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Greenhouse gas emission trends and projections in Europe 2007

Tracking progress towards Kyoto targets

Annex: Additional information on greenhouse gas trends and projections by sector and by Member State

European Environment Agency

Contents


European Environment Agency

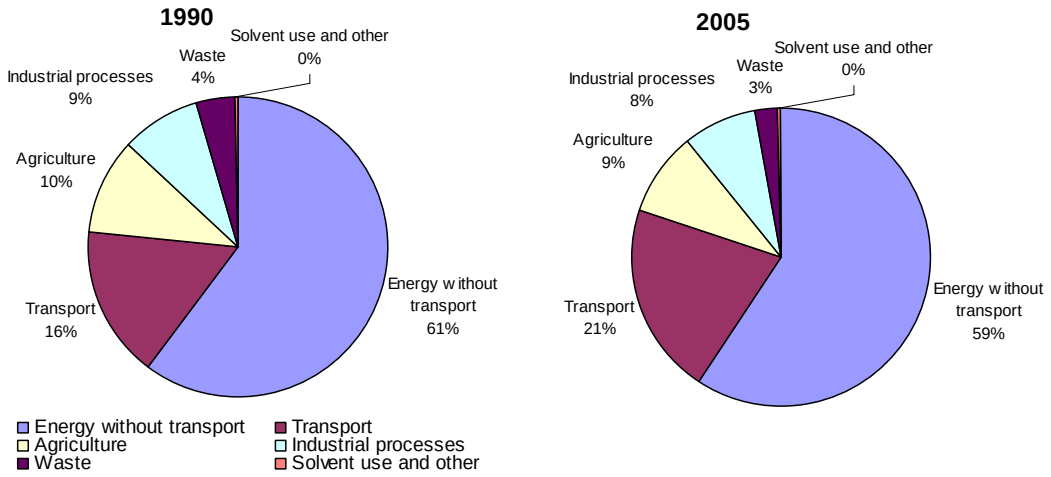
A 1 Sectoral emission trends and projections in the EU

This annex presents sectoral emissions trends and projections in the EU, as reported by Member States. It also attempts to link these trends with existing or planned policies and measures (PAM) in the EU. For information on methodological issues relating to the calculation of the effects of policies and measures and 'without measures' projections, please refer to Annex 6.

Sector shares and trends in the EU-15

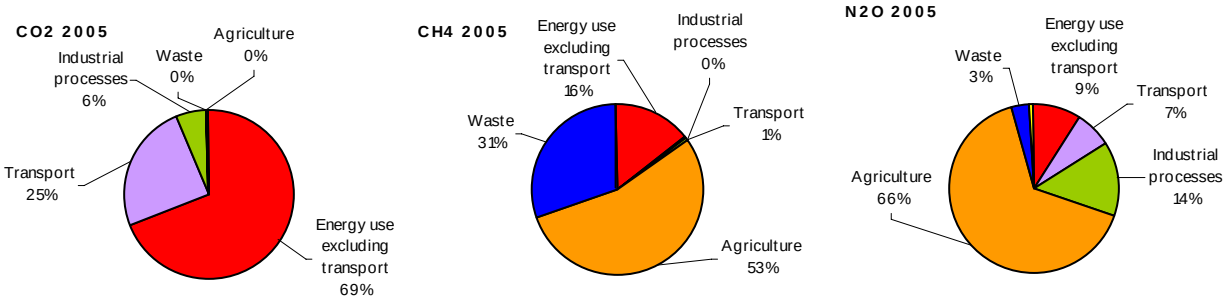
- Approximately 80% of total GHG emissions (4 192 Mt in 2005) in the EU-15 are due to the supply and use of energy (including fuel consumption from transport). CO_2 emissions from public electricity and heat production represent a quarter of all EU-15 GHG emissions, while CO_2 emissions from road transportation represent a fifth of all EU-15 GHG emissions.
- Agriculture is the main CH_4 and N_2O emitter and accounts for 9% of total GHG emissions.
- The share of transport in total GHG emissions has been increasing since 1990.
- Between 1990 and 2005, the GHG emissions that increased most in absolute value were CO_2 emissions from road transportation, CO_2 emissions from electricity and heat production and HFCs emissions from refrigeration and air conditioning equipment.
- Between 1990 and 2005, the GHG emissions that decreased most in absolute value were CH_4 emissions from land filling, CO_2 emissions from fuel combustion in manufacturing industries and construction and CO_2 emissions from the manufacture of solid fuels (e.g. charcoal).

Figure 1 Sector shares of total greenhouse gases in 1990 and 2005 in the EU-15



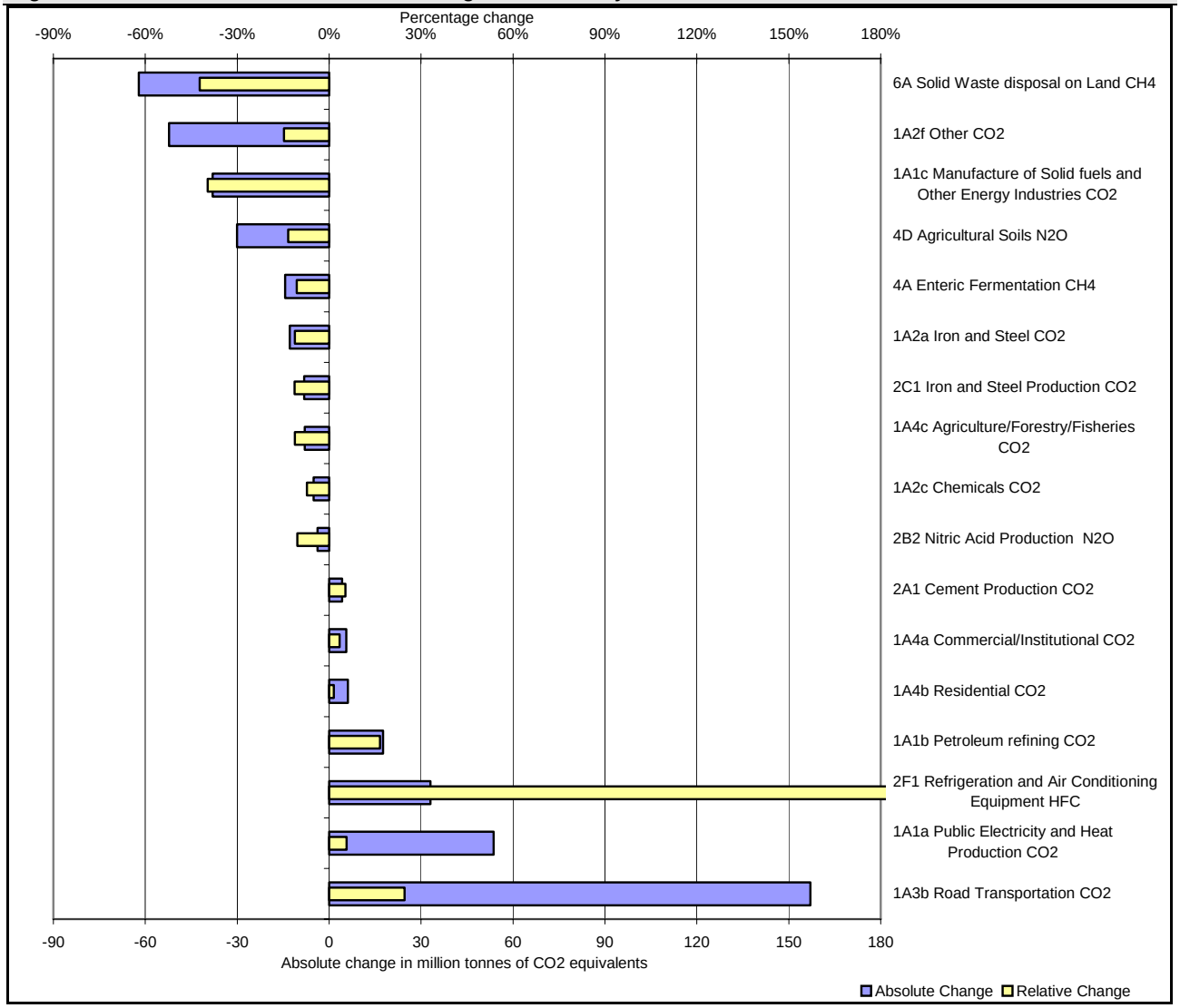
Source: EEA, 2007a.

Figure 2 Sector shares of total CO_2, CH_4 and N_2O emissions in 2005



Source: EEA, 2007a

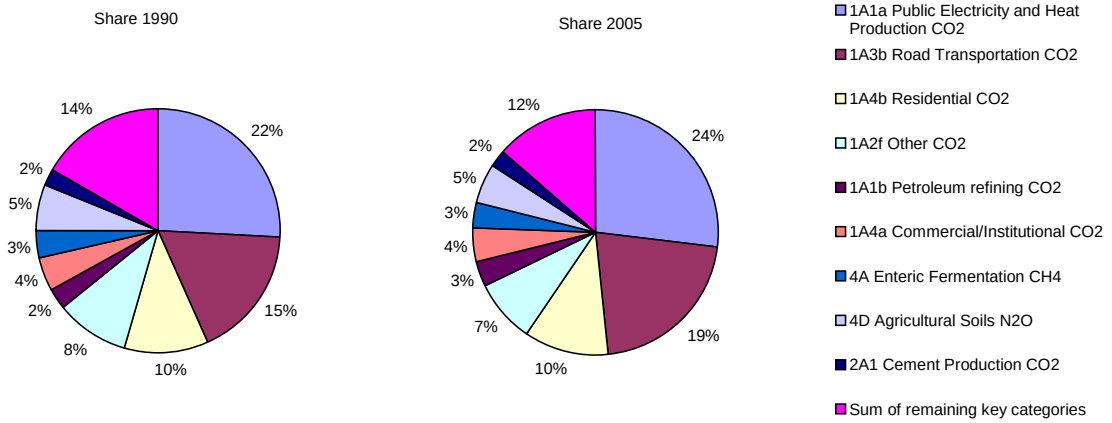
Figure 3 Absolute and relative changes of EU key source emissions from the 1990 to 2005



Note: This figure includes the most important EU key categories of 2005 level analysis, the listed key categories account for 89 % of total emissions in 2005, excluding emissions and removals from LUCF.

Source: EEA, 2007a

Figure 4 Contribution of key sources to total GHG emissions in 1990 and 2005



Source: EEA, 2007a

A 1.1 Energy supply and use (1A1)

Trends

- Between 1990 and 2005, GHG emissions from energy supply and use increased by 3%. They increased by 7% between 2000 and 2005.

Total GHG emission from 1A1	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005	Change Base Year-2005
EU-15	27.4%	28.6%	3.0%	6.9%	2.8%
EU-27	30.4%	30.5%	-7.4%	5.2%	-9.7%

Projections

- The United Kingdom and Germany are the only EU-15 Member States projecting that greenhouse gas emissions from energy supply and use (including transport) in 2010 will be lower than their base-year emissions.
- Except Malta and Slovenia, all new Member States project decreases in GHG emissions from energy supply and use, compared to base-year emissions.

In the EU-15, the Germany and the United Kingdom are the only countries projecting emission reductions by 2010 compared to base-year emissions, with existing domestic measures. All other EU-15 Member States project increasing emissions, even with the implementation of additional domestic measures for some of them. The new Member States project emission reductions by up to 60 % in the case of Estonia, except Malta and Slovenia. They projecting increased emissions in 2010 compared to base year.

Contribution of policies and measures to GHG emission reductions in 2010 in the energy supply and use sector

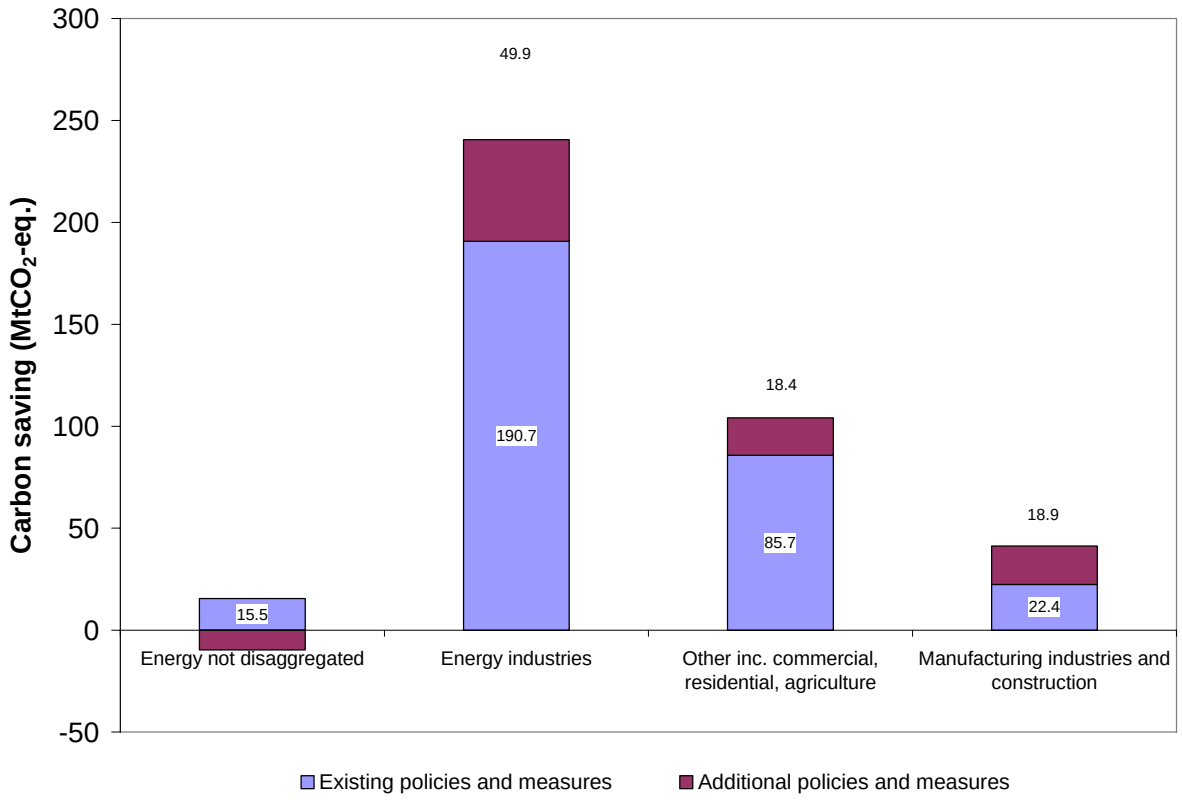
- Policies and measures targeted at reducing emissions from energy generation are projected to provide greatest emission reductions in the energy supply and use sector by 2010.
- For the energy supply and use sector (excluding transport), key EU-wide Common and Coordinated Policies and Measures (CCPMs) projected to deliver greatest savings in the EU-27 are in the areas of renewable energy, combined heat and power (CHP), energy taxation and building standards.
- Member States expect the EU Emission Trading Scheme to contribute an emission reduction of at least 133 Mt CO_2 in the EU-27 in 2010 (although not all Member States have estimated the effect of the EU ETS, which result in a reported reduction of only 85 Mt CO_2). Most reductions will result from actions in the energy and industrial sectors.
- Emission reduction potentials for energy policies have stayed relatively constant since 2006 for the EU-15, with a broadly similar split between 'existing' and 'planned' policies.

Figure 5 shows projected emission savings for the EU-15 in the energy supply and use sector, by sub-sector (except transport). Projected savings from policies and measures in 2010 are estimated by comparison with a hypothetical reference case in which no measures were implemented since the base year. Disaggregation by sub-sector was not available for the EU-12.

Policies and measures acting on the energy supply sector (energy industries) are projected to provide greatest emission reductions in 2010. They account for 61 % of all projected savings from existing measures in the energy sector (excluding transport) and 64 % of all projected savings from additional measures. Countries such as Germany, Italy and the United Kingdom report significant projected savings, often from renewable energy policies and measures.

Policies and measures applied to the end use sectors of manufacturing industries and to commercial, residential and agriculture energy use also make significant contributions to the energy sector. This possibly reflects the fact that in the EU as a whole there are many zero or low-cost options for improvements in energy efficiency that can make industry and commerce more competitive. A range of economic instruments and voluntary agreements are intended to stimulate uptake of these options.

Figure 5 EU-15 projected greenhouse gas emission savings in energy supply and use excluding transport in 2010



Note: Projected savings from policies and measures in 2010 are estimated by comparison with a hypothetical reference case in which no measures were implemented since the base year.

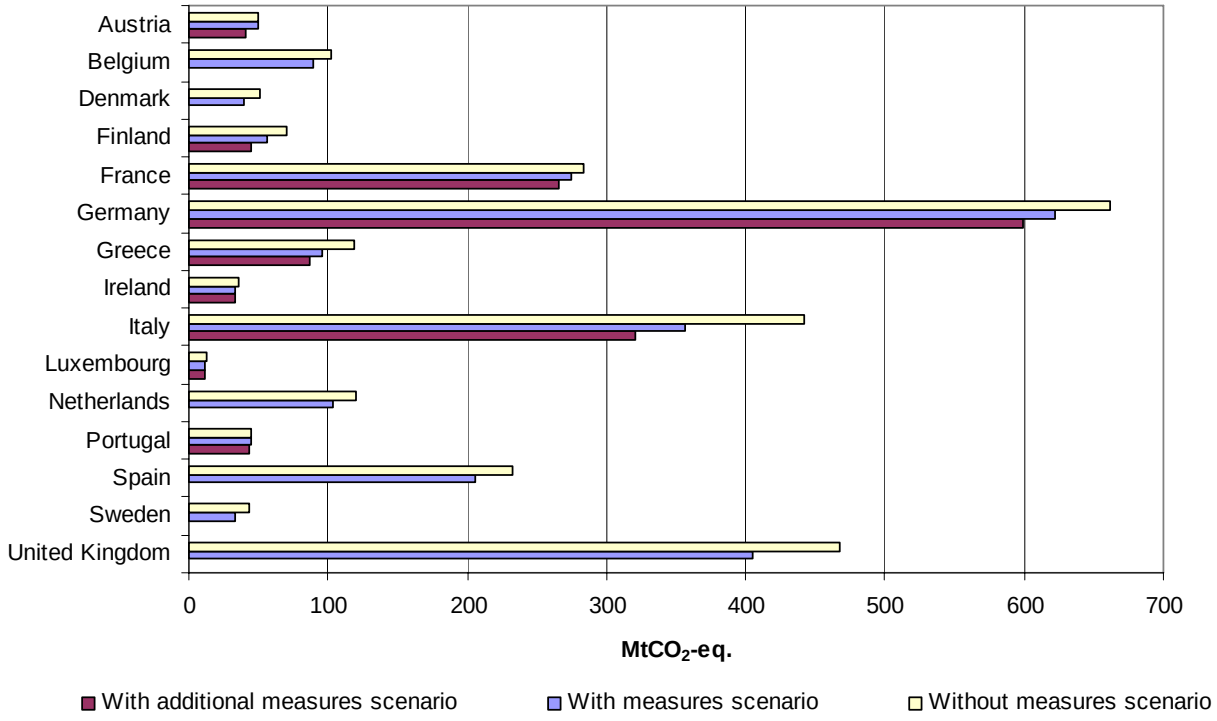
Where possible, projected emission reductions from policies are calculated from projection scenarios: the effect of 'existing' policies and measures is obtained by subtracting the 'with existing measures' projection from the 'without measures' projection and the effect of 'additional' policies and measures by subtracting the 'with additional measures' projection from the 'with existing measures' projection. Where sectoral projections were not reported, projected emission reductions from policies are based on bottom-up Member State quantification of the effect of individual policies and measures. Further details on calculation of policies and measures are provided in A6.3.2.

Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in fourth national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

In addition, some Member States reported on the effects of the EU Emission Trading Scheme. According to their preliminary estimates, it will contribute to an 85 Mt CO_2 emissions reduction in the EU-27 in 2010, largely through actions in the energy and industrial sectors. A more comprehensive approach consists in estimating the emission reductions based on the annual emission caps for the period 2008-2012 compared to average verified emissions for 2005/2006. According to that method, the EU ETS would bring an overall reduction of 133 Mt $CO_2$for the EU-27. (See Section 7.4 of the main report.)

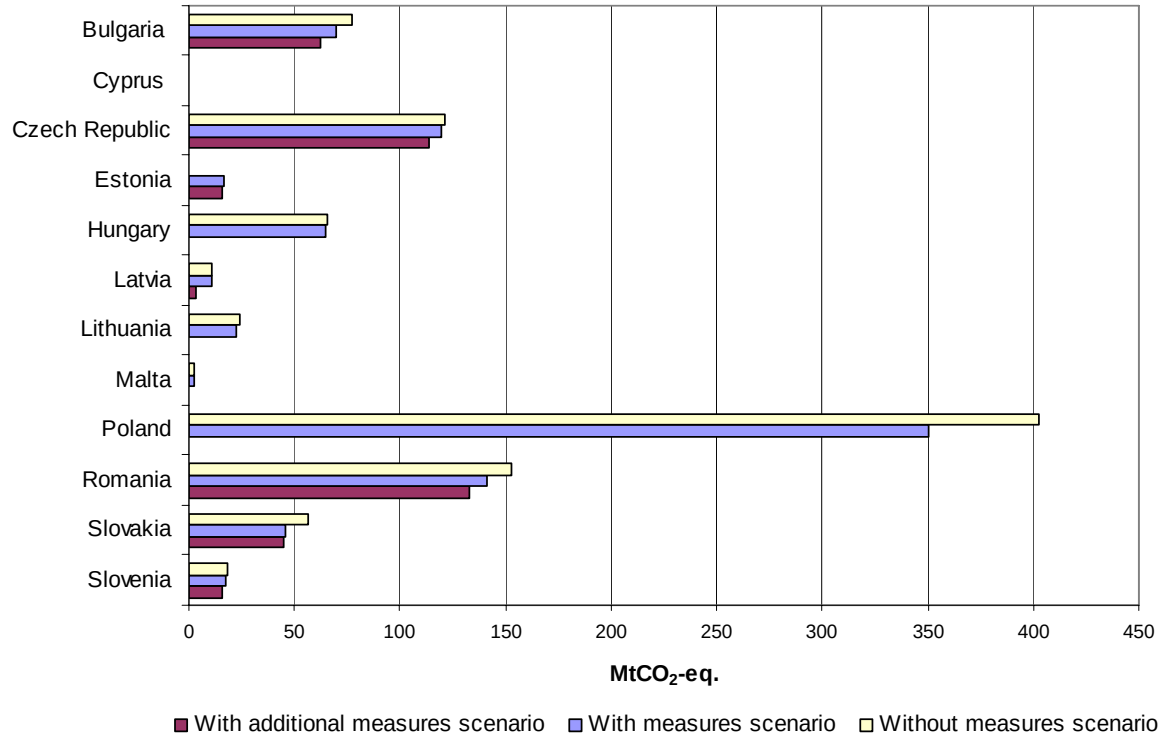
Figure 6 and Figure 7 display 2010 emission projections under 'with measures', 'with additional measures' (where one exists) and 'without measures' scenarios (WOM), as reported by Member States in their latest submissions. This illustrates the effect of policies and measures implemented in the energy sector, including EU wide and national actions. Where a 'without measures' scenario is not reported by Member States, it has been estimated through a bottom-up addition of Member State quantifications of the effect of energy-related PAM.

Figure 6 Projected effect of energy PAM (excluding transport) to EU-15 projected emission in 2010



Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in fourth national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

Figure 7 Projected contribution of energy PAM (transport included) to EU-12 projected emissions in 2010



Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in latest national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

Comparison between 2006 and 2007 projections

A number of comparisons can be made between the findings from reports submitted by Member States in 2007, mostly under the Monitoring Mechanism (Council Decision 280/2004/EC), and those submitted in 2006, which were mostly Fourth National Communications and Demonstrable Progress Reports submitted to the UNFCCC. The following points provide a comparison of projected savings (emission reductions) by energy sub-sector and by 'with measures' and 'with additional measures' scenarios in 2006 and 2007:

- For the EU-15, Combined projected savings from 'with measures' and 'with additional measures' in the 'manufacturing industries and construction' sub sector have decreased by 23 Mt in 2007 compared to 2006, while projected savings from the 'energy industries' and 'other inc. commercial, residential, agriculture' sub sectors have increased by 22 Mt and 39 Mt respectively.
- For the EU-15, reported emission reduction potentials for 2010 from energy policies have decreased by 34 Mt for existing measures and by 37 Mt for additional measures.
- Emissions savings from additional policies could be more comprehensively disaggregated by energy sub-sector in 2007 and it can be deduced that there has been little change in the split compared to 2006.

- For the whole EU, emission reduction potentials for 2010 from energy policies have increased by 47 Mt. However in 2007, figures were available for 12 new Member States, compared to eight in 2006. In addition, reduction potentials for EU-12 Member States include the transport sector.

Some countries did not provide a sectoral breakdown of projections or quantification of polices and measures. For these countries, any data used for the report *Greenhouse gas emission trends and projections in Europe 2006* has been carried forward and used in 2007 calculations. For the energy supply and use sector excluding transport, Member States' key policies and measures are in the following areas: renewable energy, CHP, energy taxation and building standards.

A 1.1.1 CO_2 emissions from electricity and heat production (1A1a)

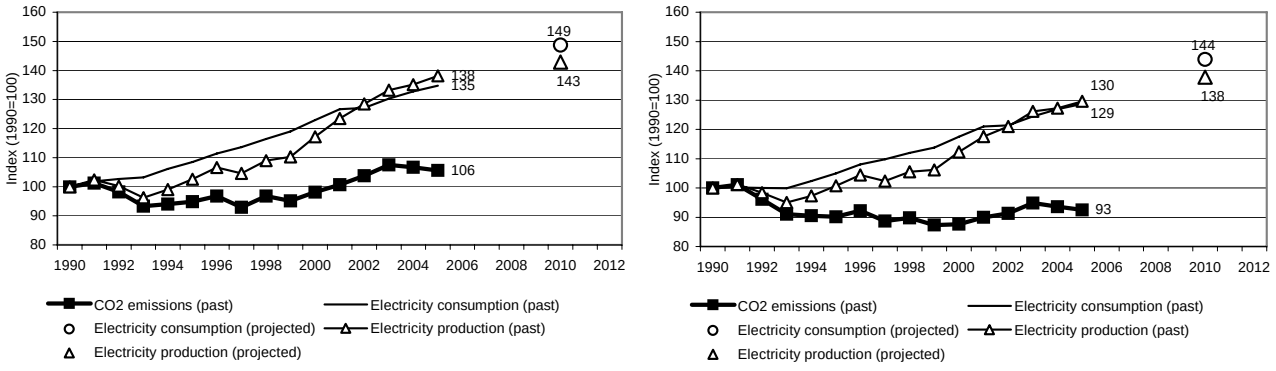
- In 2005, CO_2 emissions from public electricity and heat production in the EU-15 were 6% higher than in 1990. However, they have been decreasing since 2003, despite increasing electricity production and consumption.
- A continuous decoupling between CO_2 emissions and electricity and heat production has been observed since 1990. It is mainly due to fuel switching (coal to gas) and efficiency improvements, and much less to the effects of the use of nuclear and renewable energy.
- Electricity consumption and production are projected to keep strongly increasing, which could drive CO_2 emissions up.

CO_2 emission from 1A1a	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	22.3%	23.9%	5.6%	7.6%
EU-27	26.1%	26.2%	-7.6%	5.5%

Figure 8 indicates that electricity production and consumption are increasing stronger than the resulting CO_2 emissions. It is projected that electricity consumption and production will continue to increase. Between 1990 and 2005, the amount of fuel used increased in the EU-15 by 21 % while emissions increased by only 6 %. This is a result of fuel switching and efficiency improvements. The same pattern can be found when comparing CO_2 emissions and fuel combustion (Figure 9); the growth rate of CO_2 emission is lesser than the growth rate of fuel combustion, also mostly due to fuel switching. Since 2003, CO_2 emissions have even been decreasing while fuel combustion has been still increasing.

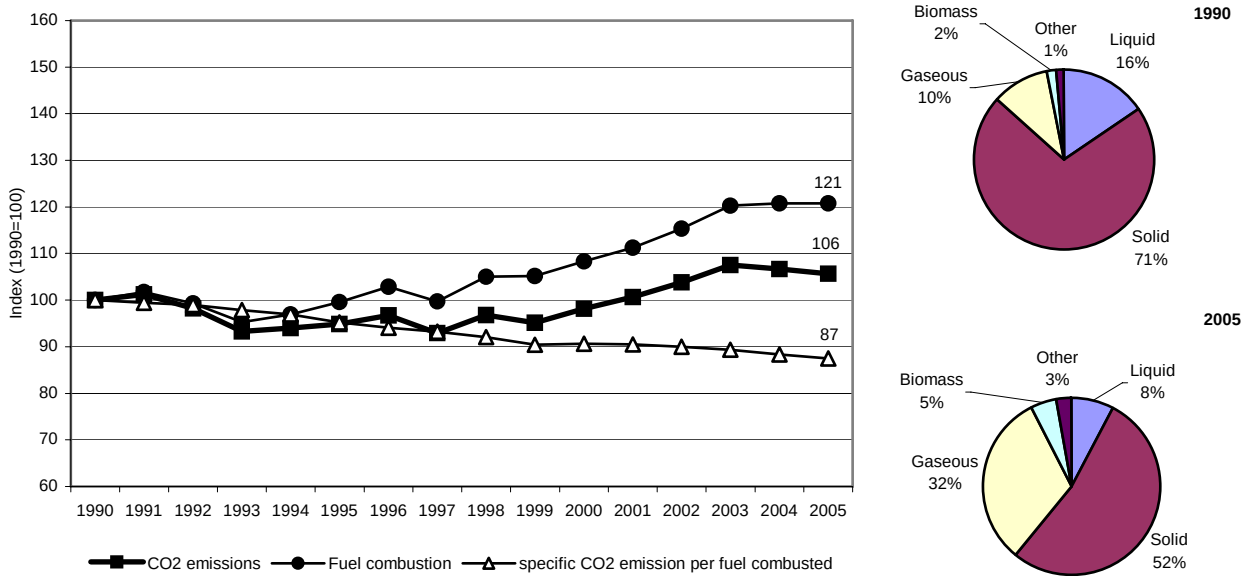
The reductions due to the share of nuclear and renewable energy are of minor importance. Although electricity generation by biomass, natural gas fired power stations and wind turbines grew extremely in the EU-15 (347 %, 338 %, > 8000 %, respectively), the effects are minor as biomass and wind turbines only have a combined share of 5 % of total electricity generation in 2005. It has also to be noted that between 2000 and 2005 electricity generation by hydropower decreased by 14 %. From 1990 to 1999, emissions were decreasing, but since 1999, emissions have been increasing again, although a small decrease can be reported for 2005. The major contributing factor to the increase between 1990 and 2004 is higher electricity production from coal power plants (EEA, 2006a).

Figure 8 EU-15 (left) and EU-27 (right) CO_2 emissions from public electricity and heat production compared with electricity production in thermal power plants and final electricity consumption



Source: EEA, 2007a; Eurostat; PRIMES.

Figure 9 Comparison of CO_2 emission and fuel combustion, and change of share of fuel use between 1990 and 2005 for the EU-15

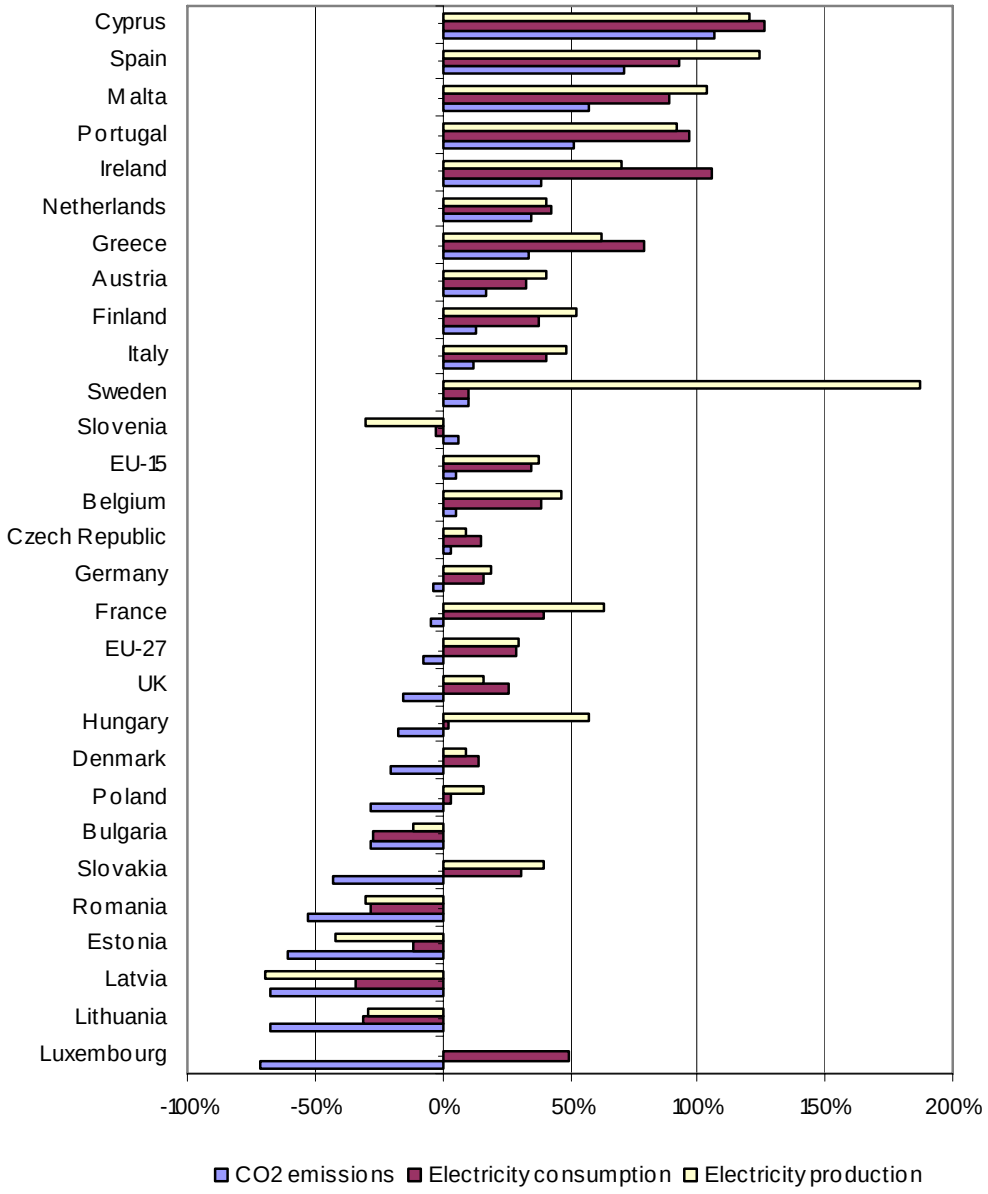


Source: EEA, 2007a;

In eight new Member States and five EU-15 Member States, CO_2 emissions even decreased between 1990 and 2005 while electricity consumption and production increased in the same time (Figure 10). Sweden has a remarkably low increase in CO_2 emissions despite a very high increase in electricity production. In Sweden, the share of biomass combustion increased from 13% (1990) to 50% (2005).

