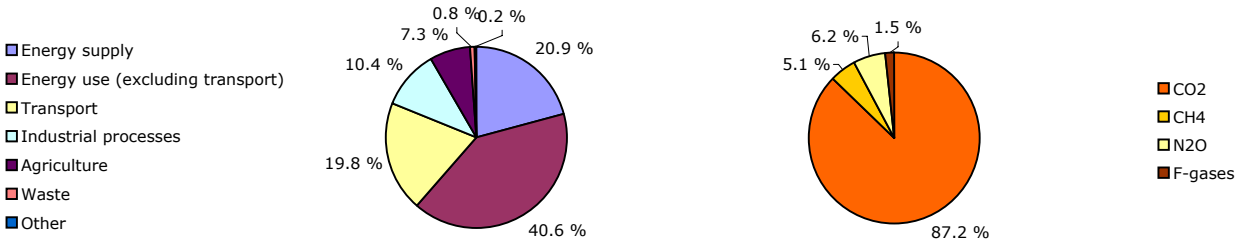


GHG trends and projections in Belgium

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	143.2	136.6	131.3	*n.a.*	Mt CO_2-eq.	11	8
GHG from international bunkers [4]	17.1	32.5	35.9	n.a.	Mt CO_2-eq.	4	4
GHG per capita	14.4	13.0	12.4	*n.a.*	t CO_2-eq. / capita	8	5
GHG per GDP [5]	704	486	455	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	2.6 %	2.7 %	2.6 %	*n.a.*	%		
EU ETS verified emissions [6]		54.8	52.8	55.5	Mt CO_2-eq.	11	8
Share of EU ETS verified emissions in total GHG		40.1 %	40.2 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 8.6 %	– 12.6 %	0.5 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 11.9	– 8.3 %	– 5.3	– 3.9 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 2.0	– 13.9 %	– 0.6	– 4.6 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			– 2.0	– 3.6 %			2.7	5.1 %

Assessment long-term trend of total GHG (1990-2007)

Emissions have been slowly decreasing since the late 1990s, mainly due to reduced emissions from industry (in particular iron and steel production and production of halocarbons) and reduced emissions from landfills, although these decreases were partly offset by emission increases from transport and energy consumption in households and services. These trends resulted in an overall emission decrease of 8.3 % between 1990 and 2007. In the residential sector, 2007 emissions were 4 % below their 1990 level. Following a sharp reduction in the early 1990s and stabilisation due to fuel switching, emissions have been driven upward after 1998 by an increasing housing stock.

Assessment short-term trend of total GHG (2006-2007)

Between 2006 and 2007, emissions decreased in all the main emitting sectors. The highest decrease was observed in the residential sector (fuel combustion), followed by the manufacturing industry sector (reduced use of solid and gaseous fuels by the iron and steel industry) and the chemical industry (decreases in N2O emissions).

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

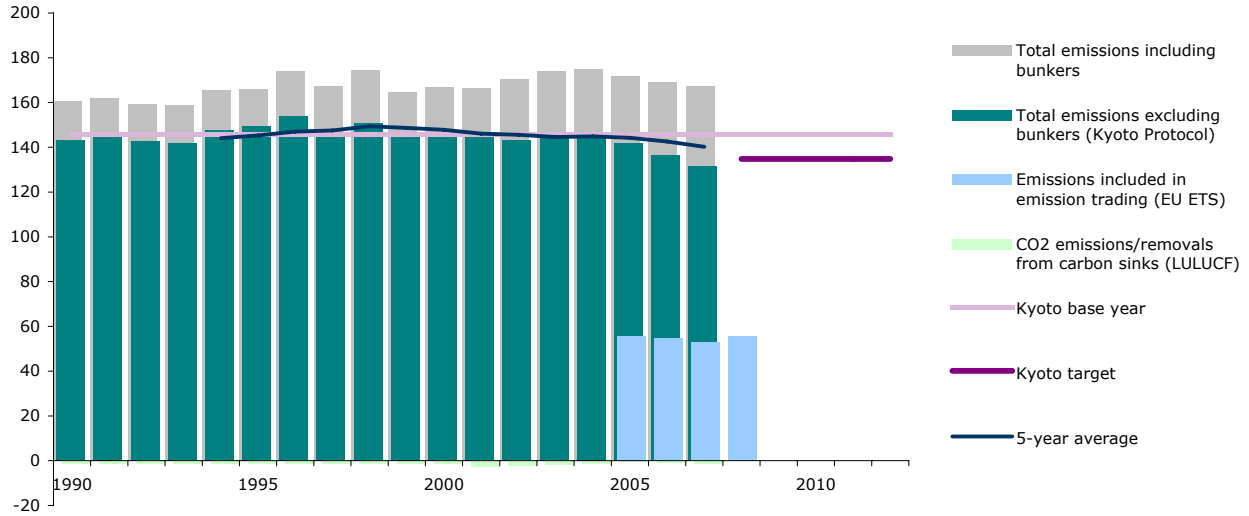
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

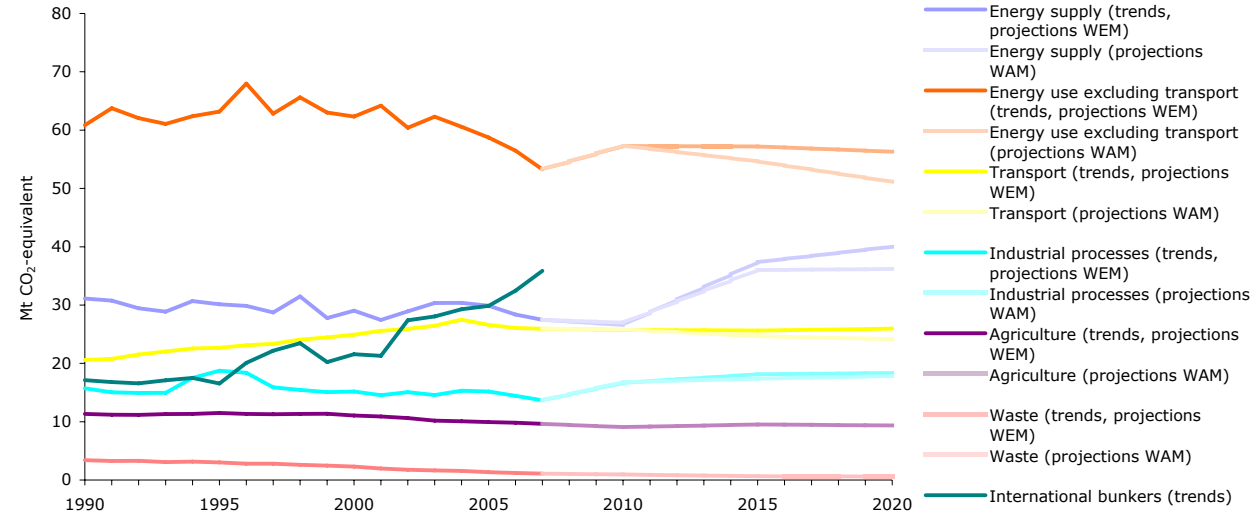
GHG trends and projections in Belgium

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

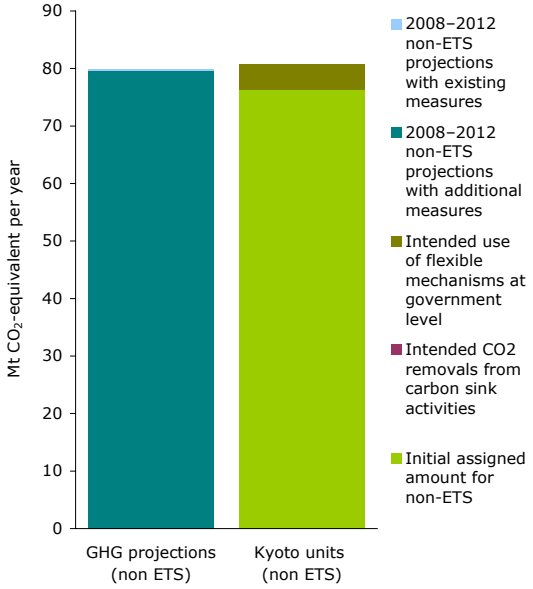


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	145.7	
Kyoto target (initial assigned amount 2008–2012)	134.8	92.5 %
Total GHG over 2003–2007	140.3	96.2 %
Implied target for the sectors not included in the EU ETS	76.3	
Intended use of flexible mechanisms by governments	4.4	3.0 %
Projected CO_2 removals from carbon sink activities	0.0	0.0 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	80.7	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	79.9	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	79.7	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 0.8	– 0.6 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 1.1	– 0.7 %

Assessment of projected progress towards Kyoto target

In Belgium, average emissions over the period 2003–2007 were 3.8 % lower than the base-year level, still above the burden-sharing target of – 7.5 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 40 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to remain higher than their 'non-ETS' target. However, Belgium expects to reach its burden-sharing target by using the Kyoto flexible mechanisms.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012

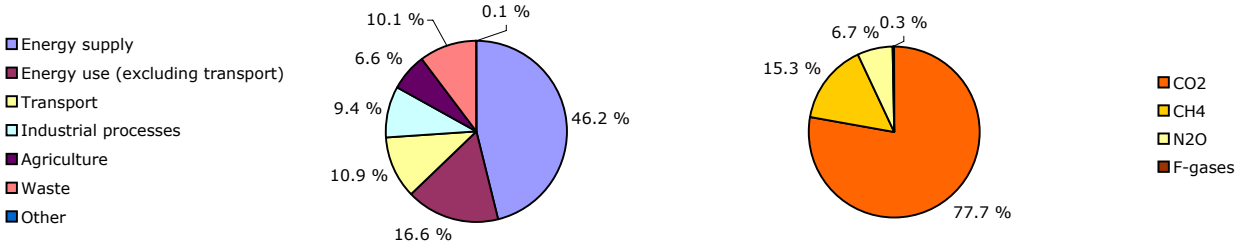


GHG trends and projections in Bulgaria

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	117.7	71.9	75.8	*n.a.*	Mt CO_2-eq.	16	n.a.
GHG from international bunkers [4]	1.8	0.8	0.7	n.a.	Mt CO_2-eq.	23	n.a.
GHG per capita	13.4	9.3	9.9	*n.a.*	t CO_2-eq. / capita	17	n.a.
GHG per GDP [5]	n.a.	3 816	3 787	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	2.1 %	1.4 %	1.5 %	*n.a.*	%		
EU ETS verified emissions [6]		n.a.	39.2	38.0	Mt CO_2-eq.	13	n.a.
Share of EU ETS verified emissions in total GHG		n.a.	51.7 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		n.a.	n.a.	n.a.	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 41.9	– 35.6 %	3.9	5.4 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 3.6	– 26.5 %	0.6	5.9 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			n.a.	n.a.			– 1.2	– 2.9 %

Assessment long-term trend of total GHG (1990-2007)

Emissions decreased sharply in the 1990s in all sectors due to the economic restructuring and have remained relatively stable since 1999. Remarkable emission decreases occurred in the production of public electricity and heat, in manufacturing industries and in chemical industries. In the agriculture sector, emissions reduced by about 60 %. In the waste sector, emission reductions were due to better solid waste management.

Assessment short-term trend of total GHG (2006-2007)

Bulgaria saw emission increases in all sectors except in the solvents and waste sectors. The total increase is mainly due to public electricity and heat production, where the use of solid fuels increased by 14 %. Electricity generation from nuclear power decreased, while the use of conventional thermal power plants increased. Remarkably, transport emissions decreased by 5 %.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

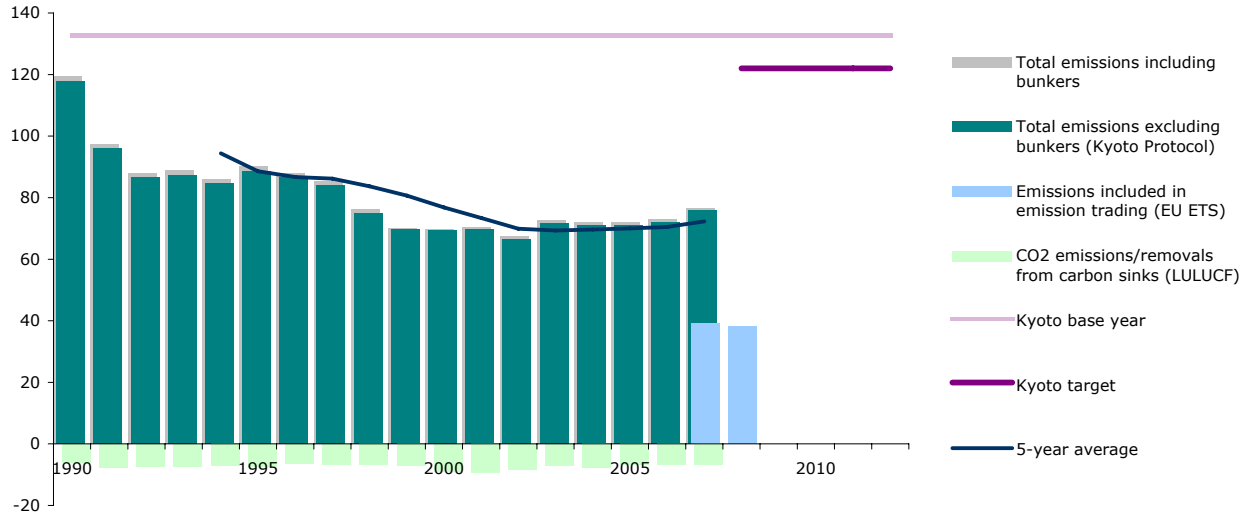
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

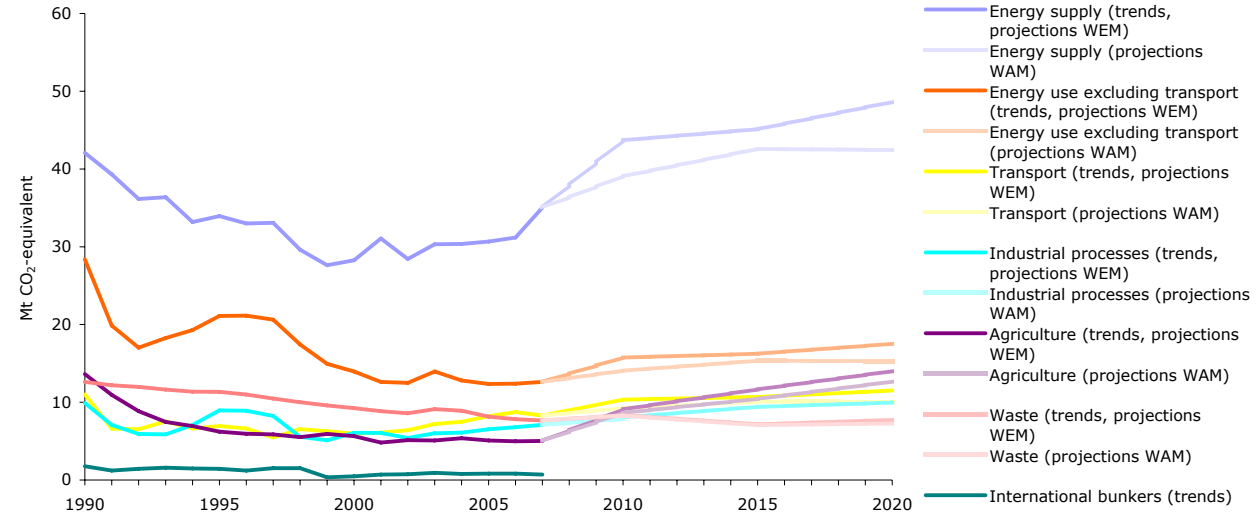
GHG trends and projections in Bulgaria

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	132.6	
Kyoto target (initial assigned amount 2008–2012)	122.0	92.0 %
Total GHG over 2003–2007	72.3	54.5 %

Assessment of progress towards Kyoto targets

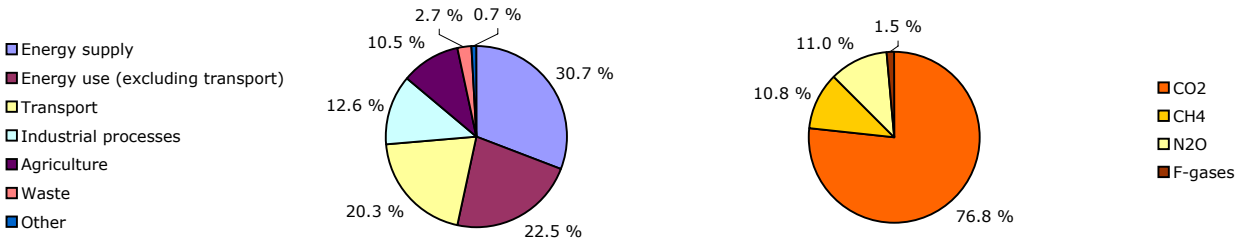
In Bulgaria, average emissions over the period 2003–2007 were 45.5 % lower than the base-year level, well below the Kyoto target of – 8 % for the period 2008–2012. Bulgaria will therefore not meet difficulty in reaching its target under the Kyoto Protocol. It will actually achieve significant surplus emission rights by the end of the Kyoto commitment period.

GHG trends and projections in Croatia

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	31.4	30.8	32.4	*n.a.*	Mt CO_2-eq.	n.a.	n.a.
GHG from international bunkers [4]	0.5	0.3	0.3	n.a.	Mt CO_2-eq.	n.a.	n.a.
GHG per capita	6.6	6.9	7.3	*n.a.*	t CO_2-eq. / capita	n.a.	n.a.
GHG per GDP [5]	#N/A	#N/A	#N/A	*n.a.*	g CO_2-eq. / euro		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	1.0	3.2 %	1.6	5.3 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	0.7	10.9 %	0.4	5.3 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*

Assessment long-term trend of total GHG (1990-2007)

After a strong decrease in the early 1990s, emissions have been steadily rising since the mid-1990s. Large increases have been observed in the transport sector, while emission decreases were observed in fuel combustion by manufacturing industries and for metal production and in agriculture. In 2007, emissions reached their highest level, 3 % above 1990 levels.

Assessment short-term trend of total GHG (2006-2007)

Emissions continued increasing, driven by transport and electricity demand. Emissions from direct fuel combustion by households and services were the only category where a decrease was observed.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

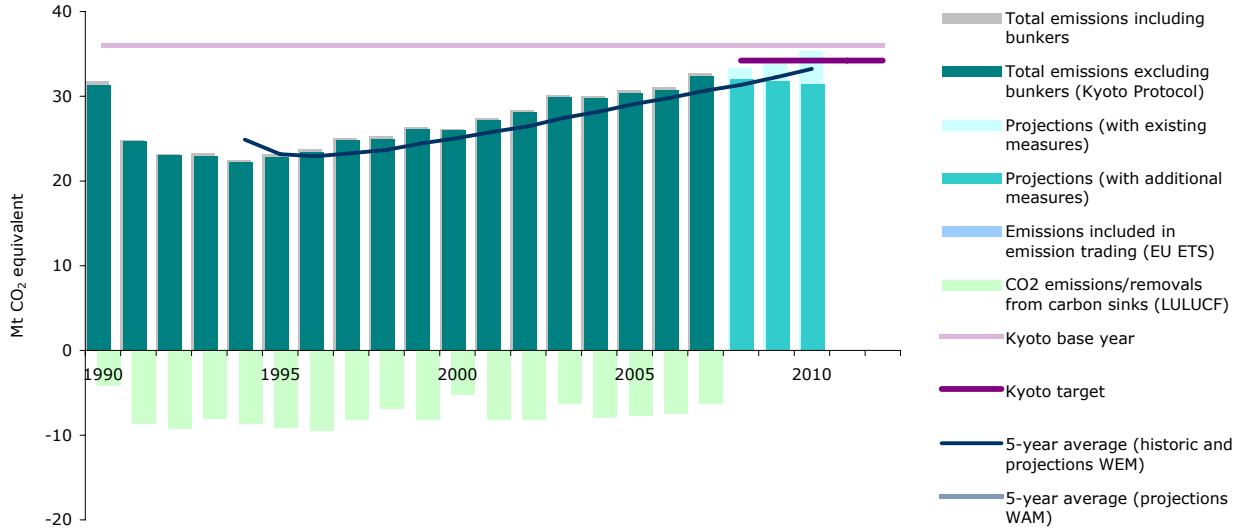
[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

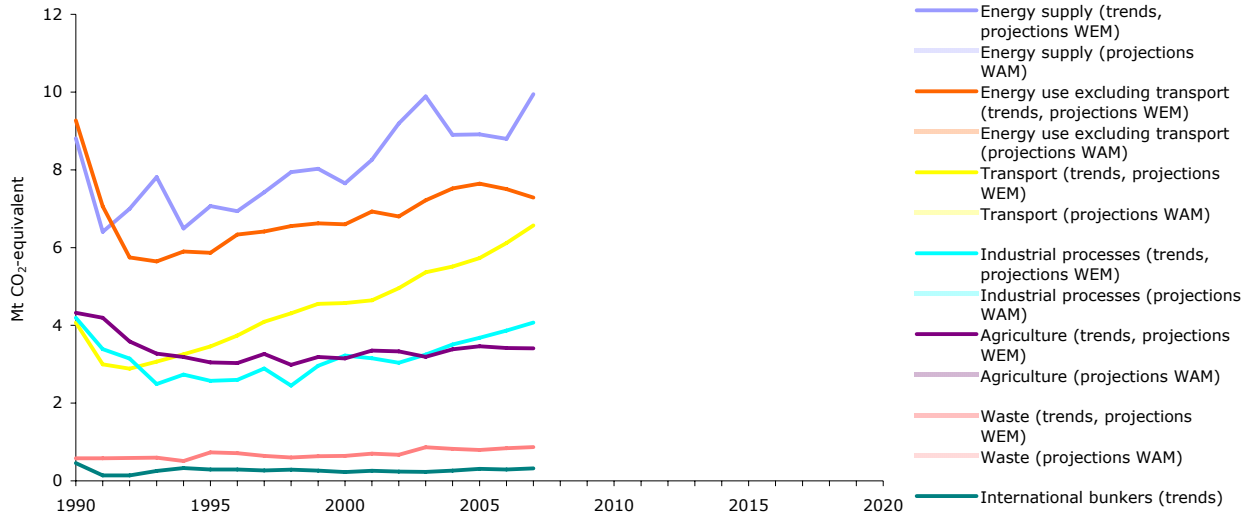
GHG trends and projections in Croatia

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

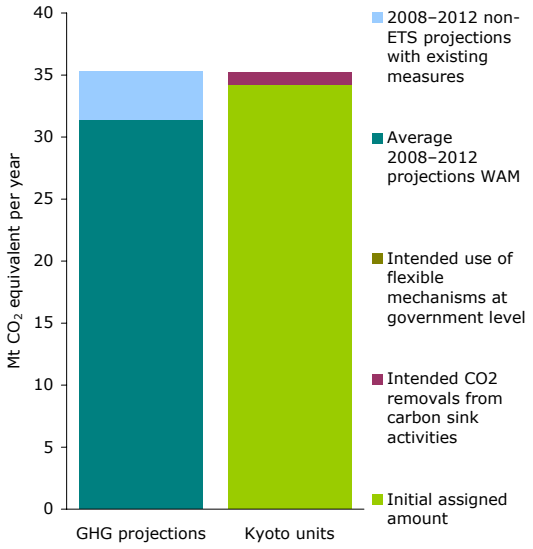


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	36.0	
Kyoto target (initial assigned amount 2008–2012)	34.2	95.0 %
Total GHG over 2003–2007	30.7	85.1 %
Intended use of flexible mechanisms by governments	not available	
Projected CO_2 removals from carbon sink activities	1.0	2.7 %
Kyoto target, including Kyoto mechanisms, carbon sinks and trading of allowances by operators in the EU ETS	35.2	
Projected emissions with existing measures (WEM)	35.3	
Projected emissions with additional measures (WAM)	31.4	
Gap between projections WEM and target, including Kyoto mechanisms and carbon sinks	0.1	0.4 %
Gap between projections WAM and target, including Kyoto mechanisms and carbon sinks	– 3.8	– 10.5 %

Assessment of projected progress towards Kyoto targets

In Croatia, average emissions over the period 2003–2007 were 14.9 % lower than the base-year level, significantly below the Kyoto target of – 5 % for the period 2008–2012. Projections of total emissions indicate that these are expected to increase above the target if additional measures are not implemented on time. Croatia expects to reach its Kyoto target by implementing such additional measures and enhancing its carbon sinks.

Comparison of projected emissions with Kyoto units for the period 2008–2012

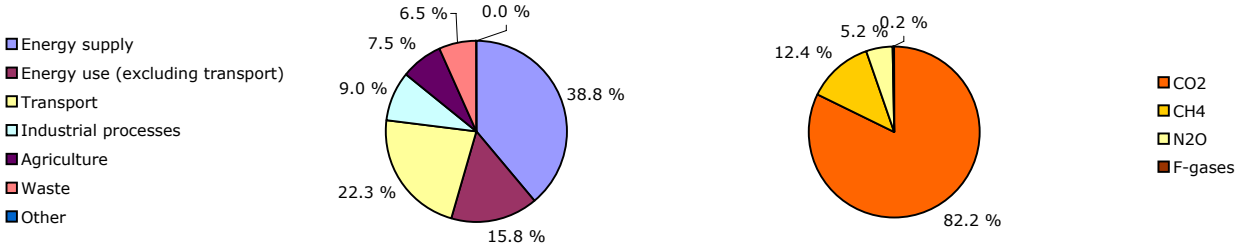


GHG trends and projections in Cyprus

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	5.5	10.0	10.1	*n.a.*	Mt CO_2-eq.	26	n.a.
GHG from international bunkers [4]	0.9	1.5	1.5	n.a.	Mt CO_2-eq.	17	n.a.
GHG per capita	9.5	13.0	13.0	*n.a.*	t CO_2-eq. / capita	6	n.a.
GHG per GDP [5]	847	811	788	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	0.1 %	0.2 %	0.2 %	*n.a.*	%		
EU ETS verified emissions [6]		5.3	5.4		Mt CO_2-eq.	24	n.a.
Share of EU ETS verified emissions in total GHG		52.7 %	53.3 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 6.3 %	– 8.5 %	n.a.	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	4.7	85.3 %	0.2	1.6 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	3.5	36.3 %	– 0.0	– 0.0 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			0.1	2.6 %			n.a.	n.a.

Assessment long-term trend of total GHG (1990-2007)

A sharp increase in emissions over the period was mainly due to public electricity and heat production as well as emissions from transport. Emissions from industrial processes, agriculture and waste increased as well.

Assessment short-term trend of total GHG (2006-2007)

The increase in emissions results from increased use of liquid fuels in public electricity and heat production and road transport. Decreases are observed for emissions from industrial processes.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

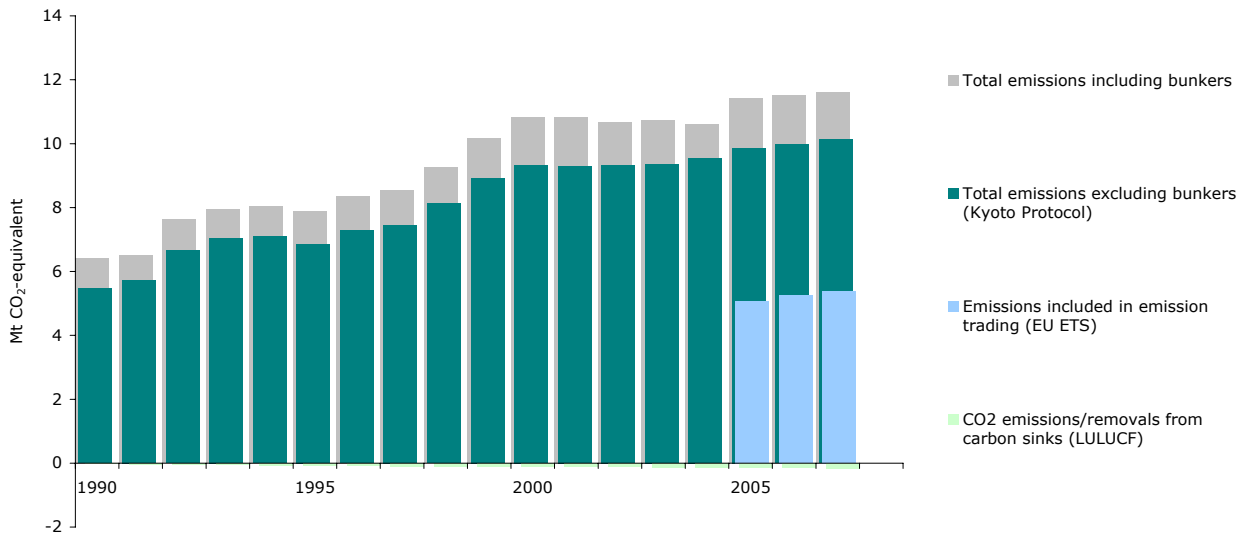
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

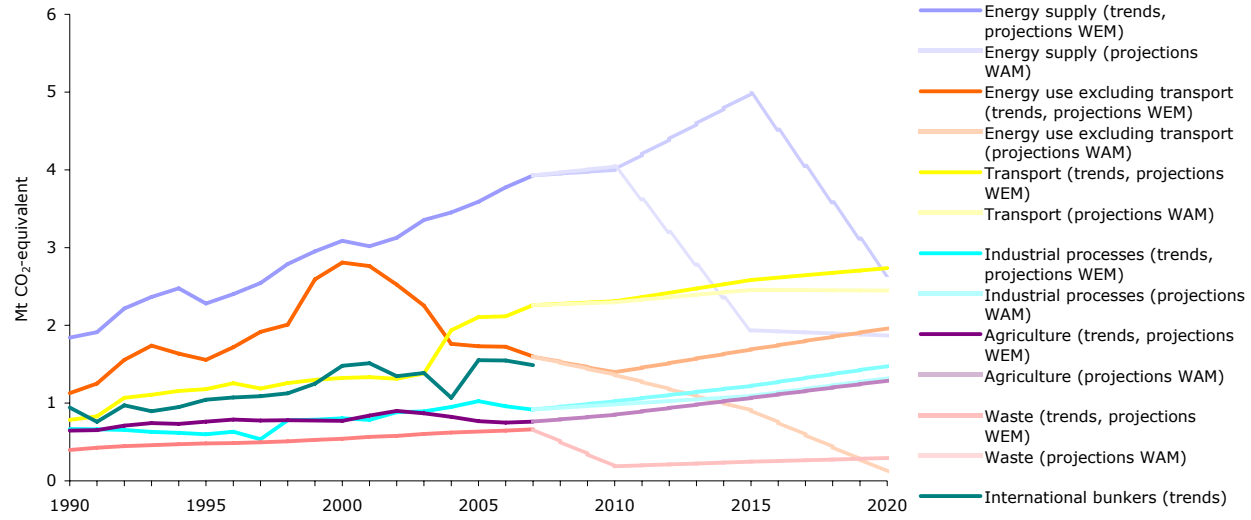
GHG trends and projections in Cyprus

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target

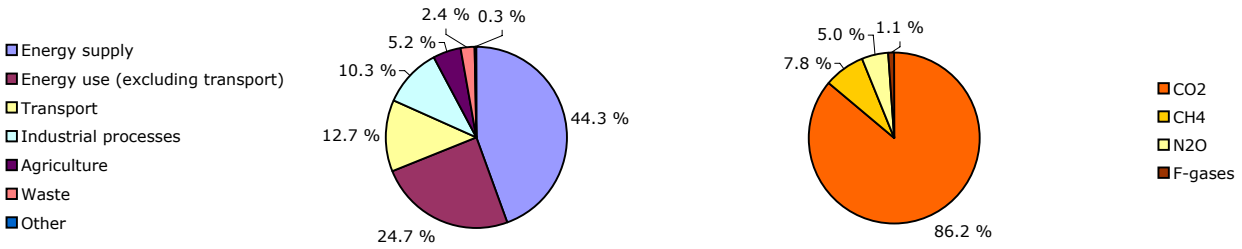
Cyprus does not have a target under the Kyoto Protocol. In 2007, total emissions in this country were 85.3 % higher than the 1990 level.