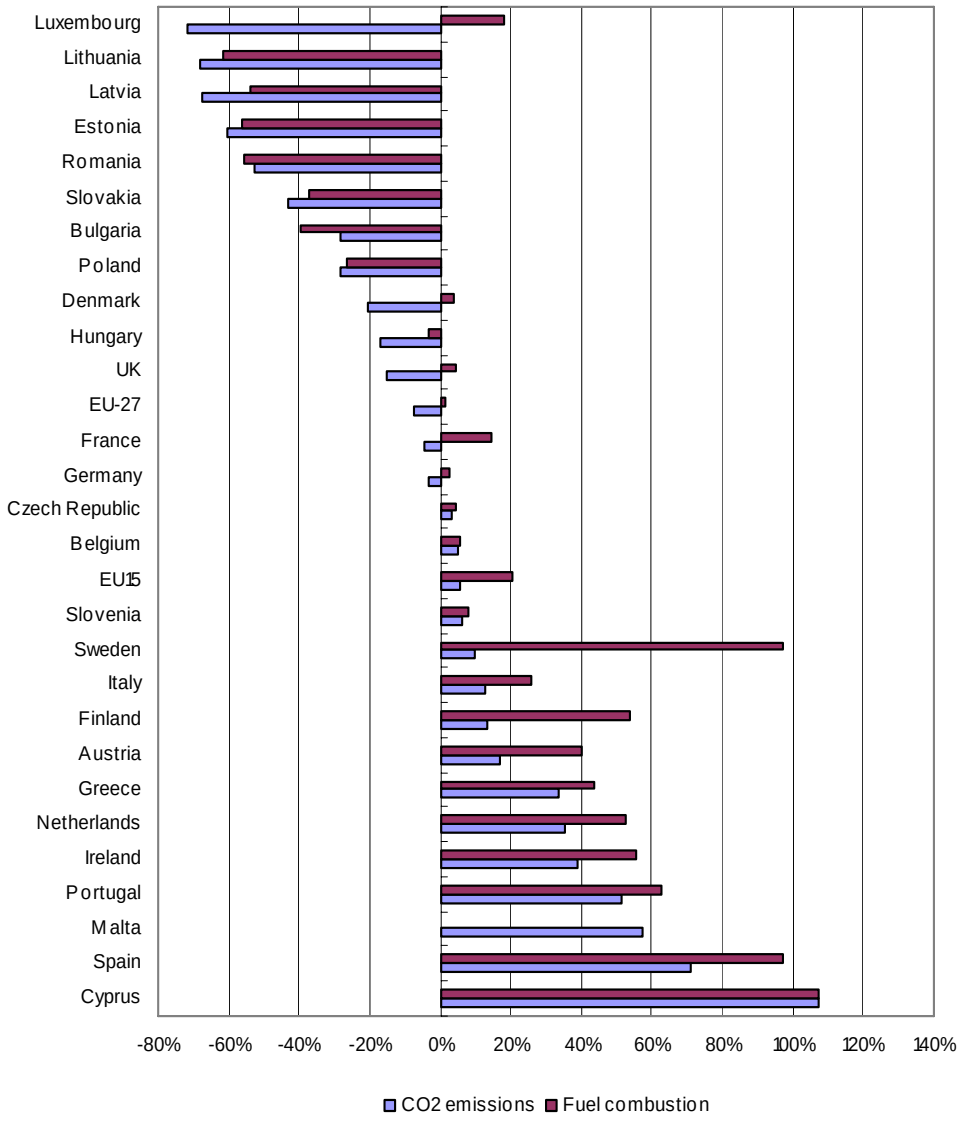
In ten EU-15 Member States and seven new Member States, CO_2 emissions were decoupled from fuel combustion between 1990 and 2005 (Figure 11). Emissions even decreased in some cases. In Romania, the change in fuel combustion exceeds the change in CO_2 emissions due to a shift from gas to liquid. In Luxembourg, a complete shift from coal to gas occurred.

Figure 10 Change of electricity consumption, electricity production (in thermal power plants) and CO_2 emissions from public electricity and heat production between 1990 and 2005 for all Member States



Source: EEA, 2007a; Eurostat.

Figure 11 Change of amount of fuel combustion and CO_2 emissions from public electricity and heat production between 1990 and 2005 for EU-15 Member States



Source: EEA, 2007a;

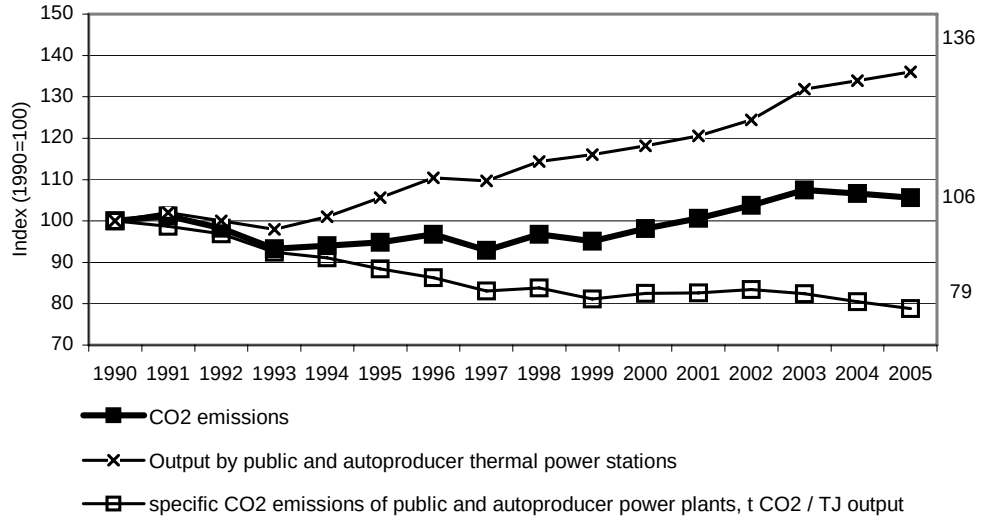
Emissions intensity from the energy transformation sector

- Specific CO_2 emissions of public and autoproducer power plants have been decreasing since 1990.

To monitor the progress of policies and measures in the energy transformation sector, specific CO_2 emissions of public and autoproducer power plants are reported by Member States. This indicator is the ratio between CO_2 emissions from public and autoproducer thermal power stations[1], and the output[2] by these stations. Significant decoupling took place between 1994 and 1997 and, to a lesser extent, between 2003 and 2005 (Figure 12).

The picture is contrasted at Member States level (Figure 13). The comparison between the change in CO_2 emissions and the change in energy output in EU-27 Member States (for which data are available) indicates that, except for Lithuania and Latvia, CO_2 intensity in new Member States is higher than in EU-15 Member States. Data for 2005 are available for only 17 EU Member States.

Figure 12 CO_2 emissions from public and autoproducer (total and thermal) power stations compared with all products-output for the EU-15

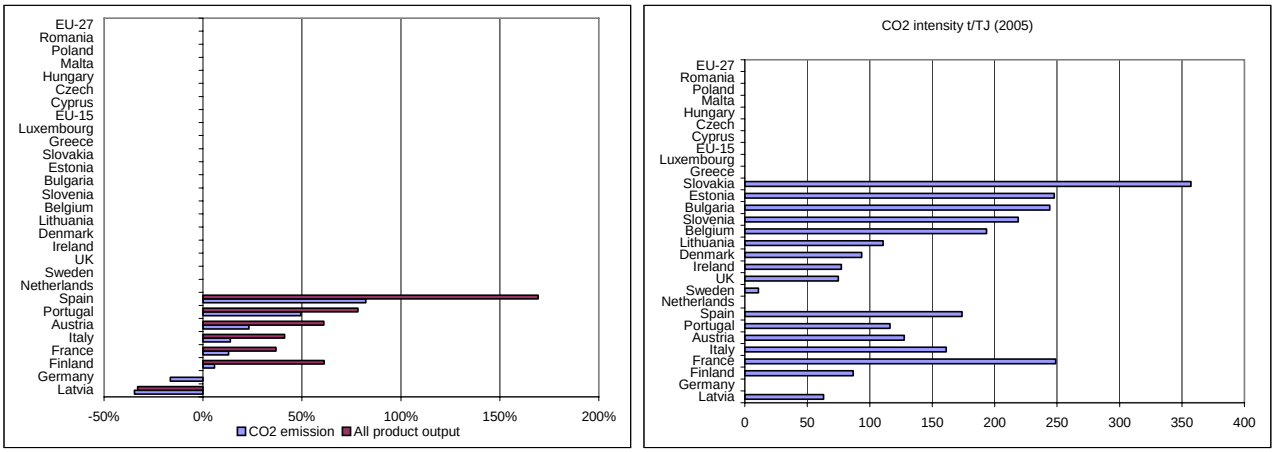


Source: EEA, 2007a; Eurostat.

[1] CO_2 emissions from all fossil fuel combustion for gross electricity and heat production by public and autoproducer thermal power and combined heat and power plants. Emissions from heat only plants are not included.

[2] Gross electricity produced and any heat sold to third parties (combined heat and power plants – CHP). Output from heat only plants is not included.

Figure 13 Specific CO_2 emissions of public and autoproducer power plants, t/TJ (change 1990-2005; absolute intensity) (Priority Indicator N°7)



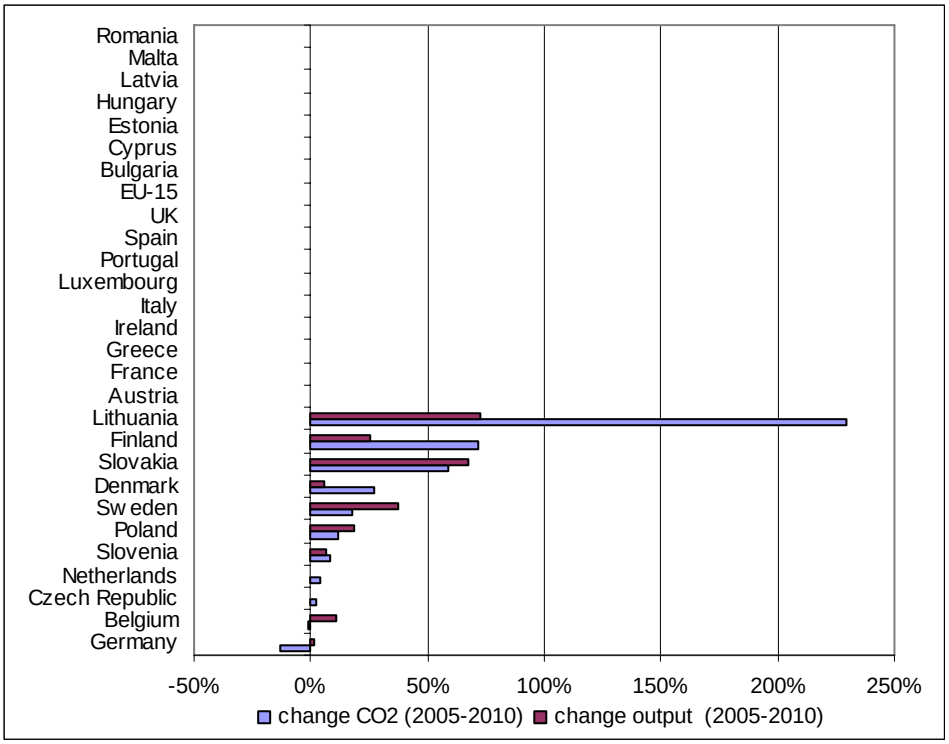
Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: EEA, 2007a; Member States submissions.

Figure 13 shows the change of numerator and denominator of Priority Indicator N°7. As not all countries reported the whole time series, the picture is not complete. The intensity values for 2005 are available for 17 Member States. Lower intensities may be explained by:

- high shares of biomass combustion in public electricity and heat production (e.g. Sweden, Denmark, and Finland),
- high shares of CHP (Denmark, Finland, Latvia),
- high shares of gaseous fuels (e.g. Latvia, Lithuania, the United Kingdom).

In some cases (e.g. Latvia, Portugal) lower intensities may also be due to the inclusion of CO_2 from public electricity and heat in the numerator (autoproducers being excluded). The high value of Slovak Republic seems to be due to the fact that the denominator includes electricity produced with CHP only (and excludes heat produced by CHP).

Figure 14 Projected Change in CO_2 emissions from public and autoproducer thermal power stations and all products output between 2005 and 2010 (Projected Indicator N°7)



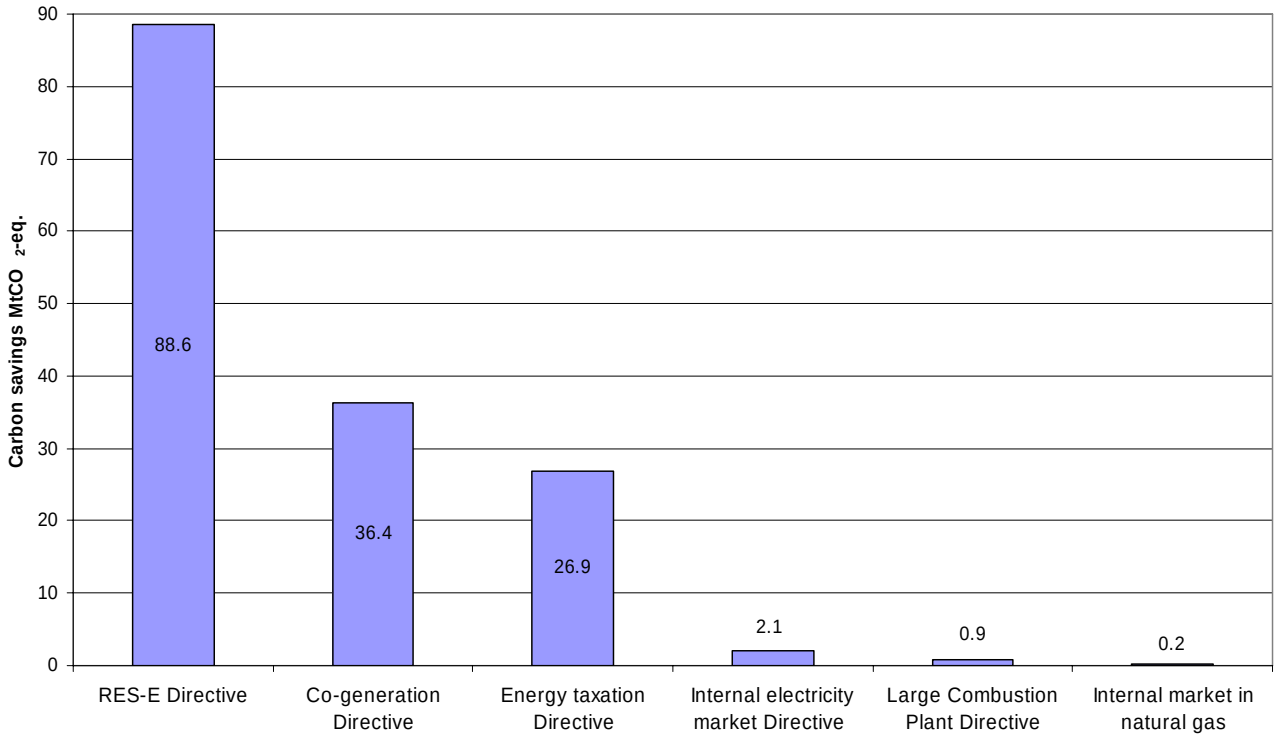
Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submissions.

Key policies and measures targeted at GHG emissions from energy industries

- Policies and measures promoting renewable energy are projected to provide the main reductions in EU-27 GHG emissions from energy industries.
- Significant additional reductions are also expected from policies and measures on combined heat and power, and energy taxation.

Savings from renewable energy policies and measures play a major role, amounting to 89 million tonnes of CO_2-equivalents (77Mt from existing measures and 12Mt from planned measures). The following policies are also expected to contribute significantly to reductions of EU-27 emissions in 2010: combined heat and power Directive (36 Mt) and the energy taxation Directive (27Mt), as illustrated in Figure 15 below. More information on policies related to renewable energy and CHP is provided in the next section. The directive on energy end-use efficiency and energy services is expected to create 1% annual savings in the energy industries sector but is quantified by Member States to reduce EU-27 emissions by under 3Mt so far. The directive requires Member States to draw up national action plans to achieve 1% yearly energy savings in the retail, supply and distribution of electricity, natural gas, urban heating, and other energy products including transport fuels.

Figure 15 EU-27 projected greenhouse gas emission savings from key CCPMs in the energy supply sector in 2010



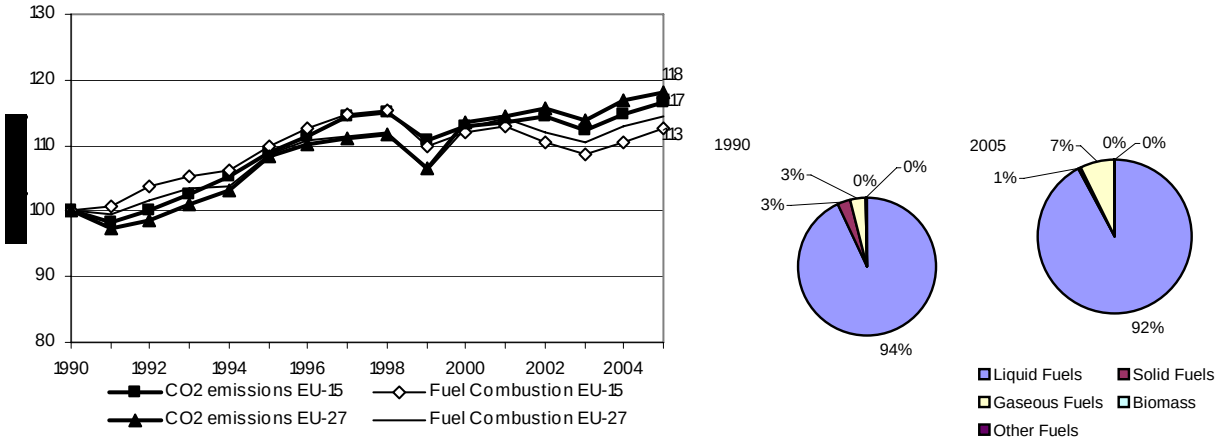
Source: European Climate Change Programme (ECCP) Database on Policies and Measures in Europe (www.oeko.de/service/pam/sector.php) as of 11 July 2007.

A 1.1.2 CO_2 emissions from petroleum refining (1A1b)

- Between 1990 and 2005, CO_2 emissions from petroleum refining increased significantly, closely following the trend in petroleum refining activity.
- The fuel mix, still largely dominated by liquid fuels, did not change significantly. Consequently no decoupling between emissions and activity has occurred.
- Except in Bulgaria, Slovenia and Cyprus, CO_2 emissions increased in all EU Member States.

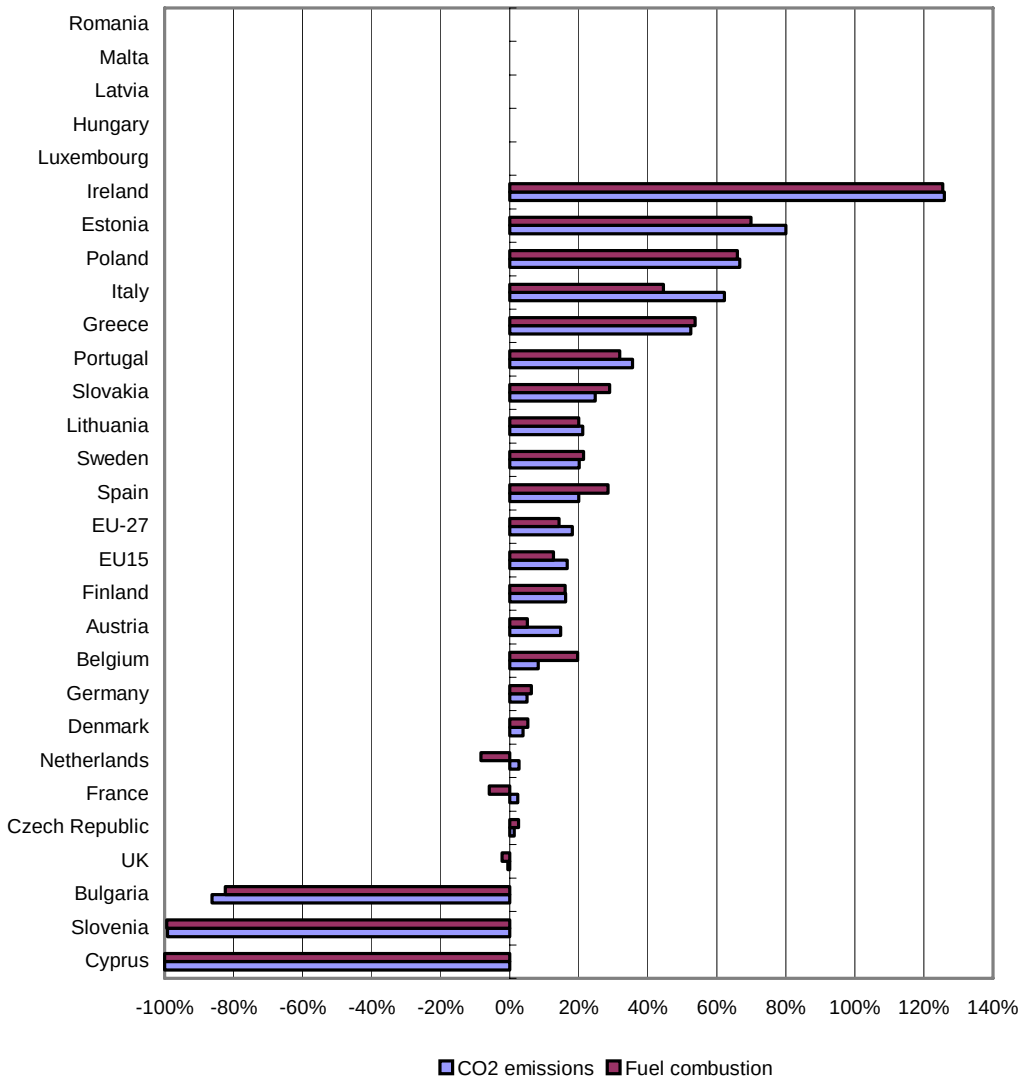
CO_2 emission from 1A1b	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	2.5%	2.9%	16.6%	3.3%
EU-27	2.0%	2.6%	18.1%	4.1%

Figure 16 Trend of EU-15 CO_2 and EU-27 CO_2 emissions from petroleum refining and gross value and share of fuels in 1990 and 2005 for the EU-15



Source: EEA, 2007a.

Figure 17 Change of CO_2 emissions and fuel combustion from petroleum refining between 1990 and 2005 for EU-27 Member States



Source: EEA, 2007a.

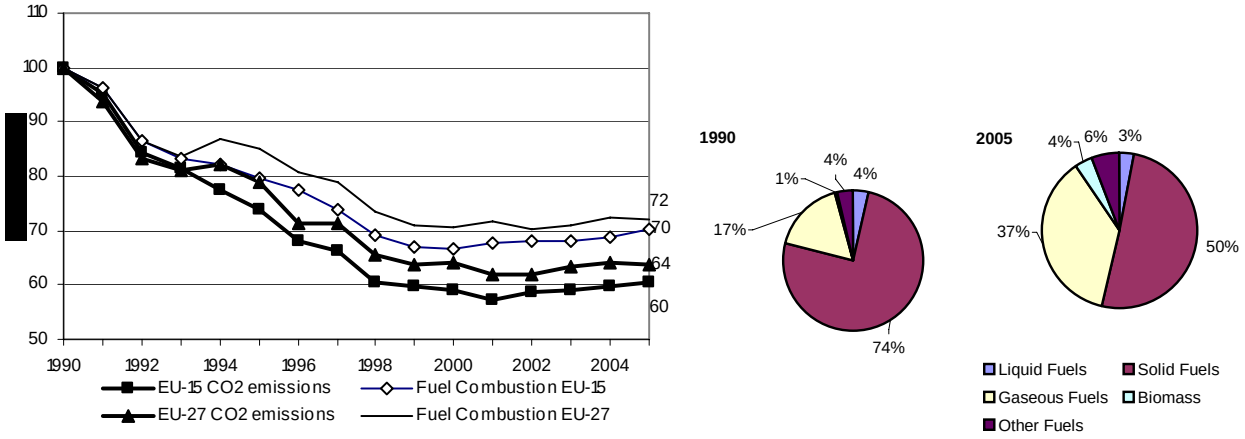
Note: Romania reports emissions under 'Public electricity and heat production'; Hungary includes emissions under 'Chemical industry'

A 1.1.3 CO_2 emissions from the manufacture of solid fuels and other energy industries (1A1c)

- Between 1990 and 2005, CO_2 emissions from the manufacture of solid fuels and other energy industries were significantly reduced, following the trend in fuel combustion in this sector.
- Fuel switching from solid to gaseous fuels led to further reduction in CO_2 emissions.
- The decreasing trend in CO_2 emissions has stopped since 2000.
- Although half of EU-27 Member States show a decrease between 1990 and 2005, emissions increased by more than 100 % in two countries (Denmark and Slovak Republic).

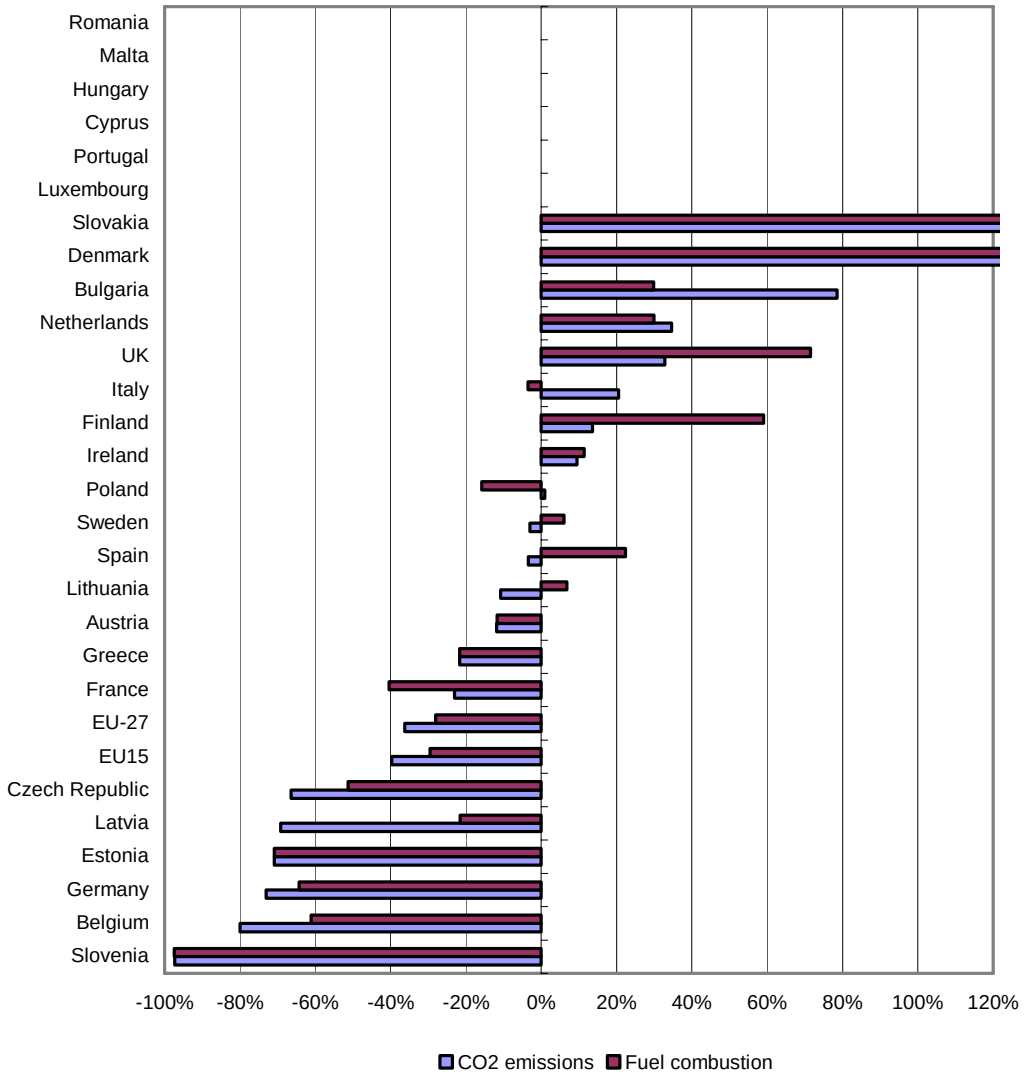
CO_2 emissions from 1A1c	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	2.3%	1.4%	-39.6%	2.1%
EU-27	1.9%	1.3%	-36.3%	-0.5%

Figure 18 Trend of EU-15 CO_2 and EU-27 CO_2 emissions from manufacture of solid fuels and other energy industries and share of fuels in 1990 and 2005 for the EU-15



Source: EEA, 2007a.

Figure 19 Change of CO_2 emissions and fuel combustion from manufacture of solid fuels between 1990 and 2005 for EU-27 Member States



Source: EEA, 2007a.

Note: Romania reports emissions under 'Public electricity and heat production'; Hungary includes emissions under 'Chemical industry'

A 1.1.4 Energy Use in Manufacturing Industries (1A2)

Trends

- Between 1990 and 2005, GHG emissions from energy use in manufacturing industries decreased by 10 %. They decreased by 1 % between 2000 and 2005.
- Energy intensity[3] in industry decreased by approximately 1 % per year over the last decade (EEA, 2002) and continued since then.
- This was due to structural changes in favour of higher value-added products, changes in some industries to less energy-intensive processes, improvements in the energy efficiency of processes and import substitution.

CO_2 emission from 1A2	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	14.3%	13.0%	-10.3%	-0.7%
EU-27	14.5%	13.1%	-16.7%	-2.4%

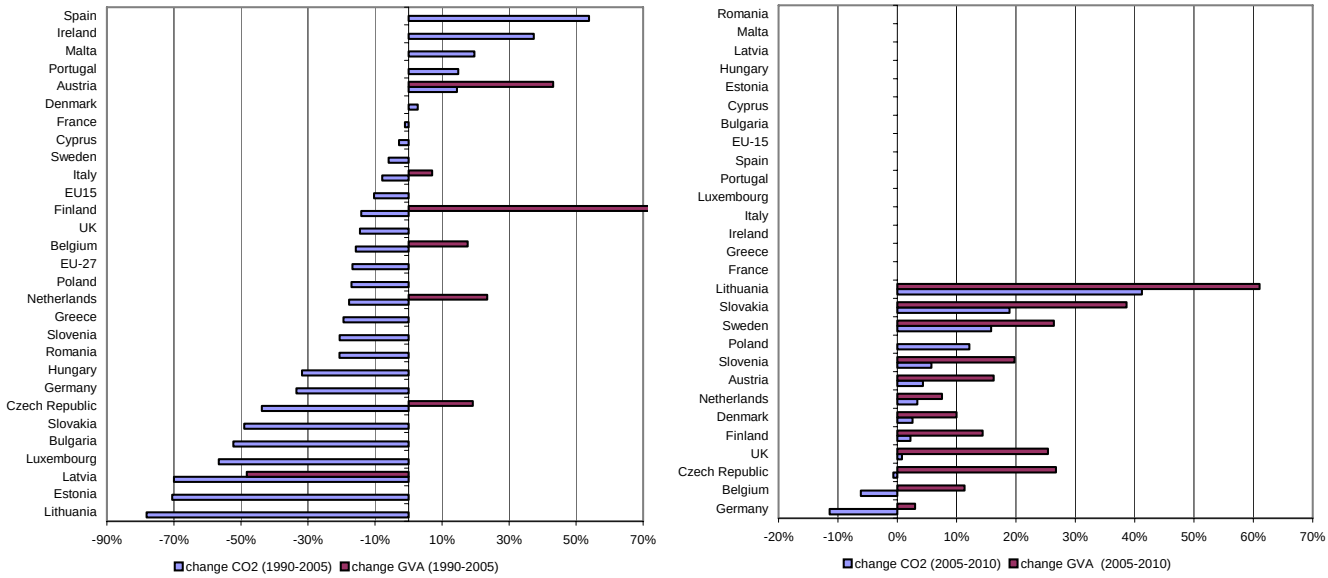
Contribution of polices and measures to GHG emission reductions in 2010 in energy use in manufacturing industries

- Specific climate policies and measures contributed only partially to the decrease in energy intensity.
- The promotion of CHP in industry is expected to further reduce energy intensity.

The reduction in CO_2 emissions from manufacturing industries in the past was due to an improvement in energy intensity (ratio of energy use to value added) in industry of 1.8% per year over the period 1990-2004 (EEA, 2006b). This was due to structural changes in favour of higher value-added products, changes in some industries to less energy-intensive processes, improvements in the energy efficiency of processes and import substitution. Only part of these developments was due to specific policies and measures aimed at reducing greenhouse gas emissions. The improvement in energy intensity is projected to continue or to be enhanced, with the help of existing and additional policies and measures. The promotion of CHP in industry is also expected to reduce energy intensity.

[3] Energy intensity: ratio of energy use to value added

Figure 20 Past and Projected Change of CO_2 emissions from fossil fuel consumption in industry and gross values added of industry per EU Member State between 1990-2005 and 2005-2010 (Projected Indicator N°4)



Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: EEA, 2007a, Member States' submissions

A 1.1.5 CO_2 emission from iron and steel production (1A2a and 2C1)

- CO_2 emissions from iron and steel production decreased by 11 % between 1990 and 2005 and by 1 % between 2000 and 2005.
- This was mainly due the increasing share of electric processing in steel production, while the share of integrated steelworks has been decreasing.
- Emissions and gross value added have been decoupling since the late 1990s.

CO_2 emissions from iron and steel production are split between:

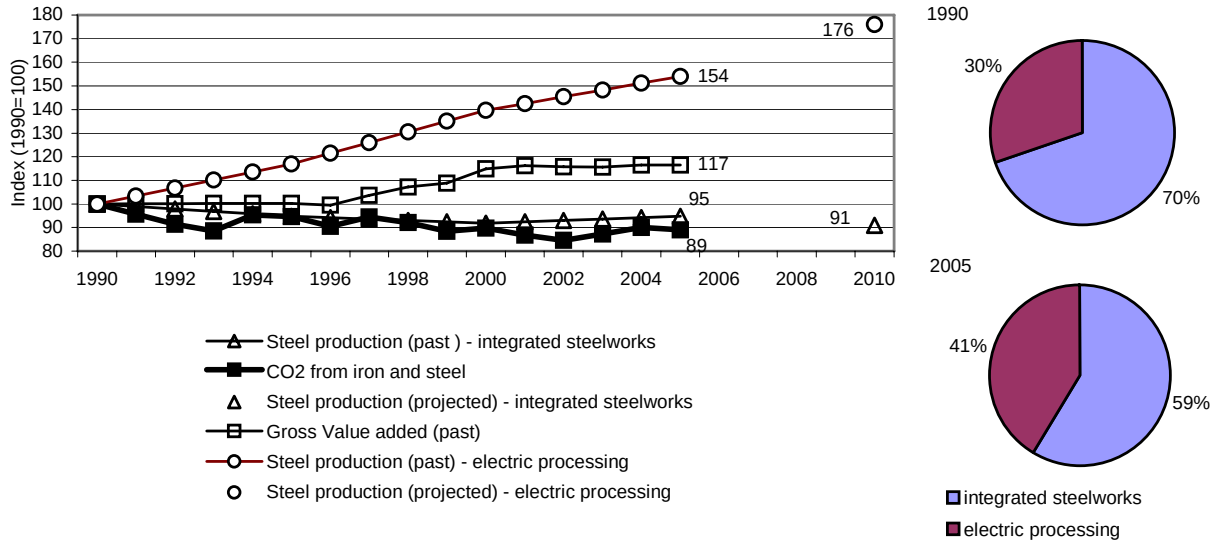
- process-related emissions, accounted for in the category Sector 2 "Industry",
- combustion-related emissions, accounted for in the category Sector 1 "Energy".

As the boundary between energy and process related emissions is not uniformly interpreted in individual Member States, this chapter deals with both – combustion (1A2a) and process (2C1) related emissions.

CO_2 emissions	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
1A2a (combustion)				
EU-15	2.7%	2.4%	-11.2%	-1.2%
EU-27	2.8%	2.4%	-21.6%	-7.6%
2C1 (process)				
EU-15	1.7%	1.5%	-11.2%	-0.5%
EU-27	1.8%	1.6%	-20.0%	-1.5%
Total Iron and Steel				
EU-15	4.4%	4.0%	-11.2%	-0.9%
EU-27	4.7%	4.0%	-21.0%	-5.2%

In 2005, energy-related CO_2 emissions and process-related CO_2 emissions contribute each 2 % to total EU-15 GHG emission. Emissions depend partly on the method of processing (integrated steelworks or electric processing), whereby electric processing causes less direct emissions in the specific category. In the EU-15, the share of steel production by electric arc furnaces increased between 1990 and 2005 by 11 percentage points, which explains the generally decreasing emission trend.

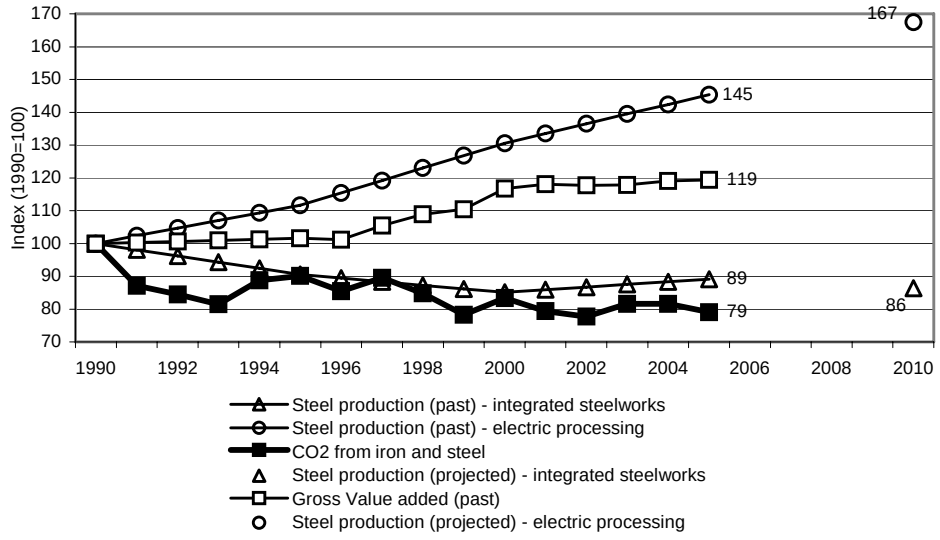
Figure 21: Trend of CO_2 emissions, steel production and gross value added for EU-15 Member States and share of fuels in 1990 and 2005



Source: EEA, 2007a, PRIMES, Eurostat

The emission trend in the EU-27 is similar to the EU-15 and shows decreasing CO_2 emissions while gross value added and electric processing of steel is increasing.

Figure 22: Trend of CO_2 emissions, steel production and gross value added EU-27 Member States



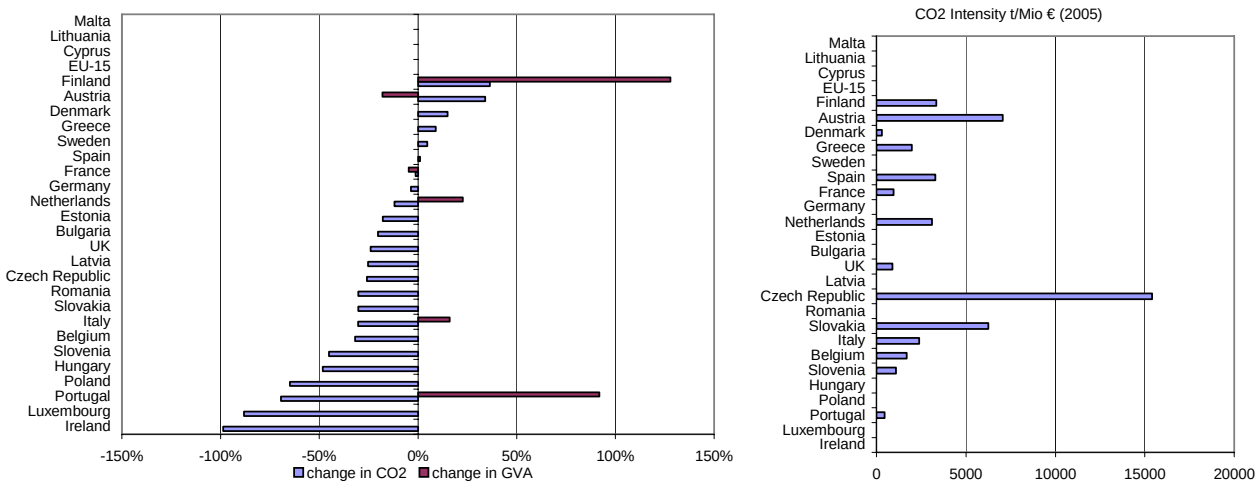
Source: EEA, 2007a, PRIMES, Eurostat

Total CO_2 intensity and specific CO_2 emissions in the iron and steel industry (additional priority indicators 2 and 5)

- In 14 of the 15 Member States for which data are available, CO_2 intensity in the iron and steel industry decreased between 1990 and 2005.
- Approximately half of the Member States reported sufficient data allowing indicators assessment.

Fifteen Member States reported both nominator and denominator in 2005 for the calculation of CO_2 intensity in the steel industry (ratio of total CO_2 emissions by gross value added in the iron and steel industry). In 11 countries, the resulting intensity is below 5 000 t CO_2 per EUR million of gross value added. For some countries (e.g. Denmark, Slovenia, Slovak Republic), the denominator may include more activities than for other countries, because no disaggregated information is available. The intensity calculated for Greece includes iron and steel production and non-ferrous metals.

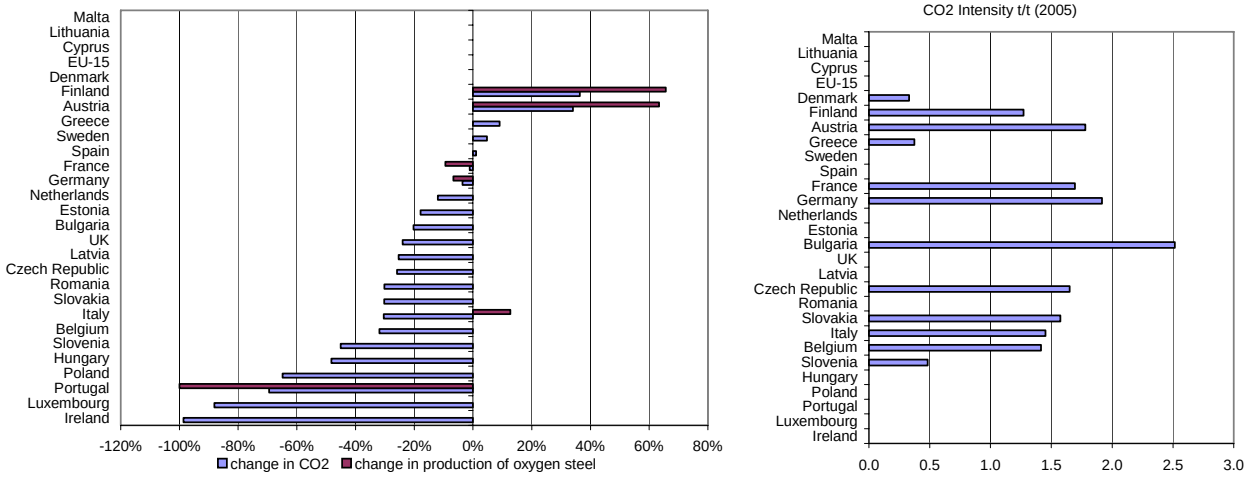
Figure 23 CO_2 intensity - iron and steel industry per gross value added, t/EUR million (change 1990-2005; absolute intensity) (Additional Priority Indicator N°2)



Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submissions

The reporting of Member States regarding CO_2 emissions from the iron and steel industry per unit of oxygen steel produced (additional priority indicator N°5) is substantially incomplete to allow meaningful EU wide comparison. Finland and Austria had a strong increase in steel production between 1990 and 2005. The low intensities observed in Slovenia, Greece and Denmark are mainly due to the fact that these countries use only electric arc steel processing.

Figure 24 CO_2 intensity - iron and steel industry per production of oxygen steel, t/t (change 1990-2005; absolute intensity) (Additional Priority Indicator N°5)



Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submissions

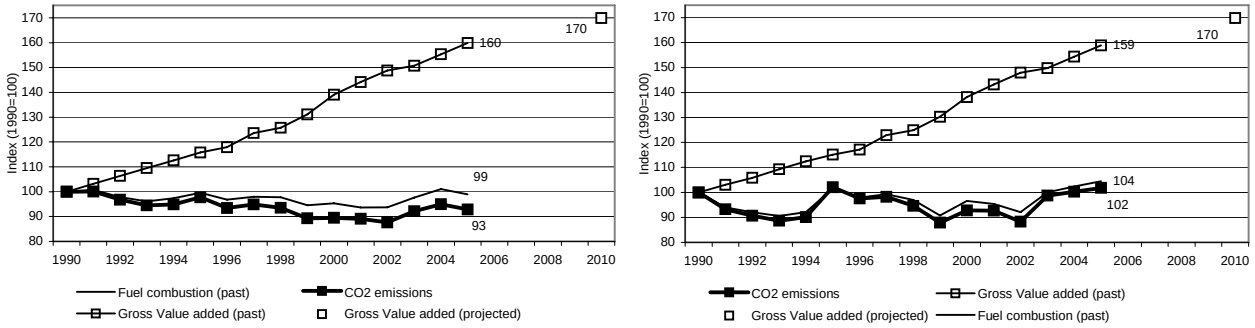
A 1.1.6 CO_2 emissions from chemical industry (1A2c)

- Between 1990 and 2005, CO_2 emissions decreased by 7 %, but have increased recently (+4% between 2000 and 2005.
- While gross value added has been constantly increasing since 1990, CO_2 emissions from the chemical industry have decreased during the same period.
- The emission trend is closely linked to the amount of fuel combusted.

CO_2 emission from 1A2c	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	1.7%	1.6%	-7.2%	3.7%
EU-27	1.5%	1.7%	1.8%	9.8%

The CO_2 emissions from the chemical industry contributed with 2 % to the total EU-15 GHG emissions. This share was the same in 2005 and 1990. The gross value added decoupled from fuel combustion and CO_2 emissions. Fuel combustion and CO_2 emissions show a similar trend.

Figure 25: Trend of CO_2 emissions, fuel combustion of the chemical industry and gross values added for EU-15 Member States



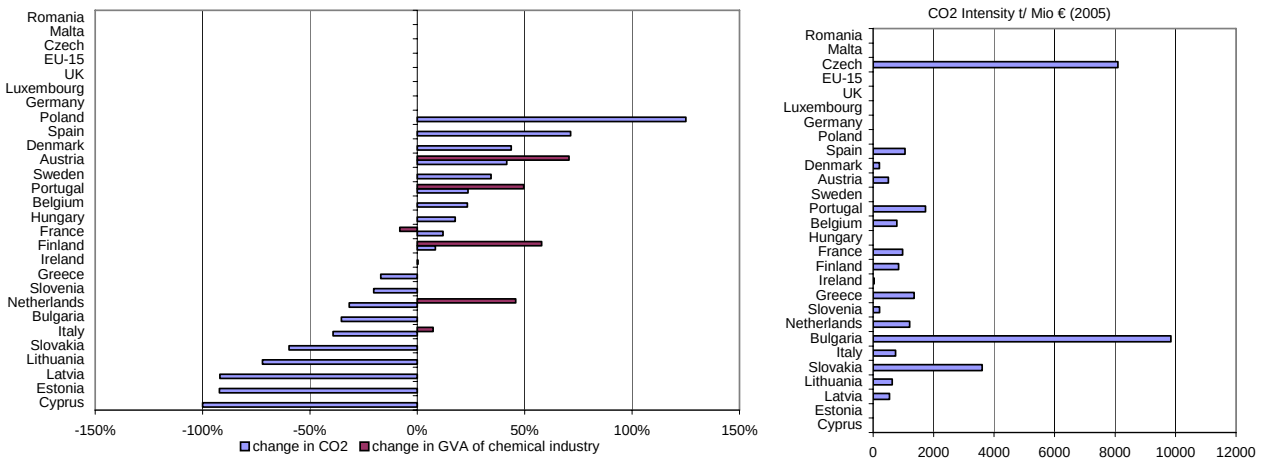
Source: EEA 2007a, PRIMES

Energy-related CO_2 intensity of the chemical industry (additional priority indicator 3)

- Energy-related CO_2 intensity in the chemical industry shows large differences among Member States for which data are available.

Additional Priority Indicator N°3 expresses the ratio between CO_2 emissions from combustion of fossil fuels in manufacture of chemical and chemical products and the gross value added in this industry branch. It was only possible for six countries to show the change of CO_2 emissions and gross value added between 1990 and 2005. France is the only Member State to report that gross value added decreased while CO_2 emissions increased. Bulgaria, Czech Republic and Slovak Republic show a much higher CO_2 intensity compared to other countries, because of the much lower gross value added of their chemical industry in comparison with other countries. The low intensities in particular of Ireland and Estonia need to be further analysed.

Figure 26 Energy related intensity - chemical industry, t/Mio EUR, (change 1990-2005; absolute intensity) (Additional Priority Indicator N°3)



Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submissions

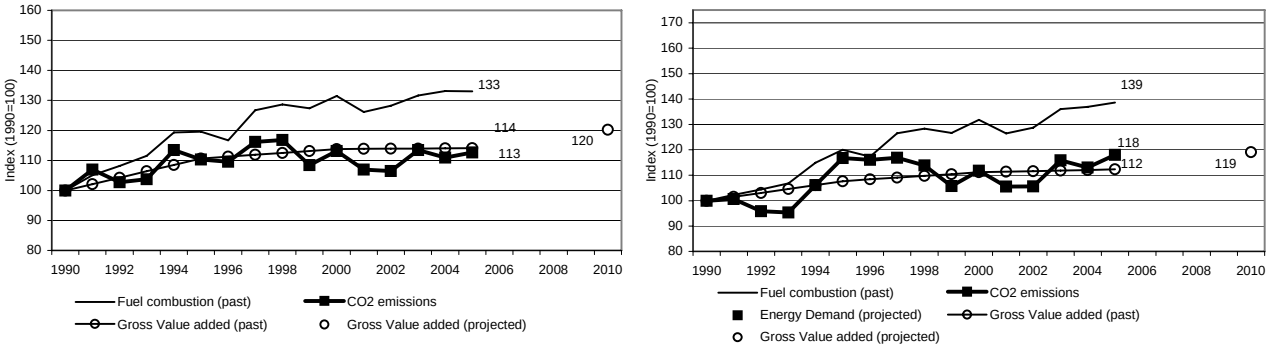
A 1.1.7 CO_2 emissions from pulp, paper and print (1A2d)

- Between 1990 and 2005, CO_2 emissions from pulp, paper and print increased by 13 %, but they have decreased slightly in the last years (-0.4 % between 2000 and 2005).
- A shift from solid and liquid fuels to gas and biomass led to partial decoupling of CO2 emissions from fuel combustion in the pulp, paper and print industry.

CO_2 emission from 1A2d	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	0.6%	0.7%	12.7%	-0.4%
EU-27	0.5%	0.7%	18.0%	5.5%

CO_2 emissions from pulp, paper and print industry account for 0.7 % of the total emissions in 2005. Although the fuel combustion is increasing (+33 % in the EU-15 between 1990 and 2005), CO_2 emissions increased by only 13 % in the EU-15 and 18 % in the EU-27. This was mainly due to a shift from liquid and solid fuels to gas and biomass.

Figure 27: Trend of CO_2 emissions, energy demand of the pulp, paper and print industry and gross values added for EU-15 (left) and EU-27 (right)



Source: EEA 2007a, PRIMES

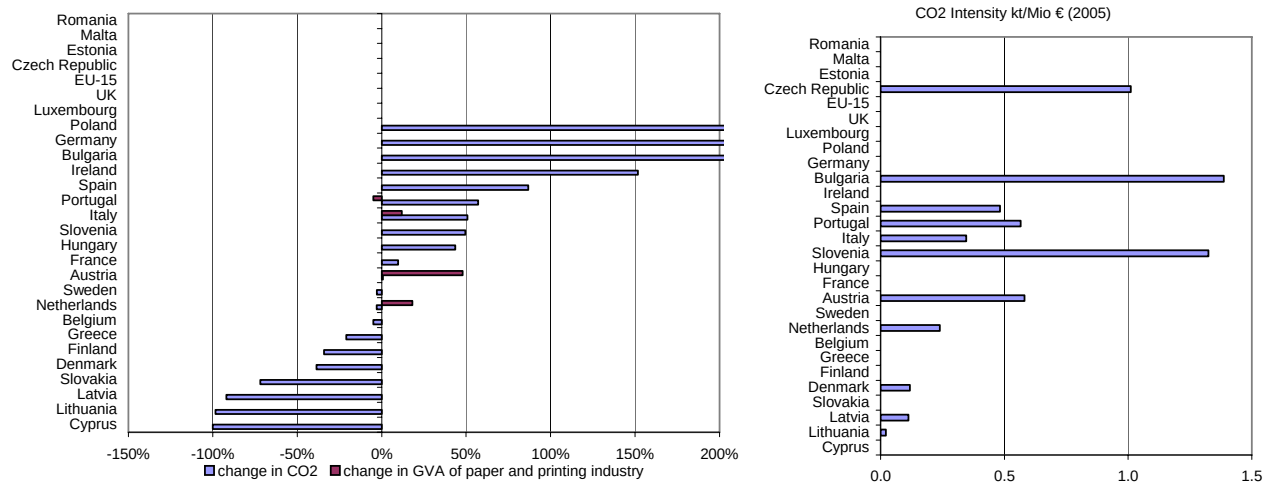
Energy-related CO_2 intensity in the paper and printing industry and specific energy-related CO_2 emissions of the paper industry (supplementary indicators 6 and 13)

- Except for Latvia and Lithuania, energy-related CO_2 intensity in the paper and printing industry is lower in EU-15 Member States than in new Member States, for which data are available.

Two supplementary indicators (N°6 and N°13) show CO_2 intensities for the paper industry.

Supplementary Indicator N°6 compares CO_2 emissions with gross value added. The change of gross value added between 1990 and 2005 can only be shown for four countries

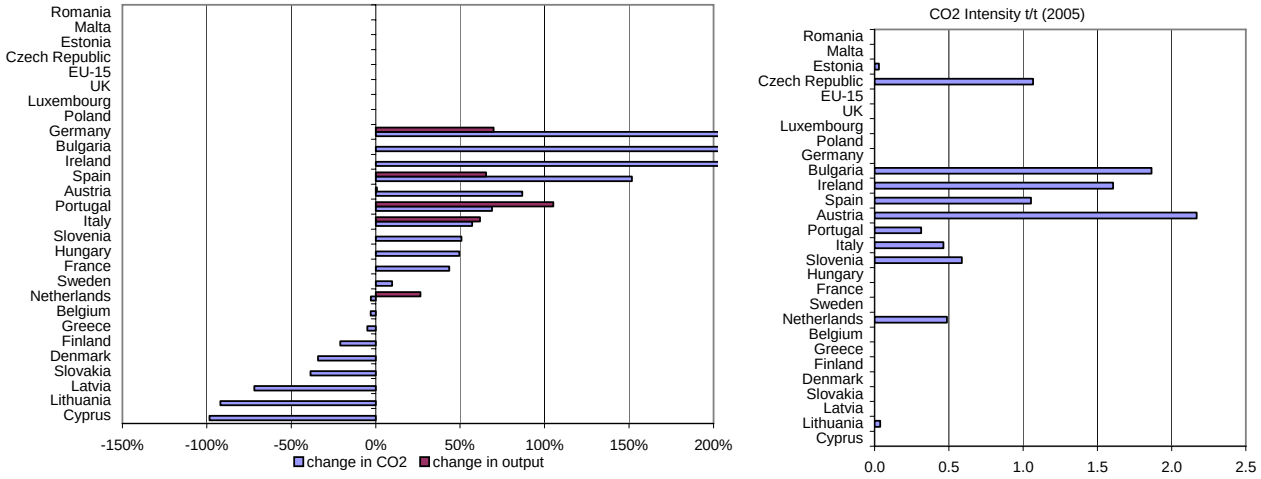
Figure 28 Energy related intensity – pulp, paper and print industry, t/Mio EUR, (change 1990-2005; absolute intensity) (Supplementary Indicator N°6)



Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submissions

Supplementary Indicator N°13 shows the specific energy related CO_2 emissions of paper industry. Gross value added in 1990 and 2005 was available for only four Member States.

Figure 29 Specific energy related CO_2 emissions of the paper industry, t/t, (change 1990-2005; absolute intensity) (Supplementary Indicator N°13)



Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submission

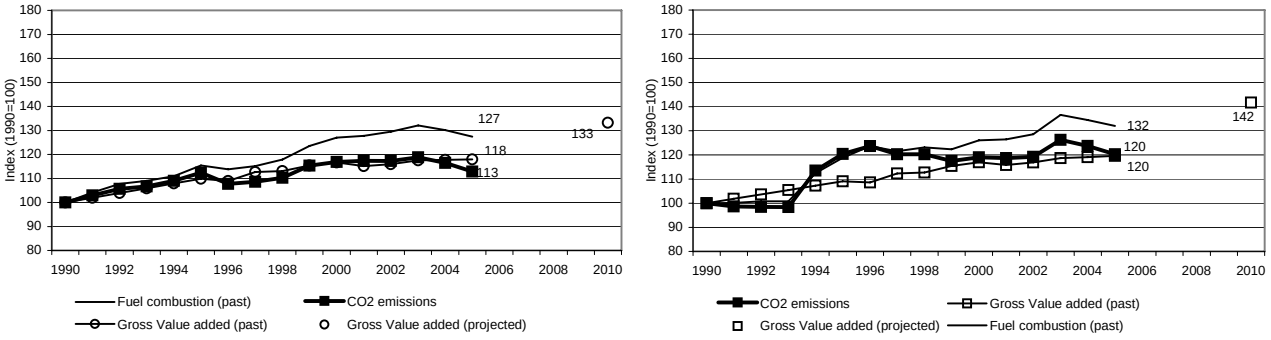
A 1.1.8 CO_2 emissions from food processing, beverages and tobacco (1A2e)

- Between 1990 and 2005, CO_2 emissions increased by 13 %, but they have decreased by 3 % between 2000 and 2005.
- A very slight decoupling between activity in the food processing, beverages and tobacco industry and related CO_2 emissions can be observed in the EU.

CO_2 emission from 1A2e	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	0.8%	0.9%	12.9%	-3.4%
EU-27	0.7%	0.9%	20.3%	1.1%

CO_2 emissions gross value added and fuel combustion show similar trends, between 1990 and 2005, both in the EU-15 and in the EU-27. It is projected that the gross value added will further increase.

Figure 30: Trend of CO_2 emissions, energy demand of the industry and gross values added for EU-15 (left) and EU-27 (right) Member States

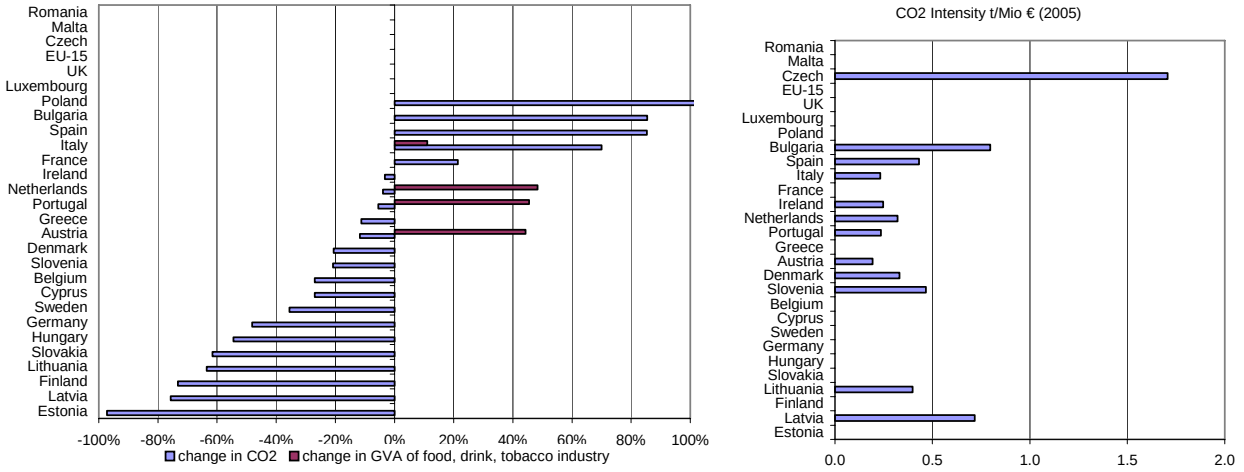


Source: EEA 2007a, PRIMES, Eurostat

Energy-related CO_2 intensity in the food, drink and tobacco industry (supplementary indicator 5)

Supplementary Indicator N°5 shows the energy related CO_2 intensity of the food, drink and tobacco industry by comparing CO_2 emissions with gross value added. Between 1990 and 2005, CO_2 emissions decreased in most Member States, except Poland, Bulgaria, France, Spain and Italy, where the significant increases could be observed. The change of gross value added between 1990 and 2005 can only be shown for four countries.

Figure 31 Energy related intensity – food, drink and tobacco industry, t/EUR million, (change 1990-2005; absolute intensity) (Supplementary Indicator N°5)



Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submission

A 1.1.9 CO_2 emissions from other industries (1A2f)

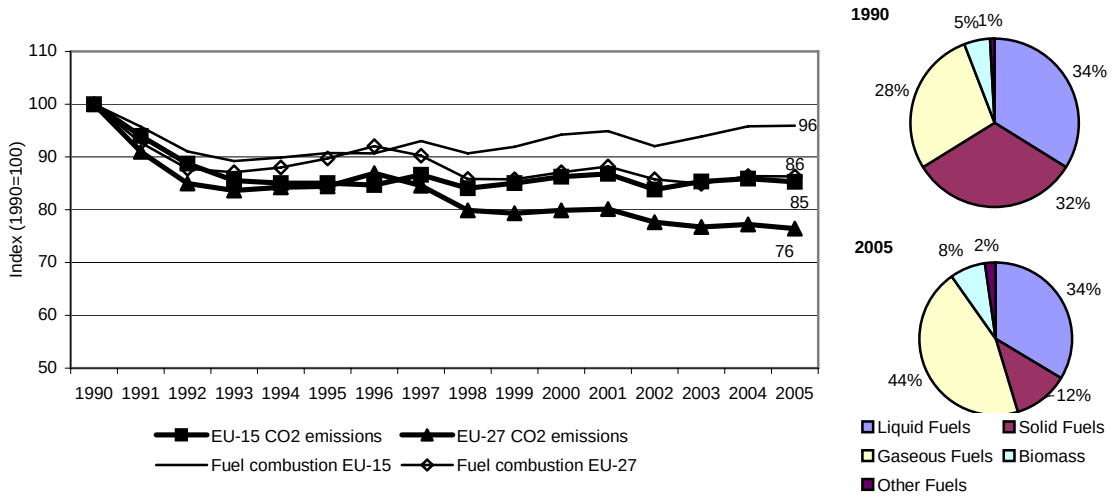
- CO_2 emissions and fuel combustion from this source category have been relatively stable since 1998. Some decoupling between emissions and combustion can be observed.

CO_2 emission from 1A2f	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	8.3%	7.2%	-14.7%	-1.1%
EU-27	8.6%	7.1%	-23.6%	-4.3%

In this category emissions from the combustion of fossil fuels in manufacturing products other than iron, steel, non ferrous metals, chemicals, pulp, paper and food, which are presented in CRF categories 1A2a, 1A2b, 1A2c, 1A2d and 1A2e, are summarized. Some countries report also in this category also emissions from the above mentioned industry branches when they cannot allocate the emissions to these specific branches (e.g. United Kingdom, Romania). For this reason, comparisons of emissions between countries have to be undertaken with care and consideration of national circumstances.

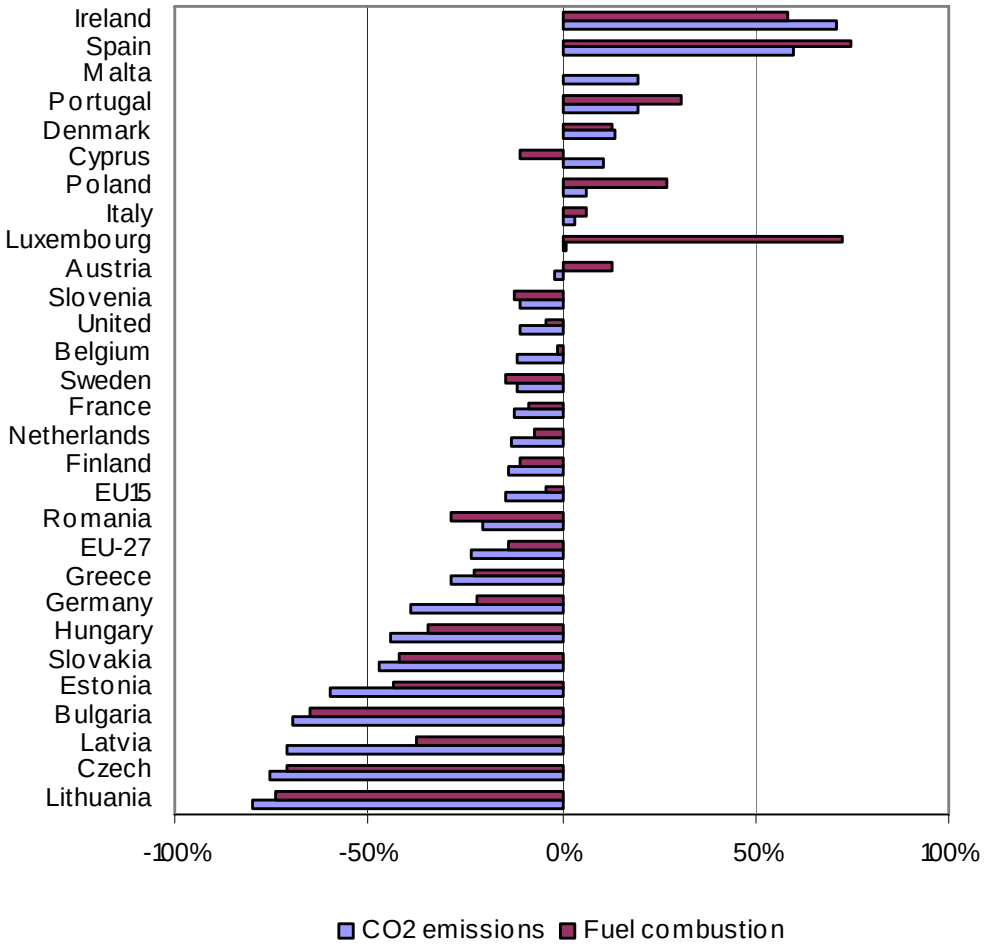
The CO_2 emissions of this source category contributed in 2005 with 7 % to the total EU-15 GHG emissions. CO_2 emissions decreased between 1990 and 2005 by 15 %. The decrease in emissions is partly due to the fuel shift, from solid to gaseous fuels. The decrease observed on the trend for the EU-27 emissions is even higher and amounts to 24 %.