GHG trends and projections in the Czech Republic

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	194.7	149.1	150.8	*n.a.*	Mt CO_2-eq.	9	n.a.
GHG from international bunkers [4]	0.6	1.1	1.1	n.a.	Mt CO_2-eq.	19	n.a.
GHG per capita	18.8	14.5	14.7	*n.a.*	t CO_2-eq. / capita	5	n.a.
GHG per GDP [5]	3 248	1 890	1 804	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	3.5 %	2.9 %	3.0 %	*n.a.*	%		
EU ETS verified emissions [6]		83.6	87.8	80.1	Mt CO_2-eq.	7	n.a.
Share of EU ETS verified emissions in total GHG		56.1 %	58.2 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 13.7 %	– 9.4 %	– 6.4 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 43.9	– 22.5 %	1.7	1.2 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 4.1	– 22.0 %	0.1	0.8 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			4.2	5.0 %			– 7.8	– 8.8 %

Assessment long-term trend of total GHG (1990-2007)

Emissions decreased significantly in the early 1990s, due to the economic restructuring, but have remained relatively stable since 2000. The decrease was mainly observed in the energy sector, caused by lower fuel consumption in manufacturing industry and in households, and by switching from coal to natural gas. Emissions from the agriculture and industrial processes sectors have also decreased. In contrast, emissions from transport are gradually increasing.

Assessment short-term trend of total GHG (2006-2007)

The decrease in emissions from fuel combustion in households was counterbalanced by an increase in emissions from public electricity and heat production. Increases are also reported for road transport, for manufacturing industries (although emissions from the production of iron and steel decreased) and for HFC emissions.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	www.chmi.cz/cc [Czech], www.chmi.cz/cc/acc/aindex.html [English]

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

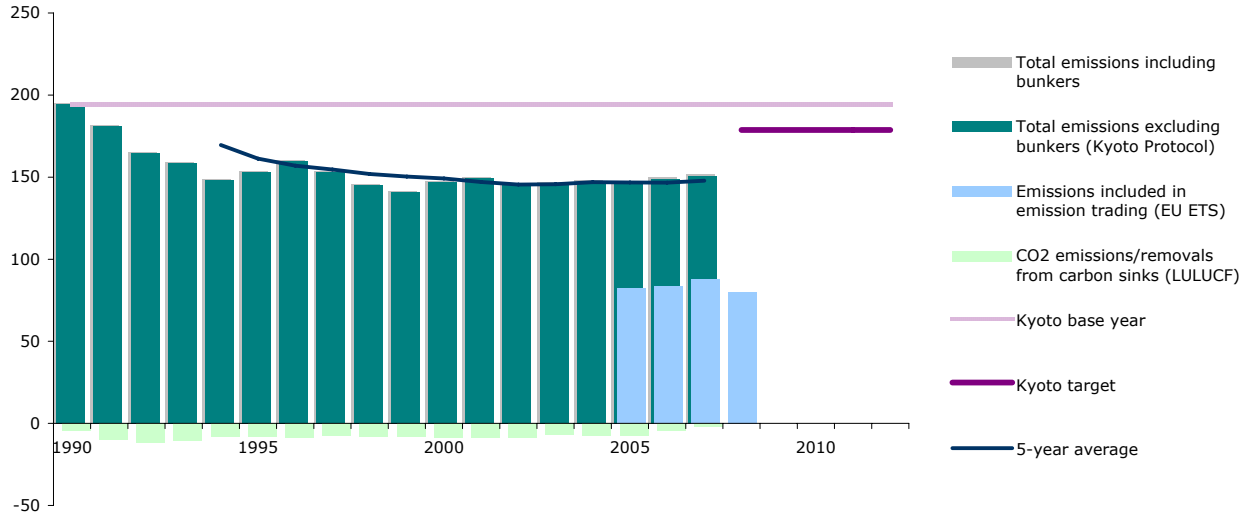
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

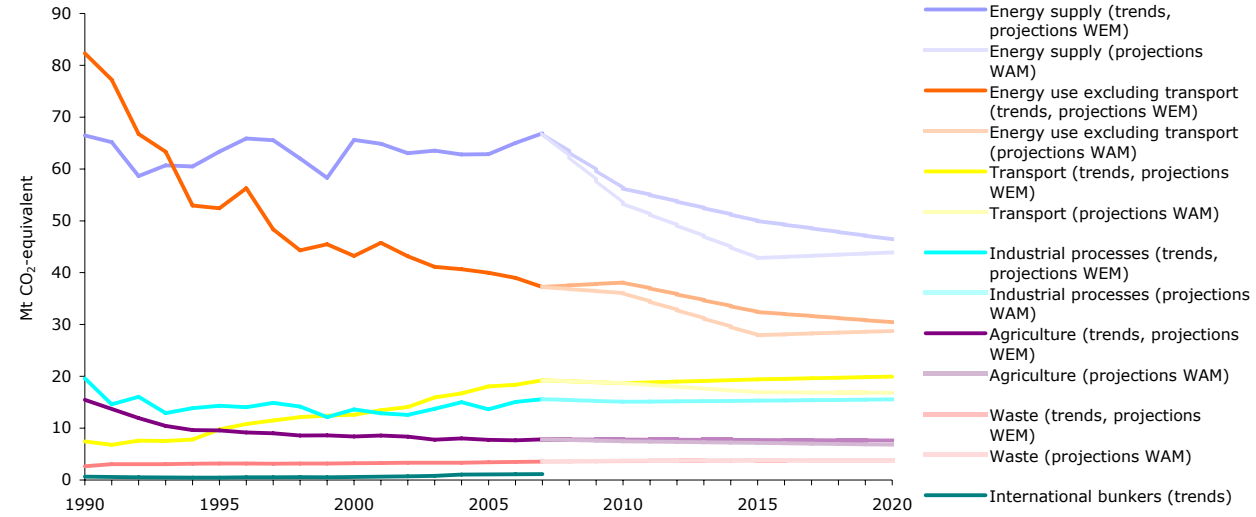
GHG trends and projections in the Czech Republic

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	194.2	
Kyoto target (initial assigned amount 2008–2012)	178.7	92.0 %
Total GHG over 2003–2007	147.8	76.1 %

Assessment of progress towards Kyoto targets

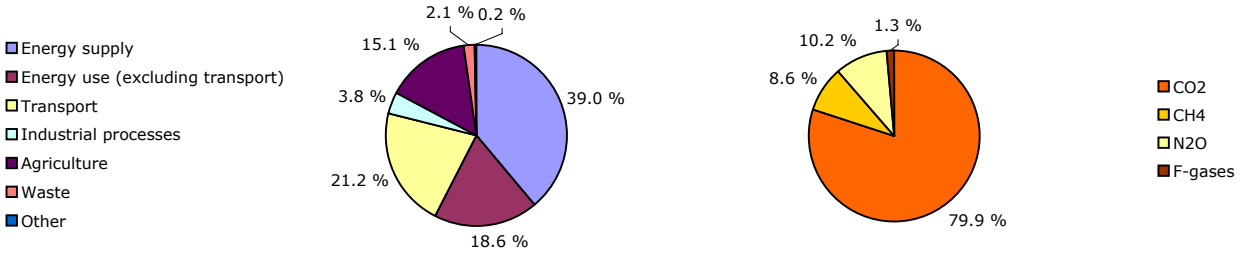
In the Czech Republic, average emissions over the period 2003–2007 were 23.9 % lower than the base-year level, well below the Kyoto target of – 8 % for the period 2008–2012. The Czech Republic will therefore not meet difficulty in reaching its target under the Kyoto Protocol. It will actually achieve significant surplus emission rights by the end of the Kyoto commitment period.

GHG trends and projections in Denmark

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	69.1	71.0	66.6	*63.5*	Mt CO_2-eq.	18	13
GHG from international bunkers [4]	4.9	6.1	6.4	n.a.	Mt CO_2-eq.	10	10
GHG per capita	13.4	13.1	12.2	*11.6*	t CO_2-eq. / capita	9	6
GHG per GDP [5]	514	372	343	*331*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	1.2 %	1.4 %	1.3 %	*1.3 %*	%		
EU ETS verified emissions [6]		34.2	29.4	26.5	Mt CO_2-eq.	16	12
Share of EU ETS verified emissions in total GHG		48.1 %	44.1 %	*41.8 %*	%		
ETS verified emissions compared to annual allowances [7]		22.5 %	5.4 %	10.7 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 2.4	– 3.5 %	– 4.4	– 6.2 %	*– 5.6*	*– 8.1 %*	*– 3.1*	*– 4.7 %*
GHG per capita	– 1.2	– 9.0 %	– 0.9	– 6.5 %	*– 1.8*	*– 13.7 %*	*– 0.6*	*– 5.1 %*
EU ETS verified emissions [9]			– 4.8	– 14.0 %			– 2.9	– 9.7 %

Assessment long-term trend of total GHG (1990-2007)

In Denmark, greenhouse gas emissions are subject to important fluctuations due to inter-country electricity trade within the Nordic energy market, which directly affects CO2 emissions from energy industries. High emissions in 1991, 1996, 2003 and 2006 reflect large electricity exports, while the low emissions in 1990 and 2005 reflect large electricity imports. CH4 energy-related emissions increased, due to a higher use of gas in decentralised cogeneration plants. CO2 emissions from the transport sector increased by 33 % over the period, mainly due to increasing road traffic. CO2 emissions from cement production increased by 59 %. Industrial emissions of N2O reduced after the production of nitric acid / fertiliser ceased in 2004. In the agriculture sector, N2O emissions decreased by 31.7 % and CH4 emissions by 4.4 %. In the waste sector, emissions decreased by 11.8 %, as a result of an increasing use of waste for power and heat generation and upgrades of waste water treatment plants, although increasing industrial load to waste water systems led to an increase of CH4 emissions from waste water.

Assessment short-term trend of total GHG (2006-2007)

The emission decrease corresponds to an increase in electricity generation from wind and increased electricity imports (good hydro year in both Sweden and Norway), which resulted in a decrease of total electricity generation in conventional thermal power plants (less coal used) and therefore in lower emissions from public electricity and heat production. Emissions from the agricultural sector increased.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

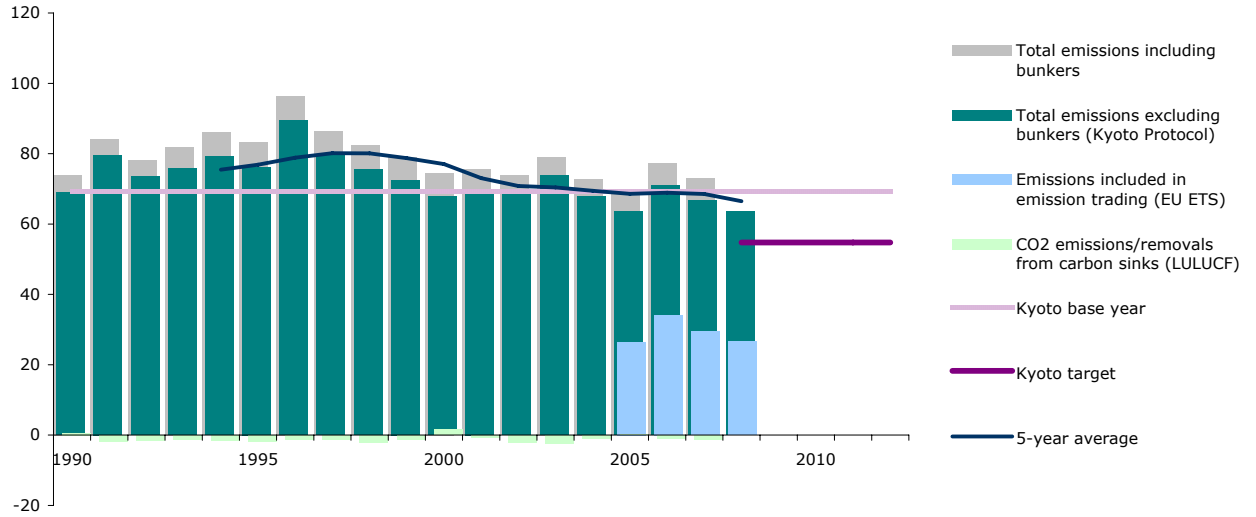
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

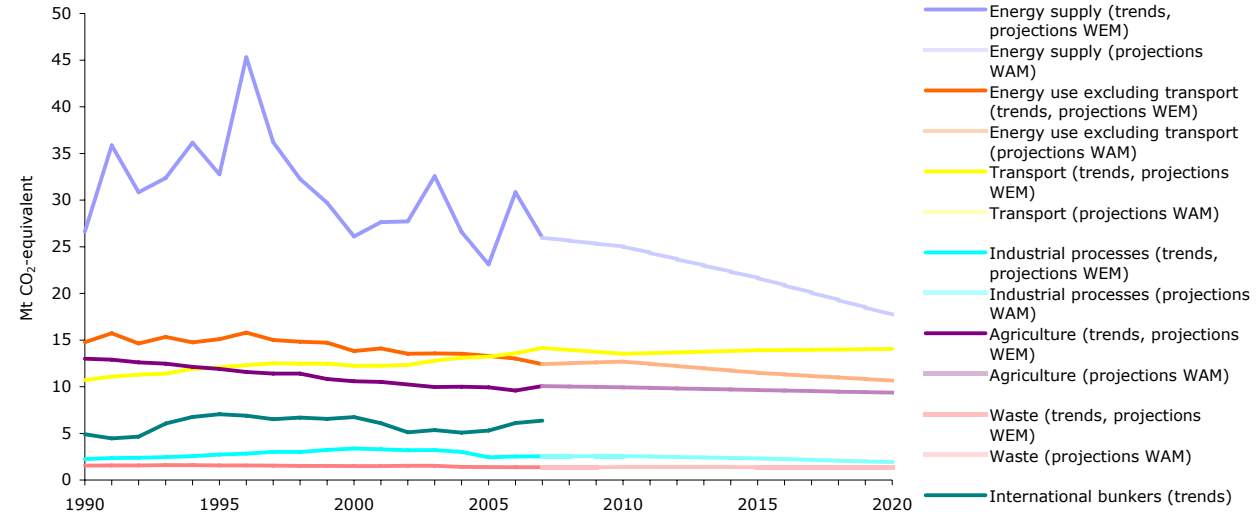
GHG trends and projections in Denmark

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

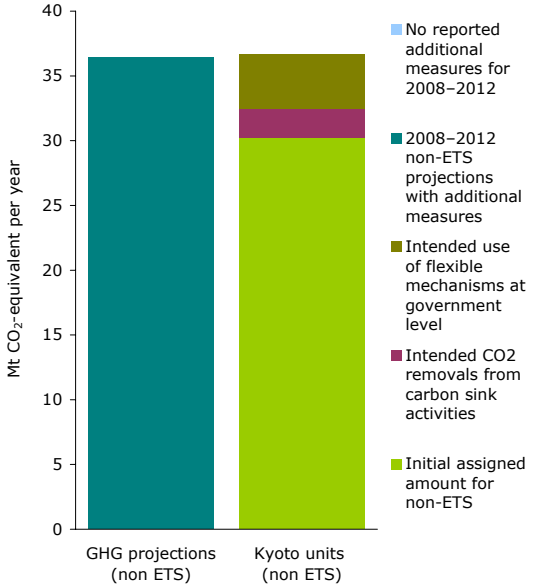


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	69.3	
Kyoto target (initial assigned amount 2008–2012)	54.8	79.0 %
Total GHG over 2004–2008	66.5	95.9 %
Implied target for the sectors not included in the EU ETS	30.3	
Intended use of flexible mechanisms by governments	4.2	6.1 %
Projected CO_2 removals from carbon sink activities	2.2	3.2 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	36.7	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	36.4	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	36.4	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 0.2	– 0.3 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 0.2	– 0.3 %

Assessment of projected progress towards Kyoto target

In Denmark, average emissions over the period 2004–2008 were 4.1 % lower than the base-year level, still significantly above the burden-sharing target of – 21 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 44 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to remain higher than their 'non-ETS' target. However, Denmark expects to reach its burden-sharing target by enhancing its carbon sinks and using the Kyoto flexible mechanisms.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012

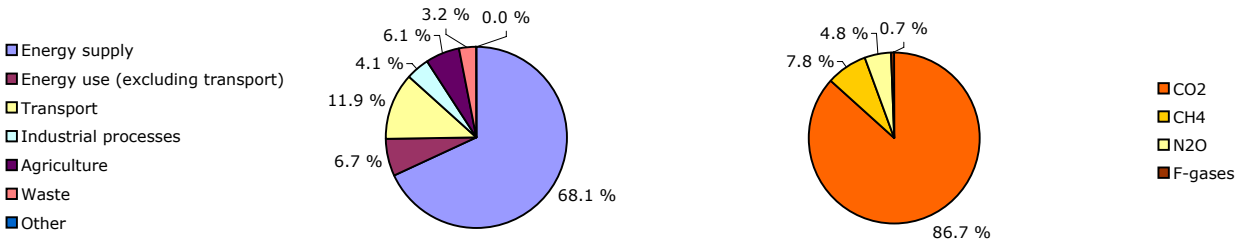


GHG trends and projections in Estonia

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	41.9	19.2	22.0	*n.a.*	Mt CO_2-eq.	22	n.a.
GHG from international bunkers [4]	0.7	0.8	0.9	n.a.	Mt CO_2-eq.	20	n.a.
GHG per capita	26.7	14.3	16.4	*n.a.*	t CO_2-eq. / capita	2	n.a.
GHG per GDP [5]	n.a.	1 951	2 106	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	0.8 %	0.4 %	0.4 %	*n.a.*	%		
EU ETS verified emissions [6]		12.1	15.3	13.5	Mt CO_2-eq.	21	n.a.
Share of EU ETS verified emissions in total GHG		63.1 %	69.6 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 33.5 %	– 28.2 %	16.0 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 19.9	– 47.5 %	2.8	14.8 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 10.3	– 38.6 %	2.1	15.0 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			3.2	26.6 %			– 1.8	– 11.6 %

Assessment long-term trend of total GHG (1990-2007)

The decrease in total emissions was mainly caused by the transition from planned economy to market economy and successful implementation of necessary reforms. Emissions have been increasing slightly since 1999. Emissions decreased in all sectors except waste. The largest emission reduction was observed in the production of public electricity and heat. Emissions from the energy sector decreased by 49 %, emissions from agriculture and from industrial processes decreased by 56 % and 5 %, respectively, while emissions from the waste sector increased by 4 %.

Assessment short-term trend of total GHG (2006-2007)

Electricity generation in conventional thermal power plants increased by 25 %, which resulted in higher emissions from public electricity and heat production. Electricity exports also increased, although not as much as generation. Emissions from the energy use in manufacturing industries increased.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

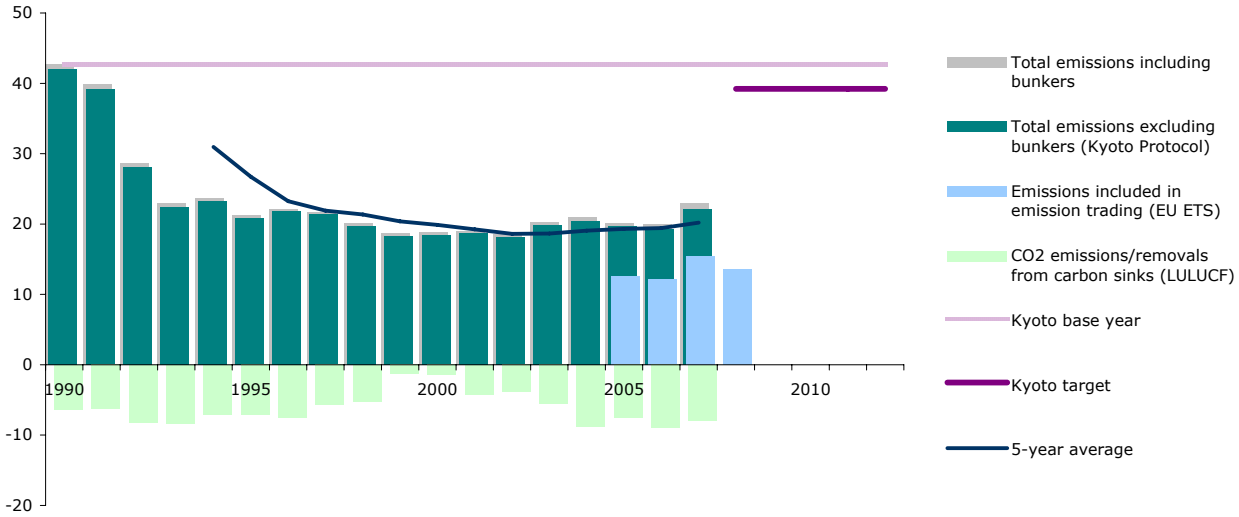
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

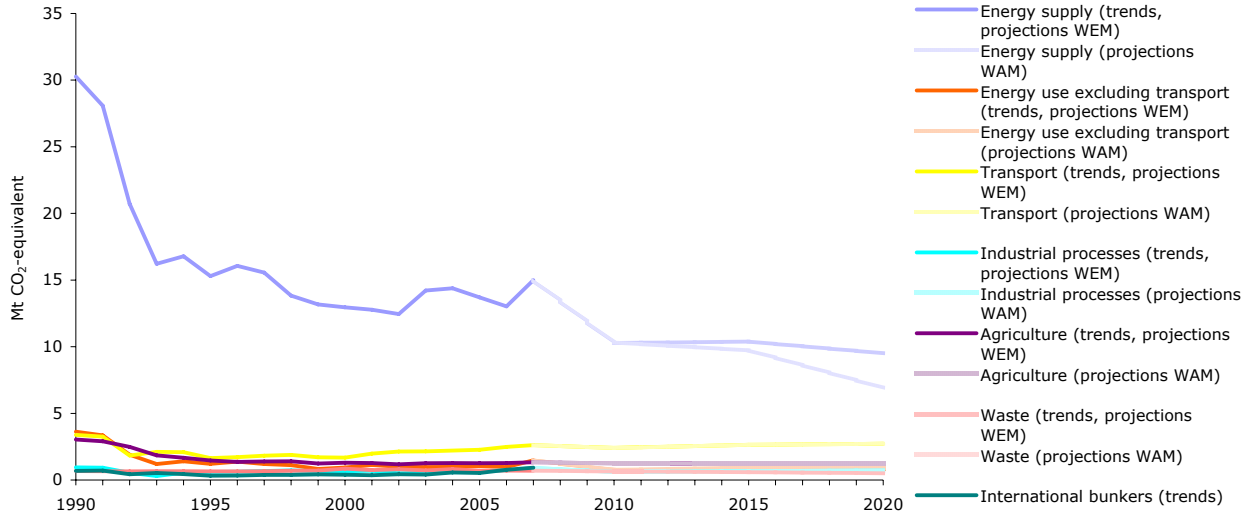
GHG trends and projections in Estonia

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	42.6	
Kyoto target (initial assigned amount 2008–2012)	39.2	92.0 %
Total GHG over 2003–2007	20.2	47.4 %

Assessment of progress towards Kyoto targets

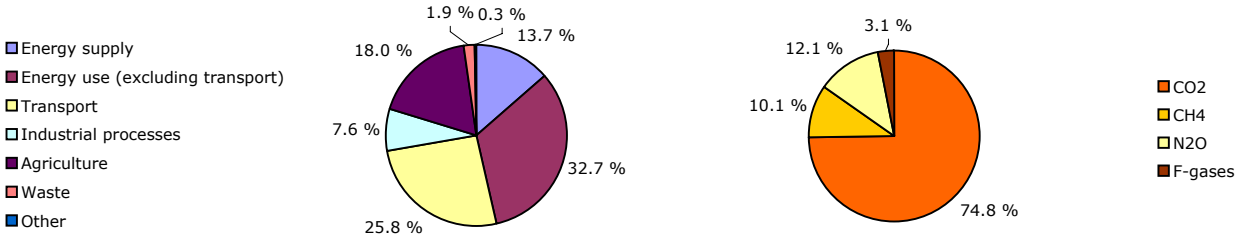
In Estonia, average emissions over the period 2003–2007 were 52.6 % lower than the base-year level, well below the Kyoto target of – 8 % for the period 2008–2012. Estonia will therefore not meet difficulty in reaching its target under the Kyoto Protocol. It will actually achieve significant surplus emission rights by the end of the Kyoto commitment period.

GHG trends and projections in France

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	562.6	541.7	531.1	*n.a.*	Mt CO_2-eq.	4	4
GHG from international bunkers [4]	16.7	25.8	26.7	n.a.	Mt CO_2-eq.	6	6
GHG per capita	9.7	8.6	8.4	*n.a.*	t CO_2-eq. / capita	20	13
GHG per GDP [5]	475	339	325	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	10.1 %	10.6 %	10.5 %	*n.a.*	%		
EU ETS verified emissions [6]		127.0	126.6	123.4	Mt CO_2-eq.	6	5
Share of EU ETS verified emissions in total GHG		23.4 %	23.8 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 15.3 %	– 15.5 %	– 4.7 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 31.5	– 5.6 %	– 10.6	– 2.0 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 1.3	– 13.6 %	– 0.2	– 2.6 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			– 0.3	– 0.3 %			– 3.2	– 2.5 %

Assessment long-term trend of total GHG (1990-2007)

Emissions remained relatively stable in the 1990s and have been slightly decreasing since the late 1990s. Large emission increases, primarily due to road transport followed by halocarbons consumption (refrigeration and air conditioning) were offset by, among others, reduction measures in adipic acid production. Key emission trends include a steady increase in emissions from road transport since 1990 (although these emissions have been decreasing since 2005), a considerable reduction in N2O emissions in the chemical industry and a fall in CH4 emissions as a combined result of increased productivity in the dairy sector, the decline in coal mining, and biogas recovery from landfill sites.

Assessment short-term trend of total GHG (2006-2007)

The highest decrease occurred in emissions from households and services, followed by emissions from energy use in manufacturing industries (in particular iron and steel). Emission decreases are also reported for road transport emissions. An important emission increase can be observed for petroleum refining.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

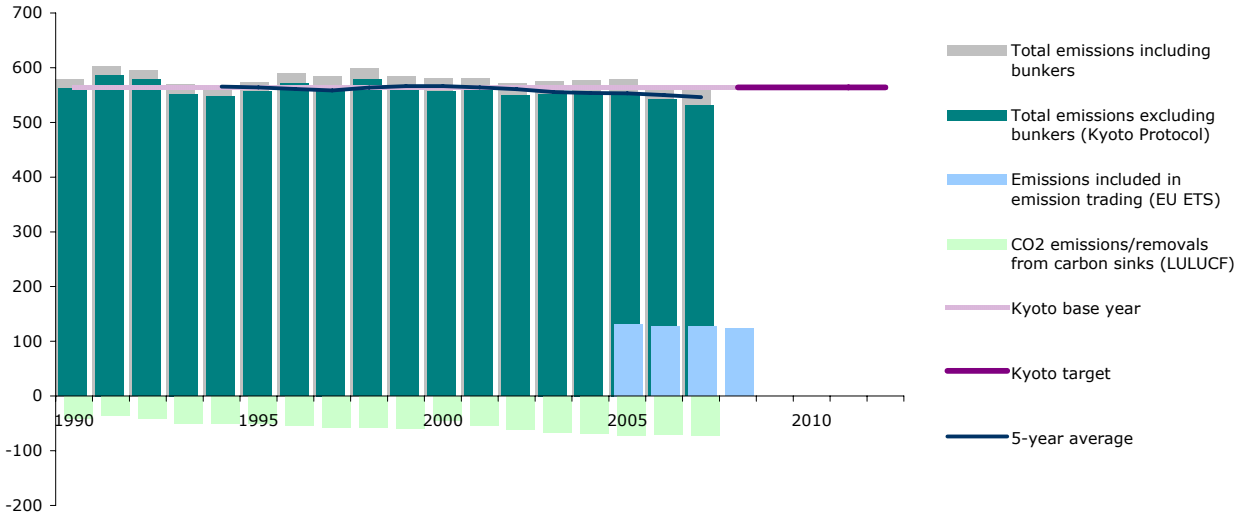
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

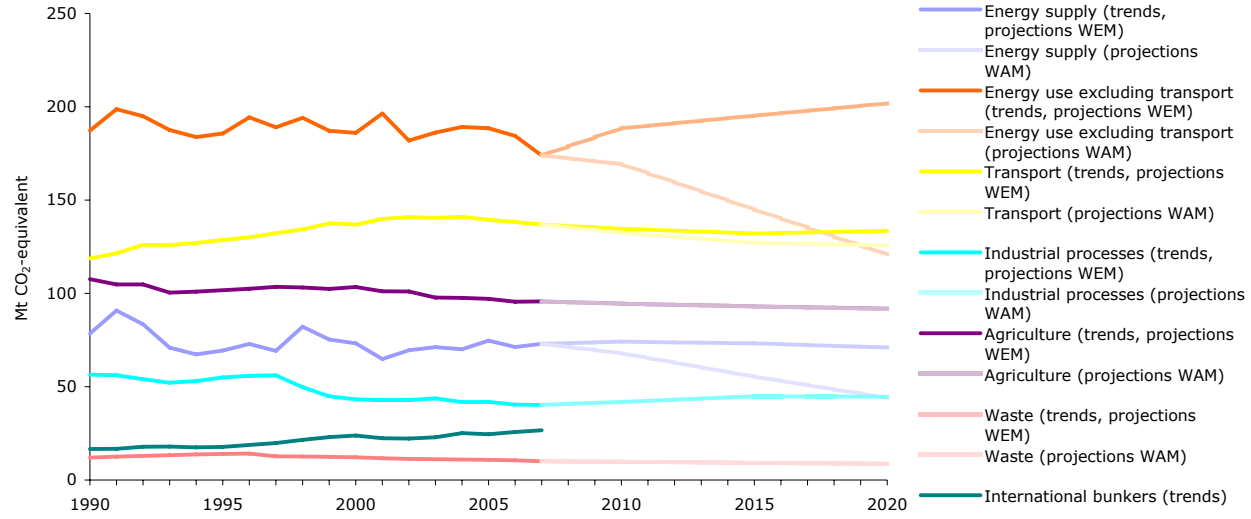
GHG trends and projections in France

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

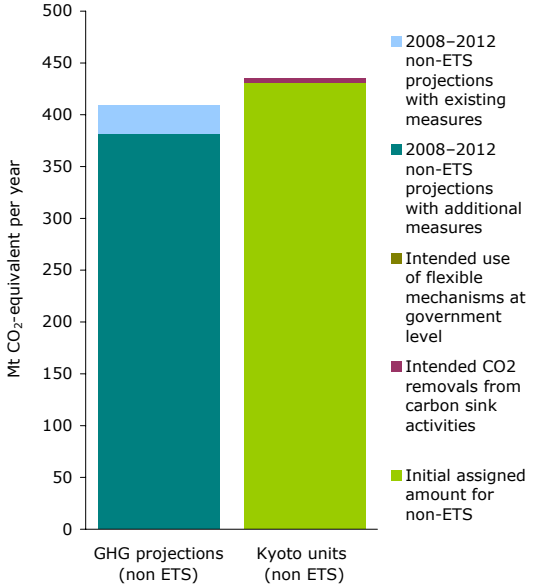


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	563.9	
Kyoto target (initial assigned amount 2008–2012)	563.9	100.0 %
Total GHG over 2003–2007	546.2	96.9 %
Implied target for the sectors not included in the EU ETS	431.1	
Intended use of flexible mechanisms by governments	0.0	0.0 %
Projected CO_2 removals from carbon sink activities	4.1	0.7 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	435.2	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	409.5	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	382.0	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 25.7	– 4.6 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 53.2	– 9.4 %

Assessment of projected progress towards Kyoto target

In France, average emissions over the period 2003–2007 were already 3.1 % lower than the base-year level, below the burden-sharing target of 0 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 24 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to be lower than their 'non-ETS' target. Implementing additional measures and enhancing carbon sinks will bring further emission reductions. Therefore France expects to reach and even over-achieve its burden-sharing target without using the Kyoto mechanisms.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012

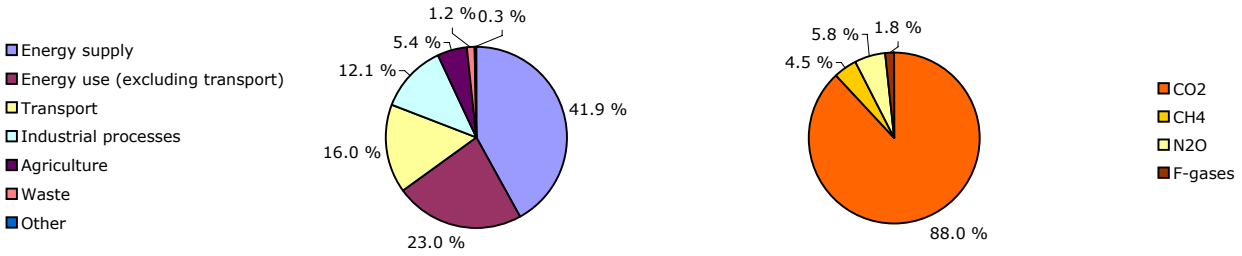


GHG trends and projections in Germany

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	1 215.2	980.0	956.1	*944.3*	Mt CO_2-eq.	1	1
GHG from international bunkers [4]	19.5	33.1	35.7	n.a.	Mt CO_2-eq.	5	5
GHG per capita	15.4	11.9	11.6	*11.5*	t CO_2-eq. / capita	11	8
GHG per GDP [5]	726	448	427	*416*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	21.8 %	19.2 %	19.0 %	*19.0 %*	%		
EU ETS verified emissions [6]		478.0	487.1	472.6	Mt CO_2-eq.	1	1
Share of EU ETS verified emissions in total GHG		48.8 %	51.0 %	*50.0 %*	%		
ETS verified emissions compared to annual allowances [7]		– 3.5 %	– 2.0 %	10.0 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 259.1	– 21.3 %	– 23.9	– 2.4 %	*– 270.9*	*– 22.3 %*	*– 11.8*	*– 1.2 %*
GHG per capita	– 3.7	– 24.4 %	– 0.3	– 2.3 %	*– 3.9*	*– 25.2 %*	*– 0.1*	*– 1.1 %*
EU ETS verified emissions [9]			9.1	1.9 %			– 14.5	– 3.0 %

Assessment long-term trend of total GHG (1990-2007)

Decreases occurred in all main source categories. The highest decreases occurred in energy and manufacturing industries, as well as fuel combustion by households and services. This is caused by efficiency improvements in the economy, the extended use of renewable energy and partly due to economic restructuring in the new federal states after German reunification.

Assessment short-term trend of total GHG (2006-2007)

Emissions from households, manufacturing industries, road transport and waste management decreased. These reductions were caused by relatively warm winter temperatures (leading to lower energy consumption in particular by households and the tertiary sector), tax effects on fuel sales, an increased share of renewable energy production (growth by 15 % compared to 2006) and improvements in the treatment of solid waste disposal. Emissions from the production of public electricity and heat and industrial processes increased (except production of halocarbons).

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	www.umweltbundesamt.de/emissionen/publikationen.htm [Deutsch], www.bmu.de/pressemitteilungen/aktuelle_pressemitteilungen/pm/42674.php [Deutsch], www.bmu.de/english/current_press_releases/pm/42839.php [English]

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

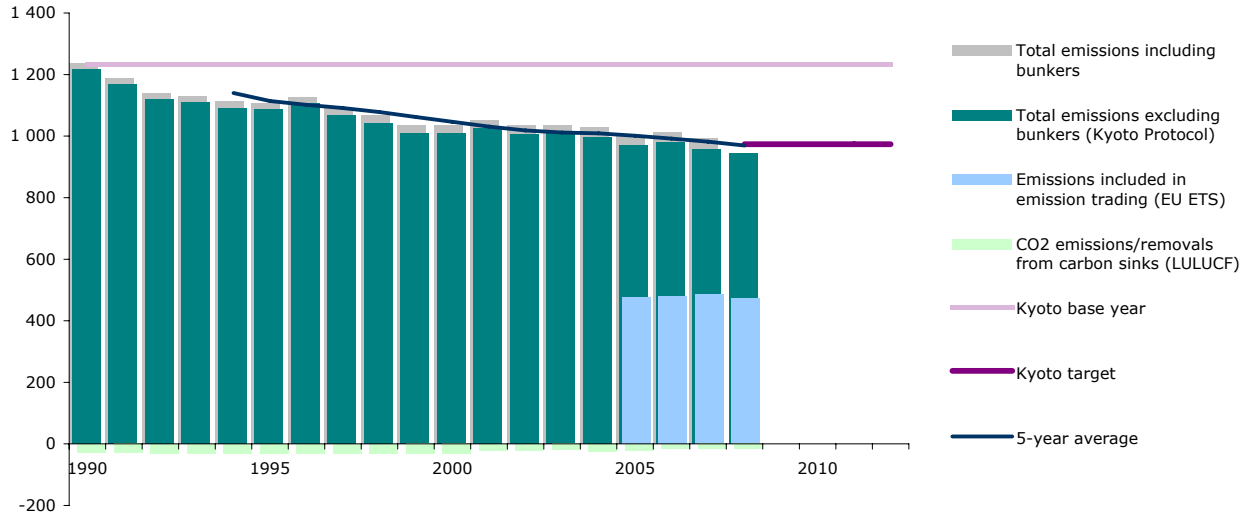
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

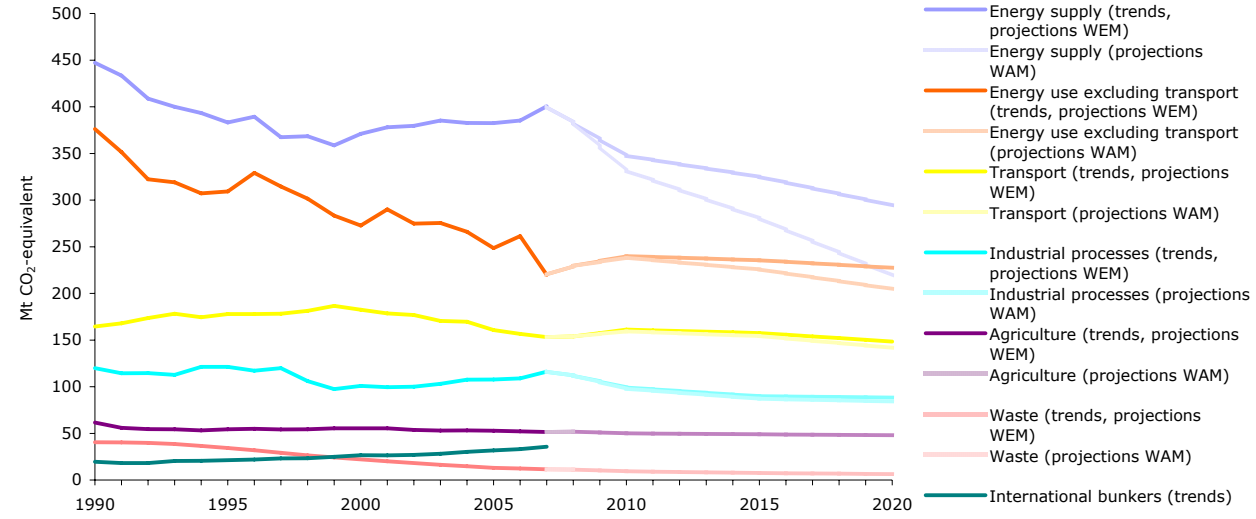
GHG trends and projections in Germany

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

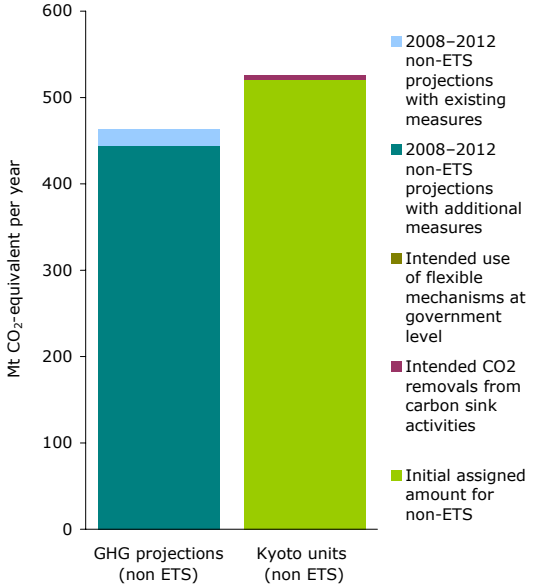


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	1 232.4	
Kyoto target (initial assigned amount 2008–2012)	973.6	79.0 %
Total GHG over 2004–2008	969.3	78.7 %
Implied target for the sectors not included in the EU ETS	520.5	
Intended use of flexible mechanisms by governments	0.0	0.0 %
Projected CO_2 removals from carbon sink activities	4.5	0.4 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	525.1	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	463.2	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	443.7	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 61.9	– 5.0 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 81.4	– 6.6 %

Assessment of projected progress towards Kyoto target

In Germany, average emissions over the period 2004–2008 were already 21.3 % lower than the base-year level, below the burden-sharing target of – 21 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 51 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to be lower than their 'non-ETS' target. Implementing additional measures and enhancing carbon sinks will bring further emission reductions. Therefore Germany expects to reach and even over-achieve its burden-sharing target without using the Kyoto mechanisms.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012

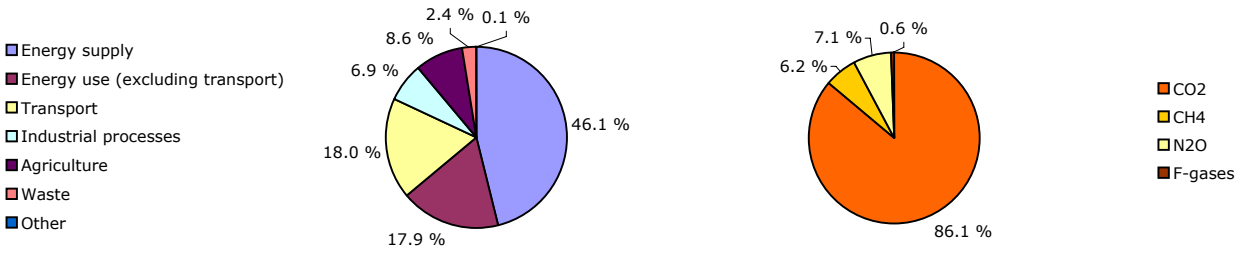


GHG trends and projections in Greece

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	105.6	128.1	131.9	*130.5*	Mt CO_2-eq.	10	7
GHG from international bunkers [4]	10.6	12.8	13.1	n.a.	Mt CO_2-eq.	8	8
GHG per capita	10.4	11.5	11.8	*11.6*	t CO_2-eq. / capita	10	7
GHG per GDP [5]	965	723	716	*688*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	1.9 %	2.5 %	2.6 %	*2.6 %*	%		
EU ETS verified emissions [6]		70.0	72.7	69.9	Mt CO_2-eq.	9	7
Share of EU ETS verified emissions in total GHG		54.6 %	55.1 %	*53.5 %*	%		
ETS verified emissions compared to annual allowances [7]		– 1.7 %	2.2 %	9.7 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	26.3	24.9 %	3.8	2.9 %	*24.9*	*23.6 %*	*– 1.4*	*– 1.0 %*
GHG per capita	1.4	13.2 %	0.3	2.5 %	*1.2*	*11.6 %*	*– 0.2*	*– 1.4 %*
EU ETS verified emissions [9]			2.8	3.9 %			– 2.9	– 3.9 %

Assessment long-term trend of total GHG (1990-2007)

Emissions have steadily increased since the early 1990s, mainly driven by economic development (living standards improvement, increased transport activity and energy demand, and important growth of the services sector). Emissions have begun to stabilise in recent years, due particularly to the introduction of natural gas in the energy system and the use of hydropower. The emissions from industrial processes showed an intense fluctuation due to the discontinuation of HCFC-22 production while emissions from agriculture decreased due to the reduction of the use of synthetic nitrogen fertilizers. Emissions from the waste sector decreased due to the reduction of the wastewater volume treated under aerobic conditions.

Assessment short-term trend of total GHG (2006-2007)

Emissions increased in public electricity and heat production, reaching the levels of 2005. The small decrease in 2006 compared to 2005 and 2007 resulted from the increased use of hydroelectric systems for electricity generation. The trend of emissions from the other sectors is similar with that of the whole period of 1990 to 2007. Emissions decreases are reported for energy use in households and in the agriculture sector.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	[Greek] www.minenv.gr/4/41/g4107.html

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

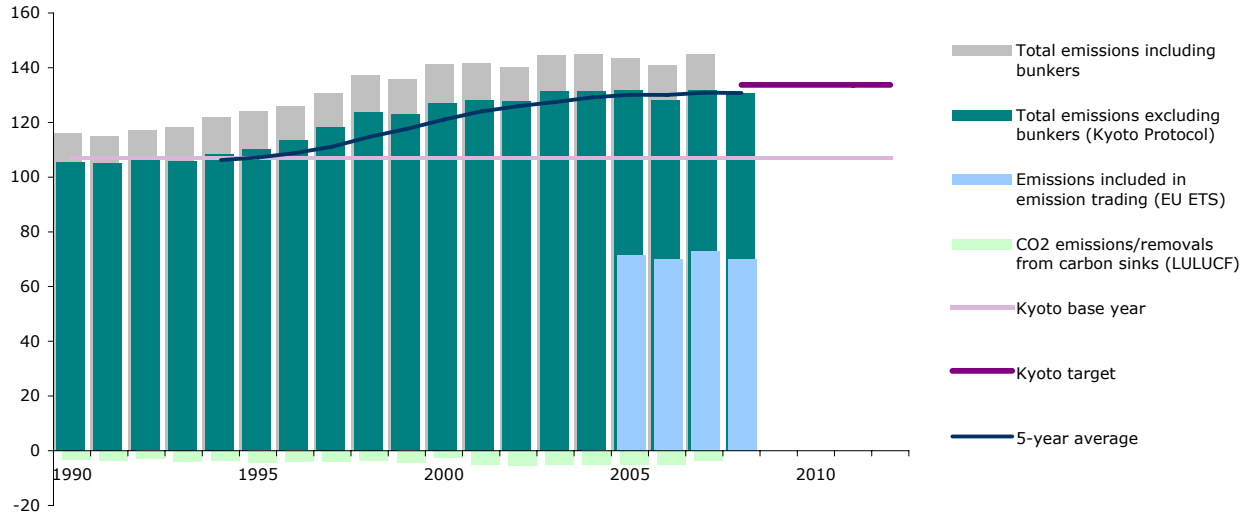
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

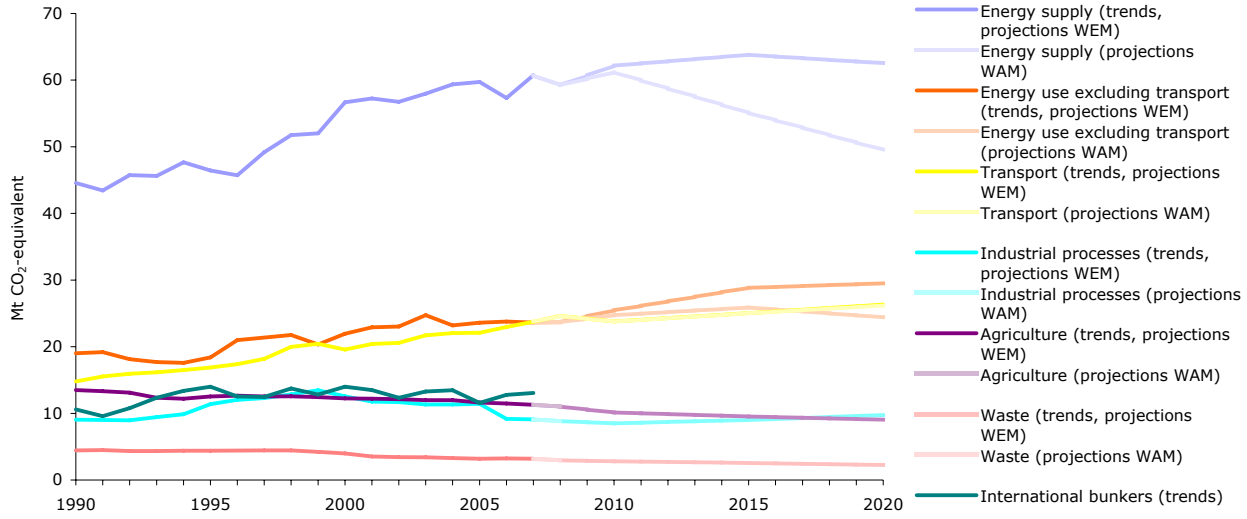
GHG trends and projections in Greece

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

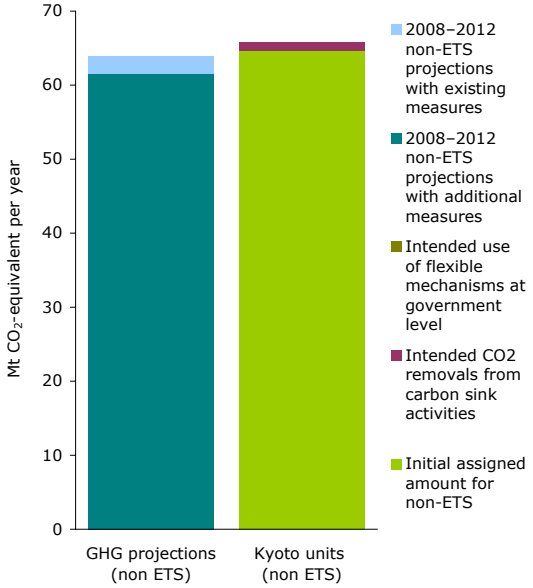


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	107.0	
Kyoto target (initial assigned amount 2008–2012)	133.7	125.0 %
Total GHG over 2004–2008	130.7	122.2 %
Implied target for the sectors not included in the EU ETS	64.6	
Intended use of flexible mechanisms by governments	0.0	0.0 %
Projected CO_2 removals from carbon sink activities	1.1	1.1 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	65.8	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	63.9	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	61.5	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 1.9	– 1.8 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 4.3	– 4.0 %

Assessment of projected progress towards Kyoto target

In Greece, average emissions over the period 2004–2008 were 22.2 % higher than the base-year level, below the burden-sharing target of + 25 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 55 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to be lower than their 'non-ETS' target. Implementing additional measures and enhancing carbon sinks will bring further emission reductions. Therefore Greece expects to reach and even over-achieve its burden-sharing target without using the Kyoto mechanisms.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012

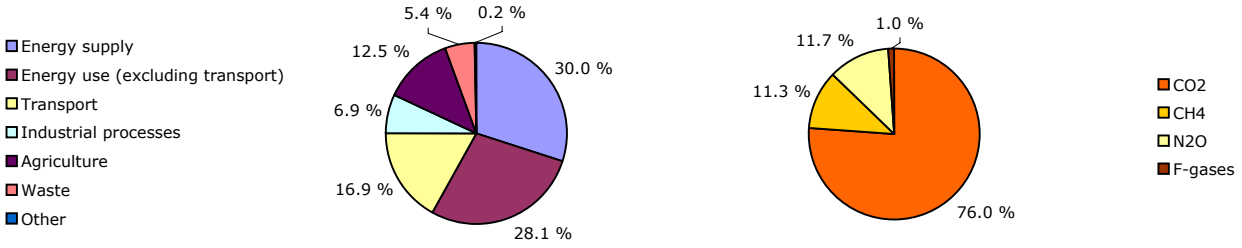


GHG trends and projections in Hungary

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	99.2	78.9	75.9	*n.a.*	Mt CO_2-eq.	15	n.a.
GHG from international bunkers [4]	0.5	0.7	0.8	n.a.	Mt CO_2-eq.	22	n.a.
GHG per capita	9.6	7.8	7.5	*n.a.*	t CO_2-eq. / capita	22	n.a.
GHG per GDP [5]	n.a.	1 182	1 126	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	1.8 %	1.5 %	1.5 %	*n.a.*	%		
EU ETS verified emissions [6]		25.8	26.8	27.2	Mt CO_2-eq.	17	n.a.
Share of EU ETS verified emissions in total GHG		32.8 %	35.3 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 14.5 %	– 11.2 %	8.9 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 23.3	– 23.5 %	– 2.9	– 3.7 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 2.0	– 21.1 %	– 0.3	– 3.6 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			1.0	3.8 %			0.4	1.5 %

Assessment long-term trend of total GHG (1990-2007)

Total emissions decreased sharply in the early 1990s due to the economic restructuring and have remained relatively stable since. Decreases were observed in fuel combustion from manufacturing industries, and households and services. In the years of economic transformation, energy demand was significantly reduced and the fuel structure changed, with the replacement of solid fuel by natural gas. Emissions from agriculture decreased over the period 1985-2007. The bulk of this decrease occurred in the years between 1985 and 1995, during which the agricultural production underwent a drastic decrease. Emissions from industrial processes decreased, in particular in the production of mineral products and in the chemical industry. The growth in emissions from waste seems to be slowing or even stopping in recent years.

Assessment short-term trend of total GHG (2006-2007)

Total emissions decreased mainly due to less fuel combustion (– 22 %) in households, services and agriculture, and the decrease in emissions from chemical industry. Emissions from public electricity and heat production increased (4 %) as also electricity generation in conventional power plants increased (13 %).

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

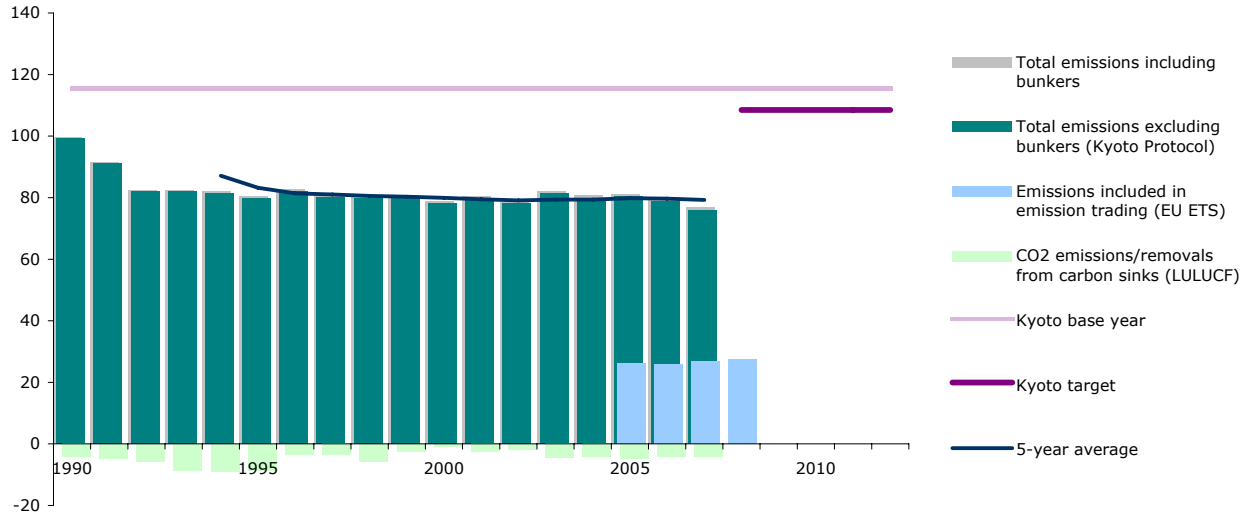
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

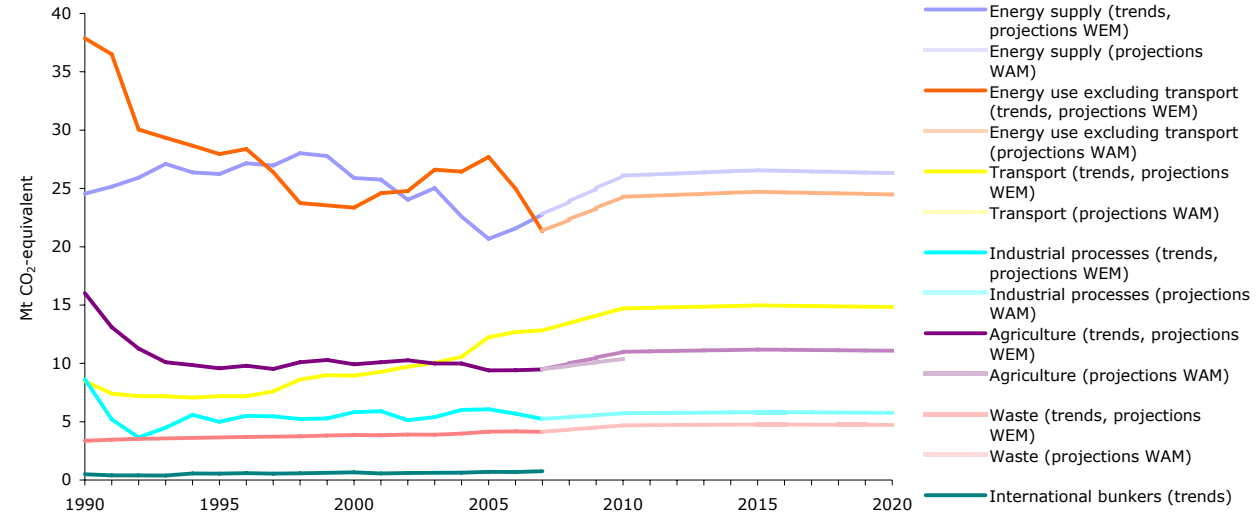
GHG trends and projections in Hungary

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	115.4	
Kyoto target (initial assigned amount 2008–2012)	108.5	94.0 %
Total GHG over 2003–2007	79.3	68.7 %

Assessment of progress towards Kyoto targets

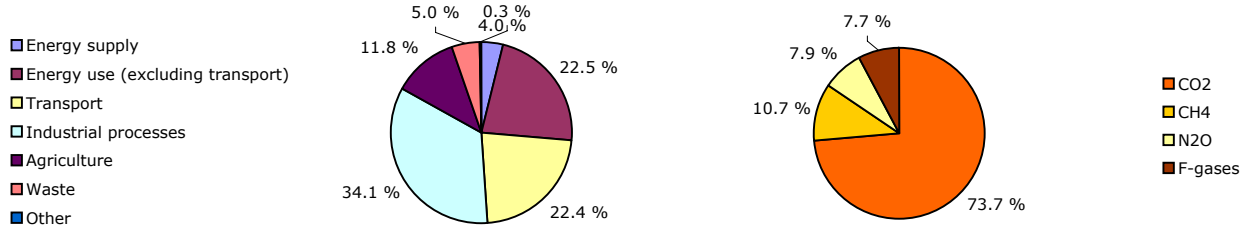
In Hungary, average emissions over the period 2003–2007 were 31.3 % lower than the base-year level, well below the Kyoto target of – 6 % for the period 2008–2012. Hungary will therefore not meet difficulty in reaching its target under the Kyoto Protocol. It will actually achieve significant surplus emission rights by the end of the Kyoto commitment period.

GHG trends and projections in Iceland

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	3.4	4.2	4.5	*n.a.*	Mt CO_2-eq.	n.a.	n.a.
GHG from international bunkers [4]	0.3	0.6	0.7	n.a.	Mt CO_2-eq.	n.a.	n.a.
GHG per capita	13.4	14.1	14.8	*n.a.*	t CO_2-eq. / capita	n.a.	n.a.
GHG per GDP [5]	464	349	355	*n.a.*	g CO_2-eq. / euro		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	1.1	33.7 %	0.3	7.3 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	1.4	10.2 %	0.6	4.6 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*

Assessment long-term trend of total GHG (1990-2007)

After a slight decrease in the early 1990s, emissions increased in the second half of the 1990s and stabilised during 1990–2005. In the past two years, emissions increased significantly. Over the whole period, the largest increases were due to metal production and transport, which represent more than half of total emissions. Emissions from agriculture decreased.

Assessment short-term trend of total GHG (2006-2007)

The significant increase in total emissions was almost exclusively due to increased emissions from aluminium production. In relative terms, emissions from public electricity and heat also contributed significantly towards the overall increase.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

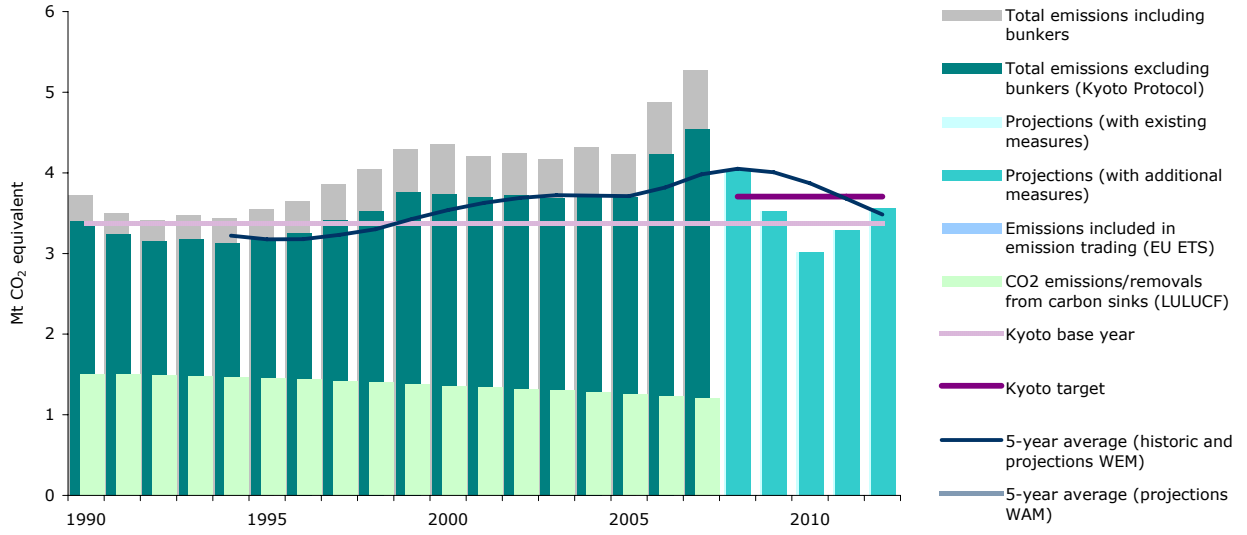
[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

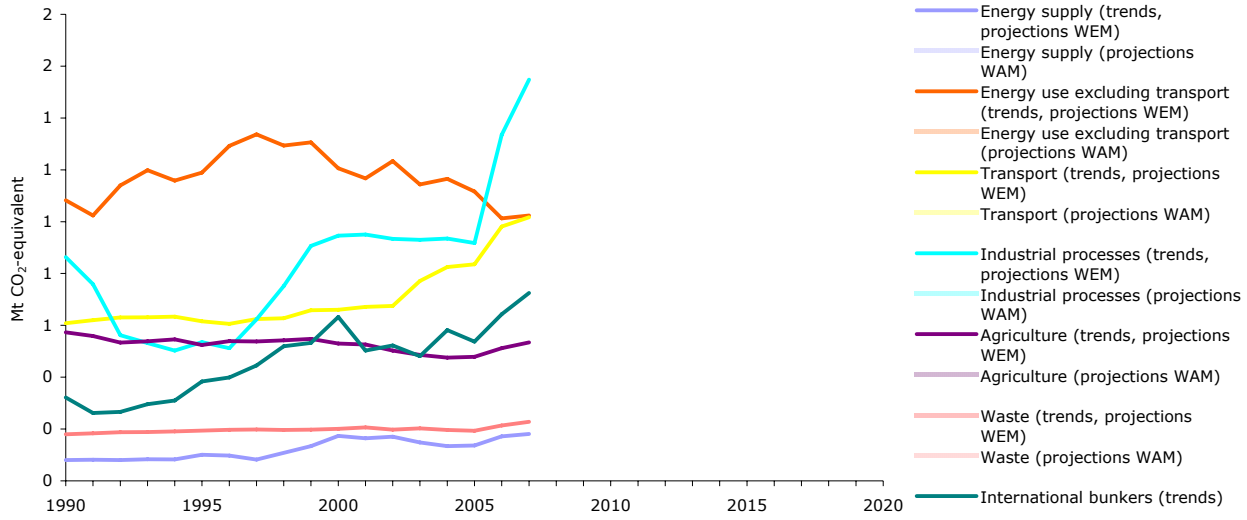
GHG trends and projections in Iceland

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

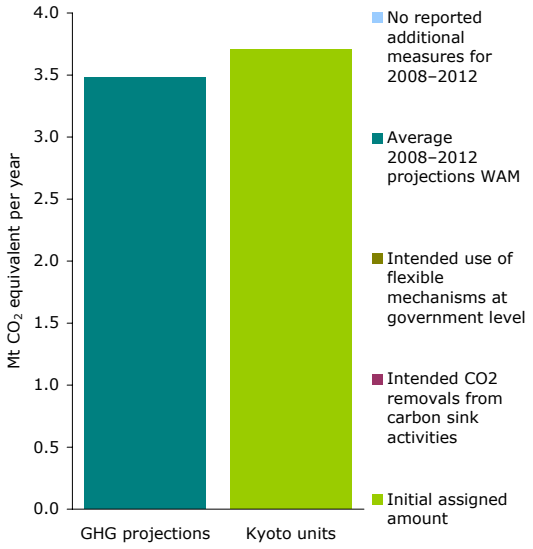


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	3.4	
Kyoto target (initial assigned amount 2008–2012)	3.7	110.0 %
Total GHG over 2003–2007	4.0	118.2 %
Intended use of flexible mechanisms by governments	not available	
Projected CO_2 removals from carbon sink activities	n.e.	
Kyoto target, including Kyoto mechanisms, carbon sinks and trading of allowances by operators in the EU ETS	3.7	
Projected emissions with existing measures (WEM)	3.5	
Projected emissions with additional measures (WAM)	3.5	
Gap between projections WEM and target, including Kyoto mechanisms and carbon sinks	– 0.2	– 6.6 %
Gap between projections WAM and target, including Kyoto mechanisms and carbon sinks	– 0.2	– 6.6 %

Assessment of projected progress towards Kyoto targets

In Iceland, average emissions over the period 2003–2007 were 18.2 % higher than the base-year level, significantly above the Kyoto target of + 10 % for the period 2008–2012. Projections of total emissions indicate that these are expected to decrease to a level below the target. Therefore Iceland expects to reach its Kyoto target with the measures already implemented and without using the Kyoto mechanisms.