Figure 32: EU-15 and EU-27 CO_2 emissions of other manufacturing industries and share of fuels for the EU-15, 1990–2005



Source: EEA 2007a

Figure 33: Change of CO_2 emissions and fuel combustion from other manufacturing industries between 1990 and 2005 for EU-27 Member States



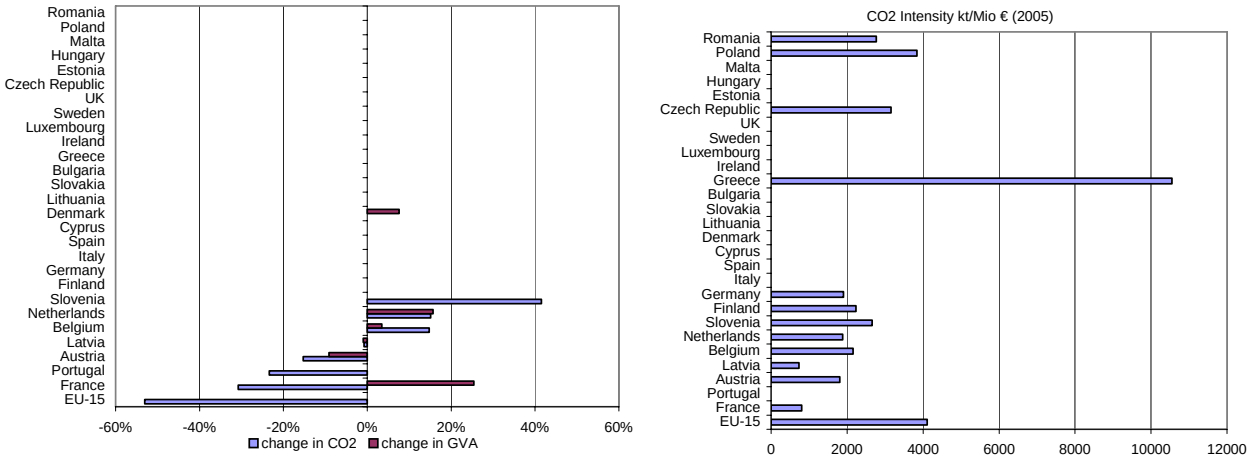
Source: EEA 2007a

In nine Member States, emissions increased while in the majority of countries CO_2 emissions from this source category decreased.

Energy related CO_2 intensity of the glass, pottery and buildings materials industry and of the cement industry (additional priority indicators N°4 and 6)

The Additional Priority Indicator 4 looks at the ratio of energy related CO_2 emissions and gross value added from mineral products.

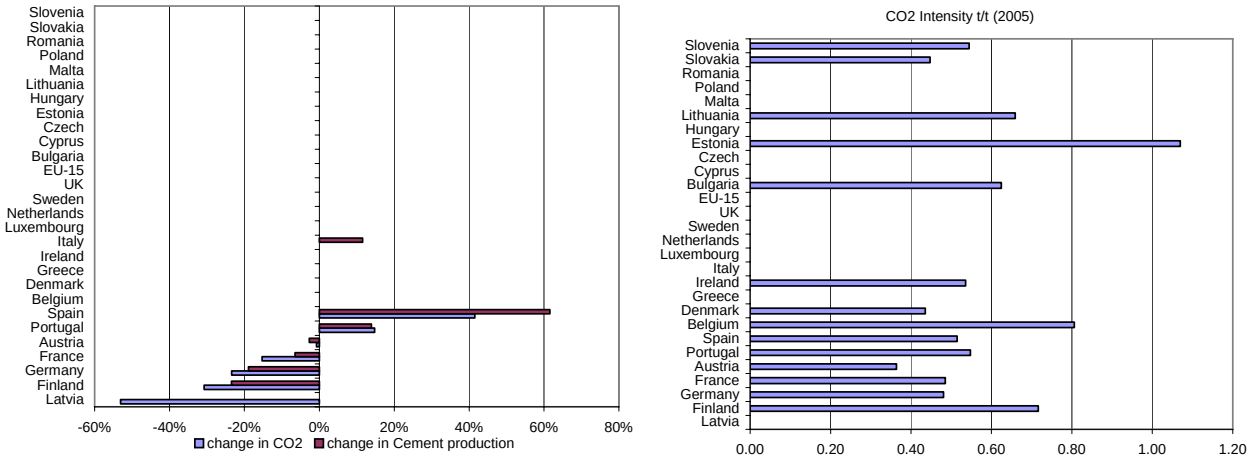
Figure 34 Change of specific energy related CO_2 emissions and gross value added of mineral products (t/t) between 1990 and 2005 (change 1990-2005; absolute intensity) (Additional Priority Indicator N°4)



Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submissions

The Additional Priority Indicator 6 looks at the ratio of energy related CO_2 emissions and cement production. For the few reporting countries, these two parameters are closely linked.

Figure 35 Change of specific energy related CO_2 emissions of cement industry (t/t) between 1990 and 2005 (change 1990-2005; absolute intensity) (Additional Priority Indicator N°6)



Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submissions

A 1.2 Transport (1A3)

Trends

- Between 1990 and 2005, GHG emissions from transport (all modes of transport) increased by 26%. They increased between 2000 and 2005 by 7 %.
- Between 2004 and 2005, GHG emissions from transport decreased by 1 %.

GHG emission from 1A3	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	16.5%	21.0%	25.6%	4.7%
EU-27	14.0%	19.1%	26.0%	6.6%

Projections

- Emissions from transport are projected to increase from 2005 levels in all Member States except Germany and Luxembourg. Ireland, Portugal and Spain even project an increase of more than 200 %. In the EU-15, emissions are projected to be roughly stabilised at 2005 levels by 2010, approximately 25 % above 1990 levels with existing measures. These emissions could be reduced at +18 % above 1990 levels with the implementation of additional measures.
- Four new Member States did not report projections. Romania and Slovenia project increase of more than 200 %. Lithuania is the only Member State projecting emissions in 2010 to be lower than the base year.

Belgium, Denmark, Ireland, Luxembourg, the Netherlands, Spain, Sweden and the United Kingdom did not define a scenario with additional measures. The lowest increase (lower than 15 %) is projected in the United Kingdom, France and Finland and a decrease is projected by Germany and Luxembourg.

Contribution of policies and measures to GHG emission reductions in 2010 in the transport sector

Carbon dioxide emissions contribute substantially to the total greenhouse gas emissions from transport, and measures to reduce these emissions are therefore important.

As far as passenger cars are concerned, the Community's strategy[4] to reduce CO_2 emissions from passenger cars and improve fuel economy is aimed at delivering an average CO_2 emission value for new passenger cars equal to 120 g CO_2/km. It will help the EU meet its commitments under the Kyoto Protocol, and reduce the EU's dependency on imported oil supplies. In order to meet these targets, voluntary commitments by the European, Japanese and Korean automobile manufacturers' associations (ACEA, JAMA, KAMA ([5])) were made. In these, the automobile industry committed itself to aim at average specific CO_2 emissions of 140 g CO_2/vehicle-km for new passenger cars by 2008 (ACEA) and 2009 (JAMA/KAMA).

According to the sixth annual report on the effectiveness of the strategy to reduce CO_2 emissions from cars (European Commission, 2006), all three associations reduced the average specific CO_2

([4]) (COM(95) 689 final, supported by the Council in 1996 and the European Parliament in 1997

([5]) ACEA: European Automobile Manufacturers Association; JAMA: Japan Automobile Manufacturers Association; KAMA: Korea Automobile Manufacturers Association.

emissions of their cars registered for the first time on the EU market in 2004 compared to 2003 (ACEA and JAMA by approximately 1.2 % and KAMA by approximately 6.1 %). Overall, average specific CO_2 emissions from new cars were equal to 163 g CO_2/vehicle-km in 2004. This was 0.6 % below the 2003 level and 12.4 % below 1995 levels. In order to meet the EU's final target of 120 g CO_2/km, additional efforts are necessary.

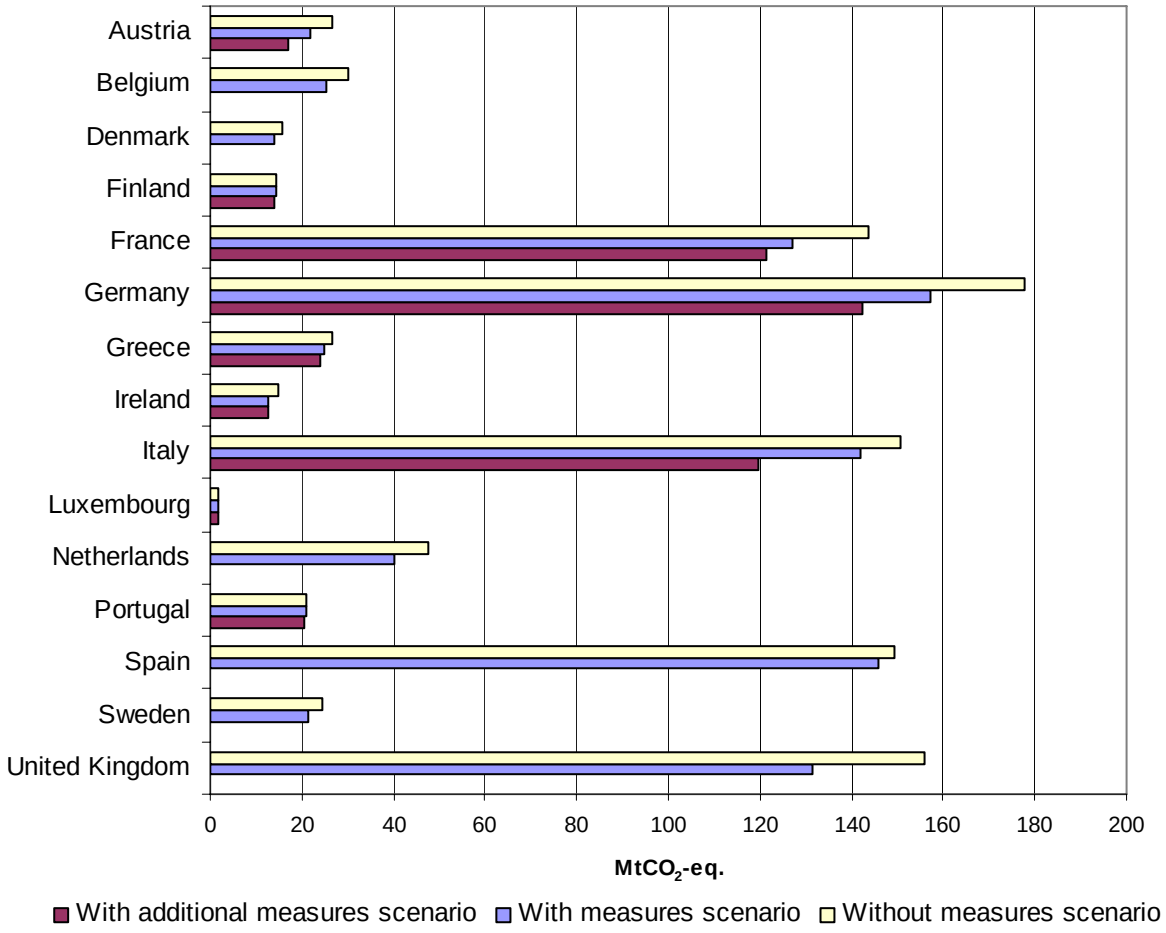
Manufacturers would need to cut CO_2 by 3.3% (ACEA and KAMA) and 3.5 % (JAMA) every year for the years remaining until 2008/09 in order to meet the final target of 140 g CO_2/km. It was anticipated from the beginning that the average reduction rates would be greater in the later years. However, it is noted that the gaps to be closed, expressed in required annual performance, further increased in 2004, putting into serious doubt the attainment of the targeted 140 g CO_2/km.

As part of the second phase of the European Climate Change Programme[6], the Commission has reviewed the CO_2 and cars strategy with a view to moving further towards the Community objective of 120 g CO_2/km. There is currently a consultation under way on new proposals for a mandatory 2012 target for reduction in CO_2[7]. The current proposals are for reductions of the emissions of CO_2 from the average new car fleet to 130 g/km by means of improvements in vehicle motor technology, and a further reduction of 10 g/km of CO_2, or equivalent if technically necessary, by other technological improvements and by an increased use of bio-fuels.

([6]) See http://forum.europa.eu.int/Public/irc/env/eccp_2/library?l=/light-duty_vehicles&vm=detailed&sb=Title

([7]) COM(2007) 19 final, Brussels, 7.2.2007. Communication from the Commission to the Council and the European Parliament. 'Results of the review of the Community Strategy to reduce CO_2 emissions from passenger cars and light-commercial vehicles'. Available at the European Commission DG Enterprise consultation website at: http://ec.europa.eu/reducing_co2_emissions_from_cars/consultation_en.htm

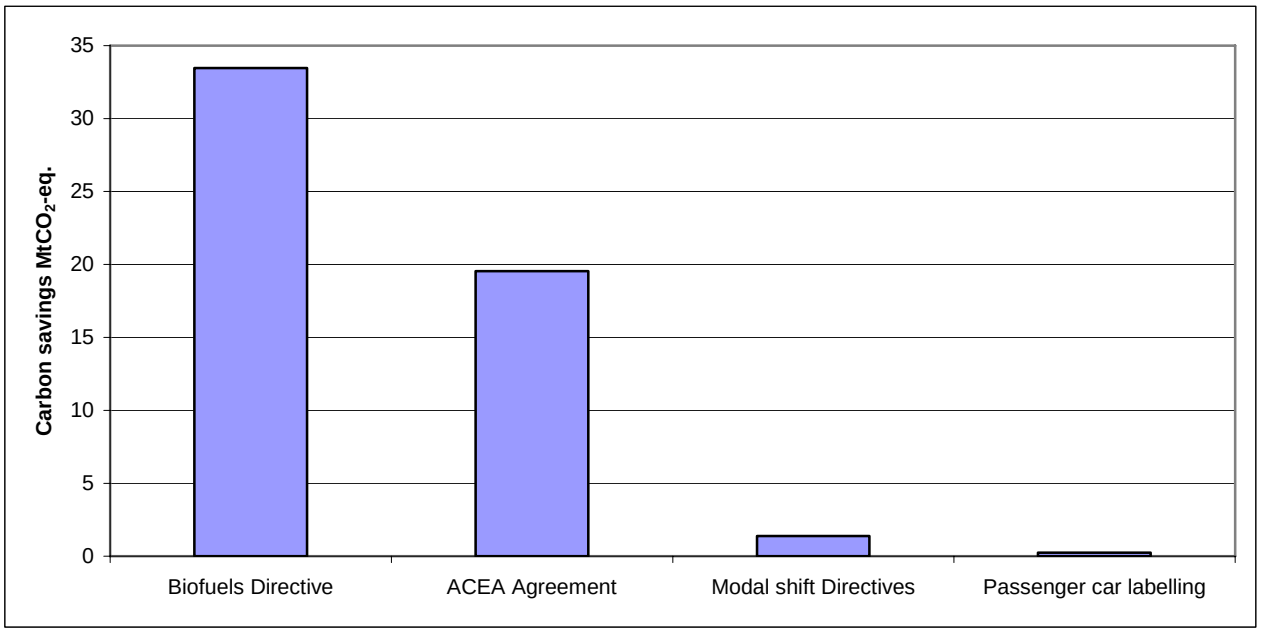
Figure 36 Contribution of policies and measures to emission reductions in the transport sector in 2010, EU15



Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in fourth national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

Figure 37 highlights four key CCPMs in the transport sector: the Biofuels Directive, the ACEA agreement, the Directives on Modal Shift and on labelling of cars. These four CCPMs are projected, according to Member State reports, to reduce emissions by 55Mt in 2010.

Figure 37 Emission reduction potential of CCPMs in the transport sector in 2010, EU27



Source: European Climate Change Programme (ECCP) Database on Policies and Measures in Europe (www.oeko.de/service/pam/sector.php) as of 11 July 2007.

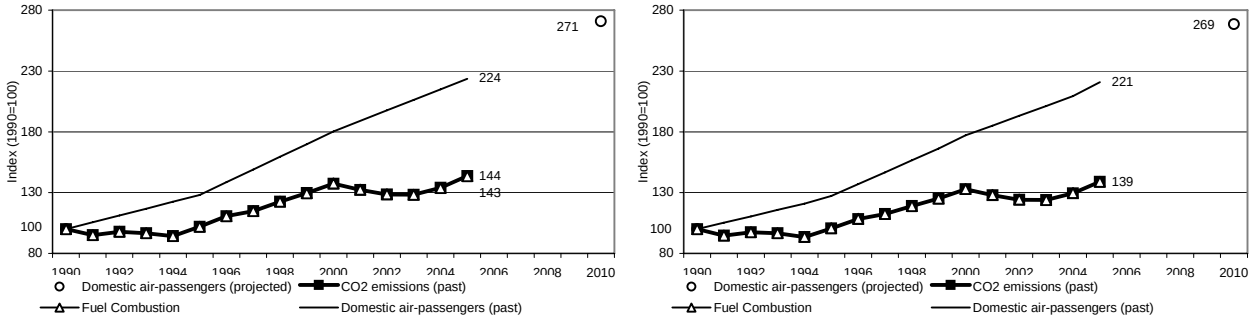
A 1.2.1 CO_2 emissions from domestic civil aviation (1A3a)

- Between 1990 and 2005, CO_2 emissions from domestic civil aviation increased by 44 %. Between 2000 and 2005 emissions increased by 5 %.
- International aviation is not included; its contribution to GHG emissions is EU wide much higher than the domestic aviation.

CO_2 emission from 1A3a	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	0.4%	0.6%	43.6%	4.5%
EU-27	0.3%	0.5%	39.0%	4.7%

CO_2 emissions from domestic civil aviation contribute 0.6 % to total EU-15 greenhouse gas emissions in 2005. The number of air passengers increased by about 125 % compared to 1990 and a further increase to about 170 % compared to 1990 is projected for 2010.

Figure 38: Trend of CO_2 emissions and fuel combustion from domestic civil aviation and projected value for air passengers in the EU-15 (left) and EU-27 (right)



Source: EEA 2007a, PRIMES

Greenhouse gas emissions from aviation have been rising steadily in the past, due to increased demand for air traffic despite efficiency increases through technological improvements and operative measures. CO_2 emissions from aviation represent approximately 2.5 % of global greenhouse gas emissions but the share is projected to rise up to 10 in a business as usual scenario of global emissions (IPCC 1999). The total impact of aviation on climate change is estimated to be two to five times higher than the effect of CO_2 alone due to emissions of NO_X and cloud formation. As a result, emissions form EU aviation could be responsible for 40 % to over 100 % of the allowable greenhouse gas emission in 2050 if global warming is limited to 2°C, the goal set by the EU (T&E 2006) (ETC/ACC 2006).

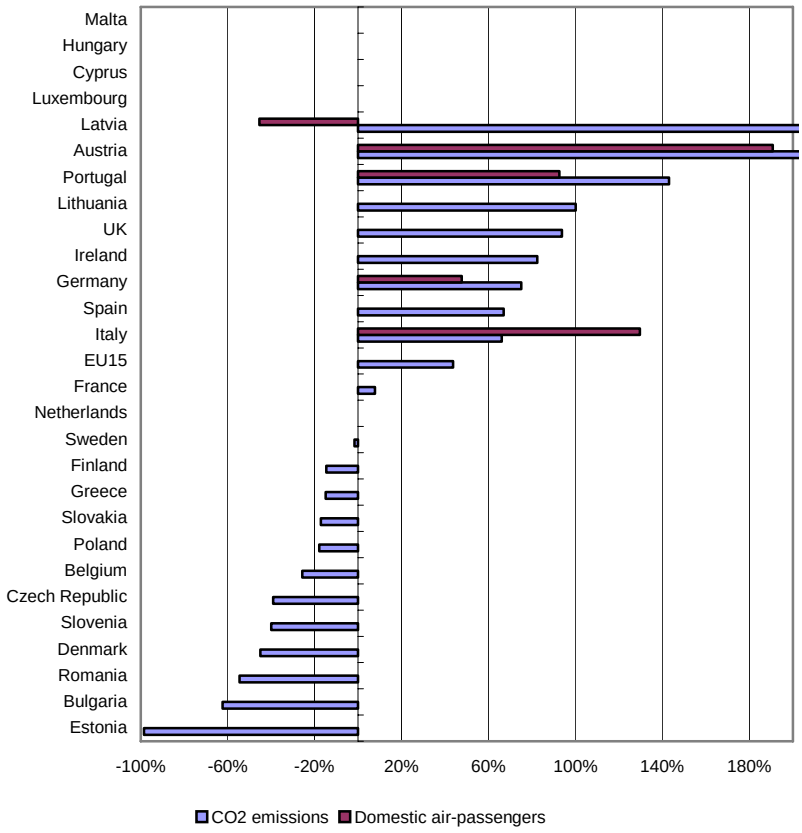
In the national inventories of Member States, only emissions from domestic aviation are covered under the quantified emissions reduction commitment under the Kyoto Protocol. Data included in the national inventory reports shows that international flights are responsible for about 80 % of total fuel consumption from aviation for the EU as a whole. The share is lowest in larger countries whereas international aviation is responsible for over 95 % of the emission in most small Member States with nor or very little domestic flights.

Air transport is steadily increasing although the attack on the World Trade Center in New York had clear impact on the growth of travel for two years. Projections show that CO_2 emissions will further increase for domestic as well as for international transport. For the EU-15 Member State, projected increases in CO_2 emission from domestic aviation range from 144 % to 309 % (ETC/ACC 2006).

Specific air transport emissions (supplementary indicator N°4)

- The trends in CO_2 emissions from domestic aviation are contrasted, with increases in some countries and decreases in others. However stronger increases results in an overall upward trend for the EU-15.
- Numbers on domestic air passenger are only reported by five countries.

Figure 39 Change of CO_2 from civil aviation and number of domestic air-passengers from between 1990 and 2005 for EU-27 Member States (Supplementary Indicator N°4)



Source: EEA 2007a, Member States' submissions

CO_2 emissions decreased in twelve EU Member States CO_2 emissions andincreased in ten (by more than 200 % in Austria and Latvia). However, the increases are much higher so emissions from aviation are growing in the EU. Italy reports that air passenger have a much higher growth than the emissions. Latvia even shows a decrease in air passengers while emissions are increasing.

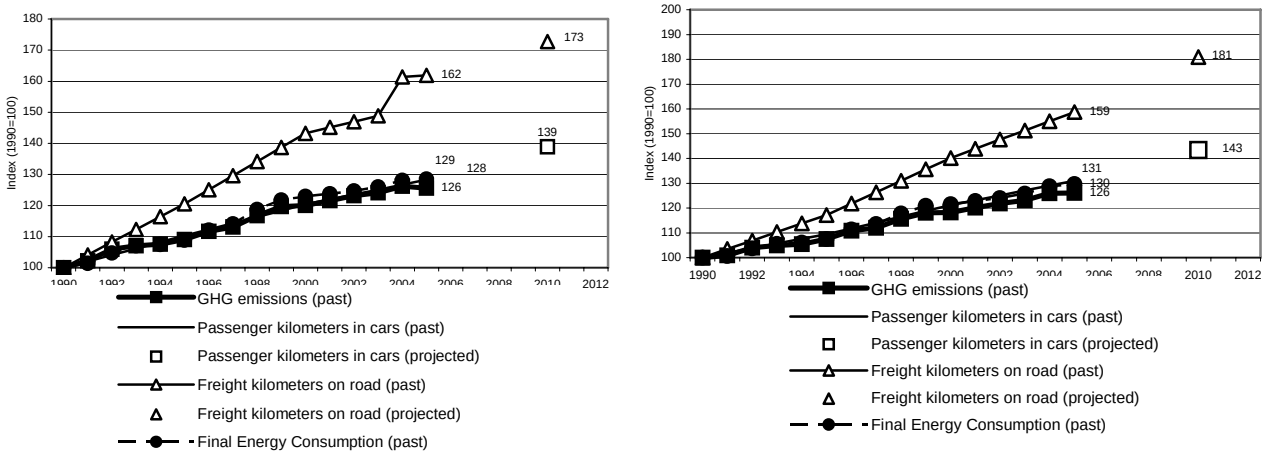
A 1.2.2 CO_2 emissions from road transport (1A3b)

- Between 1990 and 2005, CO_2 from road transport increased by 25 %. They increased by 4 % between 2000 and 2005.
- Road transport represents 93 % (in 1990 as well as in 2005) within the transport sector (international aviation excluded).

CO_2 emission from 1A3b	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	15.0%	18.9%	24.7%	4.1%
EU-27	12.5%	17.3%	27.3%	6.5%

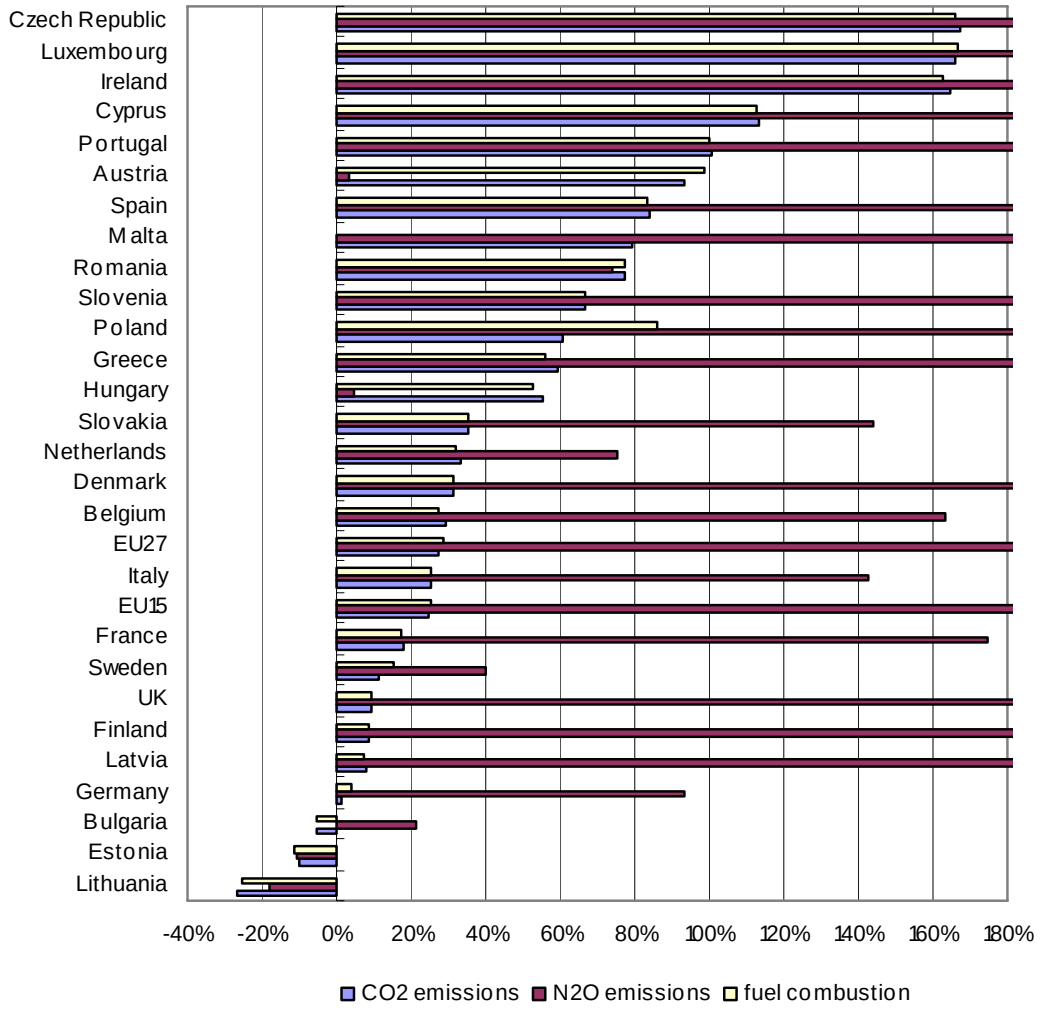
CO_2 emission from road transport is the second largest key category in EU-15 and contributes 19 % to total GHG emissions in 2005; in 1990, the share was at 15 %. International aviation and navigation are not included. Final energy demand for transport, passenger kilometres in cars and CO_2 emissions show a very similar increasing trend of about 25 -30 %, while the increase of freight transport is much stronger, about 60 % in EU.

Figure 40: Trend of CO_2 emissions from transport and passenger and freight transport of the EU-15 (left) and the EU-27 (right)



Source: EEA 2007a, Eurostat, PRIMES

Figure 41 Change of CO_2, N_2O emissions from road transport and fuel combustion between 1990 and 2005 for EU-27 Member States



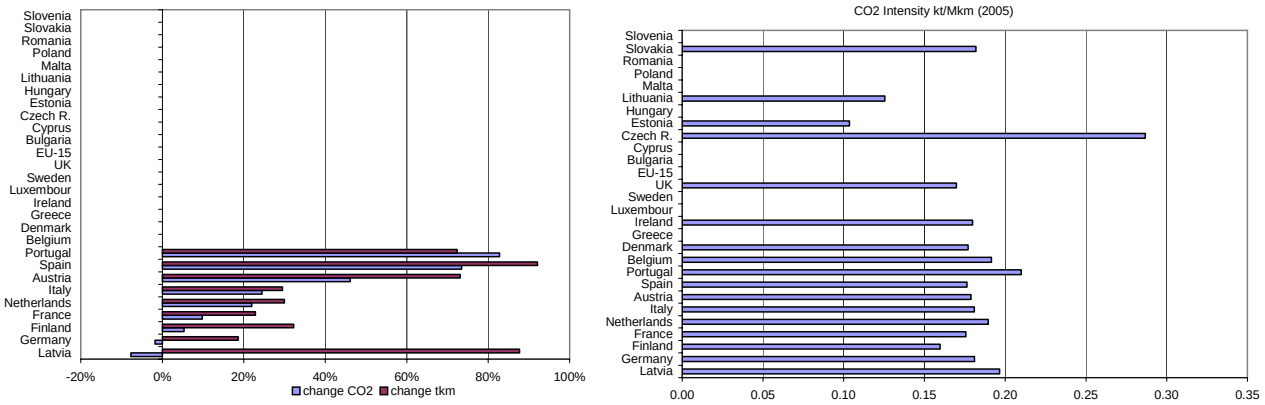
Source: EEA 2007a

The comparison of emissions and fuel combustion shows that CO_2 and fuel combustion show changes in the same range, while N_2O increased by 20% or more in all Member States except Austria and Hungary. Reductions are only reported by Estonia and Lithuania.

Emissions intensity from passenger (priority indicator N°3, projected indicator N°2)

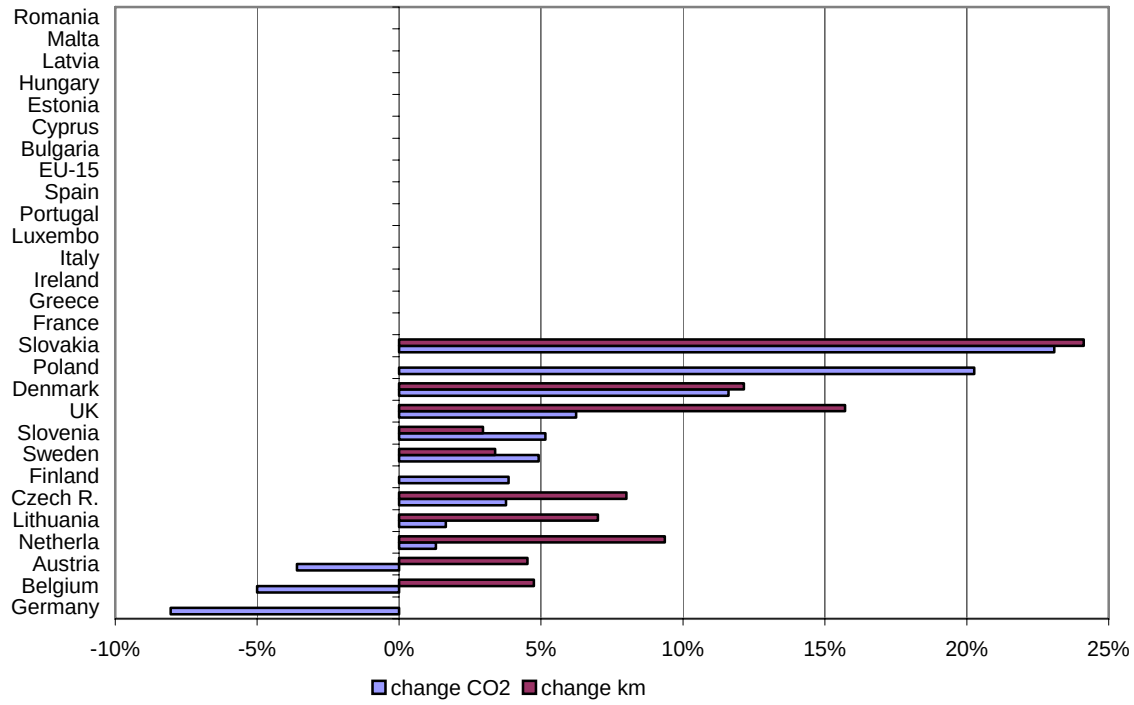
- The number of kilometres driven and emissions increased in all reporting countries, except Germany and Latvia where emissions decreased.
- All reporting Member States project a further increase of kilometres driven by 2010.

Figure 42 Change of CO_2 emission from passenger cars per number of km by passenger cars (change 1990-2005; absolute intensity) (Priority Indicator N°3)



Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member State's submissions

Figure 43 Projected change of CO_2 from passenger cars and number of km by passenger cars between 2005 and 2010 (Projected Indicator N°2)

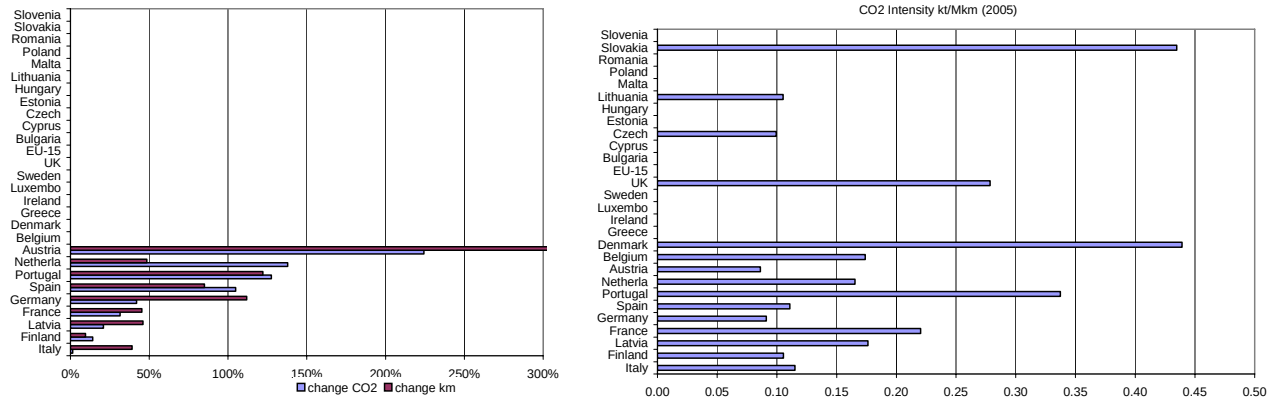


Source: Member States' submissions

Emissions intensity from freight transport (additional priority indicator N°1)

- Freight transportation on road and resulting CO_2 increased in all countries between 1990 and 2005.

Figure 44 Change of CO_2 emission from freight transport on road per freight transport on road (change 1990-2005; absolute intensity) (Additional Priority Indicator N°1)

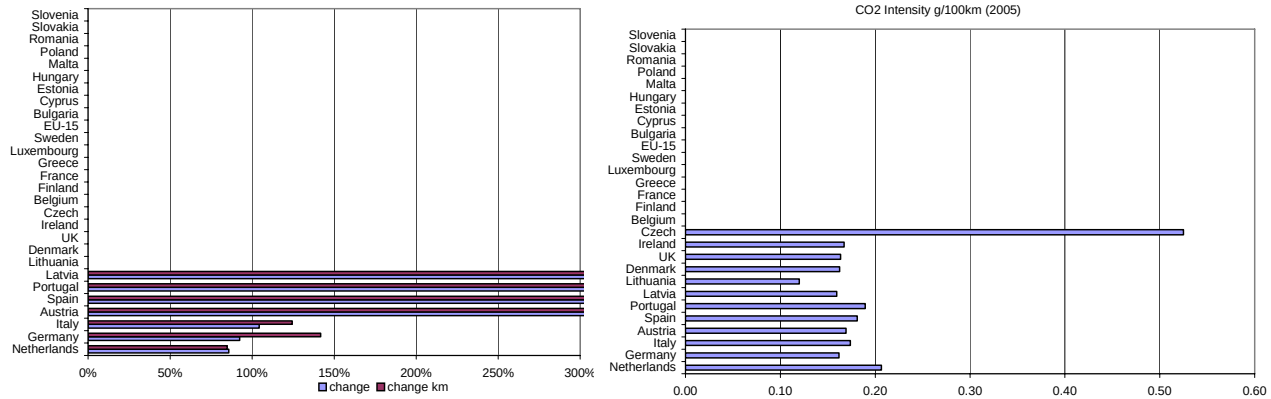


Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submissions

Specific diesel related CO_2 emissions of passenger cars (supplementary indicator N°1)

- The emissions resulting from diesel driven cars increased in all reporting Member States between 1990 and 2005.

Figure 45 Change of specific diesel related CO_2 emissions of passenger cars (g/100km) between 1990 and 2005 (change 1990-2005; absolute intensity) (Supplementary Indicator N°1)

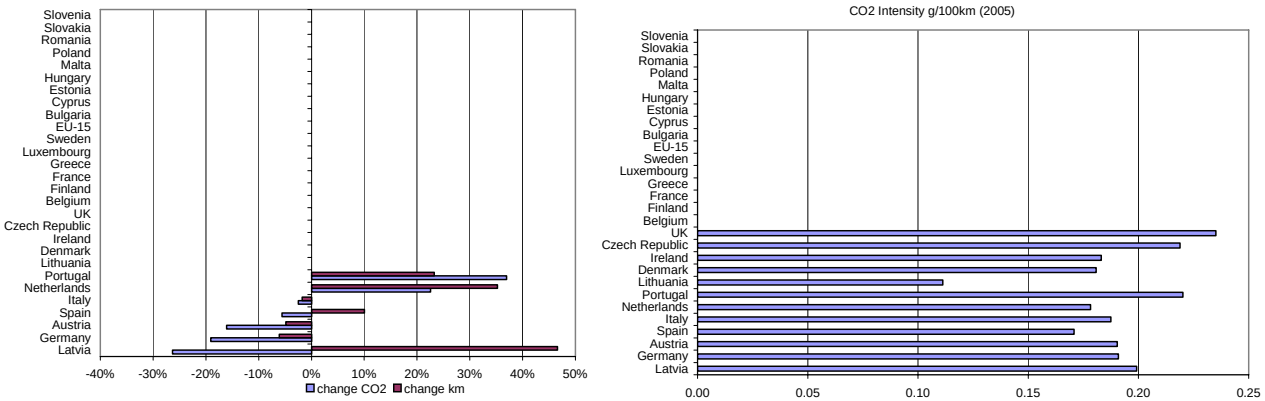


Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submissions

Specific petrol related CO2 emissions of passenger cars (supplementary indicator N°2)

- Member States report very different trends for CO_2 emissions and kilometres from petrol driven cars.

Figure 46 Change of specific petrol related CO_2 emissions of passenger cars (g/100km) between 1990 and 2005 (change 1990-2005; absolute intensity) (Supplementary Indicator N°2)



Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submissions

A 1.3 Energy Use Households, Services and Other

A 1.3.1 CO_2 emissions from energy use in services (1A4a)

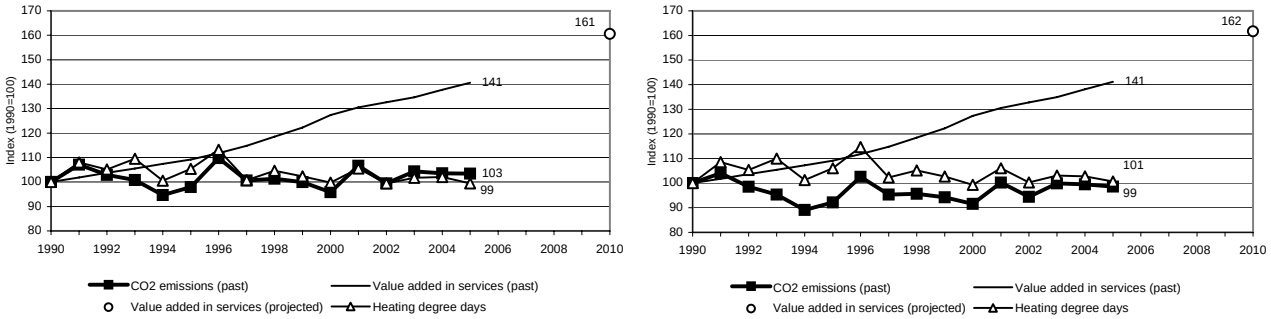
- Between 1990 and 2005, CO_2 emissions from energy use in services increased by 3 % but the observed increase was much stronger recently (+8 % between 2000 and 2005).
- In most Member States, fuel combustion increased more than emissions did.

CO_2 emission from 1A4a	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	3.8%	4.0%	3.4%	7.9%
EU-27	3.4%	3.7%	-1.4%	7.6%

CO_2 emissions from commercial and institutional services have a share of 4 % of total EU-15 GHG emissions in 2005. The trend of the EU-15 and the EU-27 are similar. Heating degree days and CO_2 emissions are coupled to a certain extent. The trend of heating degree days – one of the driving forces – was until 2001 below the emission trend.

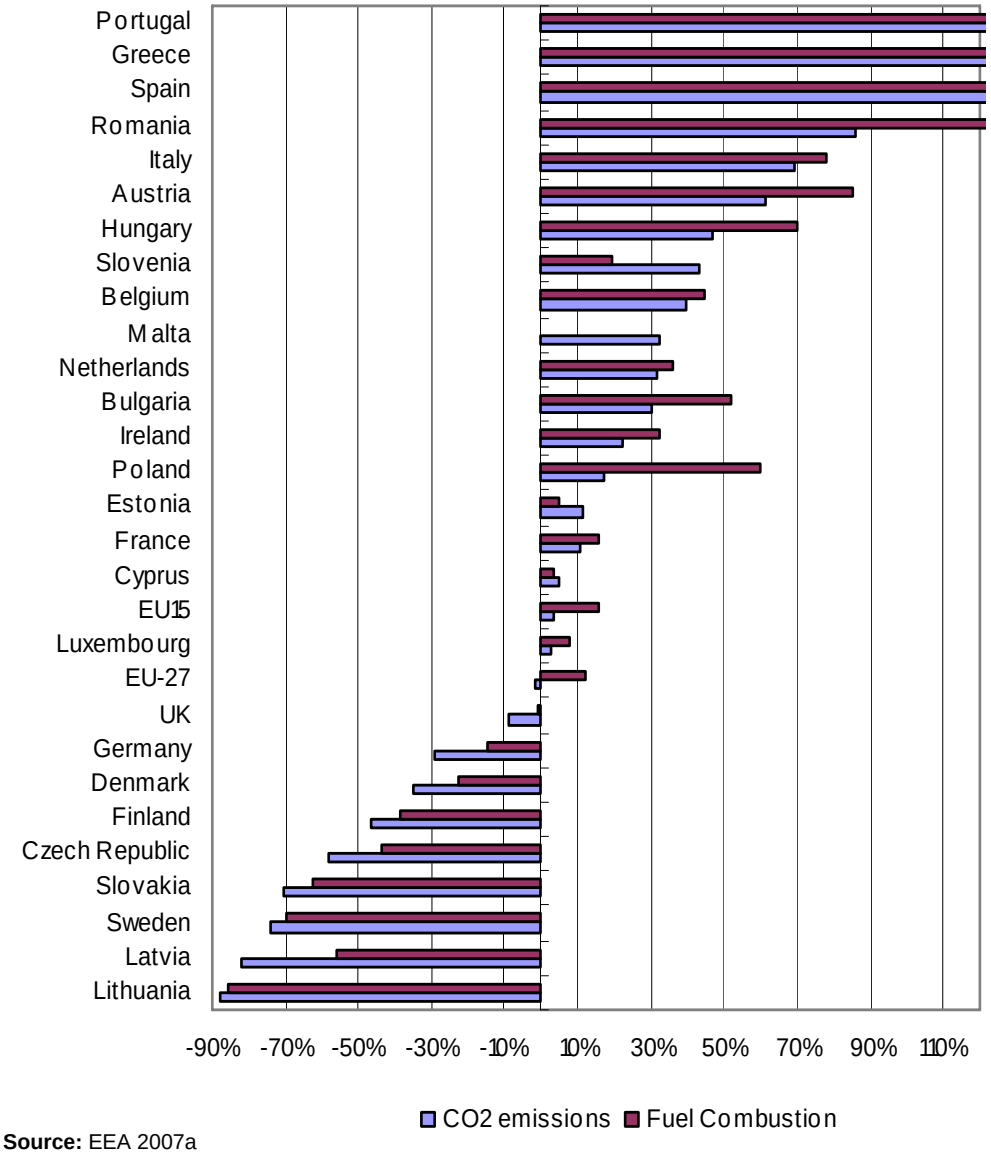
The share of solid fuels in total fuel consumption decreased from 12 % in 1990 to 1 % in 2005 and the share of liquid fuels declined from 42 % to 29 %, the share of gaseous fuels increased from 44 % to 66 %.

Figure 47: Trend of CO_2 emissions from energy use in services, gross value added of services and heating degree days in the EU-15 (left) and EU-27 (right)



Source: EEA 2007a, Eurostat, PRIMES

Figure 48 Change of CO_2 emissions and fuel combustion between 1990 and 2005 for EU-27 Member States



Source: EEA 2007a

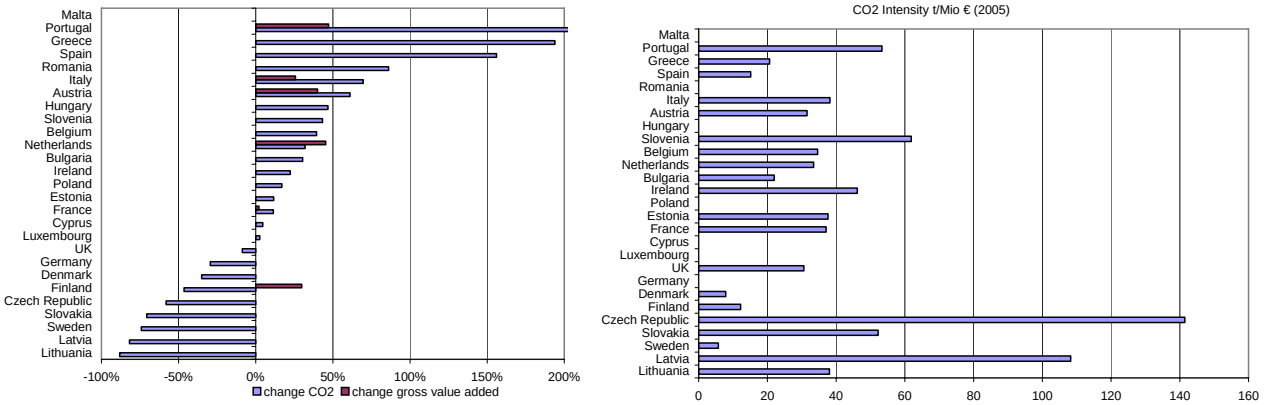
In Cyprus, Slovenia and Estonia CO_2 emission increased more than fuel combustion between 1990 and 2005. Bulgaria, Romania, Poland, Austria and Hungary had a quite strong increase in fuel combustion but not so in CO_2 emissions.

CO_2 emission intensity of the commercial and institutional sector (priority indicator N°6, projected indicator N°6)

- Twenty Member States reported numerator and denominator for 2005.
- Intensities reported from the EU-15 Member States are in general lower than in the new Member States, with the exception of Bulgaria.
- Nine Member States reported projections, five of them project a decrease in emissions, but all an increase in gross value added.

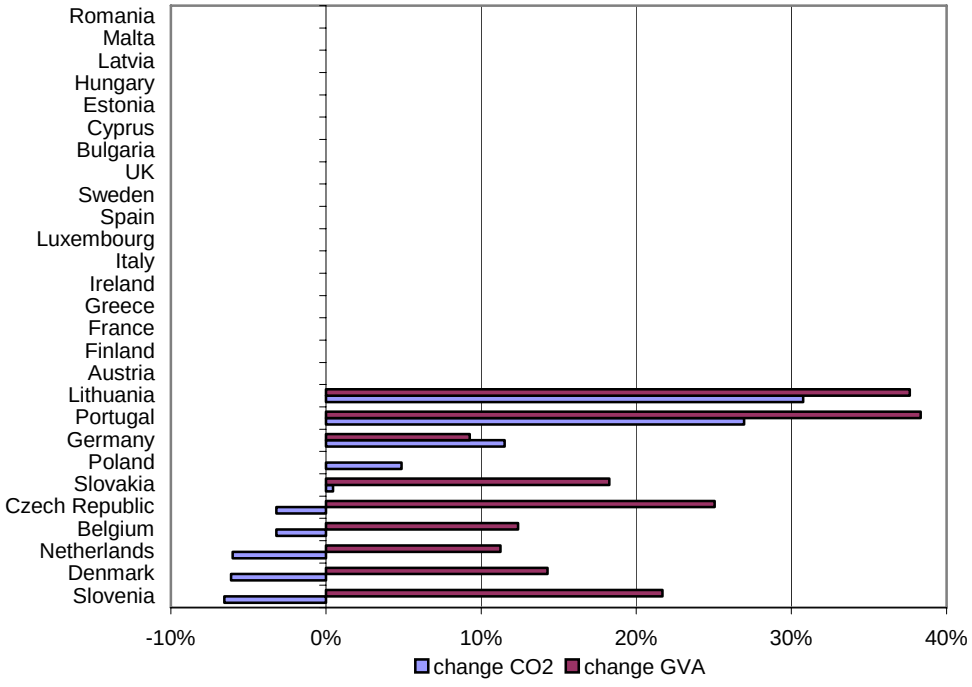
Member States have very different trend for their numerator and denominator of Priority Indicator N°6. The low intensities in Finland, Denmark and Sweden are due to high shares of district heating or biomass combustion.

Figure 49 Change of CO_2 emissions and gross value added from energy use in services between 1990 and 2005 for EU-27 Member States (Priority Indicator N°6)



Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submissions, EEA 2007a

Figure 50 Projected Change of CO_2 emissions from fossil fuel consumption in services and gross value added in services between 2005 and 2010 (Projected Indicator N°6)



Source: Member States' submissions

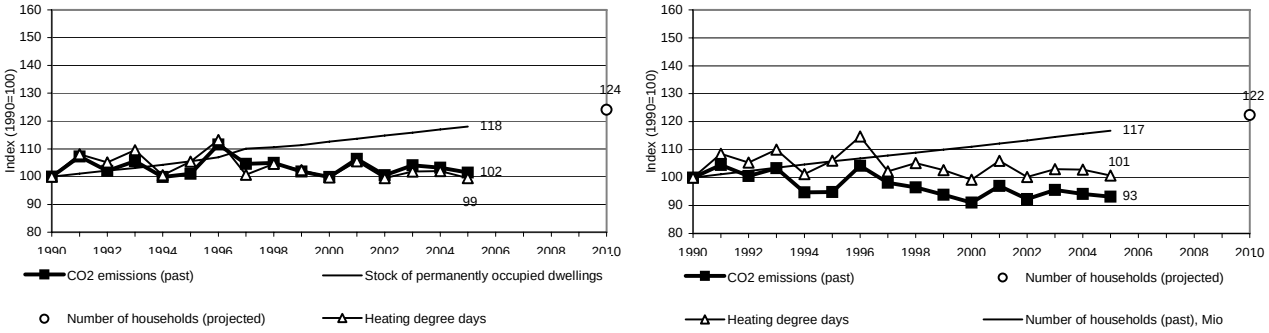
A 1.3.2 CO_2 emissions from energy use in households (1A4b)

- Between 1990 and 2005, CO_2 emissions from energy use in services increased by 2 %. Between 2000 and 2005 emissions increased also by 2 %.
- The trend of heating degree days – one of the driving forces – shows almost the same trend as emissions.
- Number of households and emissions are decoupling.

CO_2 emission from 1A4b	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	9.5%	9.8%	1.5%	1.6%
EU-27	9.1%	9.2%	-6.9%	2.3%

In 2005, CO_2 emissions from households represented 10 % total EU-15 GHG emissions. The trend in CO_2 emissions and heating degree-days shows some fluctuations between 1990 and 2005, but the 1990–2005 overall change is limited: +2 % in the EU-15 and -7 % in the EU-27. According to projections, the number of households will increase by more than 20 % by 2010, compared to 1990. The decrease in the EU-15 is partly due to a fuel switch from solid to gaseous: the respective shares of solid fuels and gaseous fuels changed from 12 % and 42 % in 1990, to 2% and 56 % in 2005. The use of liquid fuels also decreased between 1990 and 2005.

Figure 51: Trend of CO_2 emissions and number of households in the EU-15 (left) and EU-27 (right)

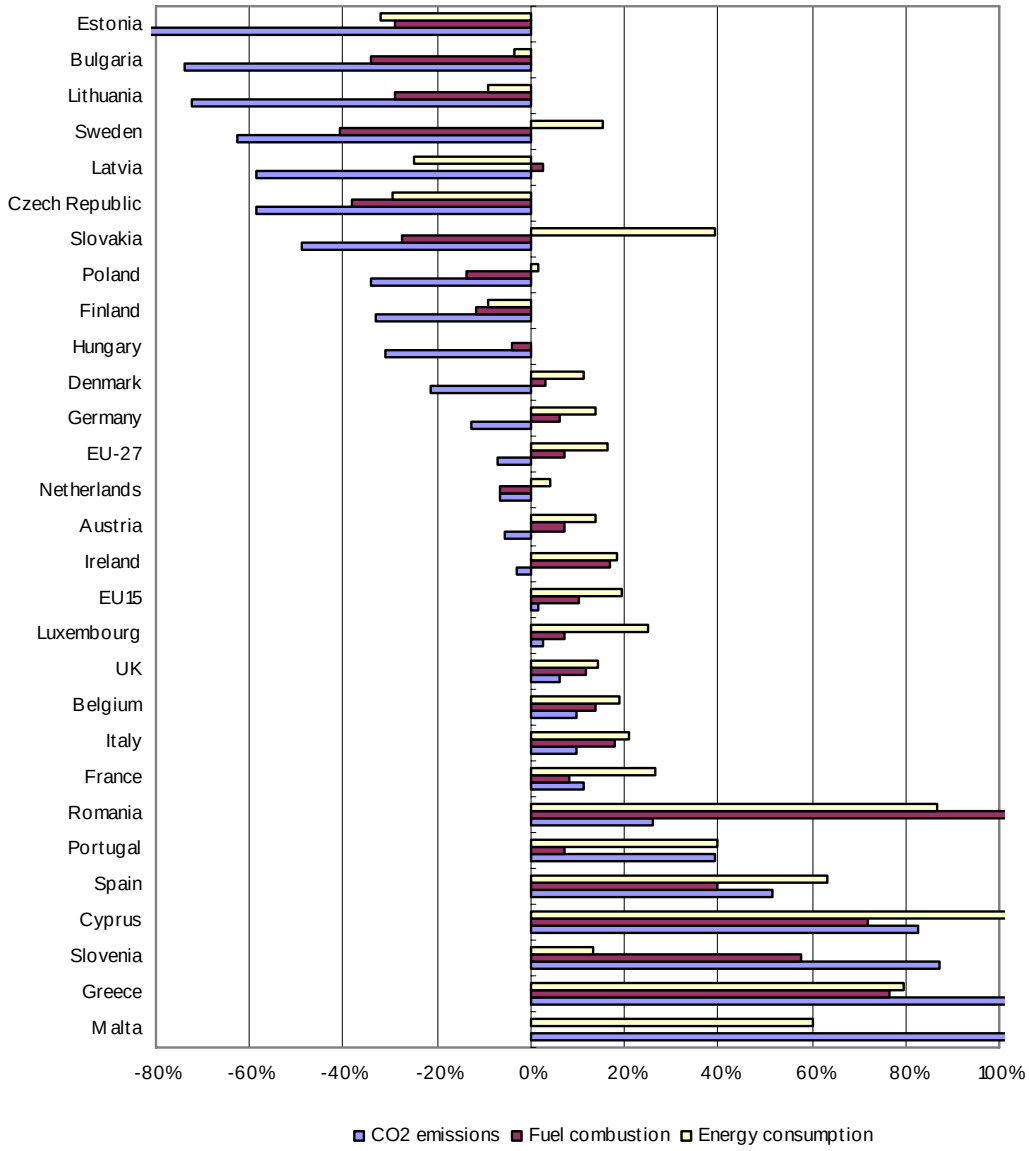


Source: EEA 2007a, PRIMES, EEA 2007a

CO_2 emissions from households are mainly influenced by outdoor temperatures, the number and size of dwellings, building code, the age distribution of the existing building stock, the fuel split for heating and warm water. The recent decrease in emissions could be partly explained by an improvement of energy efficiency from buildings and a shift from household heating boilers to district heating plants. That shift in heating facilities reduces CO_2 emissions from households but may increase emissions from energy industries.

A main reason for absolute reductions in CO_2 emissions in Denmark, Finland and Sweden is the increase of district heating which is indicated by a decrease in fuel combustion and/or an increase in final energy consumption. In Germany, efficiency improvements through thermal insulation of buildings and fuel switch in particular in eastern German households, solar thermal energy production and biomass district heating were largely responsible for CO_2 reduction from households. (EEA, 2006a)

Figure 52 Change of CO_2 emissions, fuel combustion and energy consumption between 1990 and 2005 for EU-27 Member States



Source: EEA 2007a, EEA 2007a

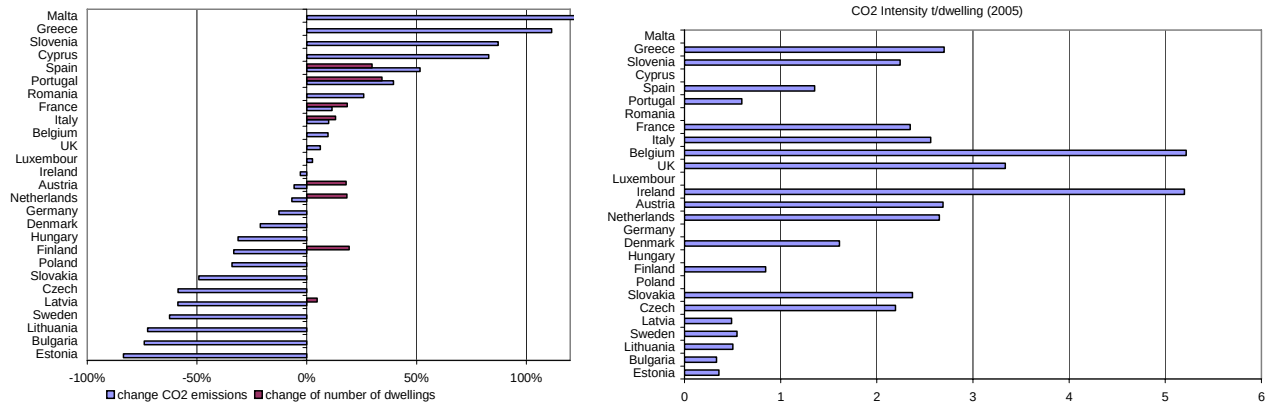
In most Member States, CO_2 emissions and fuel combustion developed in the same direction, but not in Ireland, Germany, Denmark, Austria and Latvia. In these countries fuel combustion increased while CO_2 emissions decreased. In Slovenia, Cyprus, Spain, Portugal and France CO_2 emissions increased more than fuel combustion.

Specific CO_2 emission intensity of households (priority indicator N°5, projected indicator N°5)

- No general past trend for CO_2 emissions can be seen for the Member States.
- Only eight Member States reported the number of dwellings for 1990 and 2005.
- Thirteen Member States report projections, whereby nine project a decrease in emissions between 2005 and 2010.

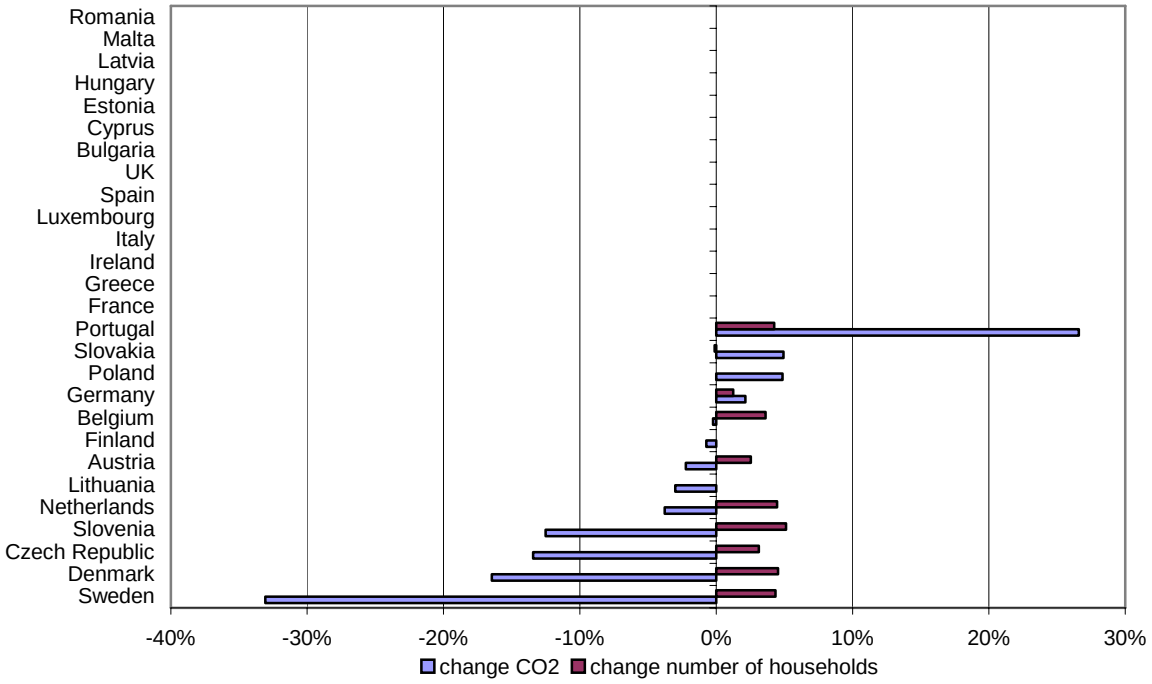
Malta, Portugal, Slovenia, Greece, Spain, Cyprus and Romania show a remarkable increase in CO_2 emission between 1990 and 2005. Austria, the Netherlands, Finland and Latvia report that CO_2 emissions are decreasing although the number of dwelling is increasing. Most EU-15 Member States report a higher absolute intensity than new Member States.

Figure 53 Change of specific CO_2 emissions of household per dwelling for EU-27 Member States, t/dwelling (change 1990-2005, absolute intensity) (Priority Indicator N°5)



Source: Member States' submissions, EEA 2007a
Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.

Figure 54 Projected Change of CO_2 emissions from fossil fuel consumption in households and number of dwellings between 2005 and 2010 (Projected Indicator N°5)

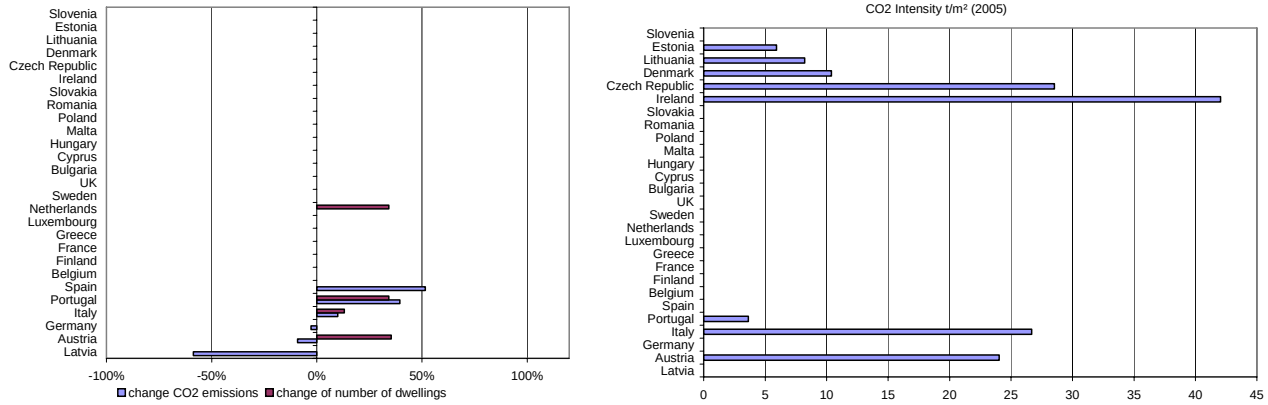


Source: Member States' submissions

Specific CO_2 emission of households for space heating (supplementary indicator N°7)

- Three Member States only (Portugal, Austria and Italy) reported both numerator and denominator for 1990 and 2005.

Figure 55 Change of CO_2 emissions of households for space heating, t/m² (change 1990-2005, absolute intensity) (Supplementary Indicator N°7)

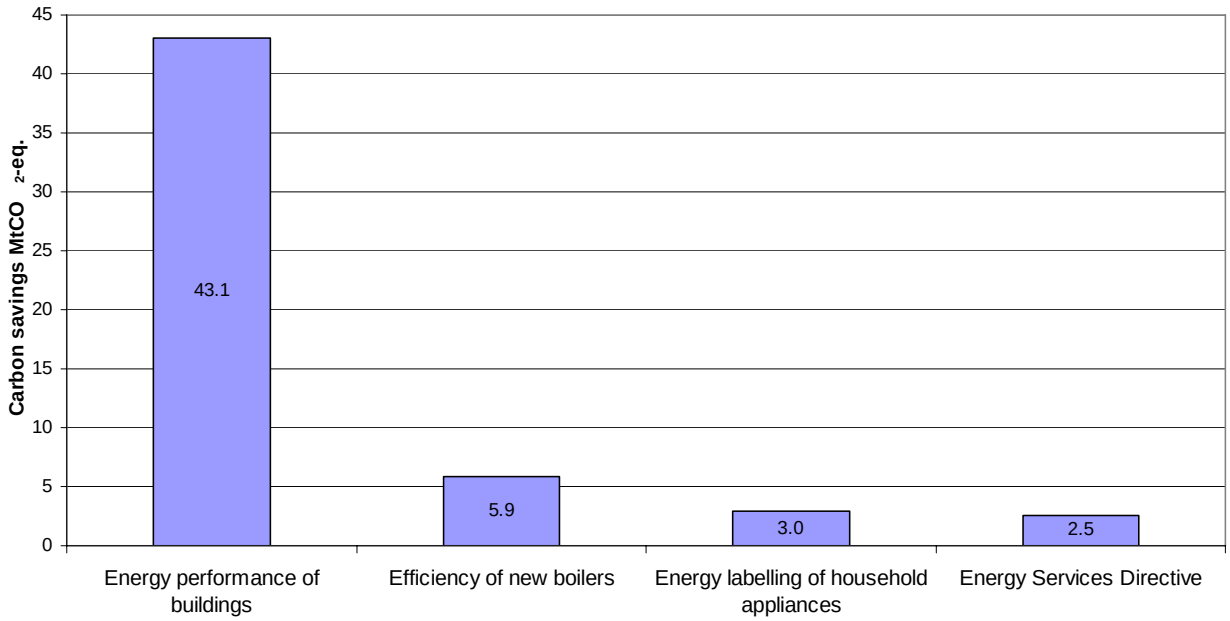


Note: Comparisons of absolute intensities are only of limited significance as data are not always consistent across countries.
Source: Member States' submissions

Key existing policies and measures for other energy use including households

The decoupling of CO_2 emissions from the number of dwellings in the last decade (see Figure 51) was mainly due to efficiency improvements through thermal insulation of buildings, fuel switch and increases in solar thermal energy production and biomass district heating. Member States project that these efficiency improvements will continue, encouraged by policies and measures. A key policy is the EU Directive on the Energy Performance of Buildings, which includes minimum standards for new buildings and for existing buildings when they are renovated and the requirement for all buildings to have energy performance certificates. According to projections from Member States, the Directive on energy performance of buildings will reduce emissions by 43Mt in 2010 (Figure 56). Other key policies are the EU appliances labelling scheme and schemes for energy efficiency standards. Some Member States already have similar policies and measures in place. The CCPMs matrix in the main report gives an overview of the implementation of these and other key policies across the EU.