Comparison of projected emissions with Kyoto units for the period 2008–2012

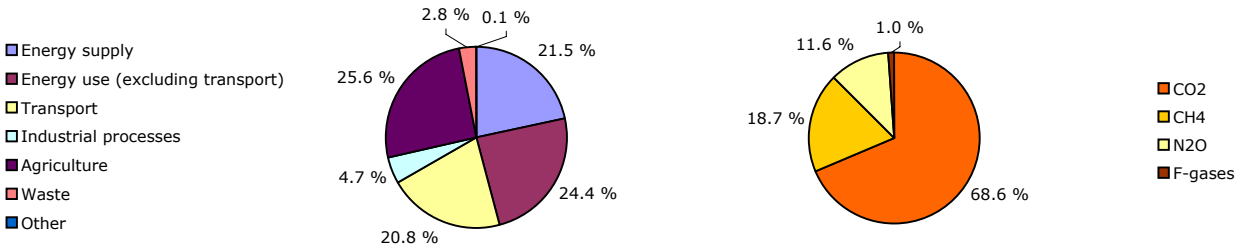


GHG trends and projections in Ireland

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	55.4	69.7	69.2	*n.a.*	Mt CO_2-eq.	17	12
GHG from international bunkers [4]	1.1	3.3	3.4	n.a.	Mt CO_2-eq.	12	12
GHG per capita	15.8	16.6	16.0	*n.a.*	t CO_2-eq. / capita	3	2
GHG per GDP [5]	1 057	480	449	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	1.0 %	1.4 %	1.4 %	*n.a.*	%		
EU ETS verified emissions [6]		21.7	21.2	20.4	Mt CO_2-eq.	19	13
Share of EU ETS verified emissions in total GHG		31.1 %	30.7 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		12.8 %	10.4 %	2.1 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	13.8	25.0 %	– 0.5	– 0.7 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	0.3	1.6 %	– 0.5	– 3.1 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			– 0.5	– 2.1 %			– 0.9	– 4.1 %

Assessment long-term trend of total GHG (1990-2007)

Important economic growth and increasing population were responsible for significant emission increases, but this upward trend has been contained since 2001. The largest increase was observed in the transport sector, as a result of increasing vehicle numbers as well as the trend towards purchase of larger vehicles and increased reliance on private cars, particularly for commutes to work. Rapidly increasing road freight transport, influenced by high construction activity, has also had a significant impact on transport emissions. Substantial emission increases were observed in the industry sector, which reflects increasing electricity demand and higher industrial activity, despite energy efficiency improvements and fuel switching. Emissions from agriculture reached a peak in 1998 and have decreased to below their 1990 level in the last years, reflecting long-term decline in cattle population and in fertiliser use due to the Common Agricultural Policy. Increased housing stock drove emissions upward in the residential sector after 1998, following a sharp reduction in the early 1990s and stabilisation that resulted from fuel switching.

Assessment short-term trend of total GHG (2006-2007)

Transport continues to be the dominant growth sector with emissions 4.7 % higher in 2007 than in 2006. This represents a 178 % increase on the 1990 transport emissions. Road transport accounts for 97 % of the transport sector emissions. The increase in the emissions from the transport sector reflects sustained increases in fuel consumption with petrol usage up 1.9 % and diesel consumption up 7.4 % from the previous year. The decrease in emissions from energy industries (– 4.0 %) follows a similar decrease in the previous year. Emissions were still 27.4 % higher than in 1990. Displacement of oil by natural gas largely accounts for the decrease in emissions in energy in 2007. The emissions from agriculture decreased by 3.8 percent in 2007, continuing the downward trend from the 1998 peak. Lower sheep and cattle numbers coupled with reduced use of fertiliser resulted in the lower emissions from the agriculture sector. Emissions from the residential sector in 2007 decreased by 3.1 % from the 2006 level.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	www.epa.ie/news/pr/2009/april/name,25868,en.html, www.epa.ie/downloads/pubs/air/airemissions/GHG_UN_2007_Final_150409.pdf

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

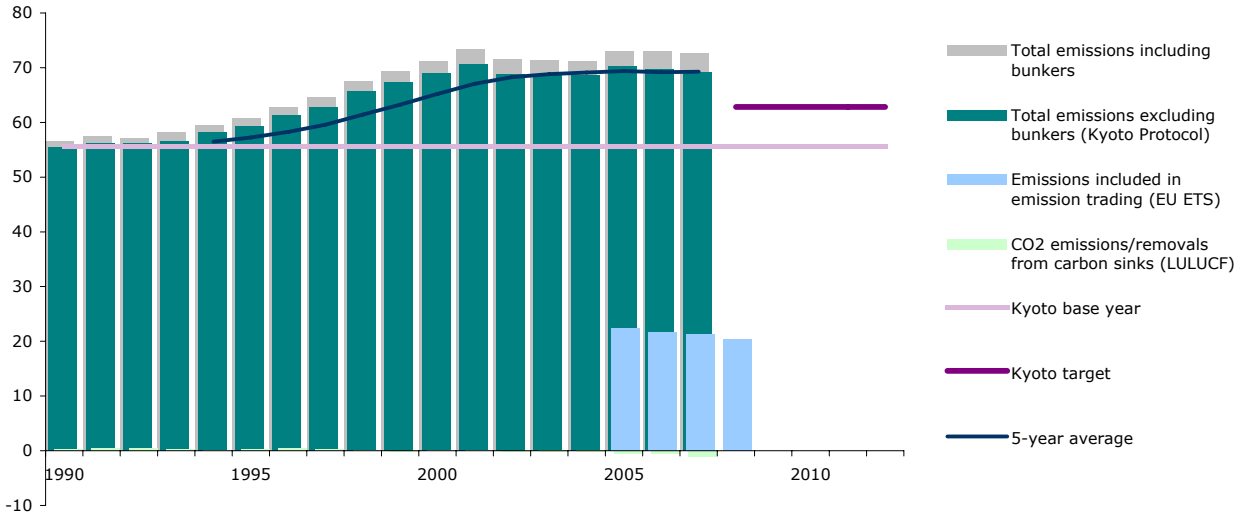
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

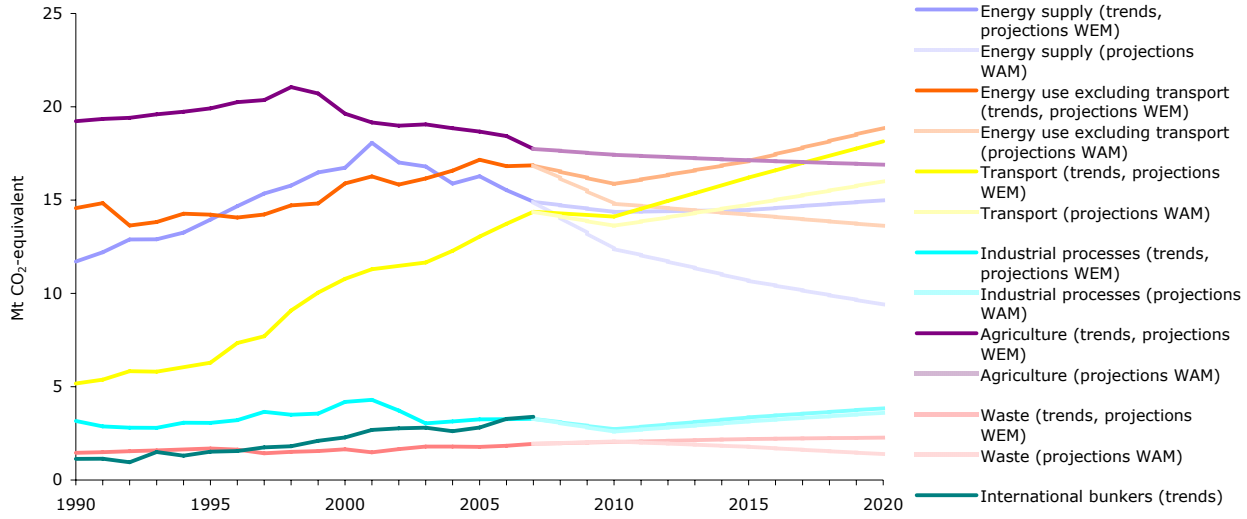
GHG trends and projections in Ireland

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

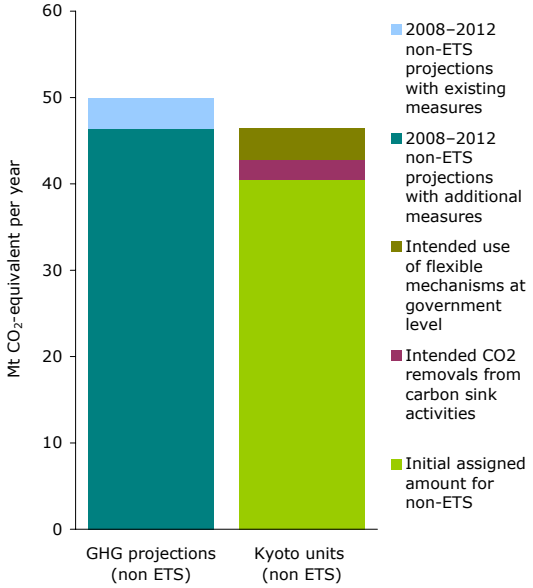


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	55.6	
Kyoto target (initial assigned amount 2008–2012)	62.8	113.0 %
Total GHG over 2003–2007	69.3	124.6 %
Implied target for the sectors not included in the EU ETS	40.5	
Intended use of flexible mechanisms by governments	3.6	6.5 %
Projected CO_2 removals from carbon sink activities	2.2	4.0 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	46.4	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	49.9	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	46.4	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	3.5	6.3 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 0.0	– 0.0 %

Assessment of projected progress towards Kyoto target

In Ireland, average emissions over the period 2003–2007 were 24.6 % higher than the base-year level, still significantly above the burden-sharing target of + 13 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 31 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to remain higher than their 'non-ETS' target. However, Ireland expects to reach its burden-sharing target by implementing additional measures, enhancing its carbon sinks and using the Kyoto flexible mechanisms.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012

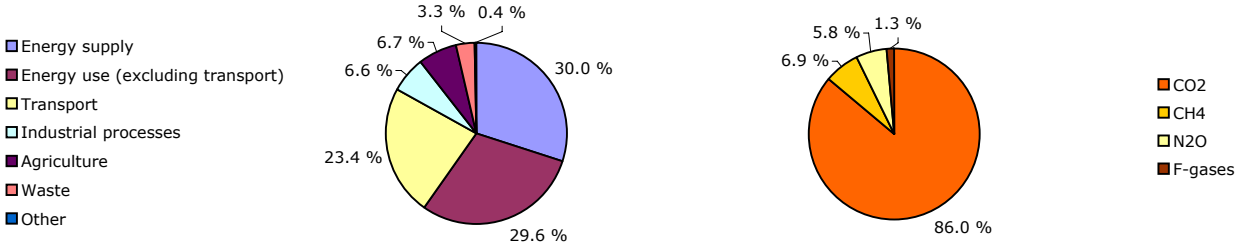


GHG trends and projections in Italy

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	516.3	563.0	552.8	*540.7*	Mt CO_2-eq.	3	3
GHG from international bunkers [4]	8.6	17.4	18.3	n.a.	Mt CO_2-eq.	7	7
GHG per capita	9.1	9.6	9.3	*9.1*	t CO_2-eq. / capita	18	12
GHG per GDP [5]	507	443	429	*424*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	9.3 %	11.0 %	11.0 %	*10.9 %*	%		
EU ETS verified emissions [6]		227.4	226.4	220.7	Mt CO_2-eq.	3	3
Share of EU ETS verified emissions in total GHG		40.4 %	41.0 %	*40.8 %*	%		
ETS verified emissions compared to annual allowances [7]		10.9 %	11.4 %	4.2 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	36.5	7.1 %	– 10.2	– 1.8 %	*24.4*	*4.7 %*	*– 12.1*	*– 2.2 %*
GHG per capita	0.2	2.6 %	– 0.2	– 2.4 %	*– 0.0*	*– 0.4 %*	*– 0.3*	*– 3.0 %*
EU ETS verified emissions [9]			– 1.1	– 0.5 %			– 5.7	– 2.5 %

Assessment long-term trend of total GHG (1990-2007)

Emissions remained stable in the first half of the 1990s but increased during the following 10 years, showing signs of stabilisation more recently. The largest emission increases were observed in the transport sector and in the energy industries. Process-related emissions from mineral production increased while emissions from chemical and metal production decreased. In particular, N2O emissions decreased substantially due to the abatement technology introduced in the production of adipic acid. The decrease in the agricultural sector was mostly due to the decrease of CH4 emissions from enteric fermentation and to a minor decrease from manure management. Emissions from the waste sector increased by 2.9 % due to an increase in the emissions from solid waste disposal and from waste-water handling.

Assessment short-term trend of total GHG (2006-2007)

The emission change is due to lower emissions from households, services, manufacturing industries and public electricity and heat production. A factor influencing this trend was probably the decrease of heating degree days by 6 %. Emissions from transport stabilised.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

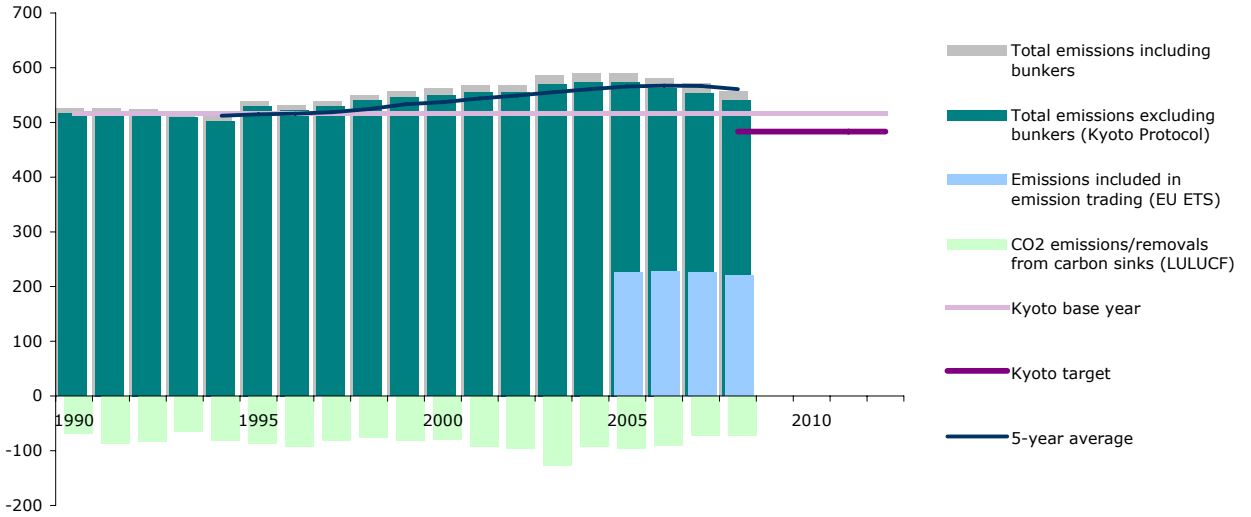
[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

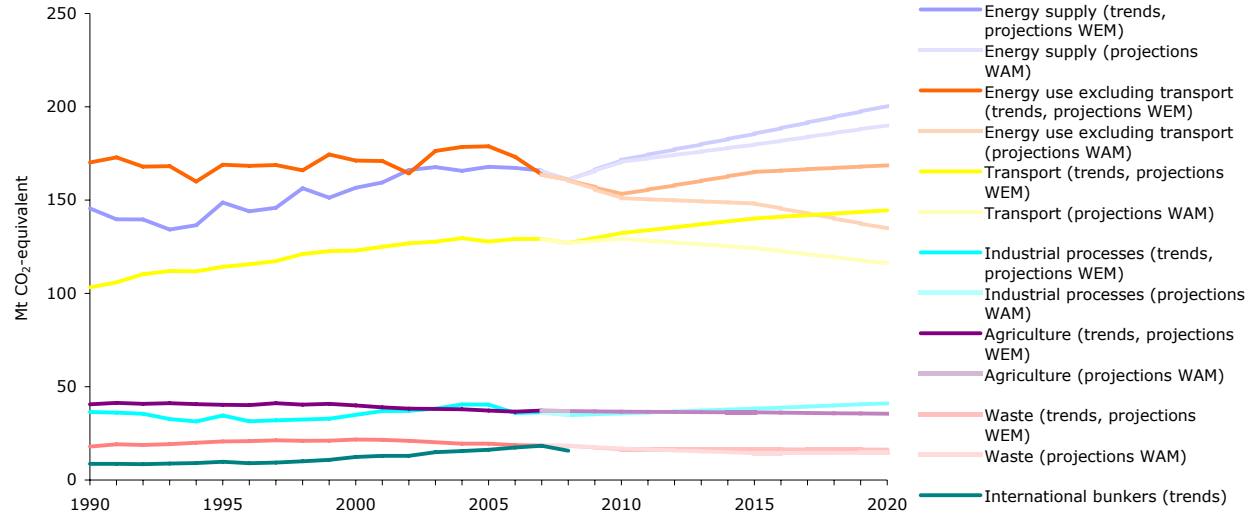
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

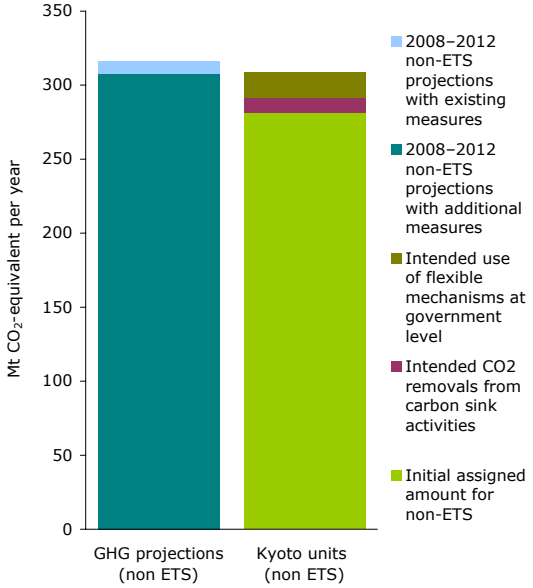


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	516.9	
Kyoto target (initial assigned amount 2008–2012)	483.3	93.5 %
Total GHG over 2004–2008	560.8	108.5 %
Implied target for the sectors not included in the EU ETS	281.6	
Intended use of flexible mechanisms by governments	17.1	3.3 %
Projected CO_2 removals from carbon sink activities	10.2	2.0 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	308.9	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	316.3	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	308.1	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	7.4	1.4 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 0.8	– 0.2 %

Assessment of projected progress towards Kyoto target

In Italy, average emissions over the period 2004–2008 were 8.5 % higher than the base-year level, still significantly above the burden-sharing target of – 6.5 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 41 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to remain higher than their 'non-ETS' target. However, Italy expects to reach its burden-sharing target by implementing additional measures, enhancing its carbon sinks and using the Kyoto flexible mechanisms.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012

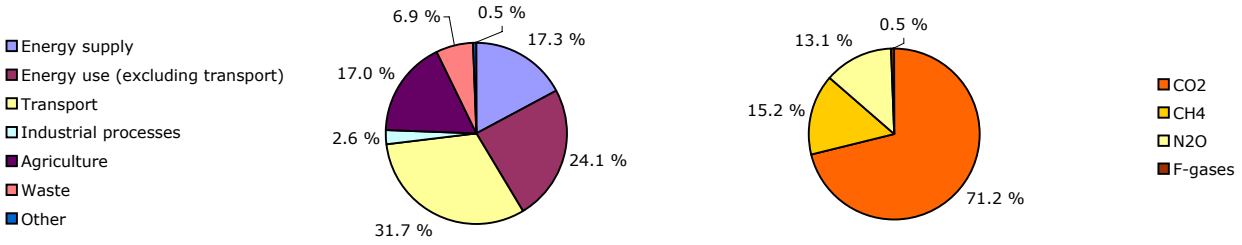


GHG trends and projections in Latvia

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	26.7	11.7	12.1	*n.a.*	Mt CO_2-eq.	25	n.a.
GHG from international bunkers [4]	1.8	0.9	0.8	n.a.	Mt CO_2-eq.	21	n.a.
GHG per capita	10.0	5.1	5.3	*n.a.*	t CO_2-eq. / capita	27	n.a.
GHG per GDP [5]	2 172	826	777	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	0.5 %	0.2 %	0.2 %	*n.a.*	%		
EU ETS verified emissions [6]		2.9	2.8	2.7	Mt CO_2-eq.	25	n.a.
Share of EU ETS verified emissions in total GHG		25.2 %	23.6 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 27.5 %	– 29.4 %	– 5.7 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 14.6	– 54.7 %	0.4	3.5 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 4.7	– 47.0 %	0.2	4.1 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			– 0.1	– 3.1 %			– 0.1	– 3.7 %

Assessment long-term trend of total GHG (1990-2007)

Emissions have decreased considerably since 1990, influenced by the economic restructuring affecting the country. The transition period to market economy started after 1991. This process provoked essential changes in all sectors of the national economy and resulted in the decrease of emissions after 1990. Since 2000, emissions have been slightly increasing under the influence of increasing energy demand and road transport.

Assessment short-term trend of total GHG (2006-2007)

The emission increase was a combined result of emission increases in all the main sectors, in particular road transport (9.5 %) where diesel oil consumption increased. Emissions from public electricity and heat production decreased and emissions from households and services are stable. Emissions from the production of cement show also a significant increase in relative terms.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	[Latvian] www.meteo.lv/public/29113.html

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

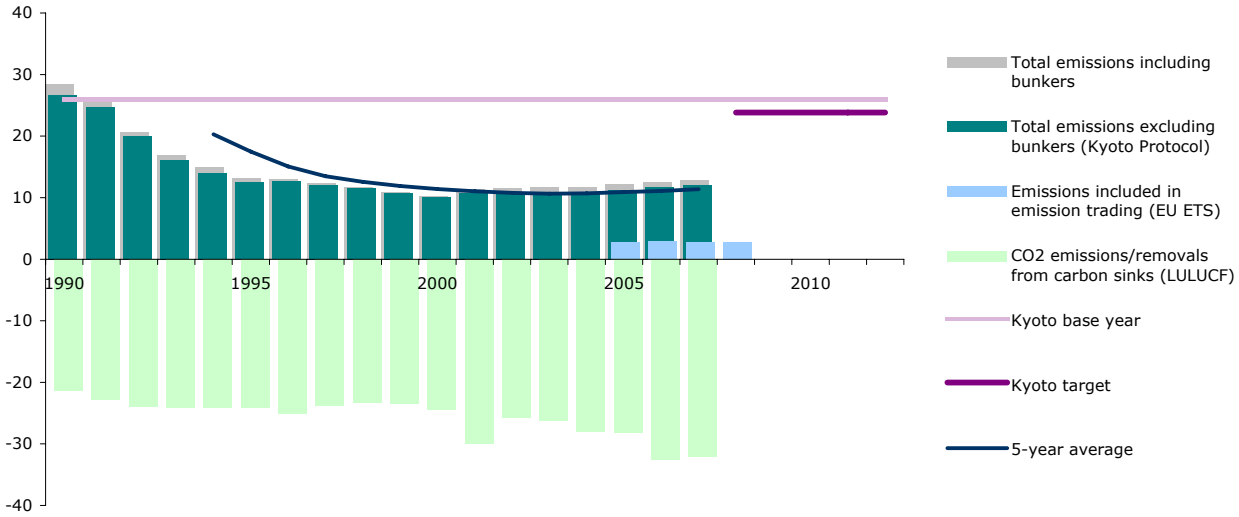
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

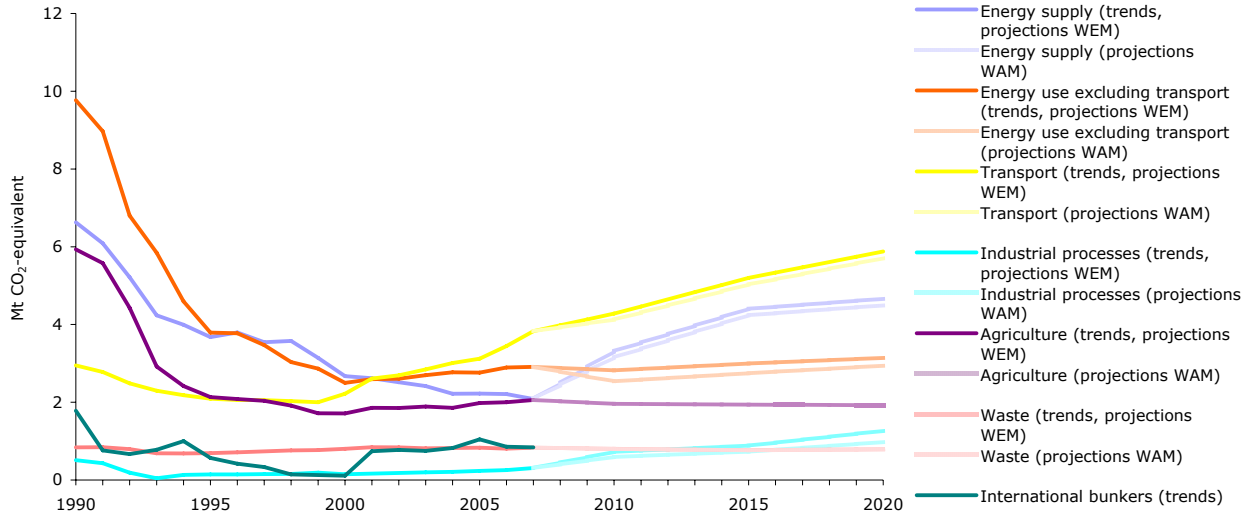
GHG trends and projections in Latvia

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	25.9	
Kyoto target (initial assigned amount 2008–2012)	23.8	92.0 %
Total GHG over 2003–2007	11.4	43.9 %

Assessment of progress towards Kyoto targets

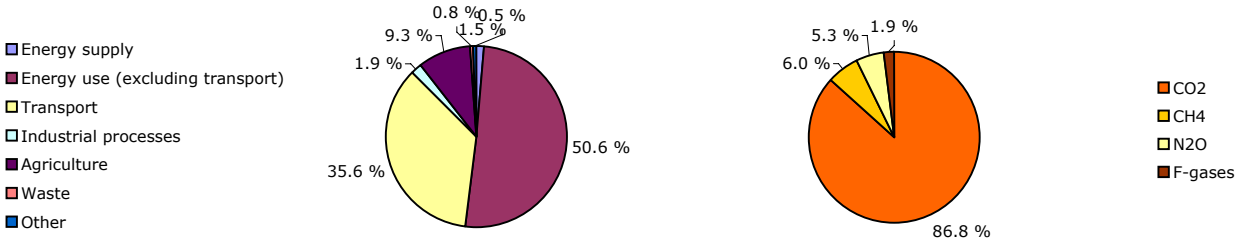
In Latvia, average emissions over the period 2003–2007 were 56.1 % lower than the base-year level, well below the Kyoto target of – 8 % for the period 2008–2012. Latvia will therefore not meet difficulty in reaching its target under the Kyoto Protocol. It will actually achieve significant surplus emission rights by the end of the Kyoto commitment period.

GHG trends and projections in Liechtenstein

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	0.2	0.3	0.2	*n.a.*	Mt CO_2-eq.	n.a.	n.a.
GHG from international bunkers [4]	0.0	0.0	0.0	n.a.	Mt CO_2-eq.	n.a.	n.a.
GHG per capita	8.1	7.8	6.9	*n.a.*	t CO_2-eq. / capita	n.a.	n.a.
GHG per GDP [5]	n.a.	n.a.	n.a.	*n.a.*	g CO_2-eq. / euro		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	0.0	6.1 %	– 0.0	– 10.8 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 1.1	– 14.2 %	– 0.9	– 11.5 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*

Assessment long-term trend of total GHG (1990-2007)

Emissions have been increasing since the early 1990s, due to increased fuel combustion by households and services.

Assessment short-term trend of total GHG (2006-2007)

A significant emission decrease was observed, due to reduced energy use by households and industry, with the largest contribution from the households and tertiary sectors. Emissions from transport increased most in absolute terms, although the largest relative increase was observed in emissions from industrial processes.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

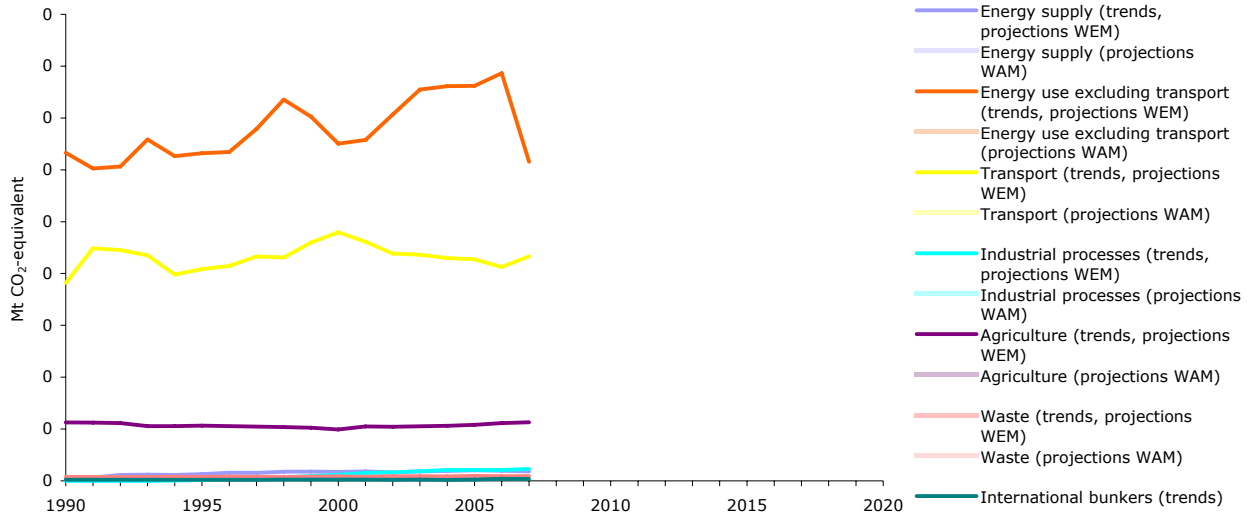
For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

GHG trends and projections in Liechtenstein

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals

GHG trends and projections 1990–2020 - emissions by sector

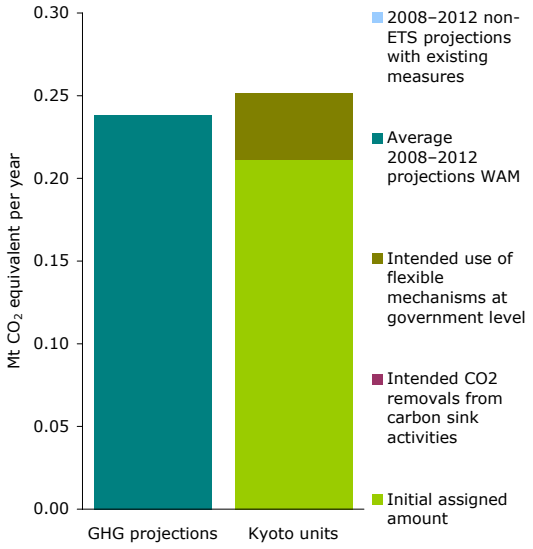


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	0.2	
Kyoto target (initial assigned amount 2008–2012)	0.2	92.0 %
Total GHG over 2003–2007	0.3	115.7 %
Intended use of flexible mechanisms by governments	0.0	17.4 %
Projected CO_2 removals from carbon sink activities	n.e.	
Kyoto target, including Kyoto mechanisms, carbon sinks and trading of allowances by operators in the EU ETS	0.3	
Projected emissions with existing measures (WEM)	0.2	
Projected emissions with additional measures (WAM)	0.2	
Gap between projections WEM and target, including Kyoto mechanisms and carbon sinks	– 0.0	– 5.6 %
Gap between projections WAM and target, including Kyoto mechanisms and carbon sinks	– 0.0	– 5.6 %

Assessment of projected progress towards Kyoto targets

In Liechtenstein, average emissions over the period 2003–2007 were 15.7 % higher than the base-year level, significantly above the Kyoto target of – 8 % for the period 2008–2012. Projections of total emissions indicate that these are expected to decrease to a level still above the target. Liechtenstein expects to reach its Kyoto target by achieving domestic emission reductions by 2012 and by using the Kyoto mechanisms.

Comparison of projected emissions with Kyoto units for the period 2008–2012

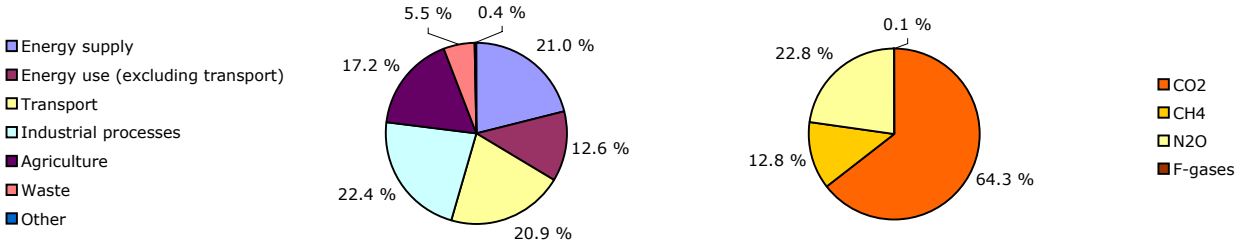


GHG trends and projections in Lithuania

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	49.1	22.9	24.7	*n.a.*	Mt CO_2-eq.	21	n.a.
GHG from international bunkers [4]	0.7	0.6	0.5	n.a.	Mt CO_2-eq.	25	n.a.
GHG per capita	13.3	6.7	7.3	*n.a.*	t CO_2-eq. / capita	24	n.a.
GHG per GDP [5]	2 894	1 178	1 169	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	0.9 %	0.4 %	0.5 %	*n.a.*	%		
EU ETS verified emissions [6]		6.5	6.0	6.1	Mt CO_2-eq.	23	n.a.
Share of EU ETS verified emissions in total GHG		28.5 %	24.2 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 38.4 %	– 41.9 %	– 18.7 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 24.3	– 49.6 %	1.9	8.1 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 6.0	– 45.0 %	0.6	8.7 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			– 0.5	– 8.0 %			0.1	1.7 %

Assessment long-term trend of total GHG (1990-2007)

Total emissions decreased sharply in the early 1990s due to the economic restructuring but have been increasing since 2000. The most significant reduction in emissions was observed immediately after declaration of independence from 1991 to 1993, when total emissions decreased by more than 50 %, mainly due to sharp decline of activities in energy and industrial sectors. The decrease was noticeable in all sub sectors but especially sharp in manufacturing and construction where the emission decrease was approximately three-fold. Emission reductions in the agriculture sector were less dramatic but still reached about 40 % within two years. A further reduction of emissions in the energy and agriculture sectors occurred in 1998–2000 though emissions from industrial processes were continuously increasing from 1995. From the year 2000, emissions have been slightly increasing in all sectors except in the waste sector, mainly due to a decline in waste disposal on land.

Assessment short-term trend of total GHG (2006-2007)

Mainly responsible for the increase in total emissions is the production of nitric acid, where the production increased by 28 %. Another driver is increasing emissions from road transport. An important decrease is reported for emissions from public electricity and heat production.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

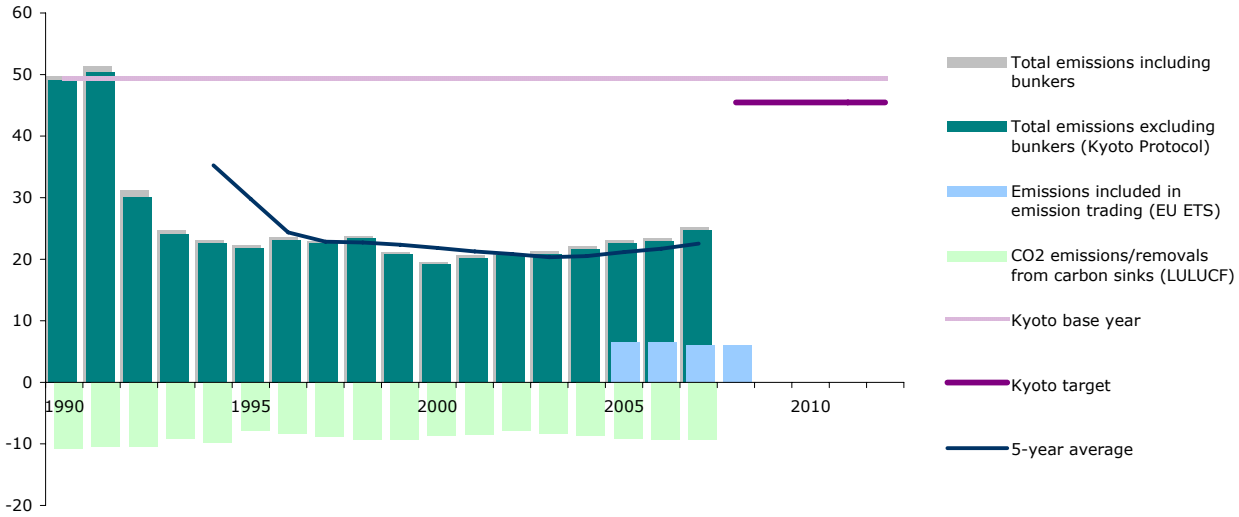
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

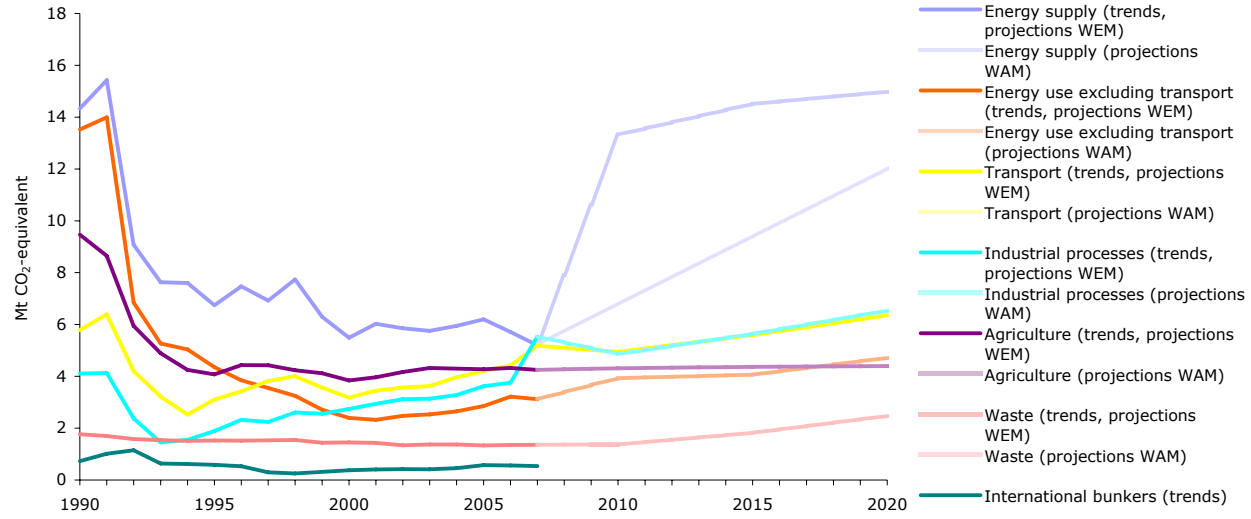
GHG trends and projections in Lithuania

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	49.4	
Kyoto target (initial assigned amount 2008–2012)	45.5	92.0 %
Total GHG over 2003–2007	22.5	45.6 %

Assessment of progress towards Kyoto targets

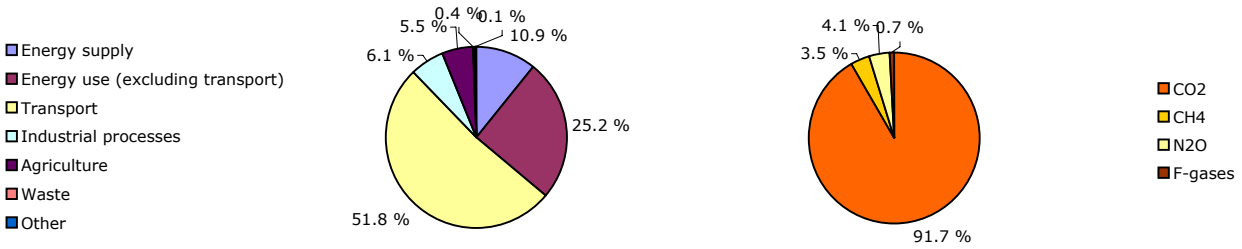
In Lithuania, average emissions over the period 2003–2007 were 54.4 % lower than the base-year level, well below the Kyoto target of – 8 % for the period 2008–2012. Lithuania will therefore not meet difficulty in reaching its target under the Kyoto Protocol. It will actually achieve significant surplus emission rights by the end of the Kyoto commitment period.

GHG trends and projections in Luxembourg

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	13.1	13.3	12.9	*12.4*	Mt CO_2-eq.	24	15
GHG from international bunkers [4]	0.4	1.2	1.3	n.a.	Mt CO_2-eq.	18	15
GHG per capita	34.6	28.4	27.1	*25.6*	t CO_2-eq. / capita	1	1
GHG per GDP [5]	975	477	440	*426*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	0.2 %	0.3 %	0.3 %	*0.2 %*	%		
EU ETS verified emissions [6]		2.7	2.6	2.1	Mt CO_2-eq.	26	15
Share of EU ETS verified emissions in total GHG		20.4 %	19.9 %	*16.9 %*	%		
ETS verified emissions compared to annual allowances [7]		– 16.0 %	– 20.5 %	– 15.6 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 0.2	– 1.6 %	– 0.4	– 2.9 %	*– 0.7*	*– 5.5 %*	*– 0.5*	*– 4.0 %*
GHG per capita	– 7.5	– 21.6 %	– 1.2	– 4.4 %	*– 9.0*	*– 25.9 %*	*– 1.5*	*– 5.5 %*
EU ETS verified emissions [9]			– 0.1	– 5.4 %			– 0.5	– 18.2 %

Assessment long-term trend of total GHG (1990-2007)

After a strong decline between 1993 and 1998, due in particular to the conversion of the steel industry to electric arc furnaces, emissions increased sharply up to 2004, mainly due to road transport and power generation. They stabilized between 2004 and 2006 and then, in 2007, experienced a significant decrease for the first time since 1998. High transport emissions are mainly driven by 'road fuel exports' (road fuels sold to non residents) resulting from lower fuel prices, an important cross–border workforce and of Luxembourg's location at the heart of a main traffic axes for Western Europe.

Assessment short-term trend of total GHG (2006-2007)

The first significant reduction in almost 10 years was mainly the result of decreasing emissions from 'road fuel exports' (road fuels sold to non residents: – 4.5 %), which, in 2007, represented almost 40 % of the total GHG emissions, excl. LULUCF. GHG emissions reductions were also observed for the power generation sector (– 10.8 %) as well as for the commercial, institutional and services sectors (– 4.4 %). Increasing emissions from manufacturing industries and construction (+6.2 %) did not offset the overall decreasing trend.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

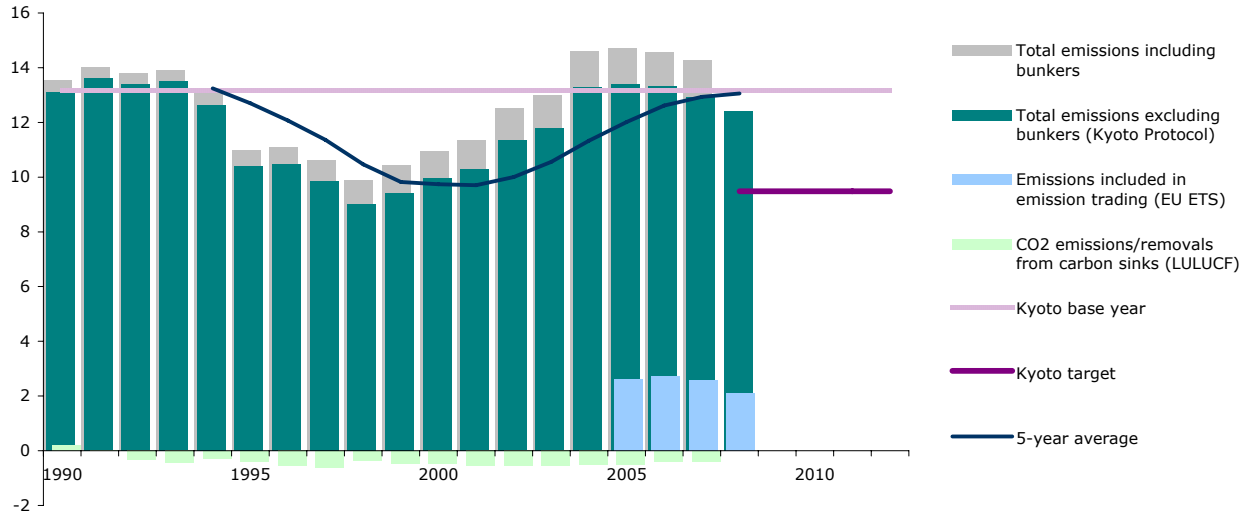
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

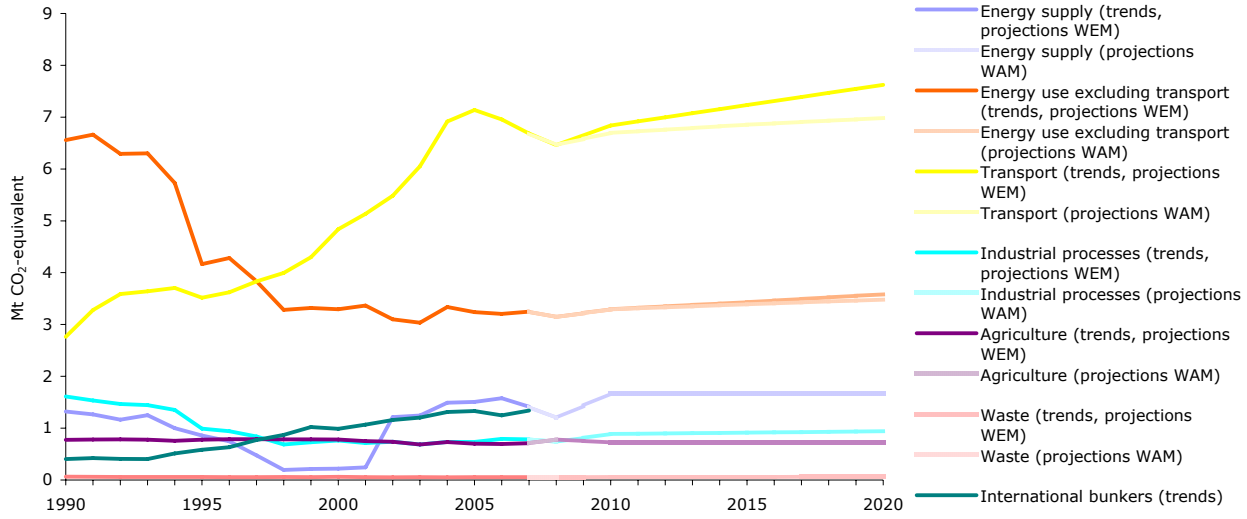
GHG trends and projections in Luxembourg

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

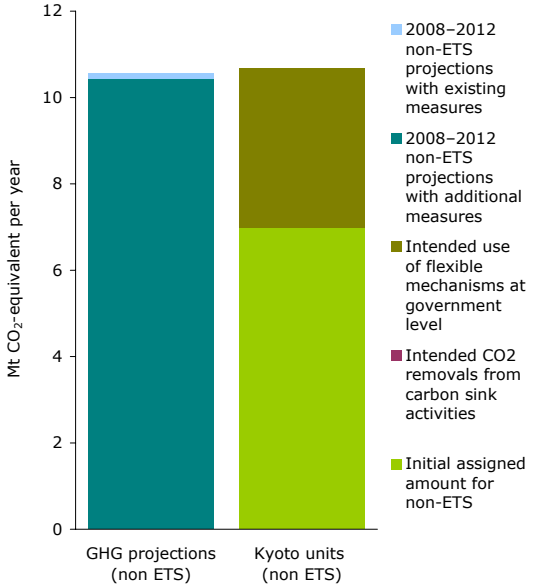


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	13.2	
Kyoto target (initial assigned amount 2008–2012)	9.5	72.0 %
Total GHG over 2004–2008	13.1	99.2 %
Implied target for the sectors not included in the EU ETS	7.0	
Intended use of flexible mechanisms by governments	3.7	28.1 %
Projected CO_2 removals from carbon sink activities	0.0	0.0 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	10.7	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	10.6	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	10.4	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 0.1	– 0.9 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 0.3	– 1.9 %

Assessment of projected progress towards Kyoto target

In Luxembourg, average emissions over the period 2004–2008 were 0.8 % lower than the base-year level, still significantly above the burden-sharing target of – 28 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 20 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to remain higher than their 'non-ETS' target. However, Luxembourg expects to reach its burden-sharing target by implementing additional measures and using to a large extent the Kyoto flexible mechanisms.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012

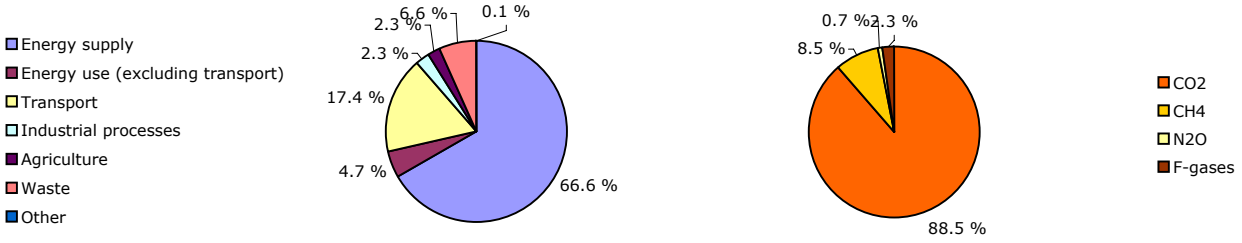


GHG trends and projections in Malta

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	2.0	3.0	3.0	*n.a.*	Mt CO_2-eq.	27	n.a.
GHG from international bunkers [4]	0.0	2.4	2.7	n.a.	Mt CO_2-eq.	14	n.a.
GHG per capita	5.8	7.3	7.4	*n.a.*	t CO_2-eq. / capita	23	n.a.
GHG per GDP [5]	n.a.	642	636	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	0.0 %	0.1 %	0.1 %	*n.a.*	%		
EU ETS verified emissions [6]		2.0	2.0		Mt CO_2-eq.	27	n.a.
Share of EU ETS verified emissions in total GHG		67.2 %	66.8 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 8.4 %	– 11.3 %	n.a.	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	1.0	49.0 %	0.1	2.6 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	1.7	28.8 %	0.1	1.9 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			0.0	2.1 %			n.a.	n.a.

Assessment long-term trend of total GHG (1990-2007)

Emissions have increased by 49 %, with CO2 contributing most to this increase. Figures indicate that on average, per capita emissions have risen from around 5.5 tonnes per head in 1990 to 7.4 tonnes per head in 2007. These trends reflect the socio-economic changes that have taken place over the past two decades, resulting in an increased demand for energy, with more waste generated and increased road transport.

Assessment short-term trend of total GHG (2006-2007)

All sectors experienced an emission increase. The highest emissions result from the energy industries, road transport and energy use in manufacturing industries. Between 2006 and 2007, CO2 emissions have increased by 2.1 % from the energy industries and by 1.9 % from road transport. CH4 emissions from solid waste have increased by 4.9 %. A substantial emissions increase has also been observed from the consumption of fluorinated gases (halocarbons).

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	[English] www.mepa.org.mt/Environment/index.htm?climate_change/emissionsinmalta_chapter9.htm&1

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

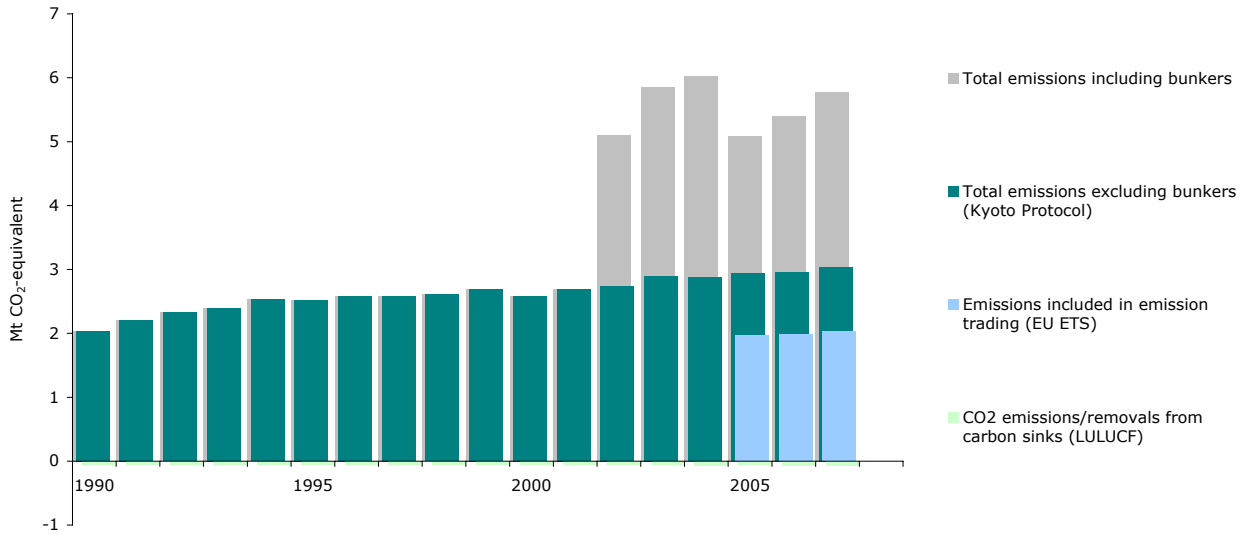
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

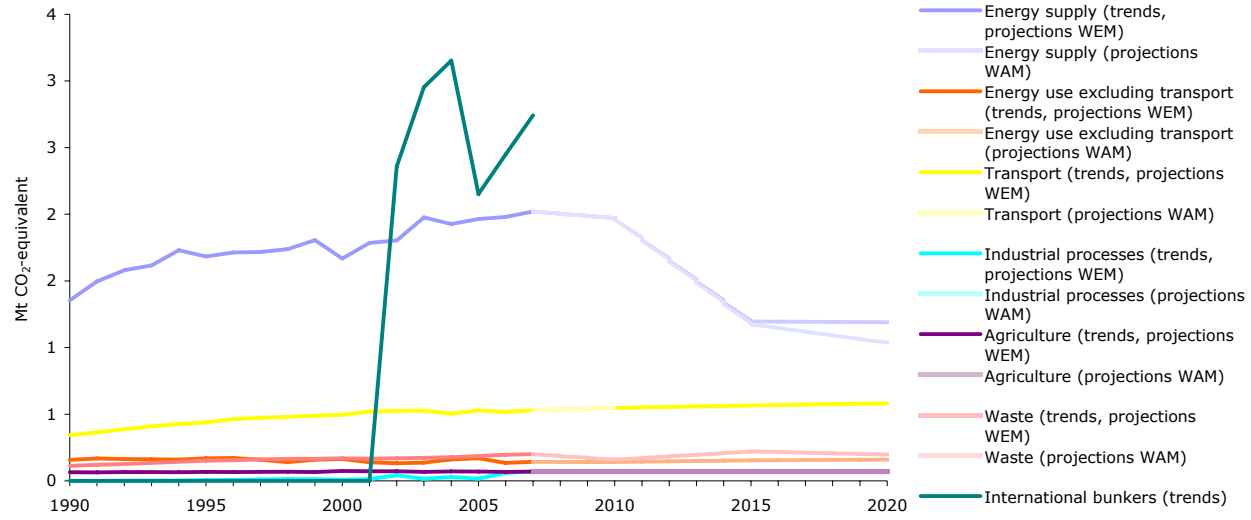
GHG trends and projections in Malta

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target

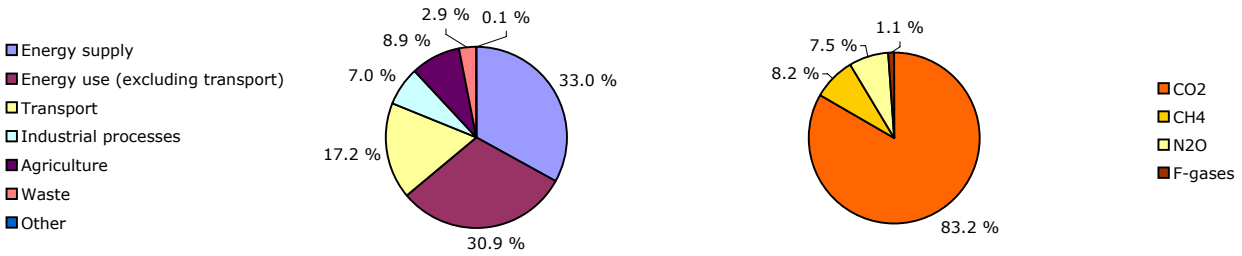
Malta does not have a target under the Kyoto Protocol. In 2007, total emissions in this country were 49.0 % higher than the 1990 level.

GHG trends and projections in the Netherlands

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	212.0	208.5	207.5	*n.a.*	Mt CO_2-eq.	7	6
GHG from international bunkers [4]	39.0	67.4	62.7	n.a.	Mt CO_2-eq.	1	1
GHG per capita	14.2	12.8	12.7	*n.a.*	t CO_2-eq. / capita	7	4
GHG per GDP [5]	693	452	435	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	3.8 %	4.1 %	4.1 %	*n.a.*	%		
EU ETS verified emissions [6]		76.7	79.9	83.5	Mt CO_2-eq.	8	6
Share of EU ETS verified emissions in total GHG		36.8 %	38.5 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 11.2 %	– 7.6 %	8.8 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 4.5	– 2.1 %	– 1.0	– 0.5 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 1.5	– 10.9 %	– 0.1	– 0.6 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			3.2	4.1 %			3.6	4.6 %

Assessment long-term trend of total GHG (1990-2007)

CO2 emissions increased by 8 %. Since 1990, emissions from the energy sector have increased by approximately 9 %, mainly due to the increased emissions from public electricity and heat production and transport. CH4 emissions decreased by 34 %. In the waste sector, CH4 emissions halved. N2O emissions decreased by about 23 % mainly in the industrial processes sector. Emissions of F-gases decreased significantly, following the installation of a thermal afterburner for the production of halocarbons and SF6. Net emissions from LULUCF did not change significantly.

Assessment short-term trend of total GHG (2006-2007)

The decrease is mainly due to reduced emissions from nitric acid production and less emissions from households and services, where the use of gaseous fuels decreased remarkably. Emissions from public electricity and heat production have increased in line withdecreased electricity imports.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

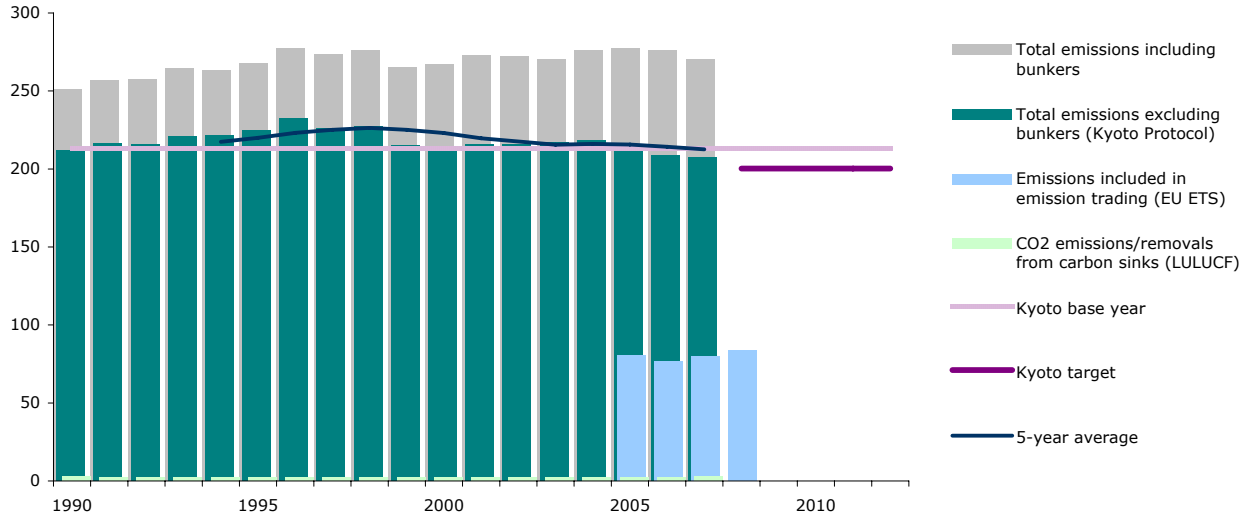
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

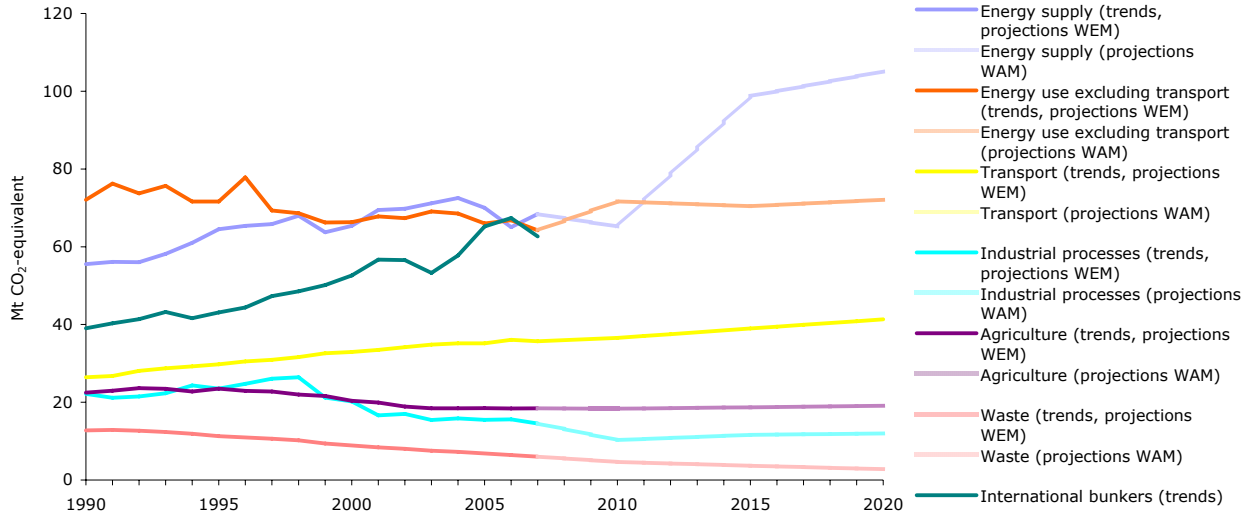
GHG trends and projections in the Netherlands

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

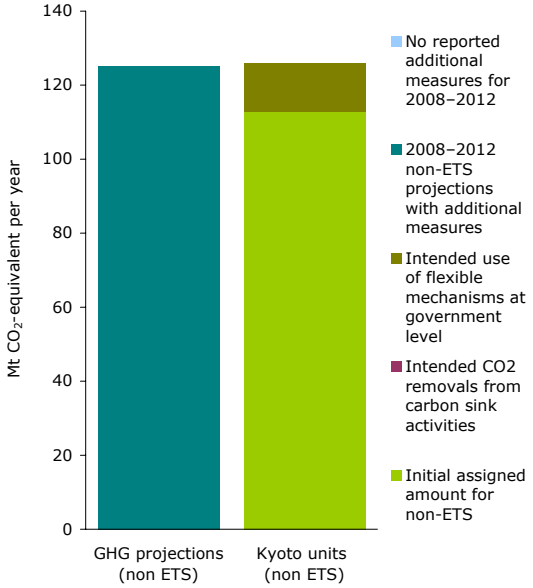


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	213.0	
Kyoto target (initial assigned amount 2008–2012)	200.3	94.0 %
Total GHG over 2003–2007	212.6	99.8 %
Implied target for the sectors not included in the EU ETS	112.8	
Intended use of flexible mechanisms by governments	13.0	6.1 %
Projected CO_2 removals from carbon sink activities	0.1	0.1 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	125.9	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	125.1	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	125.1	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 0.8	– 0.4 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 0.8	– 0.4 %

Assessment of projected progress towards Kyoto target

In the Netherlands, average emissions over the period 2003–2007 were 0.2 % lower than the base-year level, still above the burden-sharing target of – 6 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 38 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to remain higher than their 'non-ETS' target. However, the Netherlands expects to reach its burden-sharing target by enhancing its carbon sinks (to a limited extent) and using the Kyoto flexible mechanisms.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012

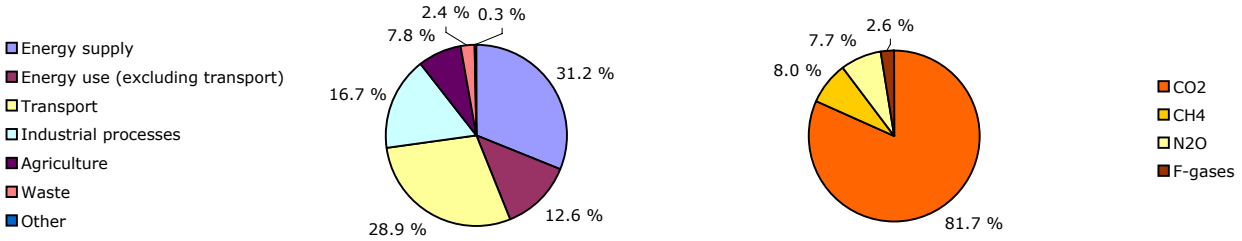


GHG trends and projections in Norway

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	49.7	53.5	55.1	*53.8*	Mt CO_2-eq.	n.a.	n.a.
GHG from international bunkers [4]	8.3	16.1	15.9	n.a.	Mt CO_2-eq.	n.a.	n.a.
GHG per capita	11.7	11.5	11.8	*11.4*	t CO_2-eq. / capita	n.a.	n.a.
GHG per GDP [5]	392	257	256	*245*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	n.a.	n.a.	n.a.	*n.a.*	%		
EU ETS verified emissions [6]		n.a.	n.a.	19.3	Mt CO_2-eq.	n.a.	n.a.
Share of EU ETS verified emissions in total GHG		n.a.	n.a.	*36.0 %*	%		
ETS verified emissions compared to annual allowances [7]		n.a.	n.a.	156.9 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	5.4	10.8 %	1.6	3.0 %	*4.1*	*8.3 %*	*– 1.3*	*– 2.3 %*
GHG per capita	0.0	0.2 %	0.2	2.1 %	*– 0.4*	*– 3.3 %*	*– 0.4*	*– 3.4 %*
EU ETS verified emissions [9]			n.a.	n.a.			n.a.	n.a.