Figure 56 EU-27 projected greenhouse gas emission savings by key CCPM addressing energy demand in 2010



Source: European Climate Change Programme (ECCP) Database on Policies and Measures in Europe (www.oeko.de/service/pam/sector.php) as of 11 July 2007.

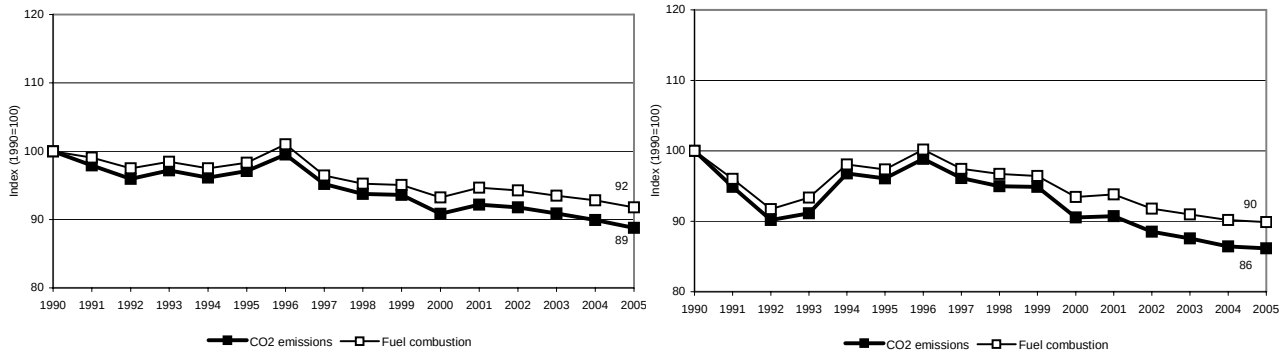
A 1.3.3 CO_2 emissions from agriculture, forestry, fisheries (1A4c)

- Between 1990 and 2005, CO_2 emissions from energy use in agriculture, forestry and fisheries decreased by 11 %. Between 2000 and 2005 emissions decreased by 2 %.

CO_2 emission from 1A4c	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	1.7%	1.5%	-11.2%	-2.3%
EU-27	1.6%	1.5%	-13.8%	-4.8%

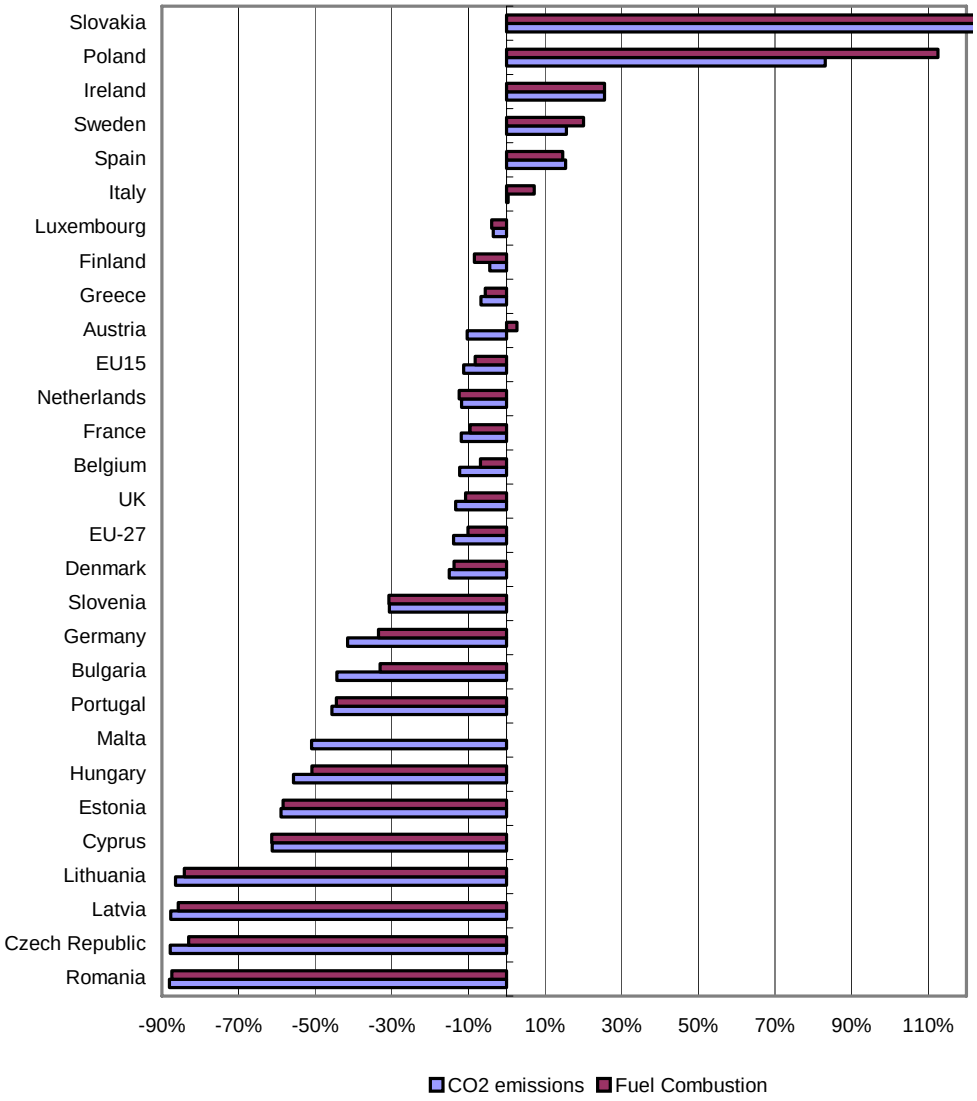
The fluctuations in the CO_2 trend of the EU-15 are different to the one of the EU-27.
Between 1990 and 2005, CO_2 emissions and the amount of fuel combusted have decreased in most countries. The difference in the change within in these two parameters is relatively small, except in Austria, Italy and Poland.

Figure 57: Trend of CO_2 emissions and fuel combustion in agricultural category in the EU-15 (left) and EU-27 (right)



Source: EEA 2007a

Figure 58 Change of CO_2 emissions and fuel combustion between 1990 and 2005 for EU-27 Member States



Source: EEA 2007a

A 1.4 Industrial Processes

Trends

- Between 1990 and 2005, greenhouse gas emissions from industrial processes decreased by 11.5 %. They remained stable between 2000 and 2005.

Total GHG emissions from sector 2	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	8.8%	7.9%	-11.5%	0.2%
EU-27	8.4%	8.0%	-13.2%	2.0%

Projections

- Emissions from industrial process are projected to further decrease, with existing measures to 12 % below base-year levels. Belgium, Germany, Italy, Luxembourg, the Netherlands and the United Kingdom project that greenhouse gas emissions from industrial processes in 2010 will be lower than base-year emissions with existing measures.
- Except Slovak Republic and Lithuania, all new Member States project decreases in GHG emissions from industrial processes compared to base-year emissions.

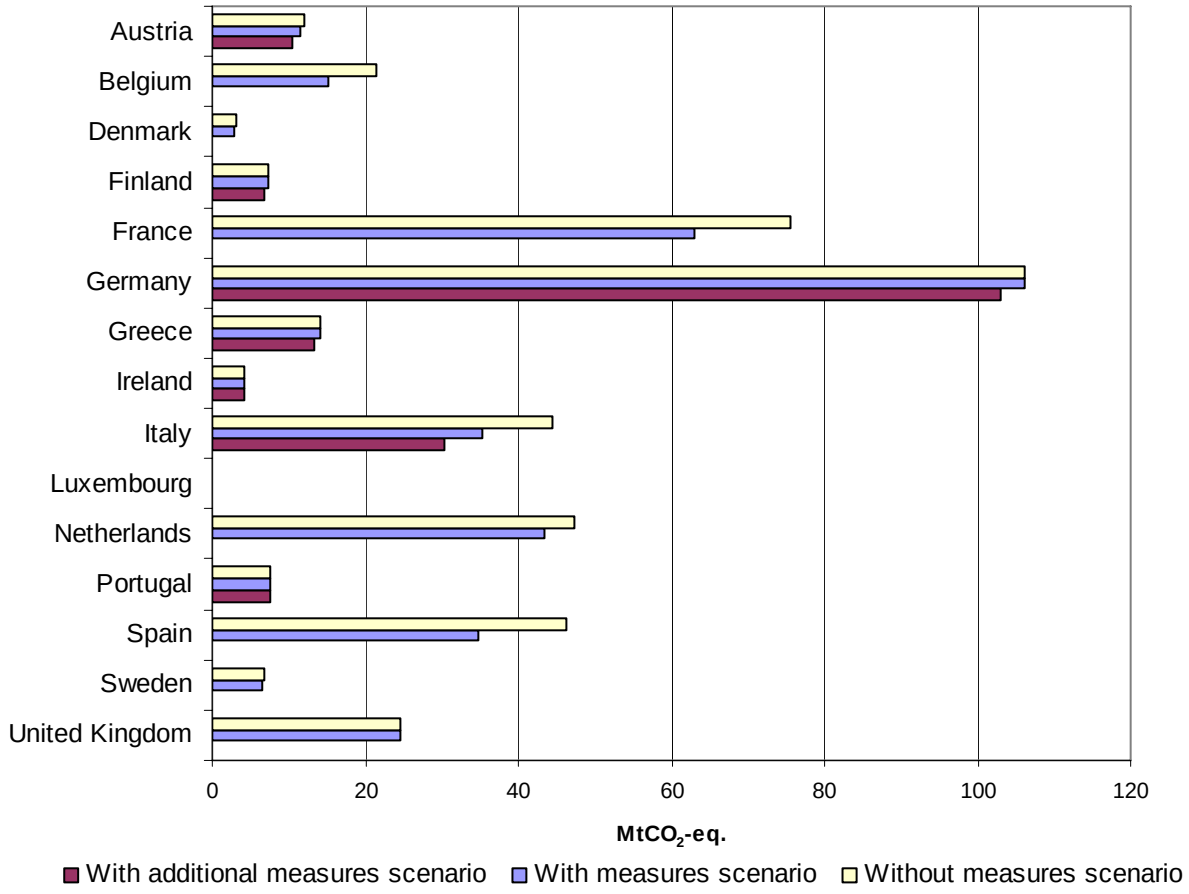
Italy, Greece, Germany, France, Finland and Austria defined additional measures, whereas the other EU-15 Member States only provide projections for already existing measures. The highest relative reductions are projected by Luxembourg, the Netherlands and the United Kingdom.

Contribution of policies and measures to GHG emission reductions in 2010 in the industrial process sector

Policies and measures are mainly aimed at abatement measures in adipic and nitric acid production (to reduce N_2O emissions) and on alternatives (substitutes) for HFCs in refrigeration and air conditioning. Measures aimed at adipic acid production are mainly in the 'with existing measures' projections, but some countries report both existing and additional domestic measures for the other process emissions. However, three of the EU-15 Member States did not report any policies and measures for these source categories. Member States expect some greenhouse gas savings in industrial processes to be achieved by regulatory policies and measures and through voluntary agreements. Policies and measures in most Member States to implement the F-gas regulation and directive are at an early stage of development.

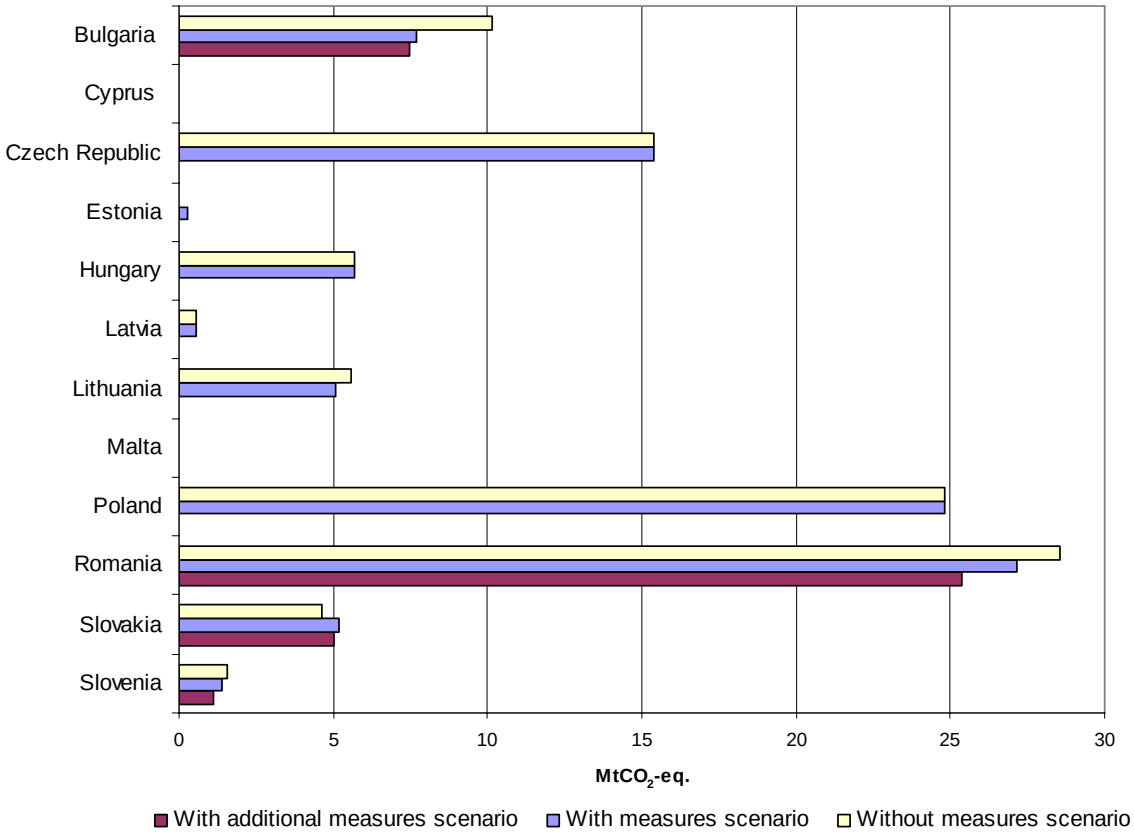
Figure 59 and Figure 60 illustrate the contribution of policies and measures to the reduction of emissions from the industrial process sector in 2010 for EU-15 and EU-12 respectively. Figure 61 highlights a number of CCPMs targeting emissions in the industrial process sector and projected to result in 9 Mt CO_2-eq. reductions across the EU-27 in 2010.

Figure 59 Contribution of policies and measures to emission reductions in the industrial process sector in 2010, EU15



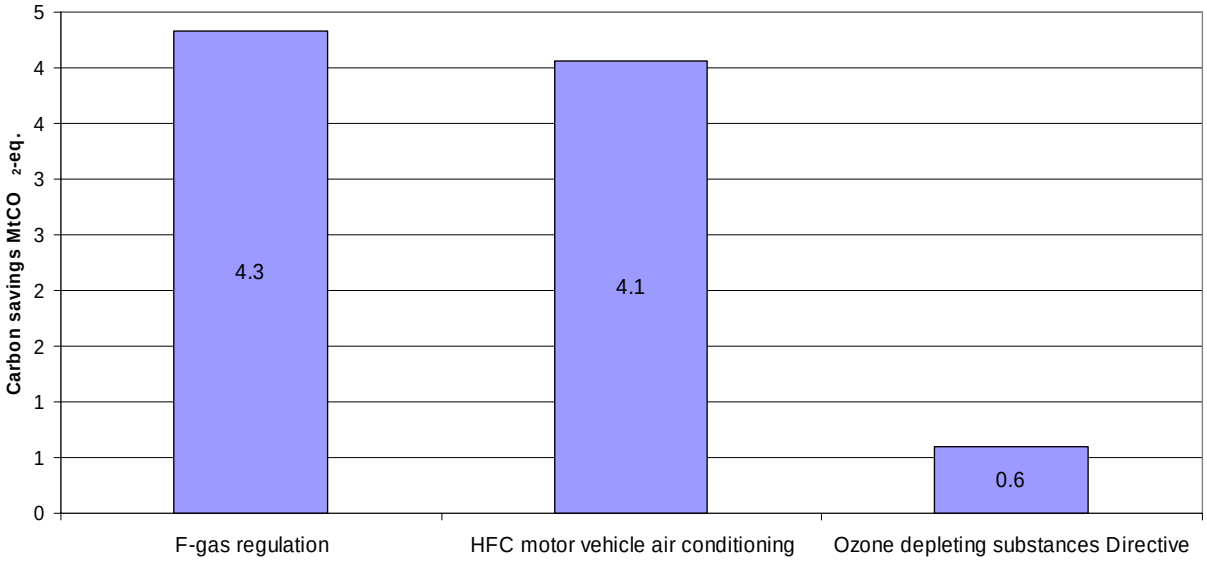
Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in fourth national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

Figure 60 Contribution of policies and measures to emission reductions in the industrial process sector in 2010, EU12



Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in latest national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

Figure 61 Emission reduction potential of CCPMs in the industrial process sector in 2010, EU27



Source: European Climate Change Programme (ECCP) Database on Policies and Measures in Europe (www.oeko.de/service/pam/sector.php) as of 11 July 2007.

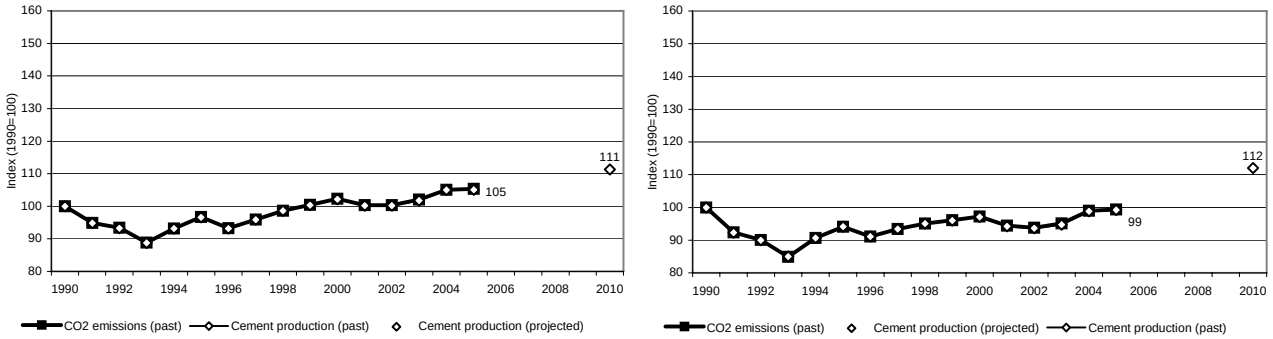
A 1.4.1 CO2 emissions from cement production (2A1)

- Between 1990 and 2005, CO_2 emissions from cement production increased by 5 %. However, between 2000 and 2005 emissions decreased by 3 %.

CO_2 emission from 2A1	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	1.9%	2.0%	5.3%	2.9%
EU-27	1.8%	1.9%	-0.6%	2.2%

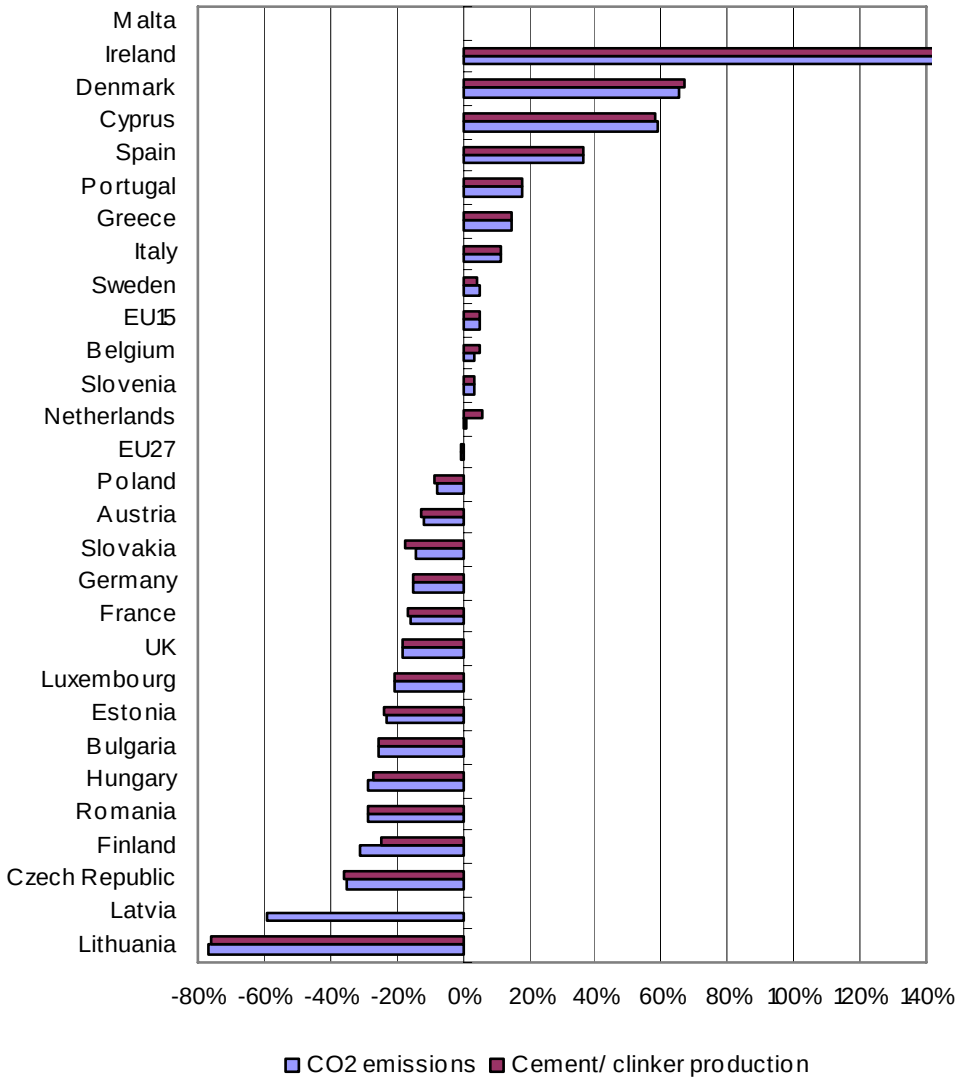
Cement production dominates the trend of total GHG emissions from industrial processes. Factor for declining emissions in the early 1990s were low economic growth and cement import from east European countries. It is projected that cement production will increase by 2010 by more than 10 %.

Figure 62: Trend of CO_2 emissions from cement production of the EU-15 (left) and the EU-27 (right)



Source: EEA 2007a, PRIMES

Figure 63: Trend of CO_2 emissions, steel production and gross value added EU-27 Member States



Source: EEA 2007a

Production and emissions seem strongly correlated in most Member States. Consequently, the trends in emissions followed the trends in production, with half of the Member States reporting increases in production and emissions, and the other half reporting decreases. Strong increases in cement production (> 50 %) can be seen for Ireland, Denmark and Cyprus.

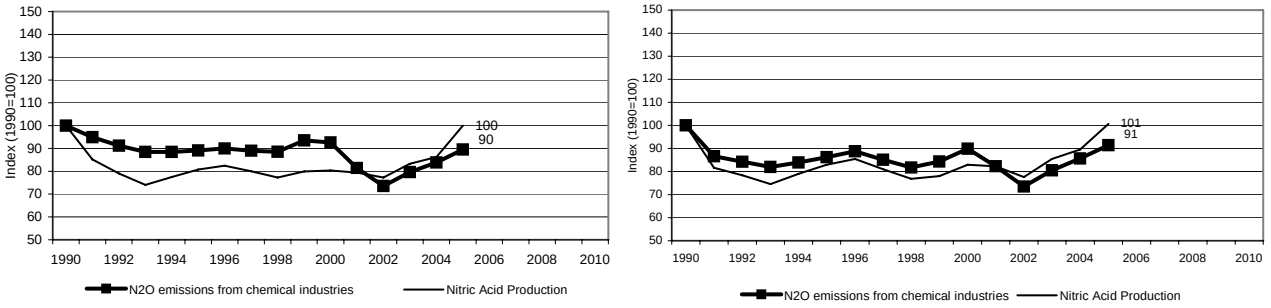
A 1.4.2 N_2O emissions from nitric acid production (2B2)

- Between 1990 and 2005, N_2O emissions from nitric acid production decreased by 10 %. Between 2000 and 2005 emissions decreased by 3 %.

N_2O emission from 2B2	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	0.9%	0.8%	-10.4%	-3.3%
EU-27	0.9%	0.9%	-8.6%	1.7%

The trend in the EU-15 and the EU-27 is very similar and decreased until 2002 and shows then a strong increase to 90 % compared to 1990. The share of N_2O emissions to total EU-15 GHG emissions in 2005 is 1 %.

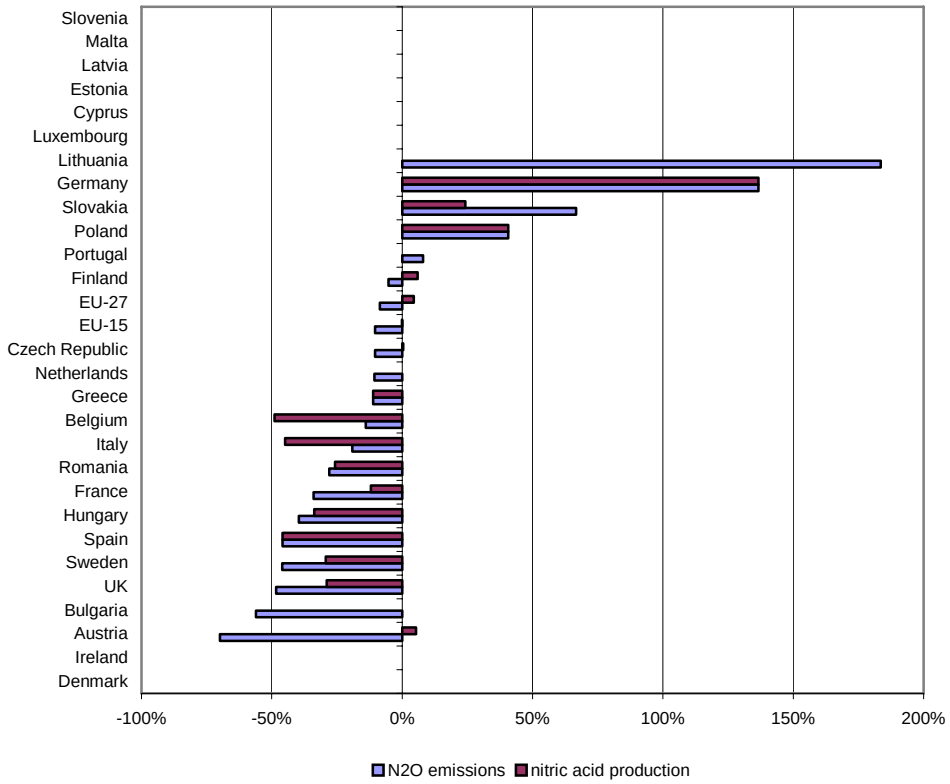
Figure 64: Trend of N_2O emissions from nitric acid production of the EU-15 (left) and the EU-27 (right)



Note: Nitric acid production for EU-15 does not include Belgium, the Netherlands and Portugal; nitric acid production for EU-27 does not include Belgium, Bulgaria, Lithuania, the Netherlands and Portugal.
Source: EEA 2007a, PRIMES

In the early 1990s, emissions decreased mainly due to production decreases in several of the main emitting Member States, in particular France, Germany, Spain and Italy. The decline between 2000 and 2002 was mainly due to the change in the production patterns in the United Kingdom (increasing weight of nitric acid plants with lower emission factors). After 2002, the trend was dominated by Germany, where N_2O emissions increased between 2003 and 2005 by almost 70 % due to the start-ups of two new plants.

Figure 65: Trend of N_2O emissions and nitric acid production for EU-27 Member States



Source: EEA 2007a

Most reporting countries show a decrease between 1990 and 2005 in N_2O emissions and in nitric acid production. Ireland and Denmark phased out nitric production all together. In Austria, emissions were reduced despite increases in nitric acid production. This was due to the installation of a N_2O decomposition facility in the nitric acid plant in 2003.

A 1.4.3 HFC emissions from refrigeration and air conditioning equipment (2F1)

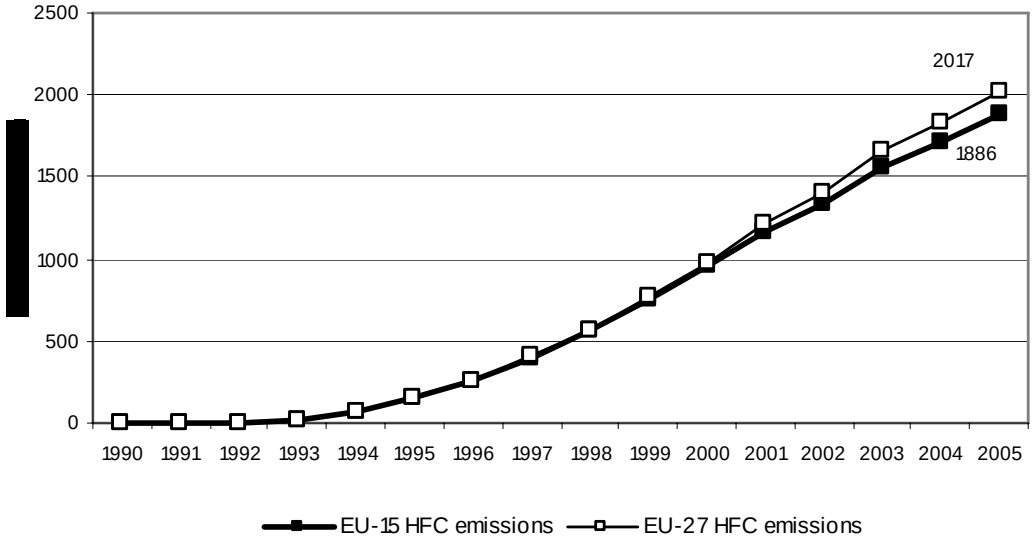
- Between 1990 and 2005, HFC emissions from refrigeration and air conditioning equipment increased from almost zero to almost 35 Mt CO_2 equivalent in EU-15. Between 2000 and 2005 emissions increased by almost 100 %.

HFC emission from 2F1	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	0.0%	0.8%	41 253 %	97 %
EU-27	0.0%	0.7%	45 753 %	105 %

HFC emissions from refrigeration and air conditioning equipment contribute 1 % of total EU-15 emissions in 2005. The emissions are increasing between base year and 2005 by a factor of 19.

The main reason for this strong increase is the phase-out of ozone-depleting substances such as chlorofluorocarbons under the Montreal Protocol and the replacement of these substances with HFCs.

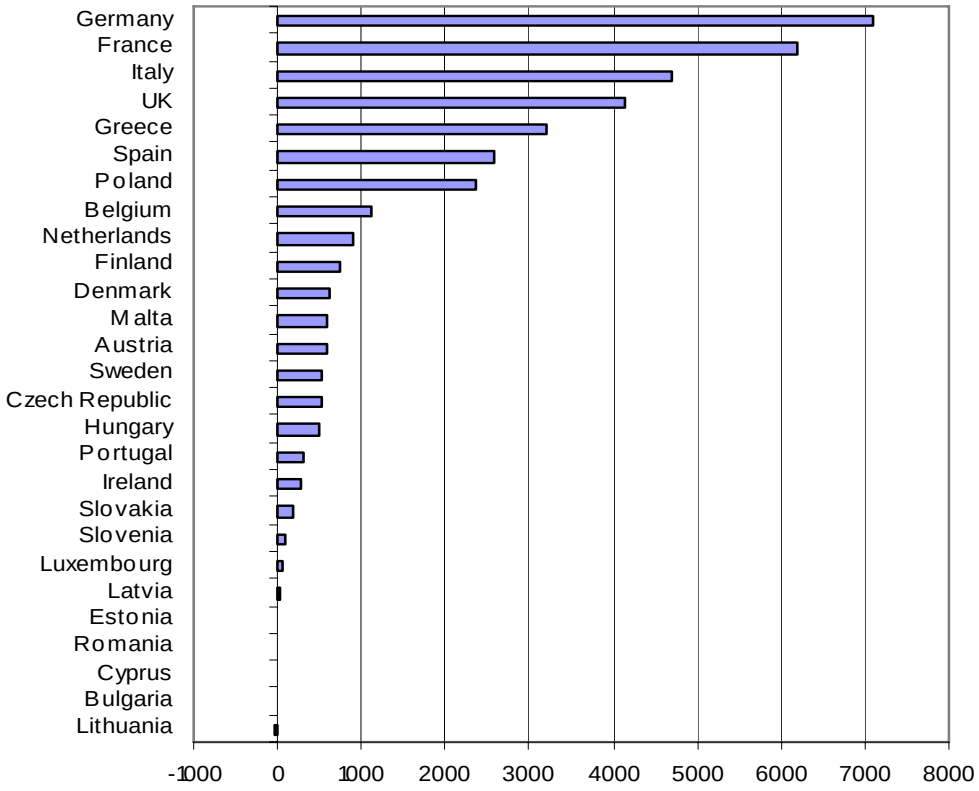
Figure 66: Trend of HFC emissions refrigeration and air conditioning of the EU-15 and the EU-27



Source: EEA 2007a

EU-15 Member States show much higher increases in HFC emissions than in new Member States (Figure 67). Numbers below are presented in absolute values, because in 1990 HFC emissions in most countries were not occurring.

Figure 67: Trend of HFC emissions from refrigeration and air conditioning for EU-27 Member States (absolute change 1990 and 2005 in kt CO_2 eq.)



Source: EEA 2007a

A 1.5 Agriculture

Trends

- Between 1990 and 2005, GHG emissions from agriculture decreased by 11%. The decrease was -6 % between 2000 and 2005.

GHG emission from 4	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	10.2%	9.2%	-11.1%	-6.4%
EU-27	10.6%	9.2%	-20.1%	-5.3%

Projections

- With the existing measures, emissions from agriculture are projected to further decrease from 2005 levels, to 14 % below base-year levels. Luxembourg, Portugal and Spain project that their greenhouse gas emissions from agriculture in 2010 will be higher than in the base year.
- All new Member States project decreases in greenhouse gas emissions from agriculture compared to base-year emissions.

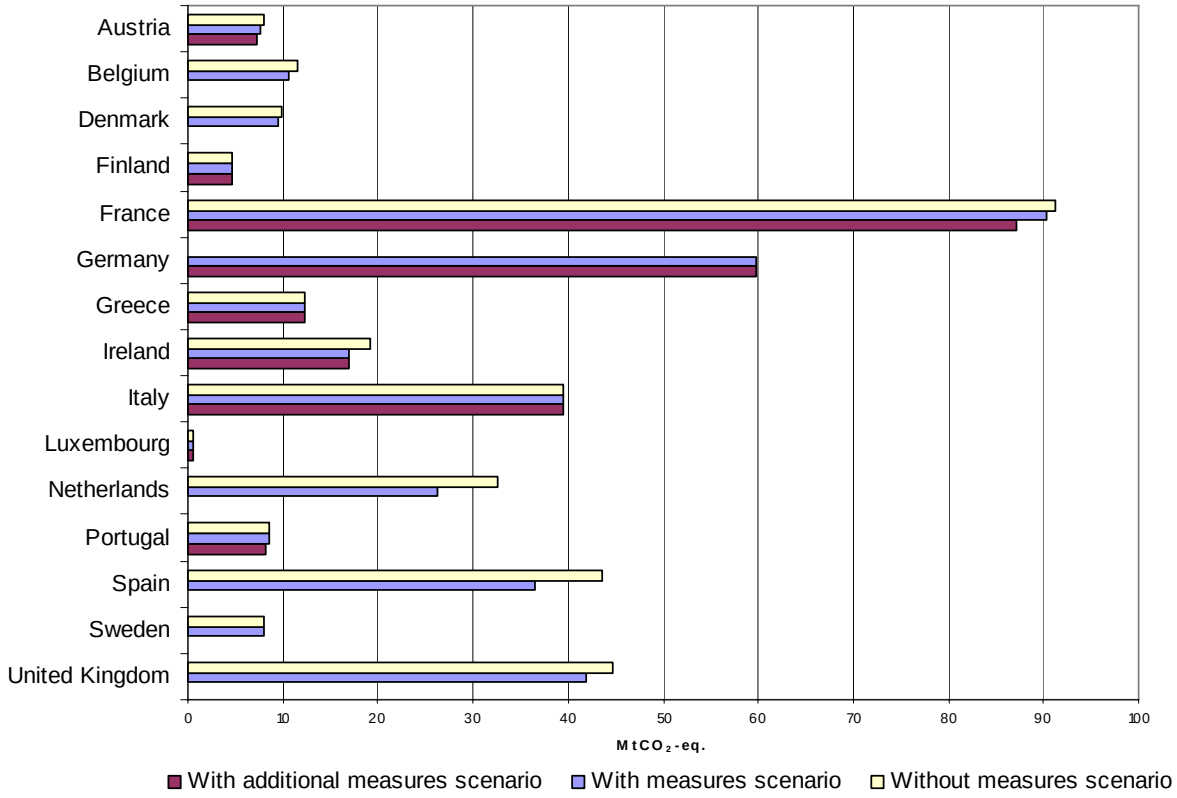
Only Austria, France and Portugal defined additional measures, whereas the other EU-15 Member States only provide projections for already existing measures. The highest relative reductions with all measures considered (more than 20 %) are projected by Austria, Finland, Denmark, Germany and the United Kingdom.

Contribution of policies and measures to greenhouse gas emission reductions in 2010 in the agricultural sector

Decreases in fertiliser use and a reduction in the application of manure on land are likely to reduce N_2O emissions, while decreases in the number of cattle and increases in cattle productivity are likely to contribute to a decline in emissions of methane.

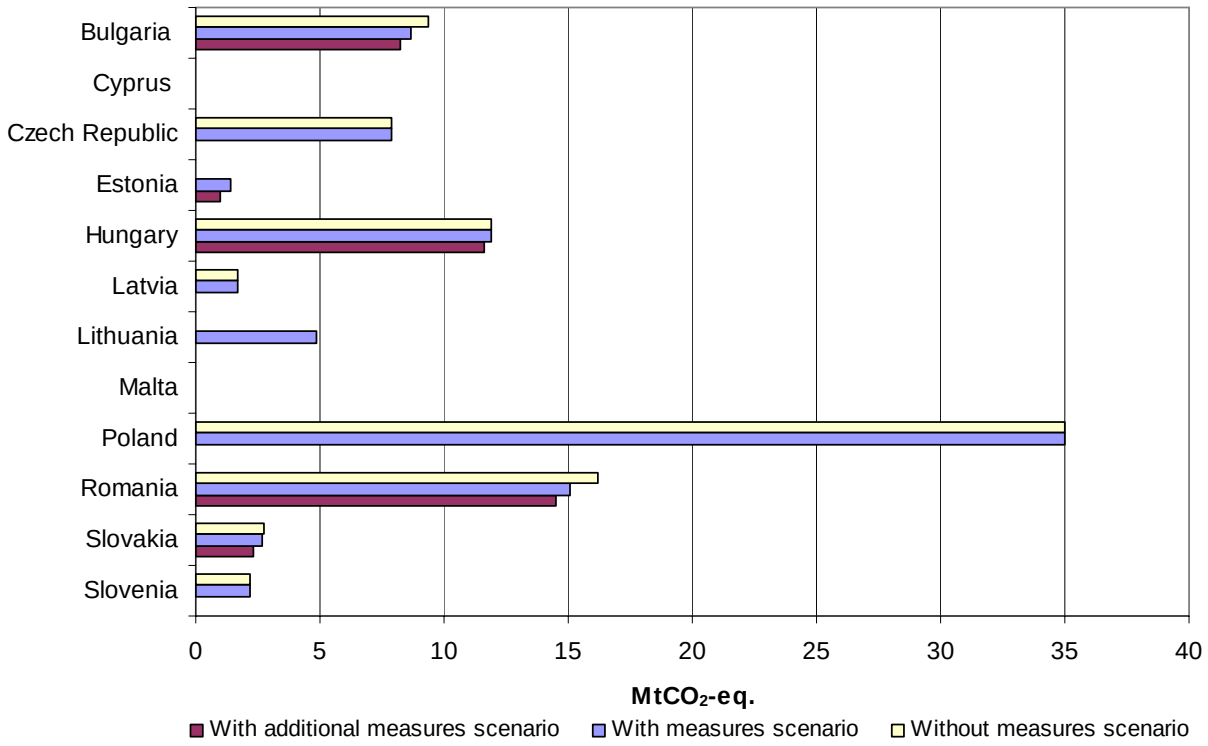
The drop in fertiliser use between 1990 and 2004 was achieved partly through the 1992 reform of the common agricultural policy (CAP), resulting in a shift from production-based support mechanisms to direct area payments in arable production. The 2003 CAP reform, which included further decoupling of payments from production and cross compliance, and the new Rural Development Policy, are expected to lead to a further decline in greenhouse gas emissions. In addition, reduction in fertiliser use has also been achieved due to the implementation of EU directives such as the nitrate directive, and the agro-environment programmes supporting extensification measures. Promotion of good practice codes for the agricultural sector is a widespread measure for Member States to reduce N_2O and methane emissions. Changes in agricultural emissions are generally driven by economic policies or those aimed at the wider issue of sustainable production, rather than targeting specifically climate change. There is an increasing awareness of the potential impacts of climate change on agriculture and the need to develop adaptation measures, although policy development is at an early stage. Figure 68 and Figure 69 illustrate the contribution of policies and measures to the reduction of emissions from the agricultural sector in 2010 for EU-15 and EU-12 respectively. Figure 70 highlights a number of CCPMs targeting emissions in the agricultural sector and projected to result in 11 Mt CO_2-eq. reductions across the EU-27 in 2010.

Figure 68 Contribution of policies and measures to emission reductions in the agricultural sector in 2010, EU15



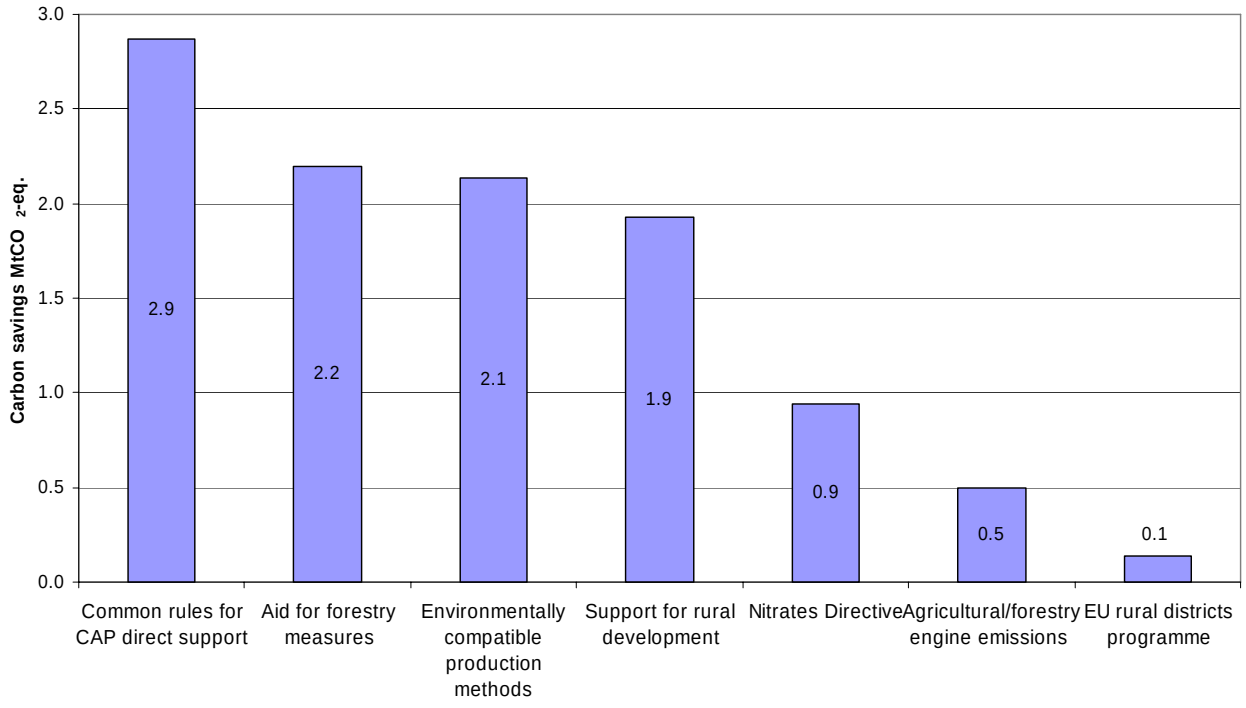
Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in fourth national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

Figure 69 Contribution of policies and measures to emission reductions in the agricultural sector in 2010, EU12



Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in latest national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

Figure 70 Emission reduction potential of CCPMs in the agricultural sector in 2010, EU27



Source: European Climate Change Programme (ECCP) Database on Policies and Measures in Europe (www.oeko.de/service/pam/sector.php) as of 11 July 2007.

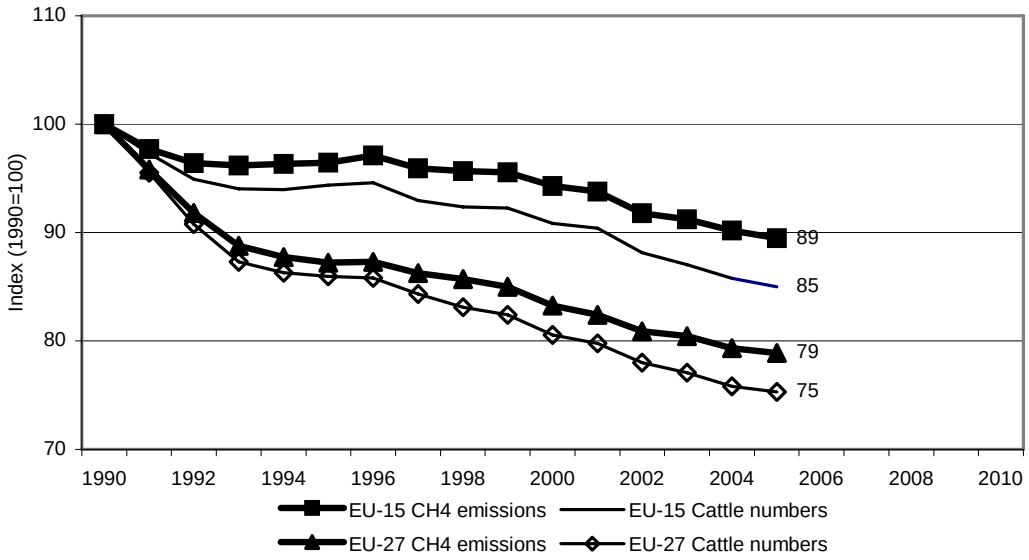
A 1.5.1 CH_4 emissions from enteric fermentation (4A)

- Between 1990 and 2005, CH_4 emissions from enteric fermentation decreased by 11 %. Between 2000 and 2005 emissions decreased by 5 %.

CH_4 emission from 4A	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	3.2%	2.9%	-10.5%	-5.1%
EU-27	3.3%	2.8%	-21.1%	-5.2%

In 2005, CH_4 emissions from enteric fermentation account for 3 % of total greenhouse gas emissions in the EU-15. Most emissions are due to cattle (source category 4A1). Between 1990 and 2005, CH_4 emissions from enteric fermentation have decreased by more than 20 % in the EU-27 and by about 10 % in the EU-15.

Figure 71: Trend of CH_4 emissions and number of cattle from enteric fermentation in the EU-15 and CH_4 emissions of the EU-27



Source: EEA 2007a

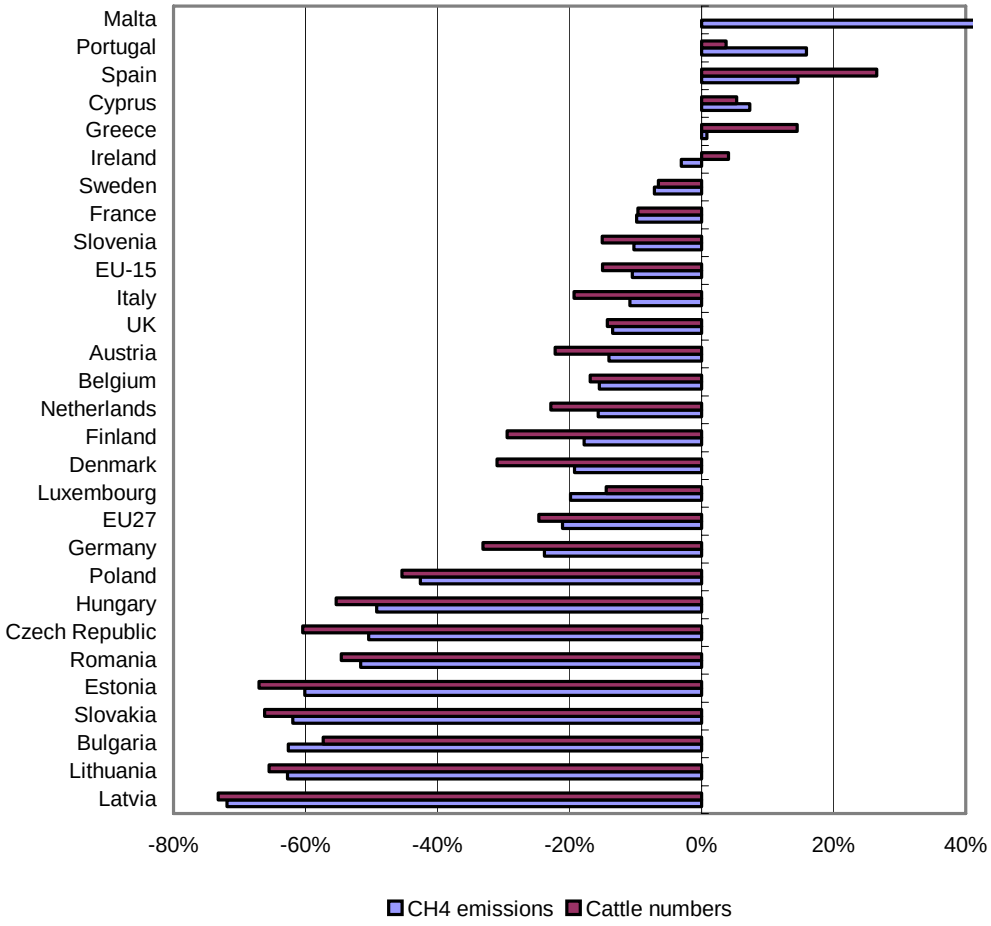
Animal numbers are coupled to emissions from enteric fermentation. One important indicator for animal productivity is the average daily gross energy intake for dairy and non-dairy cattle and sheep.

The trend in animal numbers is to a large extend influenced by EU policy such as suckler cow premia, milk quota, but also environmental legislation linked to agricultural policy through cross-compliance and the rural development. Animal development is also determined by epidemics such as the avian flu (reducing e.g. the number of poultry in the Netherlands in 2003), the BSE crisis between 2001 and 2003, to name just the most important. (EEA, 2007a)

For cattle, the decrease in numbers is mainly explained by an increase in milk production per dairy cow combined with an unchanged total milk production. Milk production per cow increased between 1990 and 2005. This development has resulted from both genetic changes in cattle (due to breeding programmes) and the change in amount and composition of feed intake. (EEA, 2007a)

The decrease in emissions can also be explained by the effects of the EU accession, note only for new EU-Member States, but also for Finland and Belgium (EEA, 2007a). It results in changes in the economic structure followed by an increase in the average farm size and a decrease in the number of small farms. It generally can be observed that small businesses are disappearing.

Figure 72 Change of CH_4 emission from enteric fermentation and number of cattle per EU Member States between 1990 and 2005



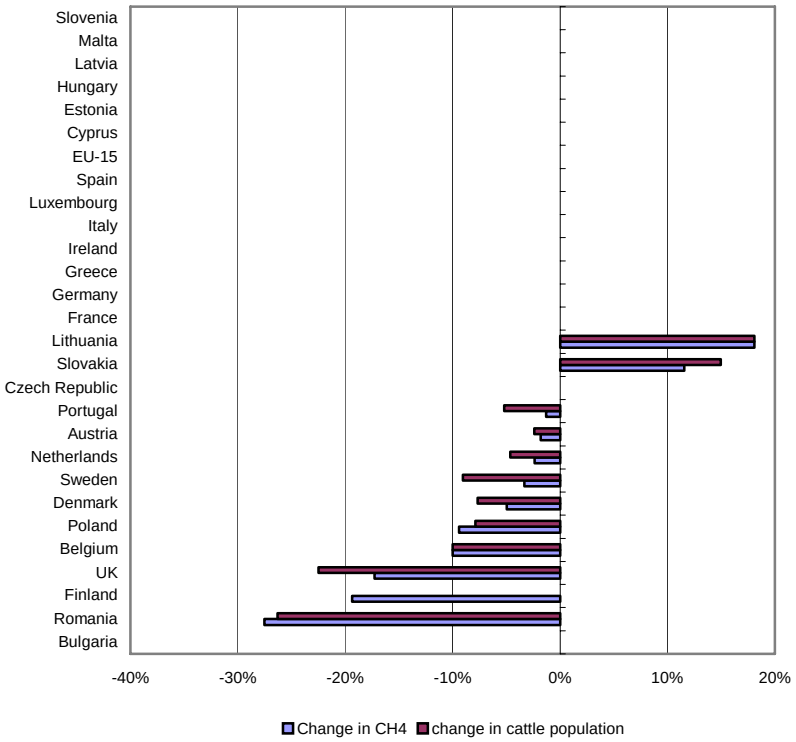
Source: EEA 2007a

The number of cattle and CH_4 emissions from this category are closely linked in most countries. However, it has to be taken into account that – apart from the cattle specific emission factors – also the development of other animal population numbers (in particular sheep) influences overall CH_4 emissions from enteric fermentation.

Specific CH_4 emissions of cattle production (projected indicator N°9)

- In most Member States cattle numbers are projected to further decrease, so are the resulting CH_4 emissions.

Figure 73 Projected change of CH_4 emission from cattle and number of cattle per EU Member States between 2005 and 2010 (Projected Indicator N°9)



Source: Member States' submissions

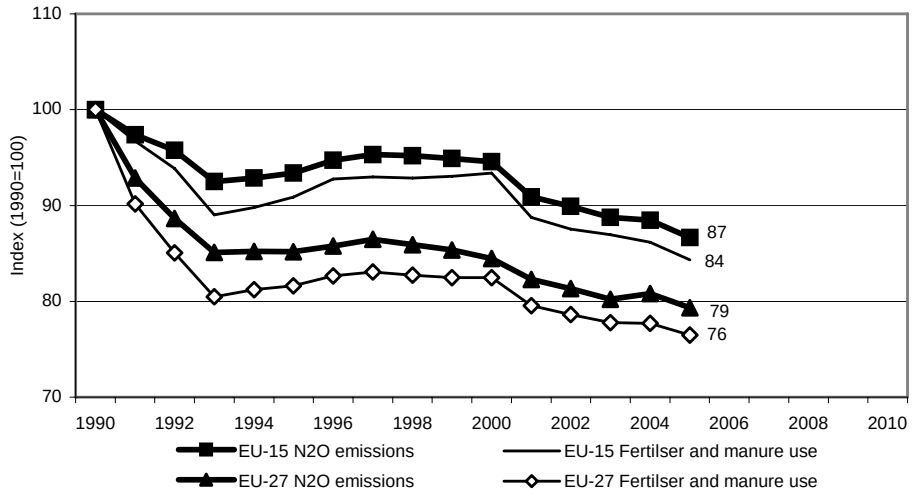
A 1.5.2 N_2O emissions from agricultural soils (4D)

- Between 1990 and 2005, N_2O emissions from agricultural soils decreased by 13 %. Between 2000 and 2005 emissions decreased by 8 %.

N_2O emissions from 4D	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	5.3%	4.7%	-13.3%	-8.3%
EU-27	5.5%	4.7%	-20.7%	-6.1%

N_2O emissions from agricultural soils due to manuring account for 1 % of total greenhouse gas emissions in the EU-15 in 2005. N_2O emissions from fertiliser use decreased in the EU-27 by more than 20 % whereas in the EU-15 by 13 %.

Figure 74: Trend of N_2O emissions and fertiliser and manure use from agricultural soils in the EU-15 and EU-27



Source: EEA 2007a

The decrease in emissions is largely a consequence of efficiency improvements, the reform of the EU's common agricultural policy (CAP) as well as the implementation of the Nitrate Directive aimed at reducing water pollution.

The decoupling of emissions from soils and fertiliser use in the Netherlands is due to the phasing out of manure spreading on the land and the incorporation of manure into the soil: this measure aimed at reducing ammonia emissions from manure has the negative side-effect of increasing N_2O emissions. In Greece, the decoupling of emissions results from the relatively low share of direct emissions from soils, so total N_2O emissions from soils are not as closely linked to fertiliser and manure use as in other Member States.

The decrease in total emissions in Denmark can largely be attributed to the decrease in N_2O emissions from agricultural soils – the total N_2O emission from 1990-2005 has decreased by 31%. This reduction is due to a proactive national environmental policy over the last twenty years. The environmental policy has introduced a series of measures to prevent loss of nitrogen from agricultural soil to the aquatic environment. The measures include improvements to the utilisation

of nitrogen in manure, a ban on manure application during autumn and winter, increasing area with winter-green fields to catch nitrogen, a maximum number of animals per hectare and maximum nitrogen application rates for agricultural crops. (EEA, 2007a)

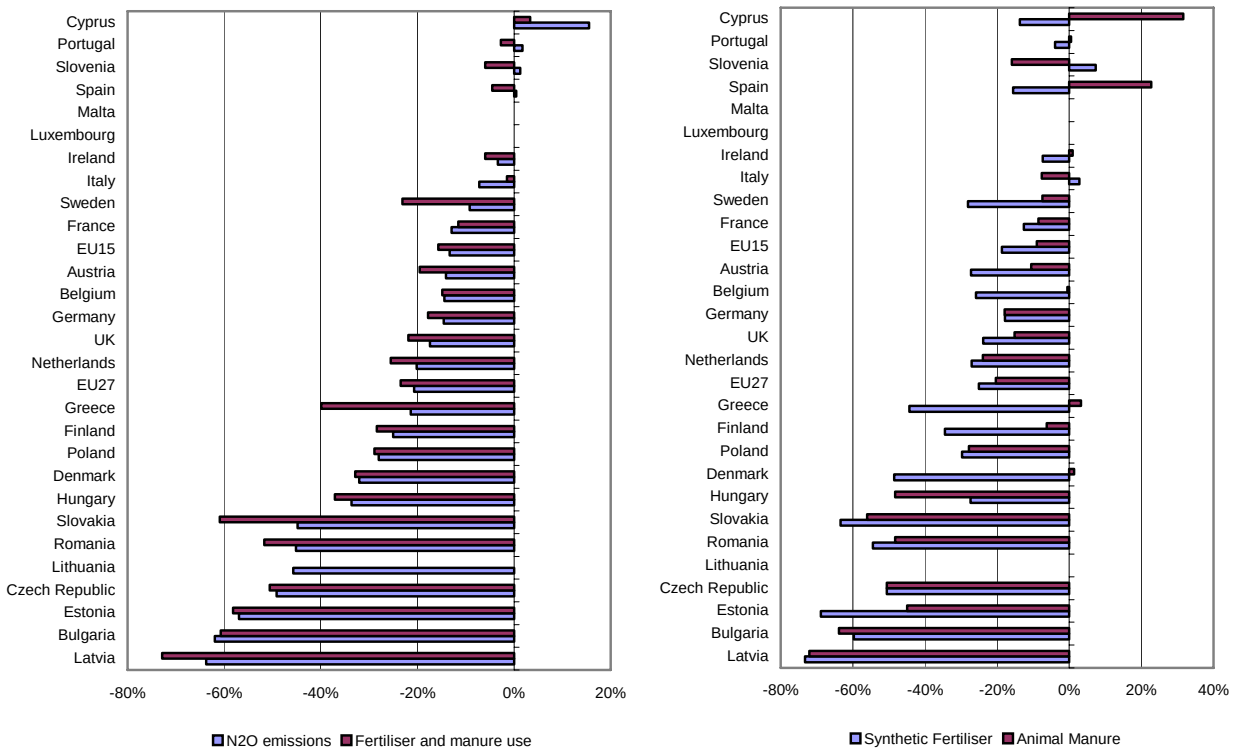
In Finland, emissions from agricultural soils have decreased 25%, from 1990 to 2005. The main reasons causing this reduction are:

- the decrease in animal numbers which affects the amount of nitrogen excreted annually to soils,
- the decrease in the amount of synthetic fertilisers sold annually,
- the decrease in the area of cultivated organic soils.

Some parameters, e.g. the annual crop yields affecting the amount of crop residues produced annually, cause the fluctuation in the time series but this fluctuation does not have much effect on the overall N_2O emissions trend (EEA, 2007a).

Fertiliser and manure use, and N_2O emissions are decreasing in all countries except Cyprus (Figure 75). In Portugal, Slovenia and Spain emissions and fertiliser use show different trends. Fertiliser use is decreasing in almost all countries (except Cyprus) and in most Member States, the application of synthetic fertiliser is decreasing faster than the application of animal manure.

Figure 75 Change of N_2O emission and fertiliser and manure use (left), split for synthetic fertiliser and animal manure (right) per EU Member States between 1990 and 2005

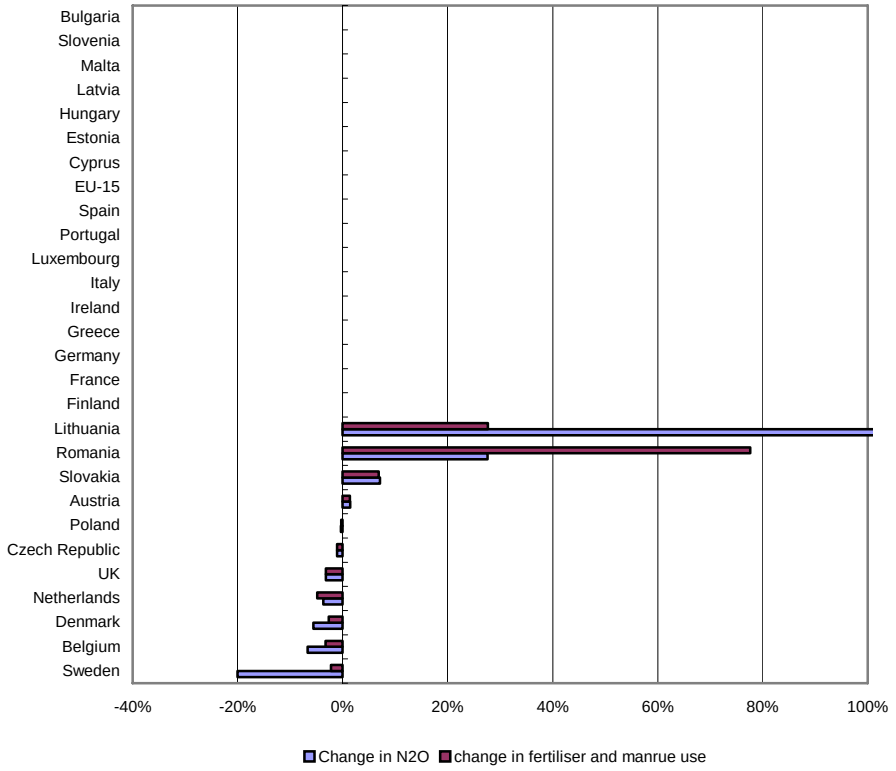


Source: EEA 2007a

Specific N_2O emissions of fertiliser and manure use (projected indicator N°8)

- Eleven Member States reported numerator and denominator. In seven countries, emissions from fertiliser and manure are projected to decrease between 2005 and 2010.

Figure 76 Projected Change in N2O emission from manuring and fertiliser and manure use per EU Member State between 2005 and 2010 (Projected Indicator N°8)



Source: Member States' submissions

A 1.6 Waste

Trends

- Between 1990 and 2005, greenhouse gas emissions from sector waste decreased by 38 %. Between 2000 and 2005 they decreased by 22 %.

GHG emission from sector 6	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	4.1%	2.6%	-37.9%	-21.7%
EU-27	3.9%	2.9%	-32.1%	-17.0%

Projections

- Emissions from waste sector are projected decrease more than in any other sector by 2010 (-47 %). Ireland and Luxembourg project that their greenhouse gas emissions from waste in 2010 will be higher than in the base year.
- Only five new Member States (Bulgaria, Czech Republic, Estonia, Hungary and Lithuania) project decreases in greenhouse gas emissions from waste compared to base-year emissions.

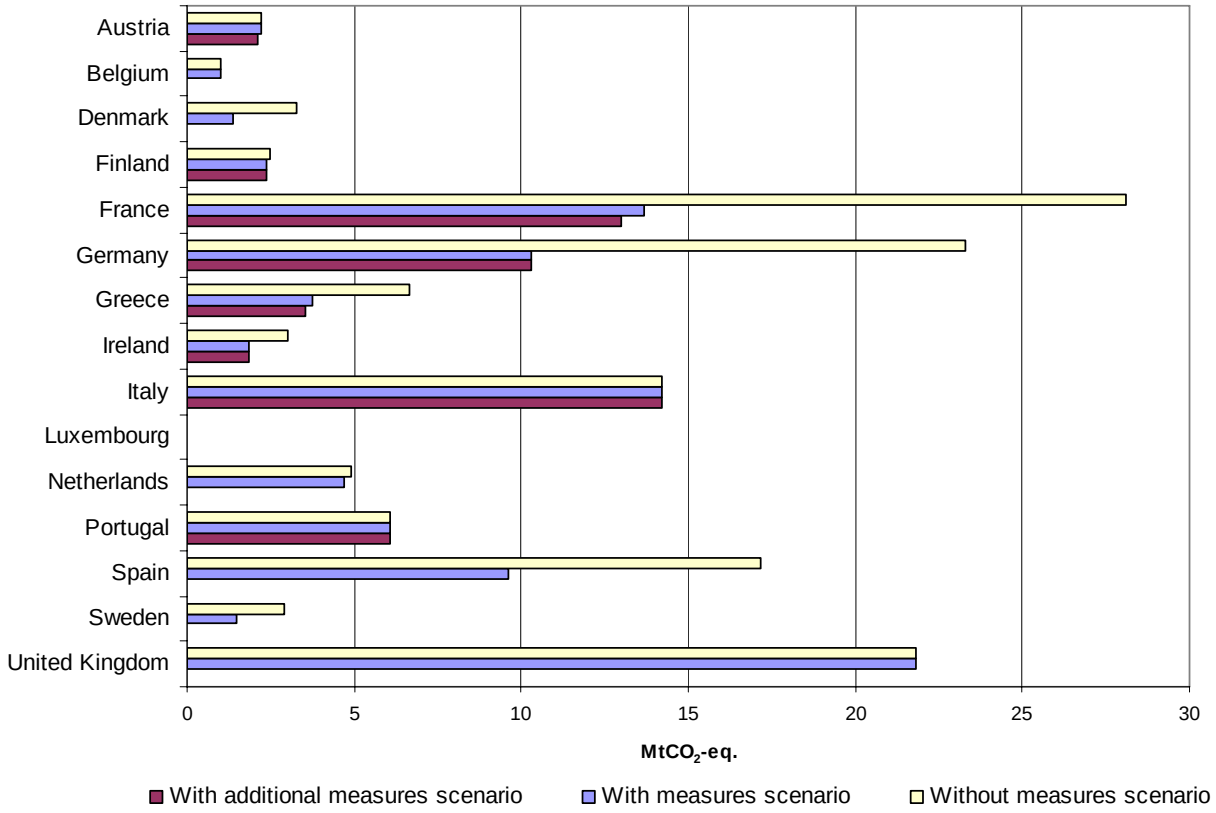
Only Austria, France and Greece defined additional measures, whereas the other EU-15 Member States only provide projections for already existing measures. The highest reductions (more than 50 %) are projected by Belgium, Germany, the Netherlands, Sweden and the United Kingdom.