Assessment long-term trend of total GHG (1990-2007)

After a short period of decrease in the early 1990s, emissions increased in the rest of the decade and have remained relatively stable since. The largest increases were observed in energy industries and transport, while metal production was responsible, by far, for the largest decrease in emissions.

Assessment short-term trend of total GHG (2006-2007)

The overall emission increase was mainly due to the transport sector (road and navigation) and the oil and gas industry (fugitive emissions). Emissions due to energy use by households and industrial end-users reduced.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	www.ssb.no/emner/01/04/10/klimagassn/ [Norsk], www.ssb.no/klimagassn_en/ [English]

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

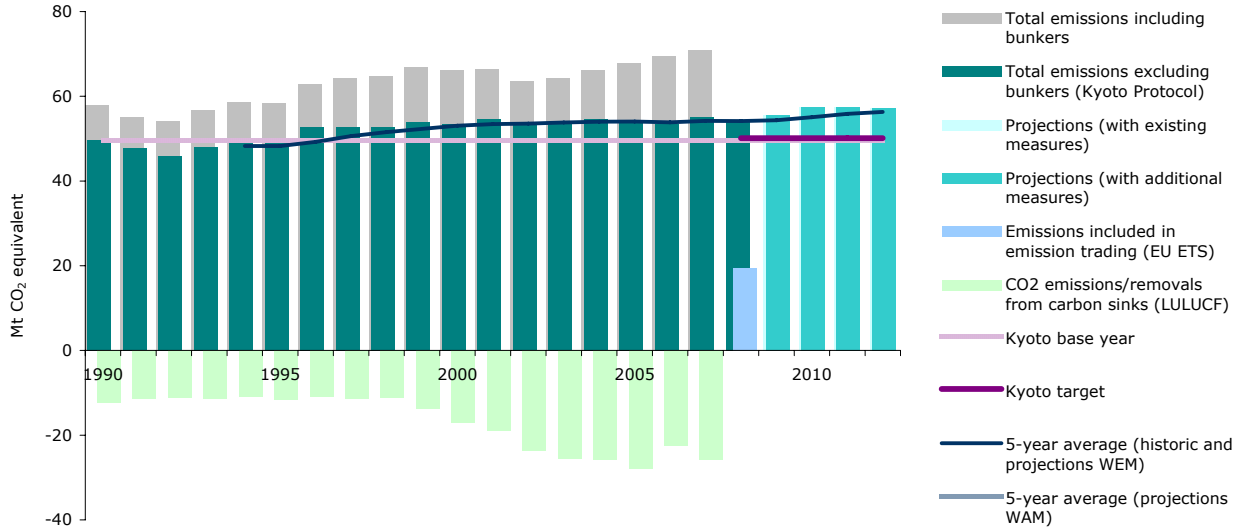
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

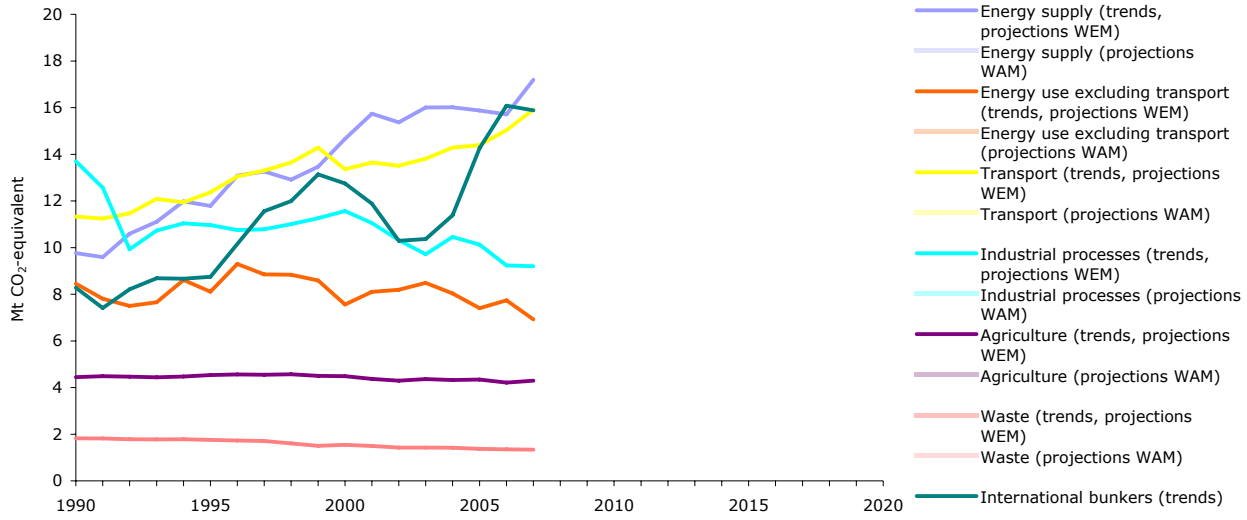
GHG trends and projections in Norway

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals

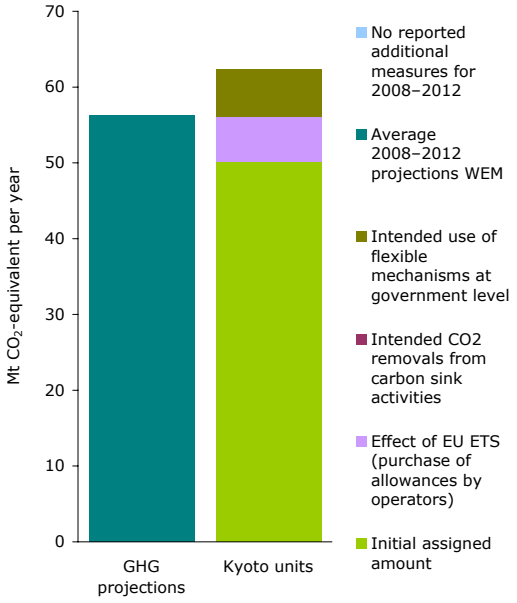


GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	49.6	
Kyoto target (initial assigned amount 2008–2012)	50.1	101.0 %
Total GHG over 2004–2008	54.1	109.1 %
Intended use of flexible mechanisms by governments	6.2	12.5 %
Projected CO_2 removals from carbon sink activities	0.0	0.0 %
Projected trading of allowances and credits by operators in the EU ETS	6.0	12.1 %
Kyoto target, including Kyoto mechanisms, carbon sinks and trading of allowances by operators in the EU ETS	62.3	125.6 %
Projected emissions with existing measures (WEM)	56.3	
Projected emissions with additional measures (WAM)	56.3	
Gap between projections WEM and target, including Kyoto mechanisms, carbon sinks and trading of EU ETS allowances	– 6.0	– 12.1 %
Gap between projections WAM and target, including Kyoto mechanisms, carbon sinks and trading of EU ETS allowances	– 6.0	– 12.1 %

Comparison of projected emissions with Kyoto units for the period 2008–2012



Assessment of projected progress towards Kyoto targets

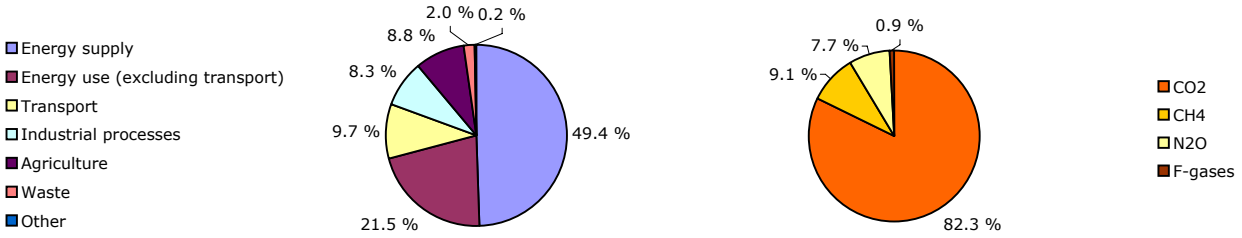
In Norway, average emissions over the period 2004–2008 were 9.1 % higher than the base-year level, above the Kyoto target of + 1 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 36 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to remain slightly higher than their 'non-ETS' target. However, Norway expects to reach its Kyoto target by using the Kyoto flexible mechanisms.

GHG trends and projections in Poland

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	459.5	399.3	398.9	*n.a.*	Mt CO_2-eq.	6	n.a.
GHG from international bunkers [4]	1.9	2.2	2.1	n.a.	Mt CO_2-eq.	16	n.a.
GHG per capita	12.1	10.5	10.5	*n.a.*	t CO_2-eq. / capita	14	n.a.
GHG per GDP [5]	3 586	1 739	1 629	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	8.3 %	7.8 %	7.9 %	*n.a.*	%		
EU ETS verified emissions [6]		209.6	209.6	204.1	Mt CO_2-eq.	4	n.a.
Share of EU ETS verified emissions in total GHG		52.5 %	52.6 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 11.8 %	– 11.8 %	1.6 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 60.6	– 13.2 %	– 0.4	– 0.1 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 1.6	– 13.4 %	– 0.0	– 0.0 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			0.0	0.0 %			– 5.5	– 2.6 %

Assessment long-term trend of total GHG (1990-2007)

Between 1988 and 1990, emissions decreased dramatically, triggered by significant economical changes, especially in heavy industry, related to political transformation from a centralized to market economy. Emissions continued to decline up to 1993, thereafter rising and peaking in 1996 as a result of modernization processes implemented in heavy industry and other sectors and dynamic economic growth. The succeeding years are characterised by a slow decline in emissions up to 2002 as a result of energy efficiency policies and measures, followed by a slight increase up to 2007 caused by sustained economic development.

Assessment short-term trend of total GHG (2006-2007)

Poland's emissions decreased by a very small amount due to a strong decrease in emissions from households and services, which compensated for an increase in emissions from other sectors. The decrease in emissions from energy use might be related to less heating degree days in 2007 than in 2006 (– 7 %). The highest emission increases resulted from energy use in iron and steel industry and cement production.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

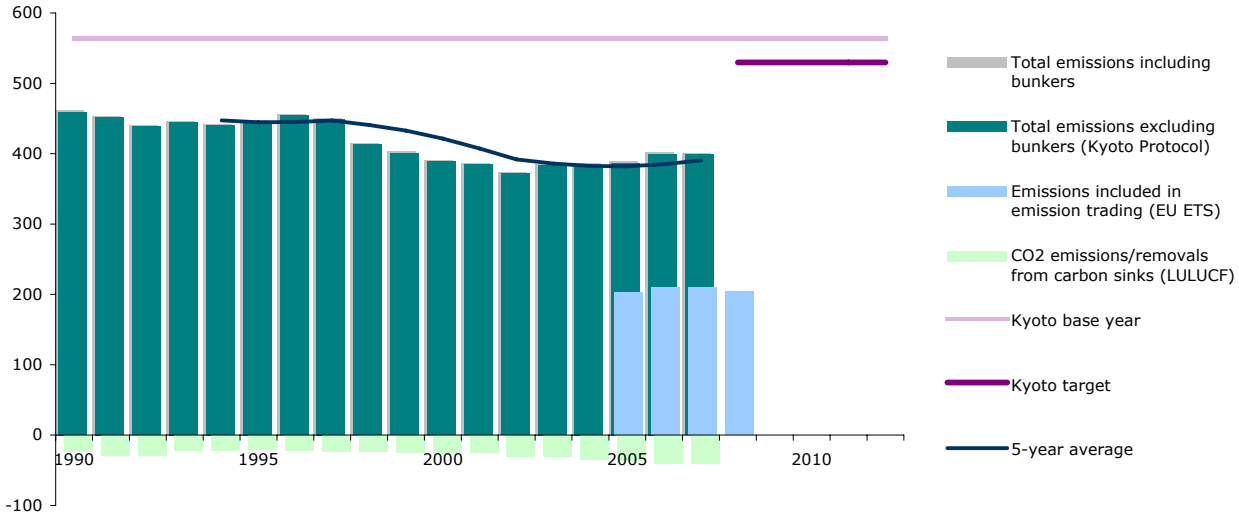
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

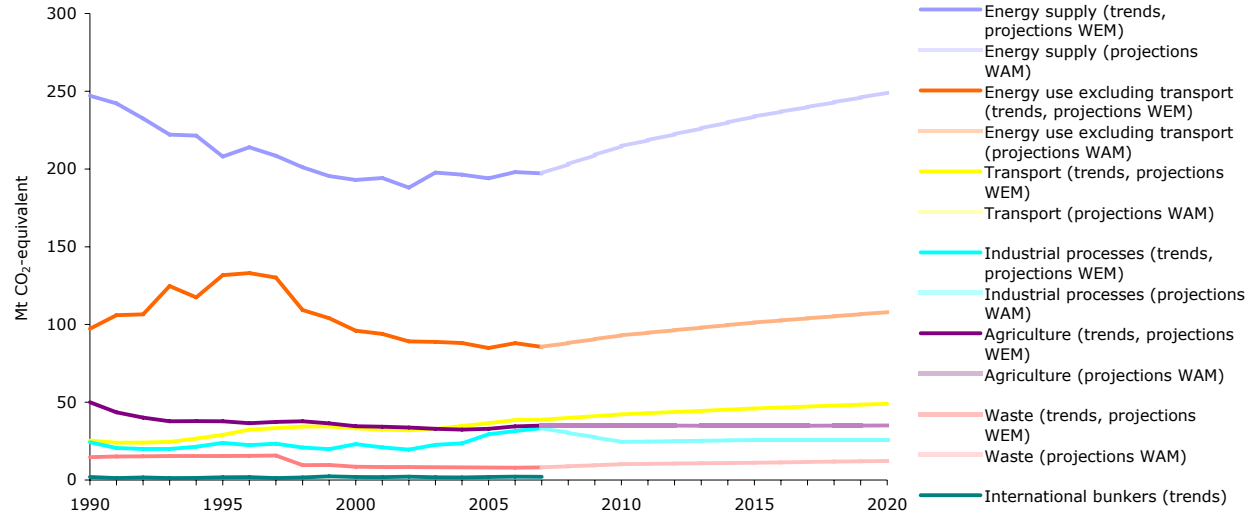
GHG trends and projections in Poland

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	563.4	
Kyoto target (initial assigned amount 2008–2012)	529.6	94.0 %
Total GHG over 2003–2007	390.5	69.3 %

Assessment of progress towards Kyoto targets

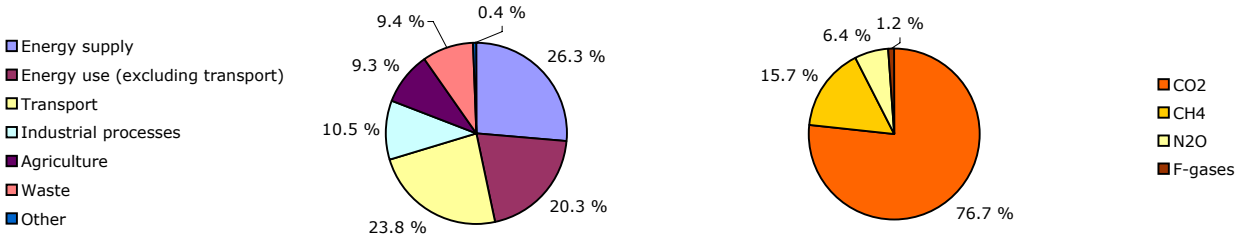
In Poland, average emissions over the period 2003–2007 were 30.7 % lower than the base-year level, well below the Kyoto target of – 6 % for the period 2008–2012. Poland will therefore not meet difficulty in reaching its target under the Kyoto Protocol. It will actually achieve significant surplus emission rights by the end of the Kyoto commitment period.

GHG trends and projections in Portugal

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	59.3	84.7	81.8	*n.a.*	Mt CO_2-eq.	13	10
GHG from international bunkers [4]	2.9	4.1	4.3	n.a.	Mt CO_2-eq.	11	11
GHG per capita	5.9	8.0	7.7	*n.a.*	t CO_2-eq. / capita	21	14
GHG per GDP [5]	644	654	620	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	1.1 %	1.7 %	1.6 %	*n.a.*	%		
EU ETS verified emissions [6]		33.1	31.2	29.9	Mt CO_2-eq.	15	11
Share of EU ETS verified emissions in total GHG		39.1 %	38.2 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 10.4 %	– 15.4 %	– 1.5 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	22.6	38.1 %	– 2.9	– 3.4 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	1.8	30.2 %	– 0.3	– 3.6 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			– 1.9	– 5.6 %			– 1.3	– 4.2 %

Assessment long-term trend of total GHG (1990-2007)

Emissions have been increasing since the early 1990s, driven by strong economic growth. The greatest increases occurred in the transport sector (rapid growth in private car ownership) and the public electricity and heat production sector (continued increase of electricity demand driven in particular by the residential/commercial sector), which reflects the country's dependence on fossil fuels for electricity generation and transportation. The situation has changed in recent years, where emissions have stabilised or even reduced. Rising emissions from industrial processes are mostly due to the increase of cement production, road paving, limestone and dolomite use, lime production and, glass and ammonia production. The decrease in emissions from agriculture reflects the declining role of this sector in the national economy, and is associated for instance with the reduction of the livestock production (e.g. swine), and the decrease of fertilizer consumption. In the waste sector, emissions grew significantly in the 1990s, primarily because of rising waste generation and the deposition of waste in landfills.

Assessment short-term trend of total GHG (2006-2007)

All sectors except industrial processes show decreases. Emissions from public electricity and heat production decreased most, followed by road transport, fuel combustion in households and agriculture, agricultural soils and waste water handling.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

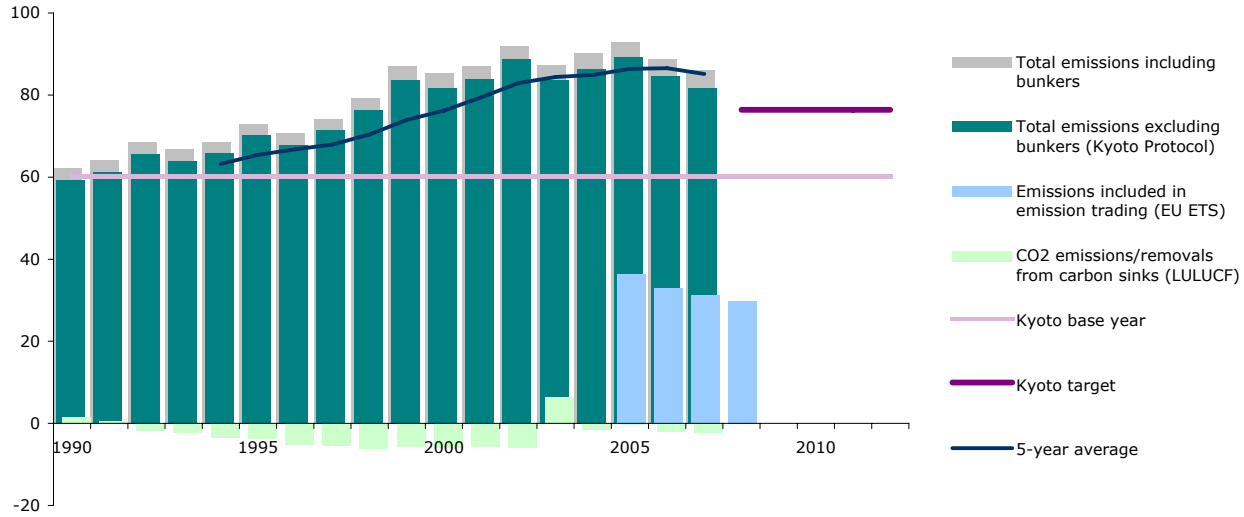
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

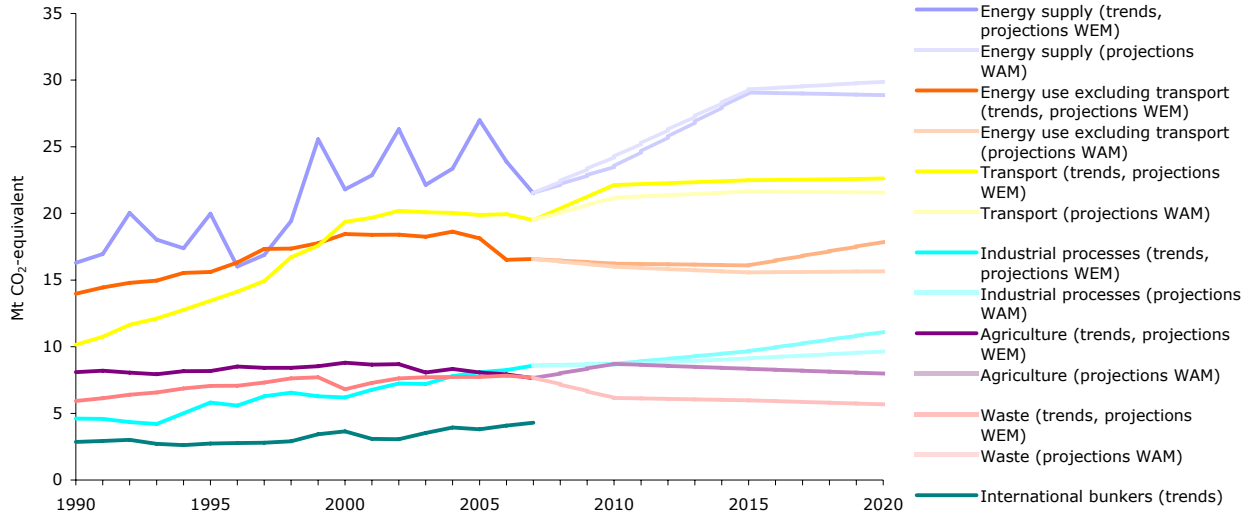
GHG trends and projections in Portugal

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

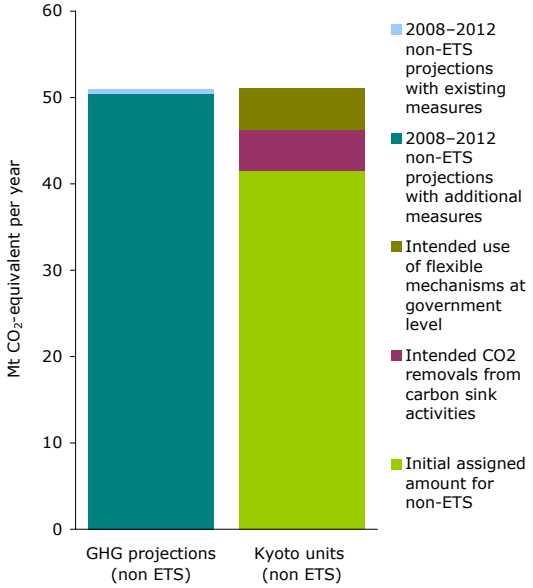


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	60.1	
Kyoto target (initial assigned amount 2008–2012)	76.4	127.0 %
Total GHG over 2003–2007	85.2	141.6 %
Implied target for the sectors not included in the EU ETS	41.6	
Intended use of flexible mechanisms by governments	4.8	8.0 %
Projected CO_2 removals from carbon sink activities	4.7	7.7 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	51.1	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	50.9	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	50.4	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 0.1	– 0.2 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 0.7	– 1.1 %

Assessment of projected progress towards Kyoto target

In Portugal, average emissions over the period 2003–2007 were 41.6 % higher than the base-year level, significantly above the burden-sharing target of + 27 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 38 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to remain higher than their 'non-ETS' target. However, Portugal expects to reach its burden-sharing target by implementing additional measures, enhancing its carbon sinks and using the Kyoto flexible mechanisms.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012

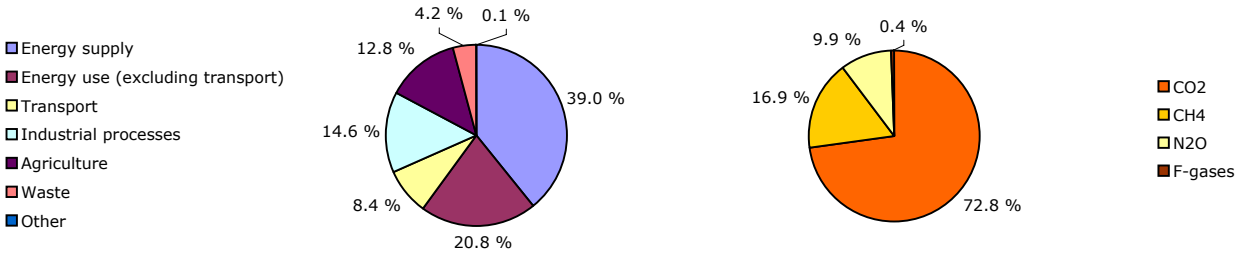


GHG trends and projections in Romania

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	243.0	153.8	152.3	*n.a.*	Mt CO_2-eq.	8	n.a.
GHG from international bunkers [4]	1.1	0.5	0.6	n.a.	Mt CO_2-eq.	24	n.a.
GHG per capita	10.5	7.1	7.1	*n.a.*	t CO_2-eq. / capita	26	n.a.
GHG per GDP [5]	5 033	2 657	2 475	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	4.4 %	3.0 %	3.0 %	*n.a.*	%		
EU ETS verified emissions [6]		n.a.	69.6	63.6	Mt CO_2-eq.	10	n.a.
Share of EU ETS verified emissions in total GHG		n.a.	45.7 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		n.a.	– 6.4 %	– 10.0 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 90.7	– 37.3 %	– 1.6	– 1.0 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 3.4	– 32.6 %	– 0.1	– 0.8 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			n.a.	n.a.			– 6.1	– 8.7 %

Assessment long-term trend of total GHG (1990-2007)

Total emissions decreased significantly in the 1990s, following the transition process to a market economy but have been increasing since 1999. The decrease in energy-related emissions was due to the decline of economic activities and energy consumption. Public electricity and heat production was by far the largest contributor to emission decreases, followed by manufacturing industries and fugitive emissions from energy industries. Emissions from industrial processes decreased due reduced industrial production levels (in particular in the chemical, mineral and metal industries). In the agriculture sector, the decline of livestock populations, decreased use of synthetic fertilizer and the decline of cultivated areas and crop productions drove emissions down. Waste emissions increased due to consumption growth, an increase in the number of waste management sites and an increase in the percentage of the population connected to sewerage.

Assessment short-term trend of total GHG (2006-2007)

The slight emission decrease is due to decreases reported for households, services, waste handling, agricultural soils, fugitive emissions and public electricity and heat production. Emissions increases can be seen for cement and lime production, road transport and energy use in manufacturing industries. The emission reductions in public electricity generation were due to the commissioning of the second unit of the Cernavoda nuclear plant at the end of 2007. The development of the industrial construction sector led to minor emission increases in emissions from cement and lime production. Reductions of emissions from agriculture can be attributed to a decrease in agricultural crop and livestock production. Emissions from waste management decreased due to the reduced amount of hazardous waste incinerated. Emissions from solvent and other product use decreased due to the decline of the several economic activities.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	www.anpm.ro/content.aspx?id=53 [Romanian], www.mmediu.ro/departament_mediu/schimbari_climatice/schimbari_climatice.htm [Romanian], www.anpm.ro/content.aspx?id=53 [English]

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

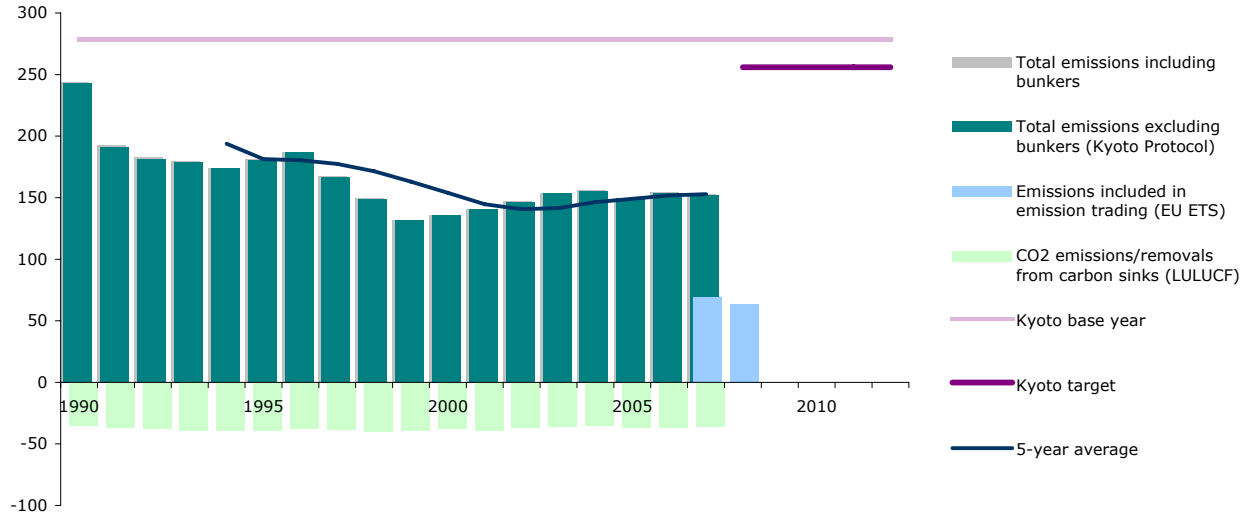
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

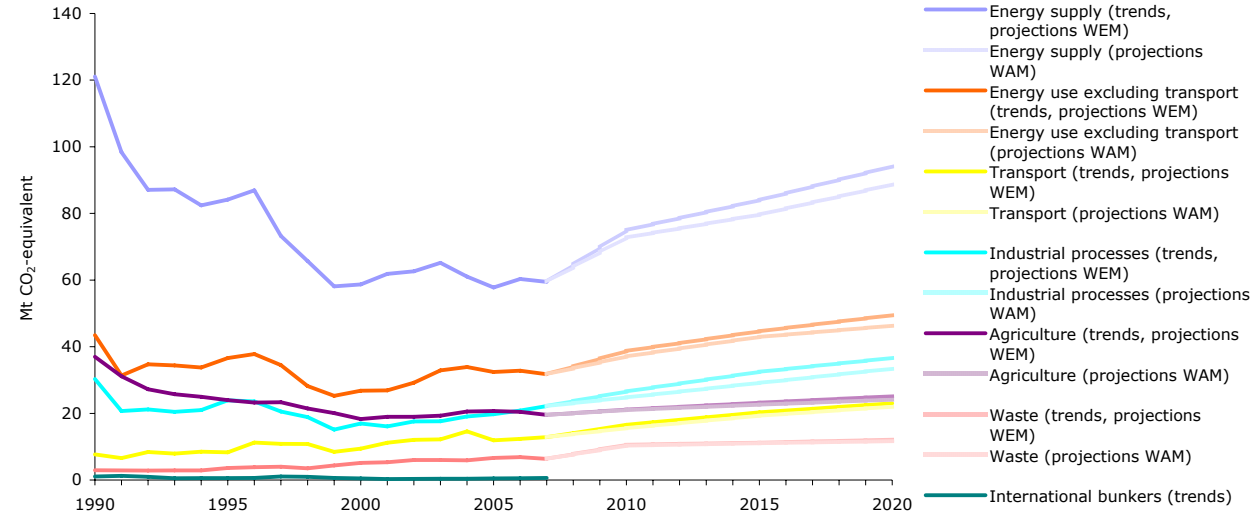
GHG trends and projections in Romania

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	278.2	
Kyoto target (initial assigned amount 2008–2012)	256.0	92.0 %
Total GHG over 2003–2007	152.9	55.0 %

Assessment of progress towards Kyoto targets

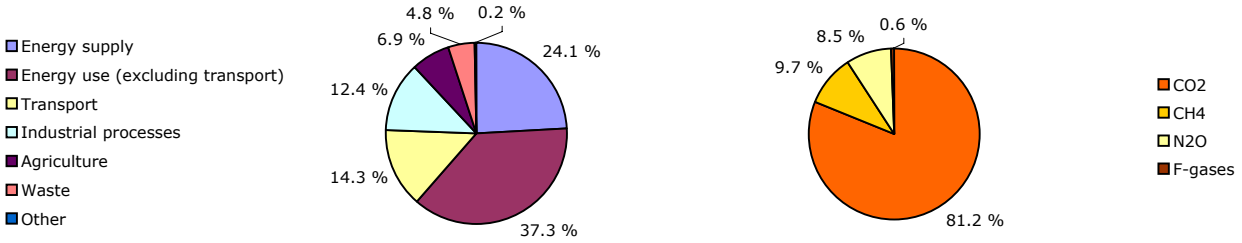
In Romania, average emissions over the period 2003–2007 were 45.0 % lower than the base-year level, well below the Kyoto target of – 8 % for the period 2008–2012. Romania will therefore not meet difficulty in reaching its target under the Kyoto Protocol. It will actually achieve significant surplus emission rights by the end of the Kyoto commitment period.

GHG trends and projections in Slovakia

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	73.3	48.9	47.0	*n.a.*	Mt CO_2-eq.	20	n.a.
GHG from international bunkers [4]	0.1	0.1	0.2	n.a.	Mt CO_2-eq.	27	n.a.
GHG per capita	13.9	9.1	8.7	*n.a.*	t CO_2-eq. / capita	19	n.a.
GHG per GDP [5]	n.a.	1 610	1 399	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	1.3 %	1.0 %	0.9 %	*n.a.*	%		
EU ETS verified emissions [6]		25.5	24.5	25.5	Mt CO_2-eq.	18	n.a.
Share of EU ETS verified emissions in total GHG		52.2 %	52.2 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 16.2 %	– 19.6 %	– 20.8 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 26.3	– 35.9 %	– 2.0	– 4.1 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 5.1	– 37.2 %	– 0.4	– 4.1 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			– 1.0	– 4.0 %			1.0	4.0 %

Assessment long-term trend of total GHG (1990-2007)

Total emissions decreased significantly in the 1990s and have remained relatively stable since. The decreasing trend was mainly driven by decreases in the energy and agriculture sectors. Important decreases were observed for emissions from public electricity and heat generation and from energy use in manufacturing industries and households/services. Emissions from transport, waste and industrial processes increased.

Assessment short-term trend of total GHG (2006-2007)

Slovakia's emissions decrease is mainly related to fuel combustion activities. A warmer winter in 2007 and resultant decrease in heating degree days by 8 % may have driven reduced emissions from fuel combustion in public electricity and heat production, manufacturing industries and households and services.). A remarkable increase in emissions is reported for road transport.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

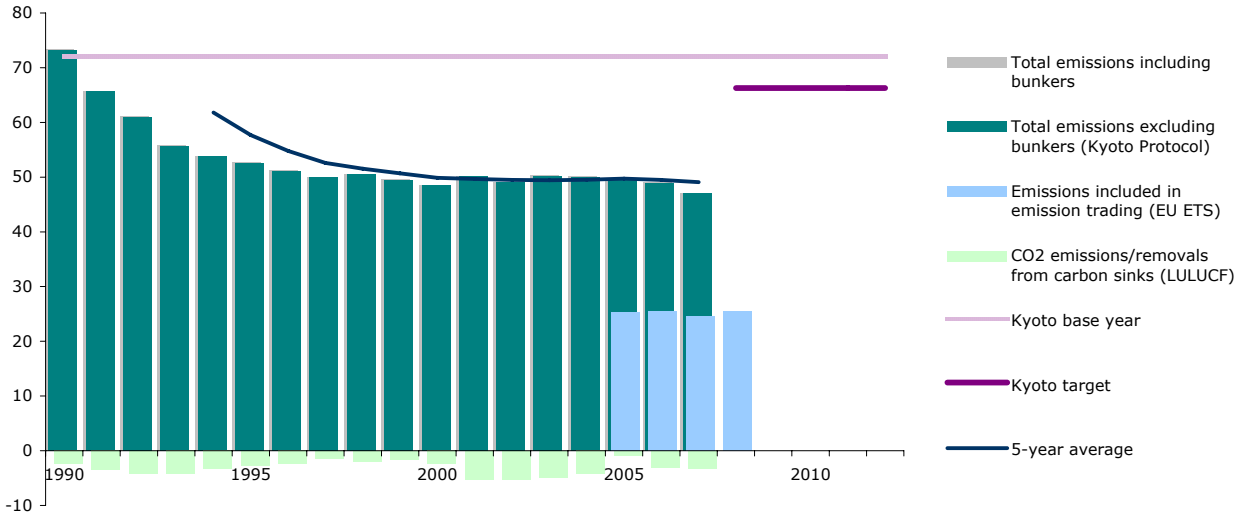
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

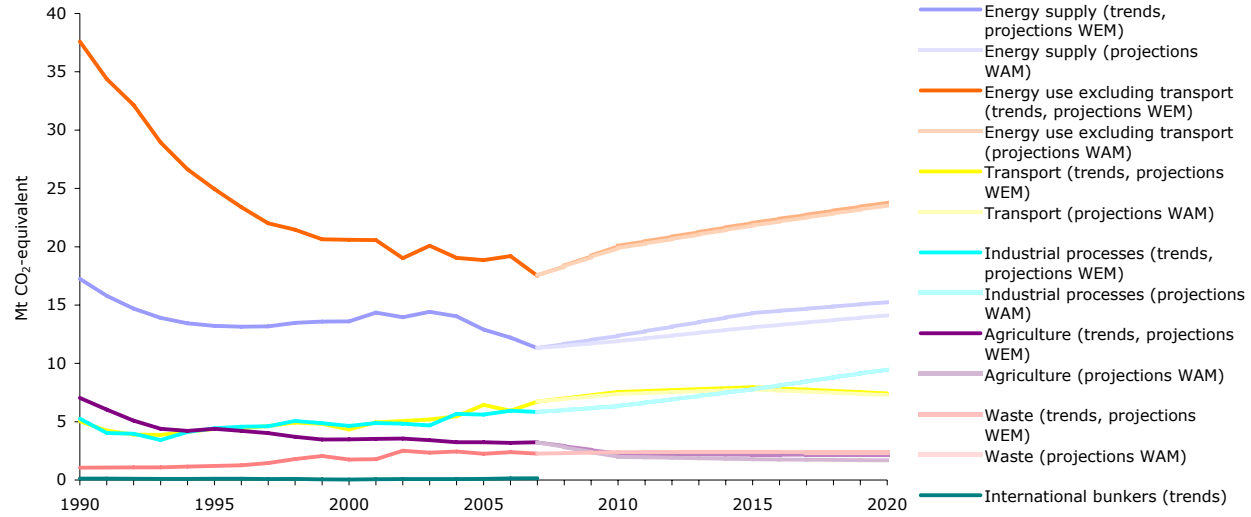
GHG trends and projections in Slovakia

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	72.1	
Kyoto target (initial assigned amount 2008–2012)	66.3	92.0 %
Total GHG over 2003–2007	49.1	68.1 %

Assessment of progress towards Kyoto targets

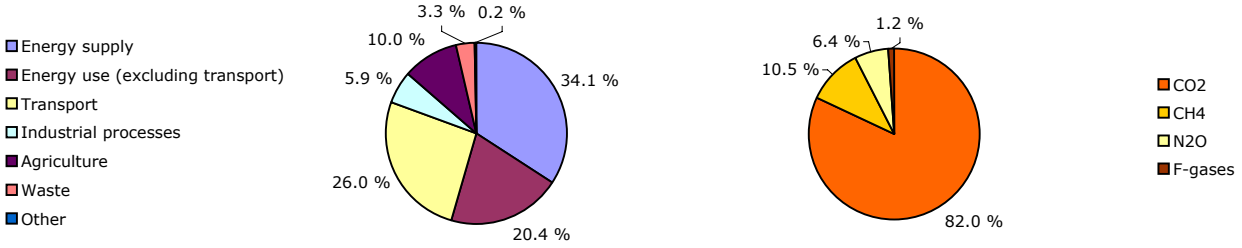
In the Slovak Republic, average emissions over the period 2003–2007 were 31.9 % lower than the base-year level, well below the Kyoto target of – 8 % for the period 2008–2012. The Slovak Republic will therefore not meet difficulty in reaching its target under the Kyoto Protocol. It will actually achieve significant surplus emission rights by the end of the Kyoto commitment period.

GHG trends and projections in Slovenia

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	18.6	20.6	20.7	*21.3*	Mt CO_2-eq.	23	n.a.
GHG from international bunkers [4]	0.1	0.2	0.3	n.a.	Mt CO_2-eq.	26	n.a.
GHG per capita	9.3	10.3	10.3	*10.6*	t CO_2-eq. / capita	15	n.a.
GHG per GDP [5]	1 042	757	714	*710*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	0.3 %	0.4 %	0.4 %	*0.4 %*	%		
EU ETS verified emissions [6]		8.8	9.0	8.9	Mt CO_2-eq.	22	n.a.
Share of EU ETS verified emissions in total GHG		43.0 %	43.7 %	*41.5 %*	%		
ETS verified emissions compared to annual allowances [7]		1.7 %	9.7 %	7.9 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	2.2	11.6 %	0.2	0.7 %	*2.8*	*14.9 %*	*0.6*	*2.9 %*
GHG per capita	1.0	10.8 %	0.0	0.4 %	*1.3*	*14.1 %*	*0.3*	*2.9 %*
EU ETS verified emissions [9]			0.2	2.3 %			– 0.2	– 2.1 %

Assessment long-term trend of total GHG (1990-2007)

The increase in emissions is mainly caused by road transport and to a lesser extent by fuel combustion for electricity and heat production, consumption of HFCs and methane emissions from solid waste disposal sites. Decreases are observed in fuel combustion in manufacturing industries and construction, metal industry, particularly aluminium production and in the agricultural sector (mainly manure management).

Assessment short-term trend of total GHG (2006-2007)

Emissions increased by 0.7 %, mainly driven by increases in fuel combustion. The biggest increase of GHG emissions was in road transport followed by public electricity and heat production. Due to the mild winter (– 10 % heating degree days), the biggest decrease in emissions was in households, although emissions from public electricity and heat production increased. To a lesser extent, emissions from manufacturing industries and construction have decreased.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	http://kazalci.arso.gov.si/kos2/?&ind_id=157&data=indicator&menu_group_id=8&q=lang_select&lang_id=94, http://nfp-si.eionet.eu.int/Dokumenti/GIS/zrak/obremenitve/87_1.xls

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

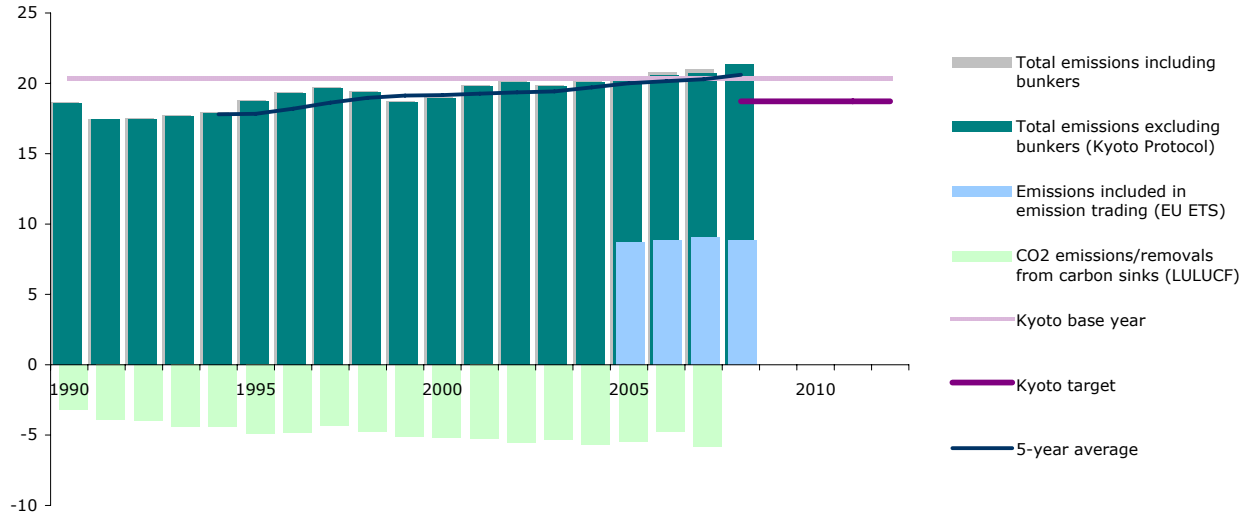
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

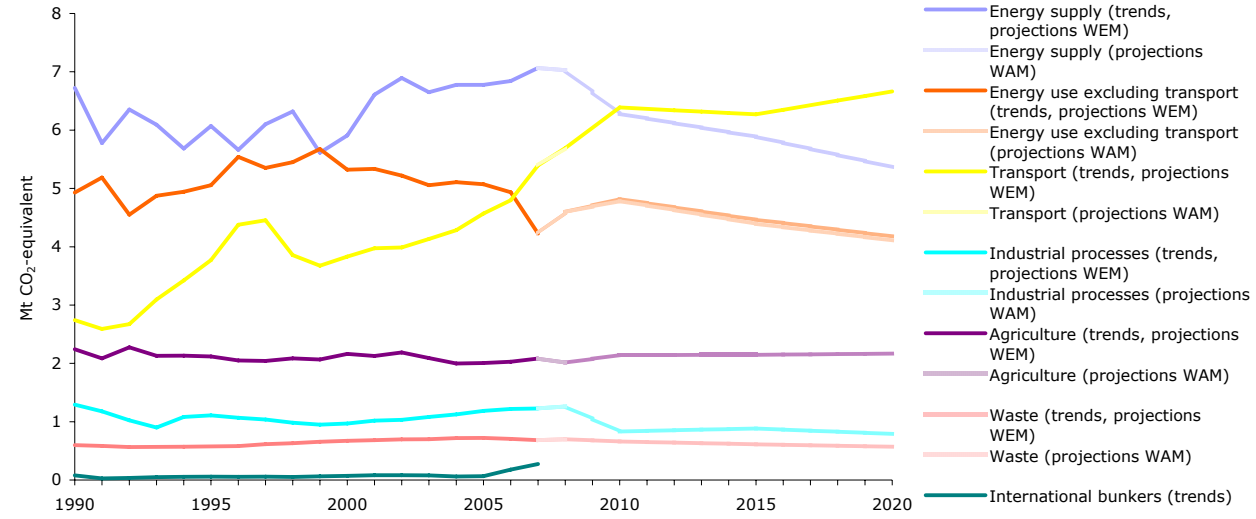
GHG trends and projections in Slovenia

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	20.4	
Kyoto target (initial assigned amount 2008–2012)	18.7	92.0 %
Total GHG over 2004–2008	20.6	101.3 %

Assessment of progress towards Kyoto targets

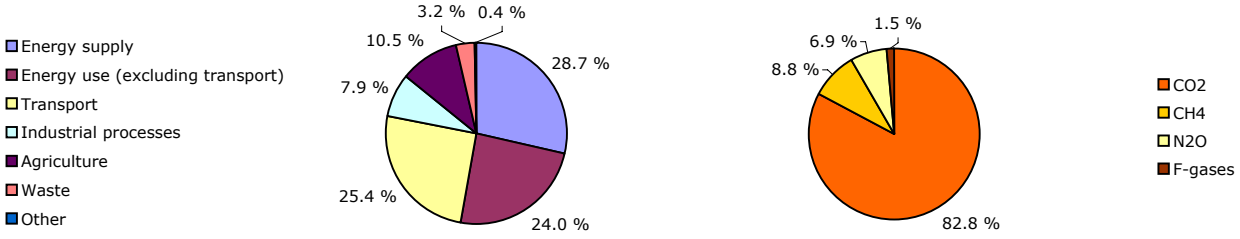
In Slovenia, average emissions over the period 2004–2008 were 0.3 % lower than the base-year level, still above the Kyoto target of – 8 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 44 % of total emissions. Slovenia expects to reach its Kyoto target by enhancing its carbon sinks and using the Kyoto flexible mechanisms.

GHG trends and projections in Spain

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	288.1	433.1	442.3	*n.a.*	Mt CO_2-eq.	5	5
GHG from international bunkers [4]	15.1	36.5	37.6	n.a.	Mt CO_2-eq.	3	3
GHG per capita	7.4	9.9	9.9	*n.a.*	t CO_2-eq. / capita	16	11
GHG per GDP [5]	602	563	555	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	5.2 %	8.5 %	8.8 %	*n.a.*	%		
EU ETS verified emissions [6]		179.7	186.6	163.5	Mt CO_2-eq.	5	4
Share of EU ETS verified emissions in total GHG		41.5 %	42.2 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		8.1 %	16.8 %	6.1 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	154.2	53.5 %	9.3	2.1 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	2.5	34.0 %	0.0	0.5 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			6.8	3.8 %			– 23.1	– 12.4 %

Assessment long-term trend of total GHG (1990-2007)

Overall, emission trends were characterised by a sustained increase in the context of general economic growth. Following a moderate increase between 1990 and 1996, emissions have increased more rapidly thereafter. The largest increase in emissions was observed in the transport sector. Annual fluctuations in rainfall affect hydropower and nuclear power production.

Assessment short-term trend of total GHG (2006-2007)

The emission increase in Spain is mainly due to public electricity and heat production (intensified use of gaseous and solid fuels due to reduced rainfall and subsequent reduction in use of nuclear and hydro power), road transport and the agricultural sector.A decrease in energy use by manufacturing and construction industries offset some of the general increase in emissions from the energy sector. Most emissions from industrial processes show moderate decreases, but emissions due to the consumption of F– gases continue to increase.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	[Espanol] www.mma.es/portal/secciones/calidad_contaminacion/atmosfera/emisiones/inventario.htm

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

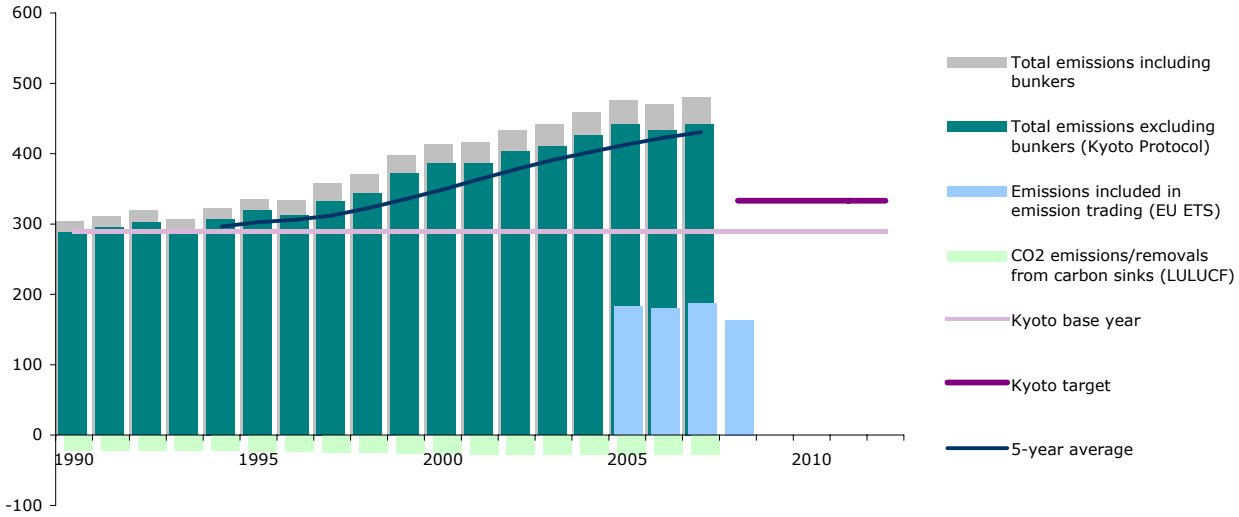
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

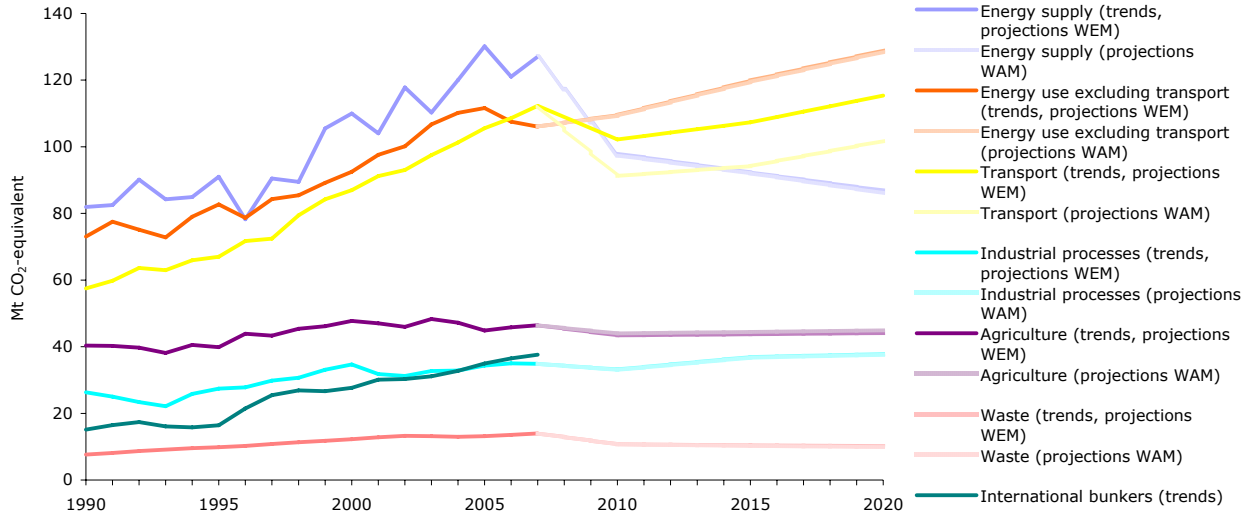
GHG trends and projections in Spain

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

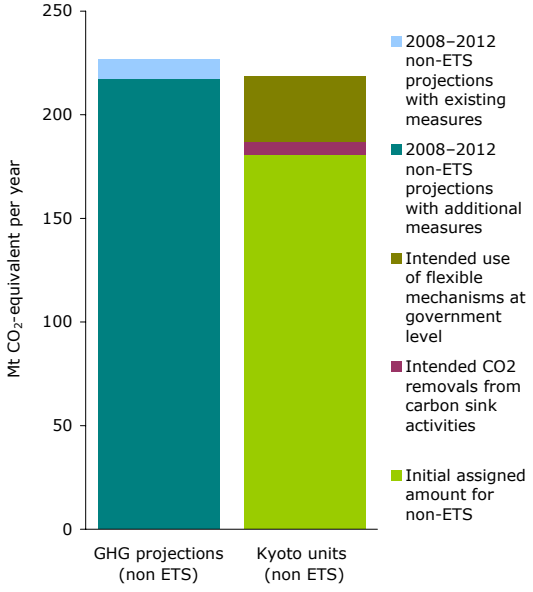


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	289.8	
Kyoto target (initial assigned amount 2008–2012)	333.2	115.0 %
Total GHG over 2003–2007	430.6	148.6 %
Implied target for the sectors not included in the EU ETS	180.9	
Intended use of flexible mechanisms by governments	31.8	11.0 %
Projected CO_2 removals from carbon sink activities	5.8	2.0 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	218.6	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	226.6	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	217.4	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	8.0	2.8 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 1.2	– 0.4 %

Assessment of projected progress towards Kyoto target

In Spain, average emissions over the period 2003–2007 were 48.6 % higher than the base-year level, significantly above the burden-sharing target of + 15 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 42 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to remain higher than their 'non-ETS' target. However, Spain expects to reach its burden-sharing target by implementing additional measures, enhancing its carbon sinks and using to a large extent the Kyoto flexible mechanisms.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012

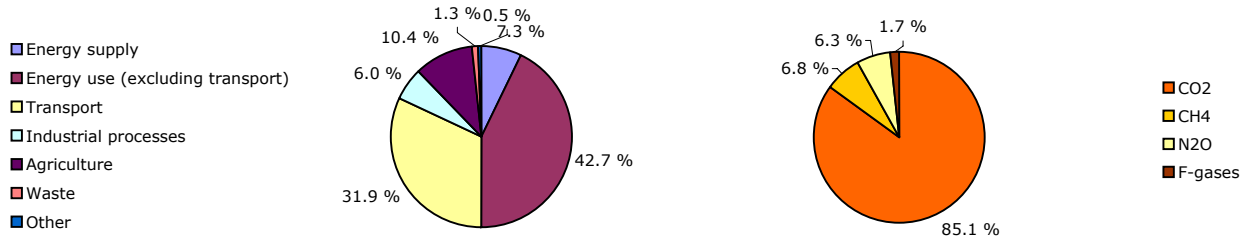


GHG trends and projections in Switzerland

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	52.7	53.2	51.3	*n.a.*	Mt CO_2-eq.	n.a.	n.a.
GHG from international bunkers [4]	3.1	3.7	4.0	n.a.	Mt CO_2-eq.	n.a.	n.a.
GHG per capita	7.9	7.1	6.8	*n.a.*	t CO_2-eq. / capita	n.a.	n.a.
GHG per GDP [5]	216	178	166	*n.a.*	g CO_2-eq. / euro		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 1.4	– 2.7 %	– 1.9	– 3.6 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 1.1	– 13.6 %	– 0.3	– 4.2 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*

Assessment long-term trend of total GHG (1990-2007)

After small variations in the early 1990s, emissions have remained relatively stable. Emissions from energy industries and transport increased, while emissions from agriculture and the chemical industry decreased.

Assessment short-term trend of total GHG (2006-2007)

Emissions from heating fuels in particular have declined sharply, mainly due to the very mild temperatures during the winter months of 2007, the increase in heating oil prices since 2004 — in particular in 2007 (+ 40 % between January and December 2007) , and possibly the increased popularity of alternative energy sources (wood, solar power and ambient heat). On the other hand, motor fuel emissions increased in 2007. This can be attributed to strong economic growth in 2007 which resulted in an increase in the transport of goods, which was not compensated for by the effects of rising crude oil price and end price of motor fuels. In addition, the difference in diesel prices between Germany and Switzerland may have encouraged 'tank tourism' (motor fuel sales in Switzerland to users from outside Switzerland). Emissions from agriculture have also increased slightly. This reflects the slight increase in cattle stock numbers in recent years after a decline by almost 17% between 1990 and 2004. Emissions from the waste sector have decreased slightly after an increase in the previous years.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	www.bafu.admin.ch/dokumentation/medieninformation/00962/index.html?lang=de&msg-id=26424 [Deutsch], www.bafu.admin.ch/dokumentation/medieninformation/00962/index.html?lang=fr&msg-id=22191 [Français], www.bafu.admin.ch/dokumentation/medieninformation/00962/index.html?lang=it&msg-id=26424

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

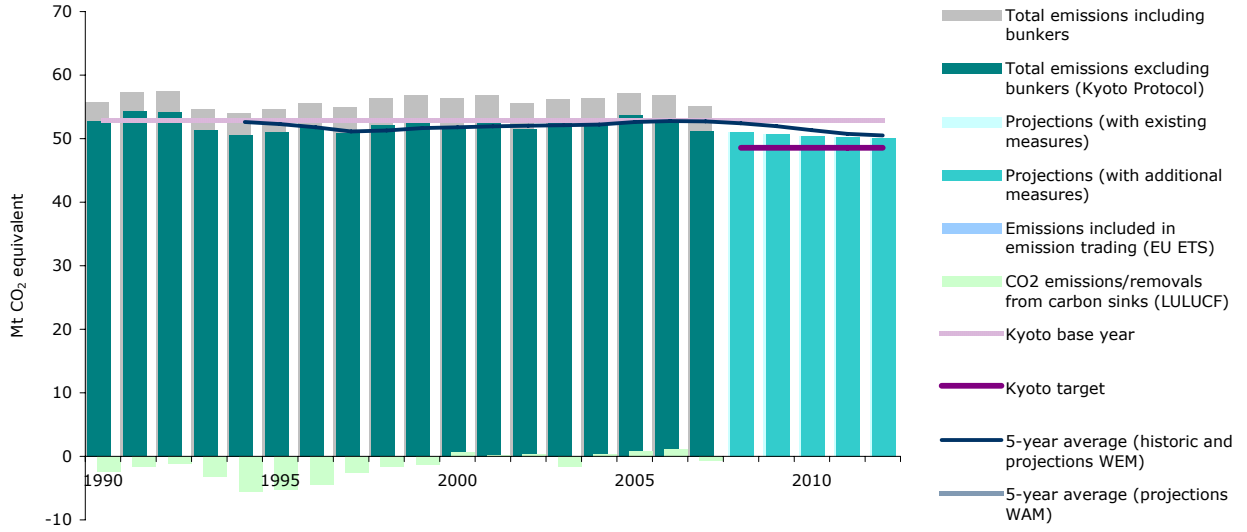
[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

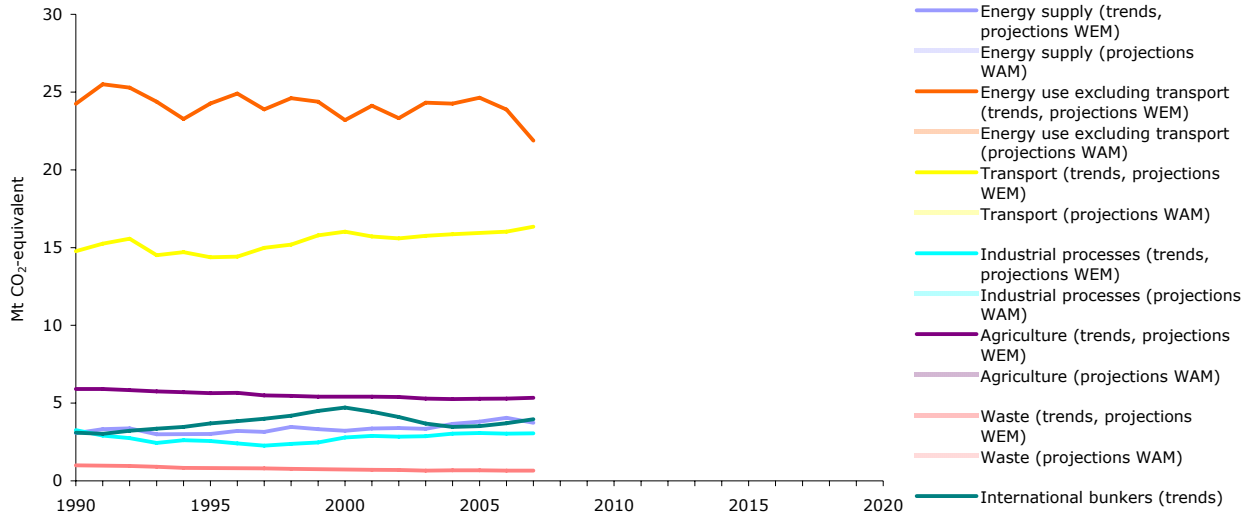
GHG trends and projections in Switzerland

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

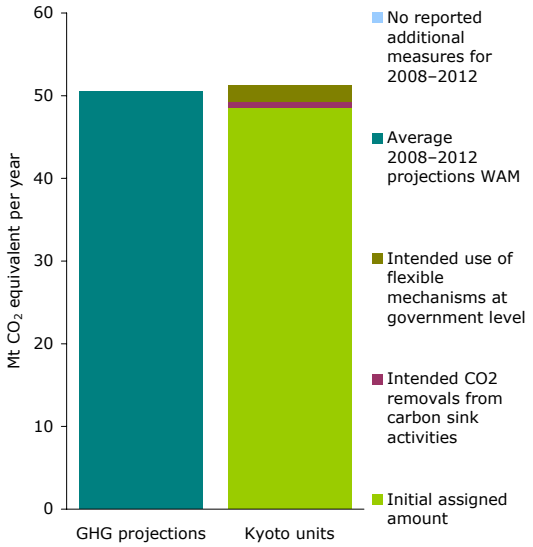


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	52.8	
Kyoto target (initial assigned amount 2008–2012)	48.6	92.0 %
Total GHG over 2003–2007	52.7	99.9 %
Intended use of flexible mechanisms by governments	2.0	3.8 %
Projected CO_2 removals from carbon sink activities	0.7	1.3 %
Kyoto target, including Kyoto mechanisms, carbon sinks and trading of allowances by operators in the EU ETS	51.3	
Projected emissions with existing measures (WEM)	50.5	
Projected emissions with additional measures (WAM)	50.5	
Gap between projections WEM and target, including Kyoto mechanisms and carbon sinks	– 0.8	– 1.5 %
Gap between projections WAM and target, including Kyoto mechanisms and carbon sinks	– 0.8	– 1.5 %

Assessment of projected progress towards Kyoto targets

In Switzerland, average emissions over the period 2003–2007 were 0.1 % lower than the base-year level, still above the Kyoto target of – 8 % for the period 2008–2012. Projections of total emissions indicate that these are expected to decrease to 4 % below base-year levels, still above the target. However, Switzerland expects to reach its Kyoto target by enhancing its carbon sinks and using the Kyoto flexible mechanisms.

Comparison of projected emissions with Kyoto units for the period 2008–2012

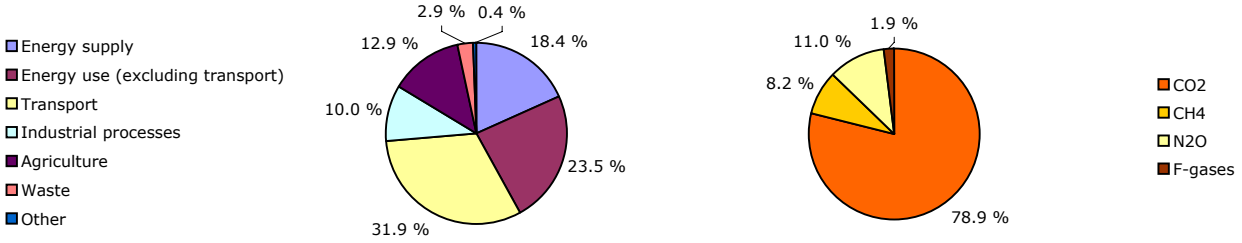


GHG trends and projections in Sweden

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	71.9	66.9	65.4	*n.a.*	Mt CO_2-eq.	19	14
GHG from international bunkers [4]	3.6	9.3	9.8	n.a.	Mt CO_2-eq.	9	9
GHG per capita	8.4	7.4	7.2	*n.a.*	t CO_2-eq. / capita	25	15
GHG per GDP [5]	329	212	202	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	1.3 %	1.3 %	1.3 %	*n.a.*	%		
EU ETS verified emissions [6]		19.9	19.0	20.0	Mt CO_2-eq.	20	14
Share of EU ETS verified emissions in total GHG		29.7 %	29.1 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		– 11.5 %	– 16.7 %	– 3.7 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 6.5	– 9.1 %	– 1.5	– 2.2 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 1.3	– 14.9 %	– 0.2	– 2.9 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			– 0.8	– 4.3 %			1.0	5.1 %

Assessment long-term trend of total GHG (1990-2007)

While emissions from transport have increased, emissions from individual combustion in buildings have decreased. As a result, emissions from the energy sector, including transport, decreased by 9.5 % in 2007 compared to 1990. In particular, emissions from the household and services sector decreased significantly, mainly because of the switch from oil to district heating. Emissions from industrial processes (mainly from the iron and steel and the mineral industries) have varied, primarily because of fluctuations of production volumes with economic cycles. Emissions from agriculture decreased, mainly due to reduced livestock keeping. The collection of landfill gas, a ban on landfill deposit and the introduction of a landfill tax have played a key role in reducing emissions from waste.

Assessment short-term trend of total GHG (2006-2007)

Emissions decreased in all sectors. Major emission decreases are reported from energy use in the paper industry, from petroleum refining, from the production of chemicals and the disposal of solid waste.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

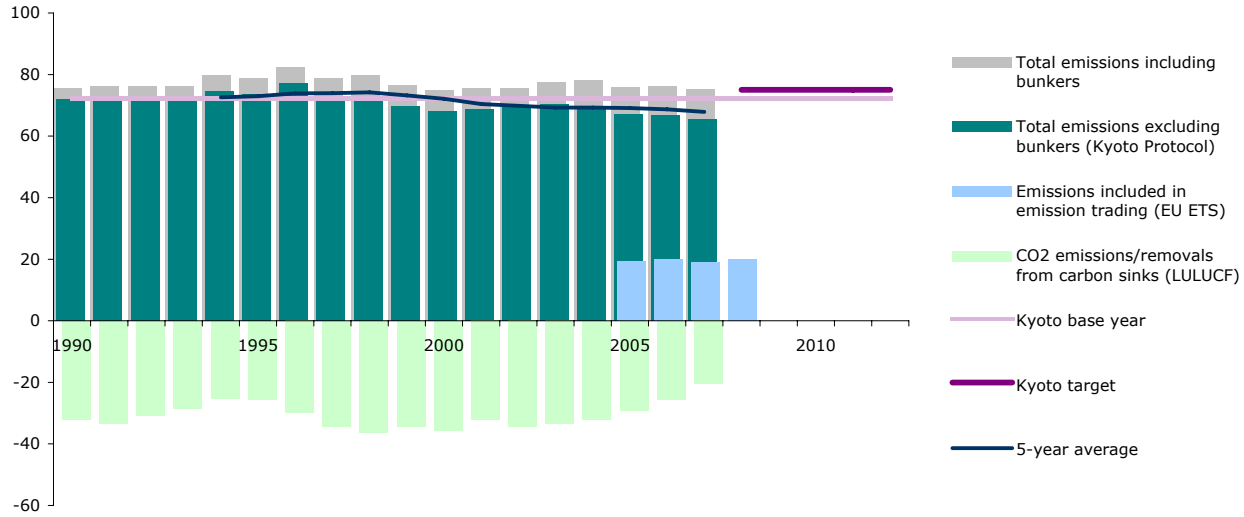
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

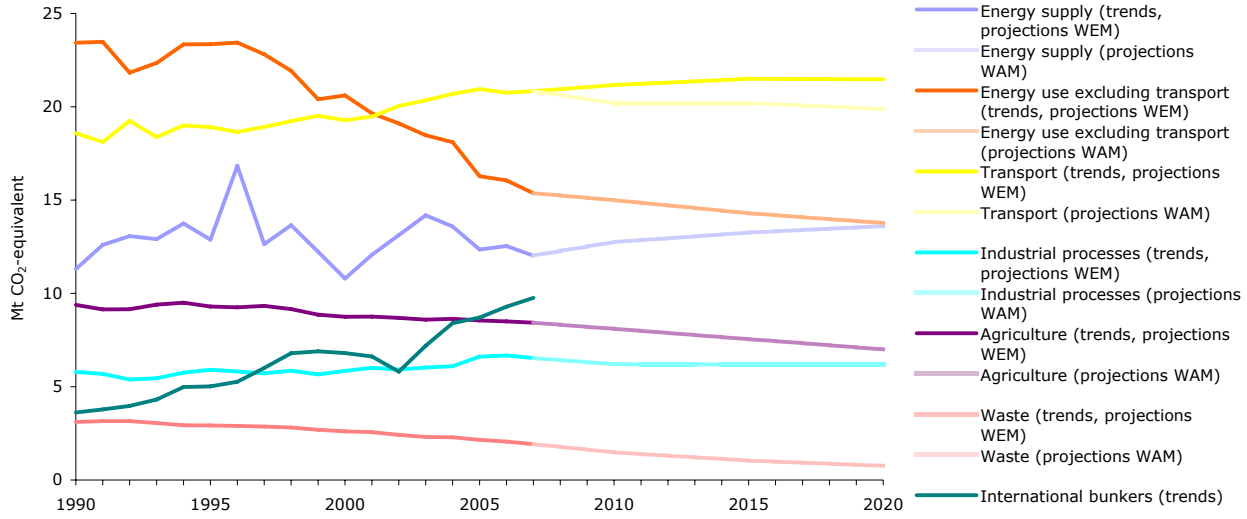
GHG trends and projections in Sweden

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

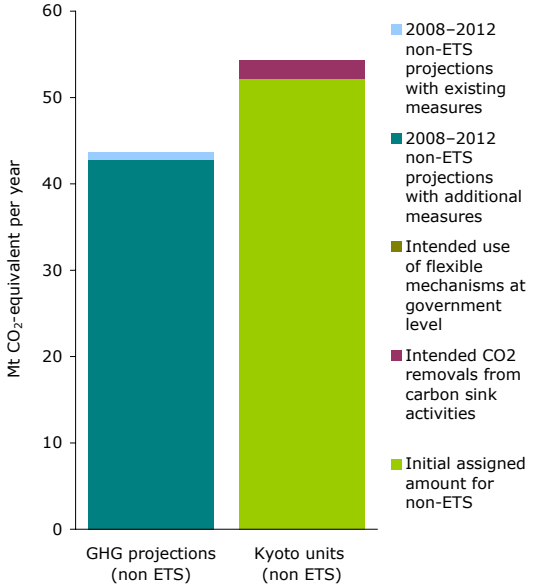


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	72.2	
Kyoto target (initial assigned amount 2008–2012)	75.0	104.0 %
Total GHG over 2003–2007	67.9	94.1 %
Implied target for the sectors not included in the EU ETS	52.2	
Intended use of flexible mechanisms by governments	0.0	0.0 %
Projected CO_2 removals from carbon sink activities	2.1	3.0 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	54.4	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	43.7	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	42.9	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 10.7	– 14.8 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 11.5	– 16.0 %

Assessment of projected progress towards Kyoto target

In Sweden, average emissions over the period 2003–2007 were already 5.9 % lower than the base-year level, below the burden-sharing target of + 4 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 29 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to be lower than their 'non-ETS' target. Implementing additional measures and enhancing carbon sinks will bring further emission reductions. Therefore Sweden expects to reach and even over-achieve its burden-sharing target without using the Kyoto mechanisms.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012

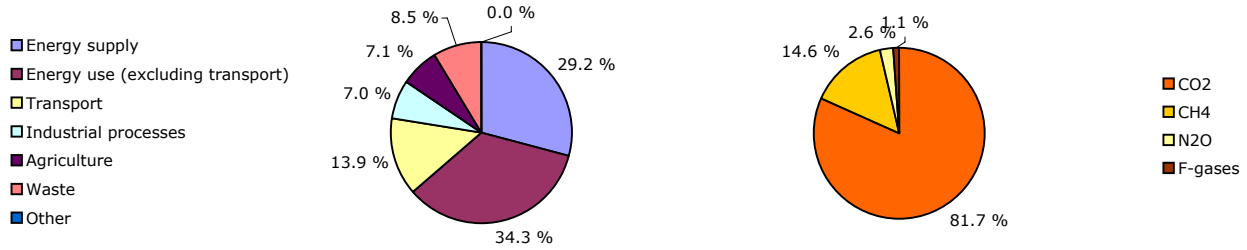


GHG trends and projections in Turkey

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	170.1	332.7	372.6	*n.a.*	Mt CO_2-eq.	n.a.	n.a.
GHG from international bunkers [4]	NA,NE,NO	NA,NE,NO	NA,NE,NO	n.a.	Mt CO_2-eq.	n.a.	n.a.
GHG per capita	3.1	4.6	5.3	*n.a.*	t CO_2-eq. / capita	n.a.	n.a.
GHG per GDP [5]	841	859	919	*n.a.*	g CO_2-eq. / euro		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	202.6	119.1 %	40.0	12.0 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	2.3	74.5 %	0.8	16.6 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*

Assessment long-term trend of total GHG (1990-2007)

Emissions have almost doubled since 1990, increasing in all sectors except agriculture.

Assessment short-term trend of total GHG (2006-2007)

Emissions increased in all main sectors except emissions from industrial processes. The largest increases in absolute terms occurred in the energy industry, agriculture and transport sectors. In the agriculture sector alone, emissions increased by more than 60 % in one year.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

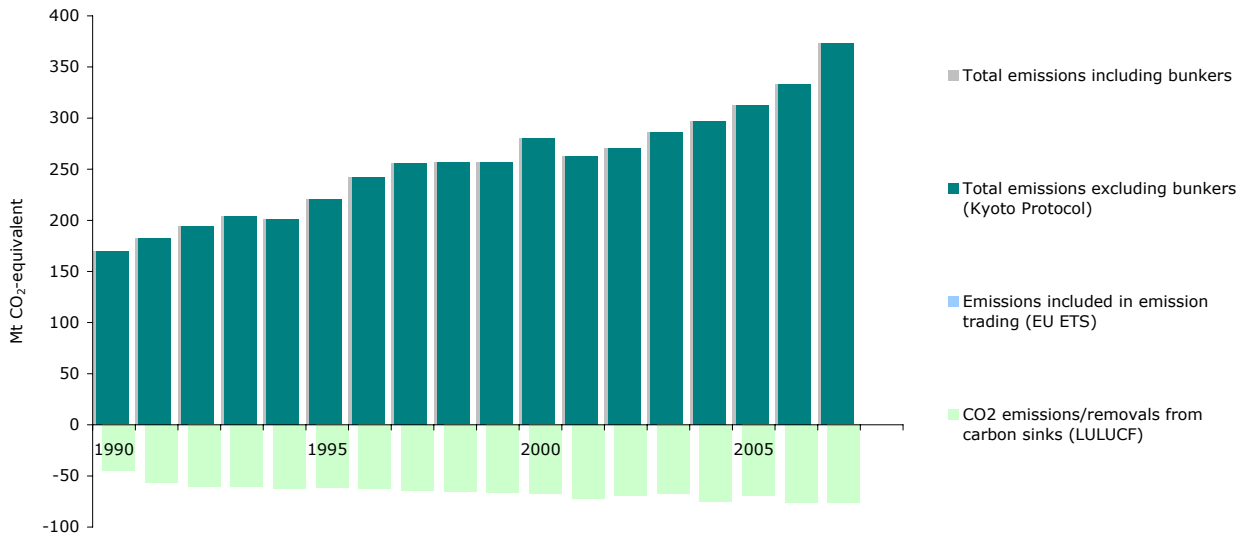
[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

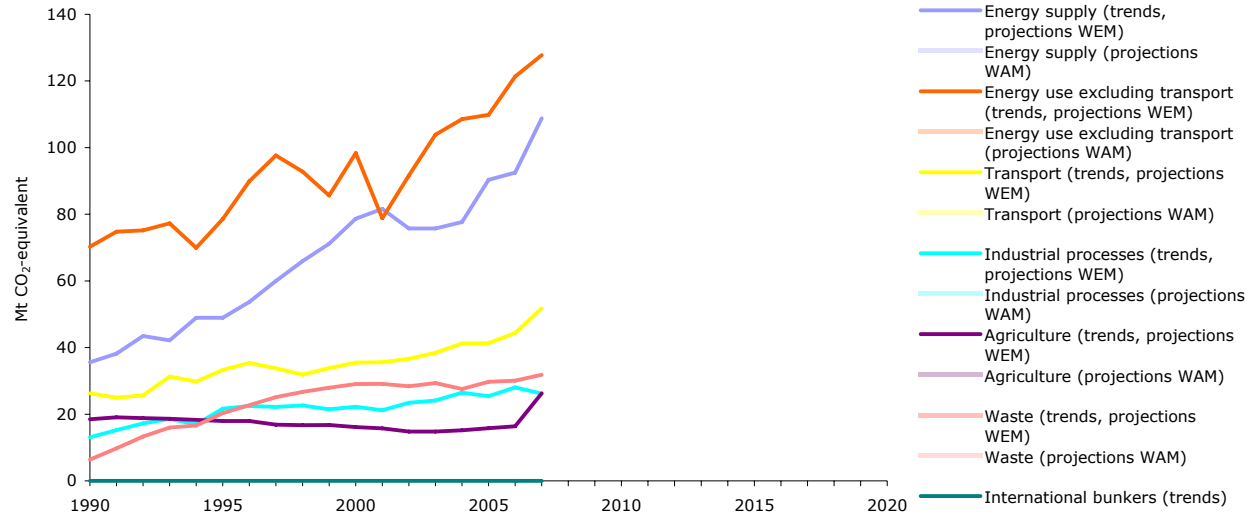
GHG trends and projections in Turkey

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector



Progress towards Kyoto target

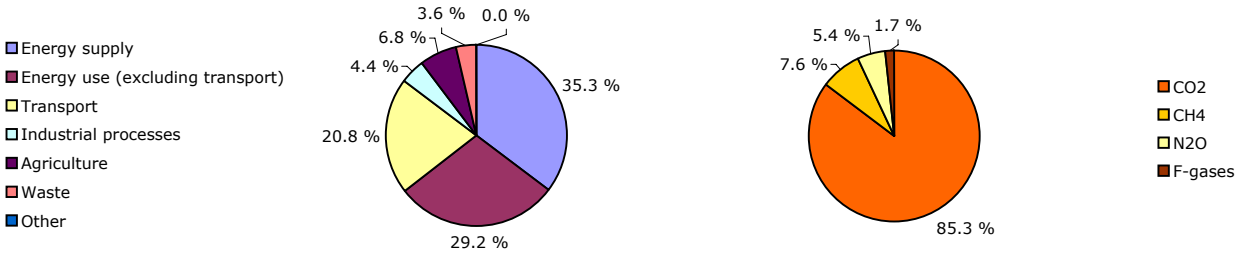
Turkey does not have a target under the Kyoto Protocol. In 2007, total emissions in this country were 119.1 % higher than the 1990 level.

GHG trends and projections in the United Kingdom

European Environment Agency

Key GHG data [1]	1990	2006	2007	2008 [2]	Unit	Rank in EU-27 [3]	Rank in EU-15 [3]
Total greenhouse gas emissions (GHG)	771.1	647.9	636.7	*n.a.*	Mt CO_2-eq.	2	2
GHG from international bunkers [4]	22.6	42.9	42.3	n.a.	Mt CO_2-eq.	2	2
GHG per capita	13.5	10.7	10.5	*n.a.*	t CO_2-eq. / capita	13	10
GHG per GDP [5]	618	349	333	*n.a.*	g CO_2-eq. / euro		
Share of GHG in total EU-27 emissions	13.9 %	12.7 %	12.6 %	*n.a.*	%		
EU ETS verified emissions [6]		251.2	256.6	265.0	Mt CO_2-eq.	2	2
Share of EU ETS verified emissions in total GHG		38.8 %	40.3 %	*n.a.*	%		
ETS verified emissions compared to annual allowances [7]		21.9 %	18.9 %	21.8 %	%		

Share of GHG emissions (excluding international bunkers) by main source and by gas in 2007 [1],[8]



Key GHG trends	1990-2007		2006-2007		1990-2008 [2]		2007-2008 [2]	
	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%	Mt CO_2-eq.	%
Total GHG	– 134.4	– 17.4 %	– 11.2	– 1.7 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
GHG per capita	– 3.0	– 22.4 %	– 0.3	– 2.4 %	*n.a.*	*n.a.*	*n.a.*	*n.a.*
EU ETS verified emissions [9]			5.4	2.2 %			8.4	3.3 %

Assessment long-term trend of total GHG (1990-2007)

Emissions have decreased in all main sectors since the early 1990s. Significant emission reductions were achieved in the energy sector, due to fuel switching from coal to gas, and reduced energy intensity of the economy. Emissions from transport have been steadily increasing. Emissions from the agriculture sector have decreased by 21 % since 1990, reflecting trends in livestock numbers and emissions from fertiliser application. Emissions from the industrial sector have decreased by 48 %, mostly due to a change in the emissions from the chemical industry. Overall emissions from the waste sector have decreased by 57 % since , mostly due to the implementation of methane recovery systems.

Assessment short-term trend of total GHG (2006-2007)

The decrease was mainly due to reduced emissions from fuel combustion in households (although heating degree days are unchanged), public electricity and heat production and manufacturing industries, as well as emission reductions in the agricultural sector. A relevant emission increase is reported for industrial processes (mainly chemical industry). Transport emissions stabilised.

Source and additional information

Greenhouse gas emission data and EU ETS data	www.eea.europa.eu/themes/climate/data-viewers
List and description of national policies and measures	www.eea.europa.eu/themes/climate/pam
National assessment of emission trends	Not available

[1] Total greenhouse gas emissions (GHG), GHG per capita, GHG per GDP and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international bunkers.

[2] Preliminary estimates reported by the country for total greenhouse gas emissions.

[3] Comparison of 2007 values, 1 = highest value among EU countries.

[4] International bunkers: international aviation and international maritime transport.

[5] GDP in constant 2000 prices - not suitable for a quantitative comparison between countries for the same year.

[6] All installations included. This includes new entrants and closures. Data from the community independent transaction log (CITL) released on 29 April 2009 for the reporting years 2005-2007 and as of 26 May 2009 for the reporting year 2008. The CITL regularly receives new information (including delayed verified emissions data, new entrants and closures) so the figures shown may change over time.

[7] "+" and "-" mean that verified emissions exceeded allowances or were below allowances, respectively. Annual allowances include allocated allowances and allowances auctioned during the same year.

[8] LULUCF sector and emissions from international bunkers excluded. Due to independent rounding the sums do not necessarily add up.

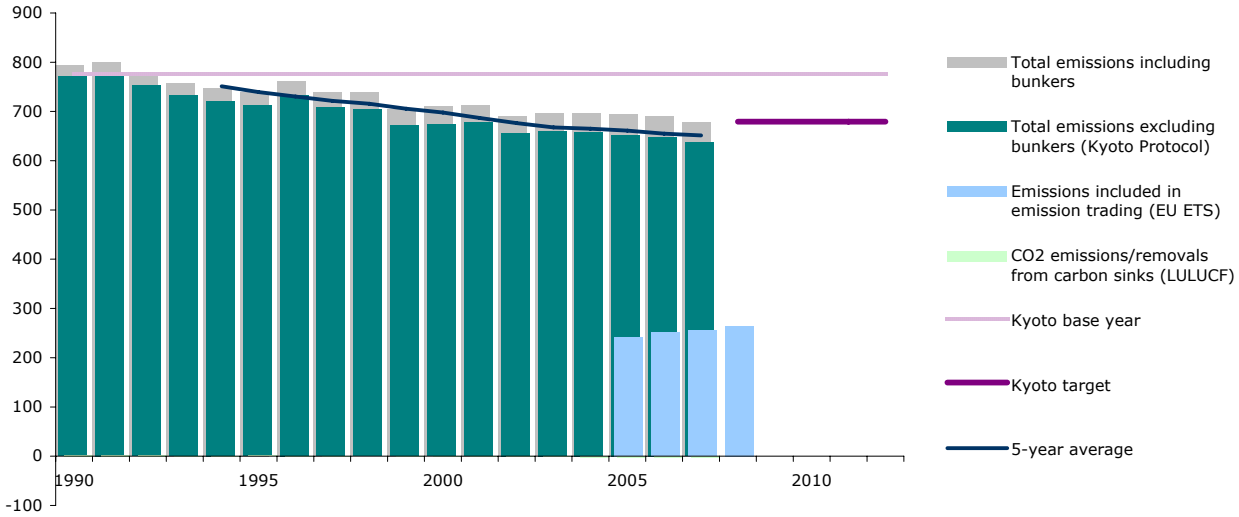
[9] The 2007–2008 comparison should be interpreted with care, as the scope of installations covered changed significantly.

For further information on greenhouse gas emission trends and projections in Europe: www.eea.europa.eu/publications/eea_report_2009_9

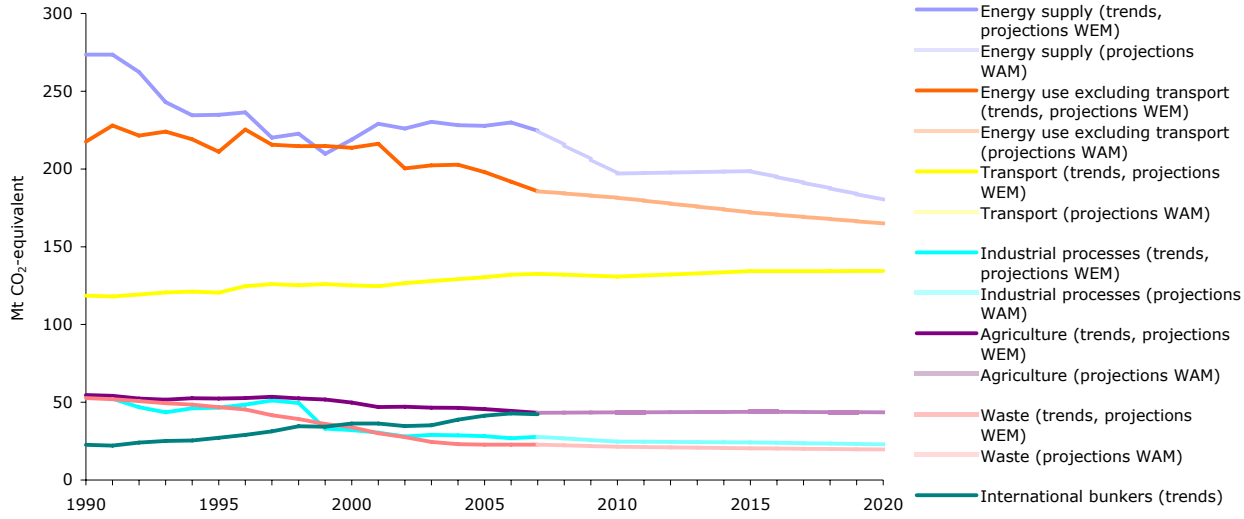
GHG trends and projections in the United Kingdom

European Environment Agency

GHG trends and projections 1990–2020 - total emissions and removals



GHG trends and projections 1990–2020 - emissions by sector

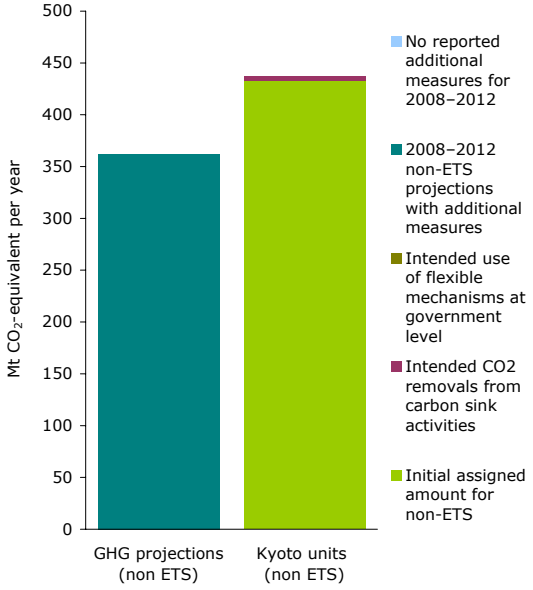


Progress towards Kyoto target	Annual average Mt CO2-eq.	% of base year emissions
Base-year emissions	776.3	
Kyoto target (initial assigned amount 2008–2012)	679.3	87.5 %
Total GHG over 2003–2007	651.3	83.9 %
Implied target for the sectors not included in the EU ETS	433.1	
Intended use of flexible mechanisms by governments	0.0	0.0 %
Projected CO_2 removals from carbon sink activities	4.0	0.5 %
Kyoto target for the sectors not included in the EU ETS, including Kyoto mechanisms and carbon sinks	437.1	
Projected emissions (sectors not included in the EU ETS) with existing measures (WEM) 2008-2012	362.2	
Projected emissions (sectors not included in the EU ETS) with additional measures (WAM) 2008-2012	362.2	
Gap between projections WEM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 74.9	– 9.6 %
Gap between projections WAM and target (sectors not in the EU ETS), including Kyoto mechanisms and carbon sinks	– 74.9	– 9.6 %

Assessment of projected progress towards Kyoto target

In the United Kingdom, average emissions over the period 2003–2007 were already 16.1 % lower than the base-year level, below the burden-sharing target of – 12.5 % for the period 2008–2012. Part of the Kyoto compliance will be achieved through operators in the EU emission trading scheme, which covers approximately 40 % of total emissions. Projections concerning the remaining emissions in the sectors not covered by the EU ETS indicate that these are expected to be lower than their 'non-ETS' target. Enhancing carbon sinks will bring further emission reductions. Therefore the United Kingdom expects to reach and even over-achieve its burden-sharing target without using the Kyoto mechanisms.

Comparison of projected emissions with Kyoto units for the sectors not included in the EU emission trading scheme for the period 2008–2012



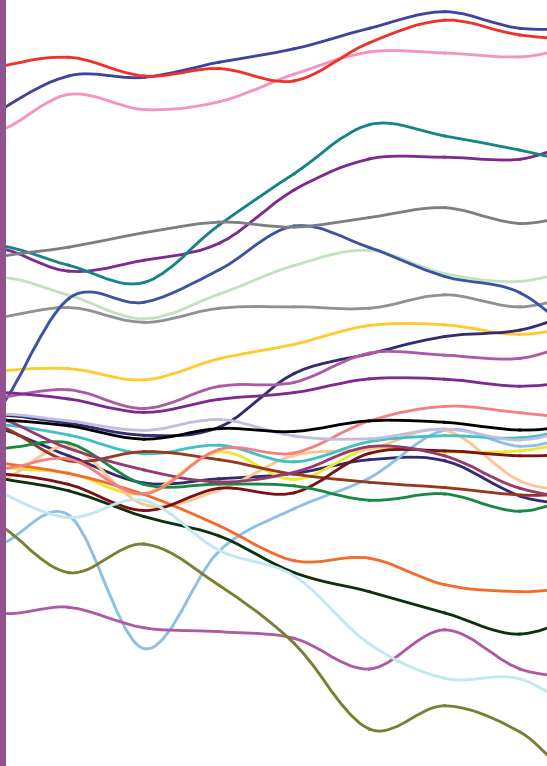
European Environment Agency

Greenhouse gas emission trends and projections in Europe 2009
Tracking progress towards Kyoto targets

2009 — 179 pp. — 21 x 29.7 cm

ISBN 978-92-9213-035-0
DOI 10.2800/23935

TH-AL-09-009-EN-C
DOI 10.2800/23935



Price (excluding VAT): EUR 10.00

ISBN 978-92-9213-035-0

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

Publications Office
Publications.europa.eu

European Environment Agency