Contribution of policies and measures to greenhouse gas emission reductions in 2010 in the waste sector

Decreases in emissions of methane in particular but also carbon dioxide and nitrous oxide are expected to result from a range of (solid and water) waste management schemes, taxes and other measures such as the EU Landfill Tax (expected to reduce emissions by 5.8 Mt CO_2-eq. in 2010).

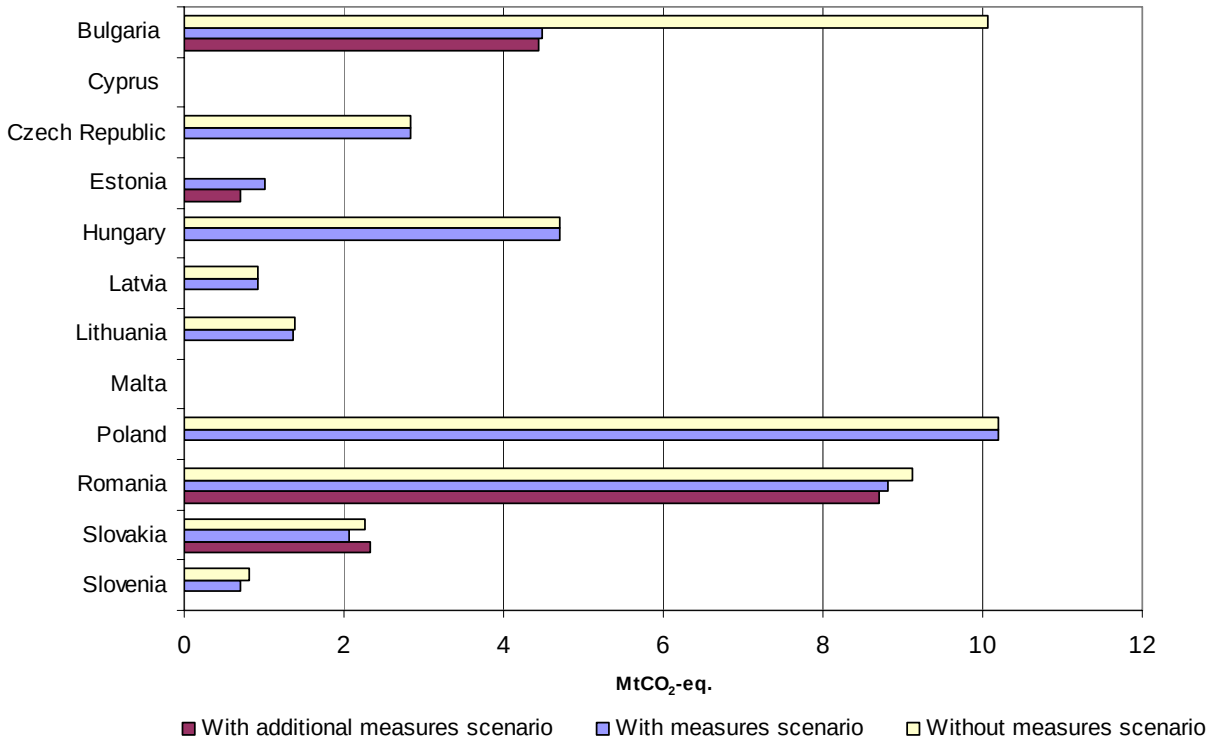
Figure 68 and Figure 69 illustrate the contribution of policies and measures to the reduction of emissions from the waste sector in 2010 for EU-15 and EU-12 respectively.

Figure 77 Contribution of policies and measures to emission reductions in the waste sector in 2010, EU15



Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in fourth national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

Figure 78 Contribution of policies and measures to emission reductions in the waste sector in 2010, EU12



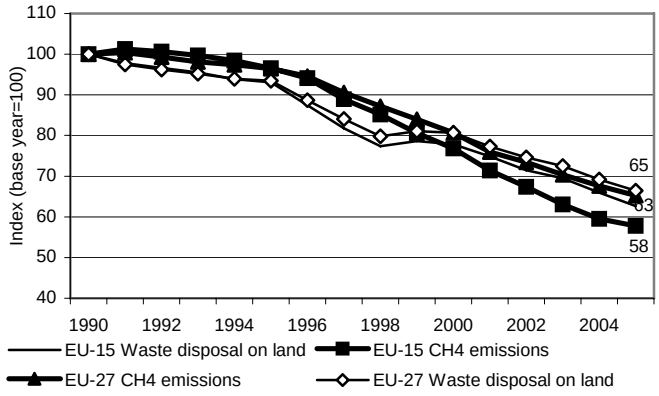
Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in latest national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

CH_4 emissions from solid waste disposal (6A)

- Between 1990 and 2005, CH_4 emissions from solid waste disposal decreased by 42%. Between 2000 and 2005 they decreased by 25 %.

CH_4 emission from 6A	Share in 1990 total GHG	Share in 2005 total GHG	Change 1990-2005	Change 2000-2005
EU-15	3.5%	2.0%	-42.2%	-24.8%
EU-27	3.1%	2.2%	-35.3%	-19.9%

Figure 79: Trend of CH_4 emissions and amount of solid waste disposed on land in the EU-15 and CH_4 emissions of the EU-27



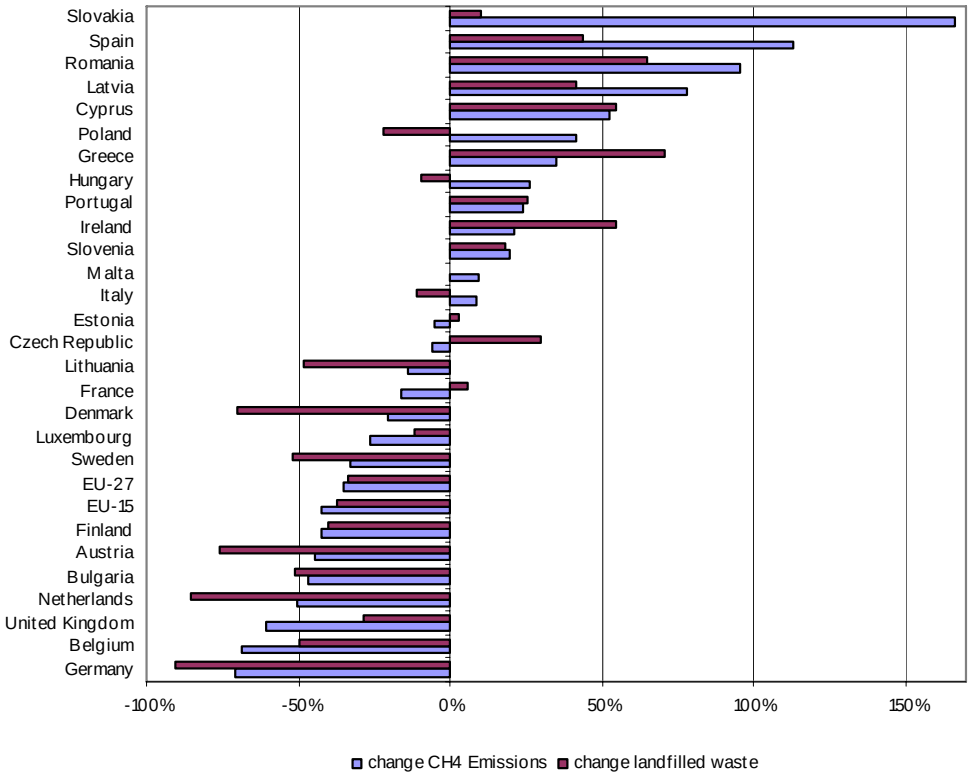
Source: EEA 2007a

Between 1990 and 2005, the amount of landfilled waste decreased in all EU-15 Member States except Spain, Greece, Portugal, Ireland and France. In the new Member States, emissions are mostly increasing (except Estonia, Czech Republic, Lithuania and Bulgaria). As emissions occur with a delay to the disposal it can occur that the amount of landfilled waste is decreasing and emissions are still increasing.

The main driving force of CH_4 emissions from solid waste disposal is the amount of biodegradable waste and the amount of CH_4 recovered and utilised or flared. The Landfill Directive limits the amount of biodegradable waste going to landfill to 65 % (by 2006), 50 % (by 2009) and 35 % (by 2016) of the waste generated in 1995. The implementation of the Directive means also that all new landfill sites must have gas recovery facilities and that such facilities will need to be installed in all existing landfill sites by 2009. The achievement of these goals implies further reductions in methane emissions, part of which have already occurred. However, many Member States are still far from fulfilling the Directive's targets.

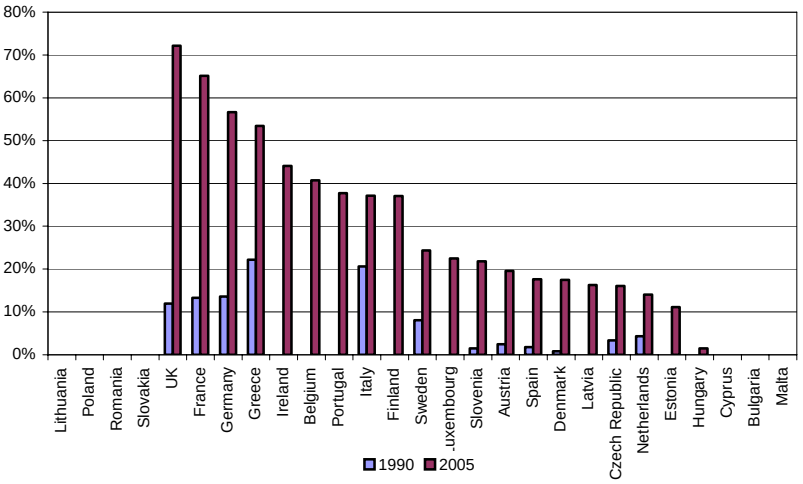
Municipal waste generation rates in central and Eastern Europe are lower than in western European countries. Whether this is due to different consumption patterns or underdeveloped municipal waste collection and disposal systems needs further clarification. Reporting systems also need further development (EEA 2005).

Figure 80 Change of CH_4 emissions and amount of landfilled waste per EU Member States between 1990 and 2005



Source: EEA 2007a

Figure 81 Methane Recovery per Member State in 1990 and 2005



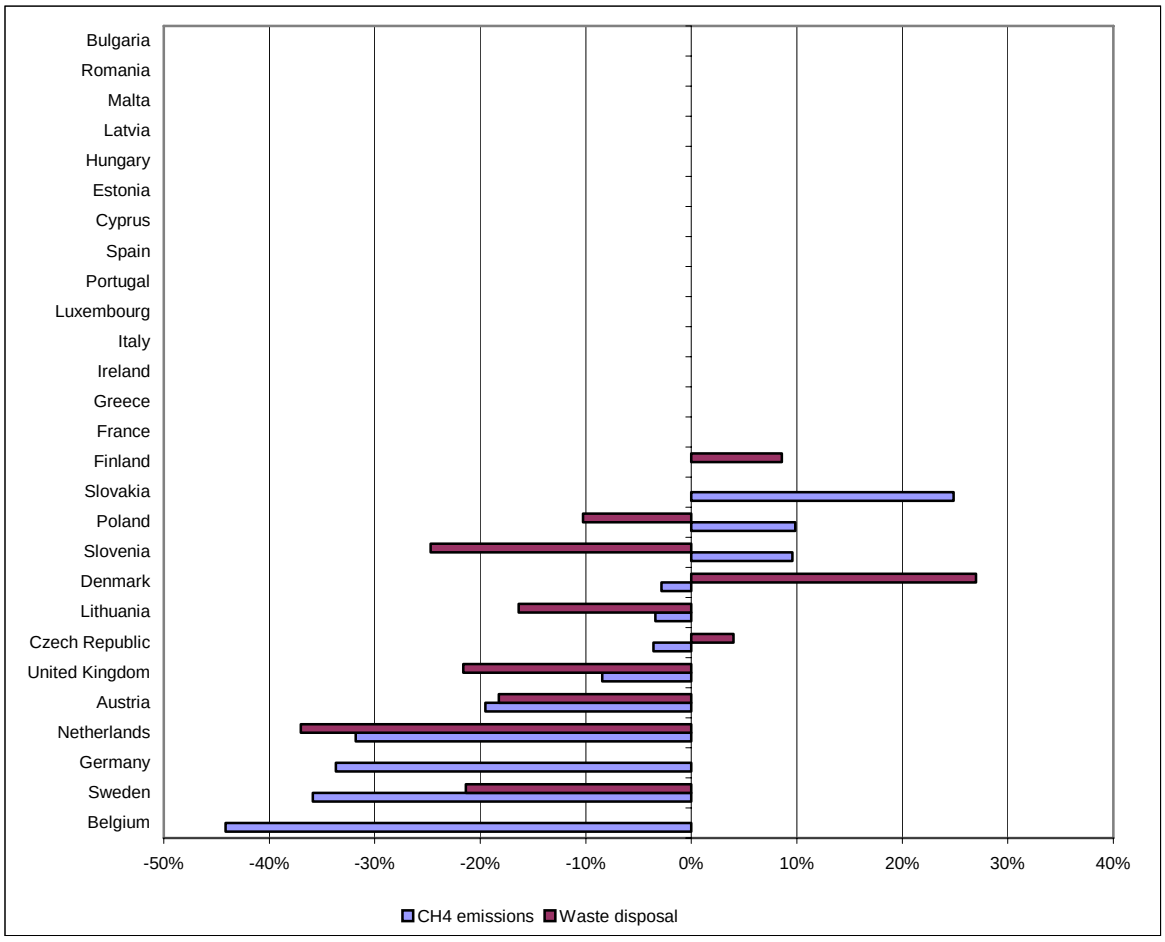
Source: EEA 2007a

Specific CH_4 emissions from landfills (projected indicator N°10)

- Most reporting Member States project that 2010 CH_4 emissions from landfills will stay below 2005 levels, except Poland, Slovak Republic and Slovenia.

Projected Indicator N°10 looks at CH_4 emissions from landfills. Thirteen MS report data on projections of amount of landfilled waste and CH_4 emissions from landfills.

Figure 82 Projected change of CH_4 emissions and amount of landfilled waste per EU Member States between 2005 and 2010 (Projected Indicator N°10)



Source: Member States' submissions

A 2 Key domestic policies and measures

A 2.1 Common and coordinated policies and measures of the EU

- From all sectoral policies and measures defined at EU level, the Directive on renewable electricity is projected to deliver the largest reduction in greenhouse gas emission by 2010 in the EU-15.
- The Community strategy on CO_2 from passenger cars (including the voluntary commitment of car manufacturers; associations) represents the second highest potential for greenhouse gas emission reduction.
- Several policy developments have occurred in 2006 and 2007, including the European Council autonomous commitment to reduce EU greenhouse gas emissions by 20% before 2020.

The European Climate Change Programme (ECCP)[8], launched in 2000, provides a cohesive framework to identify and develop all the necessary elements of an EU strategy to implement the Kyoto Protocol. Initial work to develop further policies and under the first phase of the Programme, the focus was on the Kyoto flexible mechanisms, the energy supply, energy consumption, transport and industry sectors and research. The Commission committed itself to 12 priority actions and the majority of these have been or are close to being implemented. In October 2005, the Commission launched ECCP II as a continued programme for EU's climate policy preparation and development. As well as a review of Phase 1 and further work on the implementation of existing policies and measures, it investigates new policy areas such as adaptation, aviation and carbon capture and storage.

The figures in the table below are based on ex-ante estimates of the emissions reduction potential made by the Commission. The estimates were reviewed as part of ECCP II, but in most cases, there were not sufficient quantified estimates of the impacts of policies and measures by Member States to comment on the ex-ante estimates in detail. However, a number of reasons were identified as to why in some cases these measures are unlikely to deliver the full amount of the ex-ante estimates. Member States estimates of the impact of key common and coordinated policies and measures (CCPMs) are discussed in Section 2.4.1. Both the Commission and Member States assessments of impacts indicate that of all the sectoral policies and measures defined at EU level, the Directive on renewable electricity is projected to deliver the largest reduction in greenhouse gas emission by 2010 in the EU-15.

[8] Report on the first phase of the ECCP www.europa.eu.int/comm/environment/climat/pdf/eccp_longreport_0106.pdf
Second ECCP progress report www.europa.eu.int/comm/environment/climat/pdf/second_eccp_report.pdf
Details of Phase II of the ECCP. http://ec.europa.eu/environment/climat/eccp.htm

Summary of implemented and planned policies and measures, and reduction potentials in the EU-15 estimated by the European Commission

Table 1 Cross-cutting issues

Policies and measures 'Cross-cutting'	Emission reduction potential by 2010 in EU-15 (Mt CO_2-eq.)	Stage of implementation /timetable /comments
1. EU Emission Trading Scheme		In force
2. Revision of the monitoring mechanism	N/a	In force
3. Link Kyoto flexible mechanisms to emissions trading		In force

Table 2 Energy Supply

Policies and measures 'Energy supply'	Emission reduction potential by 2010 in EU-15 (Mt CO_2-eq.)	Stage of implementation /timetable /comments
4. Directive on renewable electricity	**100-125**[9]	In force
5. Directive on the promotion of transport bio-fuels	**35-40**[9]	In force
6. Directive on promotion of cogeneration	**22-42**[10]	In force
7. Further measures on renewable heat (including biomass action plan)	**36-48**	Biomass Action Plan, Dec 2005[11], over 20 further actions planned
8. Intelligent Energy for Europe: programme for renewable energy	N/a	Programme for policy support in renewable energy
TOTAL in implementation	**193-255**	

[9] Second ECCP progress report April 2003 http://europa.eu.int/comm/environment/climat/pdf/second_eccp_report.pdf

[10] COM (2004)366 – final "The share of renewable energy in the EU, May 2004

[11] COM (2005) 628 final "Biomass Action Plan, December 2005"

Table 3 Energy demand

Policies and measures 'Energy demand'	Emission reduction potential by 2010 in EU-15 (Mt CO_2-eq.)	Stage of implementation / timetable /comments
9. Directive on the energy performance of buildings	**20**[12]	In force Monitoring and review
10. Directive requiring energy labelling of domestic appliances		
• Existing labels	**20**[9]	In force
• New (el. ovens &AC)	**1**	Monitoring and review
• Envisaged revisions (refrigerators / freezers / dishwashers)	**10**	In preparation
• Planned new (hot water heaters)	**23**	In preparation
• Extension of scope of Directive	N/k	In preparation
11. Framework Directive on eco-efficiency requirements of energy-using products	dependent on implementation of daughter directives	In force; preparatory studies for daughter directives underway
12. Directive on Energy services	**40-55**[9]	In force
13. Action Plan on Energy efficiency as a follow-up to the Green Paper	N/a	Launched Oct 2006[13]. Identifies 10 priority actions to achieve up to 20% energy savings by 2020.
14. Action under the directive on integrated pollution prevention and control (IPPC) on energy efficiency	Not known	In preparation
15. Intelligent Energy for Europe programme for energy efficiency	N/a	Programme for policy support in energy efficiency
16. Public awareness campaign on energy efficiency	N/a	Supporting program as part of Intelligent Energy for Europe: In implementation
17. Programme for voluntary action on motors (Motor Challenge)	N/a	Supporting programme for voluntary action on efficient motor systems
18. Public procurement	N/a	EU Handbook developed for guidance for increased energy efficient public procurement
TOTAL in implementation	**114-129**	

Table 4 Transport

Policies and measures 'Transport'	Emission reduction potential by 2010 in EU-15 (Mt CO_2-eq.)	Stage of implementation / timetable / comments
19. Community strategy on CO_2 from passenger cars (including voluntary commitment (VC) of car manufacturers' associations)	Total **107-115** Of which VC: **75-80**[14]	VC: monitoring; review ongoing Labelling: in force Communication on fiscal measures: in implementation Directive on taxation of passenger cars: in preparation
20. Framework Directive Infrastructure use and charging	Not known	In implementation, in relation to heavy duty road transport only
21. Shifting the balance of transport modes	Not known	Package of measures in implementation
22. Fuel taxation	Not known	In force Focus on EU harmonisation of taxation, not on CO_2 reduction
23. Directive on mobile air conditioning systems: HFCs	See regulation on fluorinated gases	In force
TOTAL in implementation	**107 - 115**	

[12] COM (2004)366 – final "The share of renewable energy in the EU, May 2004

[13] COM(2006)545 – final "Action Plan for Energy Efficiency: Realising the Potential"

[14] Second ECCP progress report April 2003 http://europa.eu.int/comm/environment/climat/pdf/second_eccp_report.pdf

Table 5 Industry & non CO_2 gases

Policies and measures 'Industry'	Emission reduction potential by 2010 in EU-15 (Mt CO_2-eq.)	Stage of implementation / timetable / comments
24. Regulation on fluorinated gases	**23**[15]	In force
25. IPPC & non-CO_2 gases	Not known	In force Review periodically

Table 6 Waste

Policies and measures 'Waste'	Emission reduction potential by 2010 in EU-15 (Mt CO_2-eq.)	Stage of implementation / timetable / comments
26. Landfill Directive	**41**[14]	In force
27. Thematic strategy on waste	Not known	Launched December 2005[16]

Table 7 Integration Research & Development

Policies and measures	Emission reduction potential by 2010 in EU-15 (Mt CO_2-eq.)	Stage of implementation /timetable /comments
28. R&D framework Program	n/a	In force. Under the 6th FFramework Programme (FP) for research and development (2000-2006) EUR 2 billion of support was available for climate change related research, including the fields of energy and transport. Under the 7th FP (2007-2013), it is EUR 11 billion.

Table 8 Integration Structural funds

Policies and measures	Emission reduction potential by 2010 in EU-15 (Mt CO_2-eq.)	Stage of implementation /timetable /comments
29. Integration climate change in structural funds &cohesion funds	n/a	EUR 308 billion (2004 prices) have been allocated for the new budgetary period of 2007-2013 Strategic guidelines highlight investments to promote Kyoto commitments, including renewable energy, energy efficiency and sustainable transport systems as eligible areas for support.

Table 9 Agriculture

Policies and measures 'Agriculture'	Emission reduction potential by 2010 in EU-15 (Mt CO_2-eq.)	Stage of implementation /timetable /comments
30. Integration climate change in rural development	N/a	Improvement of the environment is a key theme, and strategic guidelines identify combating climate change including development of renewable energy, material sources for bioenergy and preserving the carbon sink in soils as eligible areas for support. The budget for rural development is EUR 77 billion for 2007-13.

[15] COM (2003) 492 final

[16] COM (2005) 666 and 667 (final) Thematic Strategy on Waste Prevention

31. Support scheme for energy crops	N/a	In force
32. N_2O from soils	**10**	Improved implementation of the nitrates Directive

Table 10 Forests

Policies and measures 'Forests'	Sequestration potential by 2010 in EU-15 (Mt CO_2-eq.)	Stage of implementation /timetable /comments
33. Afforestation and reforestation: - Afforestation programmes - Natural forest expansion	**14**[17]	Possibility for support through forestry scheme of rural development
34. Forest management (various measures)	**19**[18]	Possibility for support through forestry scheme of rural development, dependent on national implementation.

Note: The emission reduction potentials by 2010 in EU-15 presented are based on ex-ante estimates of the emissions reduction potential made by the Commission.

Source: European Climate Change Program, ex-ante estimates of Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in fourth national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

Climate change continues to be integrated into other policy areas of the EU. The Commission is implementing climate change measures. The most important recent development is the integrated energy and climate change package announced in January 2007, which included:

- The Communication "Limiting climate change to 2° Celsius: The way ahead for 2020 and beyond."[19] In this document, the Commission proposed an independent commitment to a 20% reduction (compared to 1990 levels) in EU greenhouse gas emissions by 2020 and a more ambitious 30% reduction, provided that other developed countries commit themselves to comparable reductions. The European Council[20] subsequently endorsed these targets.
- The document "An Energy Policy for Europe – the need for Action"[21]. Proposals included binding targets of 20% for the share of renewable energy in overall EU energy consumption by 2020, increasing the level of biofuels in transport fuel to 10% by 2020, and an objective of saving 20% of the EU's energy consumption in a cost-efficient manner by 2020 as presented in the Commission's Energy Efficiency Action Plan.

Other important developments in 2006 included:

- The operation in practice of the EU-wide Emission Trading Scheme, and the submission of national allocation plans (NAPs) for Phase II.
- Proposals to include aviation in the ETS
- Adoption of a Regulation and Directive to limit emissions of fluorinated gases, including those from air-conditioning in cars.
- Action Plan for Energy Efficiency, which sets out 10 priority actions to realise up to 20% energy savings by 2020.

[17] Second ECCP progress report April 2003 http://europa.eu.int/comm/environment/climat/pdf/second_eccp_report.pdf
[18] Second ECCP progress report April 2003 http://europa.eu.int/comm/environment/climat/pdf/second_eccp_report.pdf
[19] COM(2007) 2 Limiting Global Climate Change to 2 degrees Celsius: the way ahead for 2020 and beyond.
[20] European Council, 8/9 March 2007, Presidency Conclusions
[21] COM(2007) 1 final

A 2.2 Main savings from existing and additional domestic policies and measures of the EU-15 Member States

A 2.2.1 Savings at EU-15 by level and Member States

- EU-15 emission savings in 2010 from policies and measures are projected to total to 727 Mt CO_2-eq. (compared to a scenario without measures).
- 23% (165 Mt CO_2-eq.) of these savings are projected to come from measures not implemented or adopted as yet ('additional measures').
- This compares to 817 Mt CO_2-eq. EU-15 emission absolute savings in 2010 from policies and measures reported in 2006, with 32% of savings from additional PAM.
- The greatest absolute savings are projected to occur in Italy, Germany and the United Kingdom.

Under the EU Monitoring Mechanism, Member States are required to provide information on the policies and measures (PAM) included in their 'with measures' projections (WM) and in their 'with additional measures' projections (WAM), with quantitative estimates of the effect of policies and measures on emissions by sources and removals by sinks of greenhouse gases between the base year and subsequent years, including 2005, 2010 and 2015.[22]

These estimates relate to absolute savings and are equivalent to emission reductions compared to a hypothetical scenario where no measure would have been implemented ("without measures"). This scenario would not necessarily lead to greenhouse gas emissions equal to base-year emissions. Therefore, the quantified savings referred to in the present section should be interpreted with care, as they differ from the projected emission reductions relative to base-year emissions – although they derive from the same policies and measures.

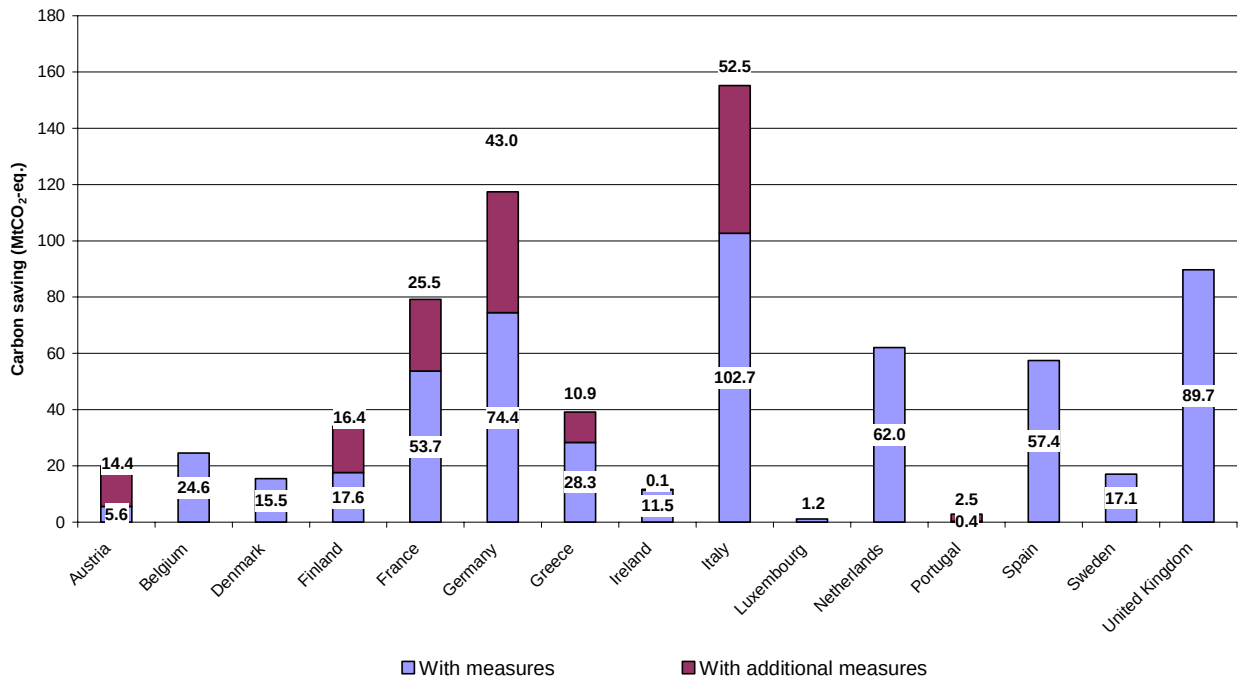
The type of policies and measures can be either EU level 'Common and Coordinated Policies and Measures' (CCPMs) or specific national policies and measures. In some cases, this distinction is clear from the information reported by the Member States, but in general, total effects of policies and measures are aggregated at a sector level and are not available at this level of detail.

For additional information on methodological issues relating to the calculation of policies and measures and 'without measures' projections, please refer to Annex 6, The reporting scheme.

[22] Article 3(2), 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.

Projected emission savings from policies and measures by 2010 in the EU-15 are projected to total to 727 Mt CO_2-eq. (Figure 83). 23 % of the total saving (165 Mt CO_2-eq.) is projected to come from measures not implemented or adopted as yet ('additional measures'). The greatest absolute savings are projected to occur in Italy, Germany and the United Kingdom, mostly after additional measures will be implemented. In 2006, 817 Mt CO_2-eq. emission savings from policies and measures in the EU-15 by 2010 were reported, with 32% of the savings coming from the implementation of additional PAM. In 2006, the largest savings were reported by Germany, Italy and France. Due to a change of calculation method (shift from a bottom up calculation of PAM savings to a top down calculation based on projections), the total savings projected by Germany have reduced by 148 Mt CO_2-eq. in 2007 compared to 2006. Germany's WAM projections in 2007 are 71 Mt CO_2-eq. lower than in 2006. Savings projected by Italy and the Netherlands have increased by 30 Mt CO_2-eq. and 34 Mt CO_2-eq. respectively compared to 2006.

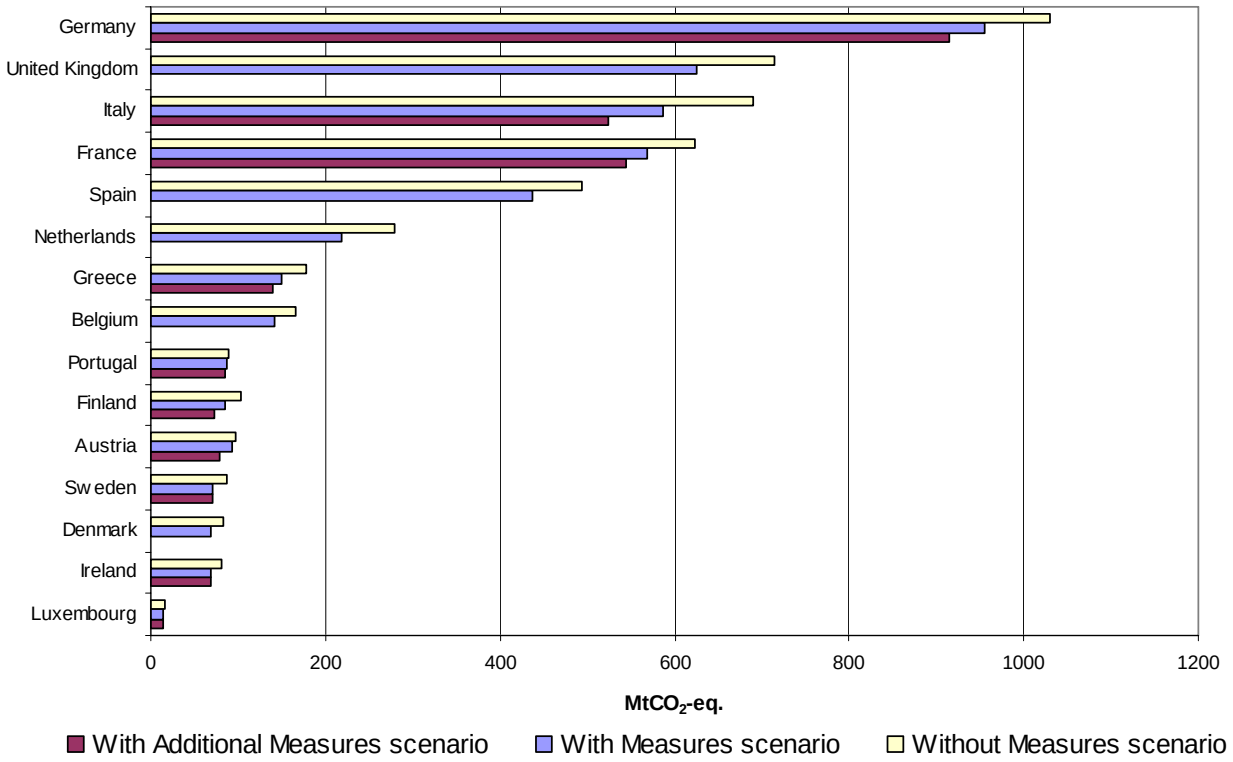
Figure 83 EU-15 Projected annual greenhouse gas emission savings from policies and measures in 2010



Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in fourth national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

Figure 84 displays 2010 projections under 'with measures', 'with additional measures' (where one exists) and 'without measures' scenarios.

Figure 84 EU-15 contribution of policies and measures to projections in 2010



Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in fourth national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

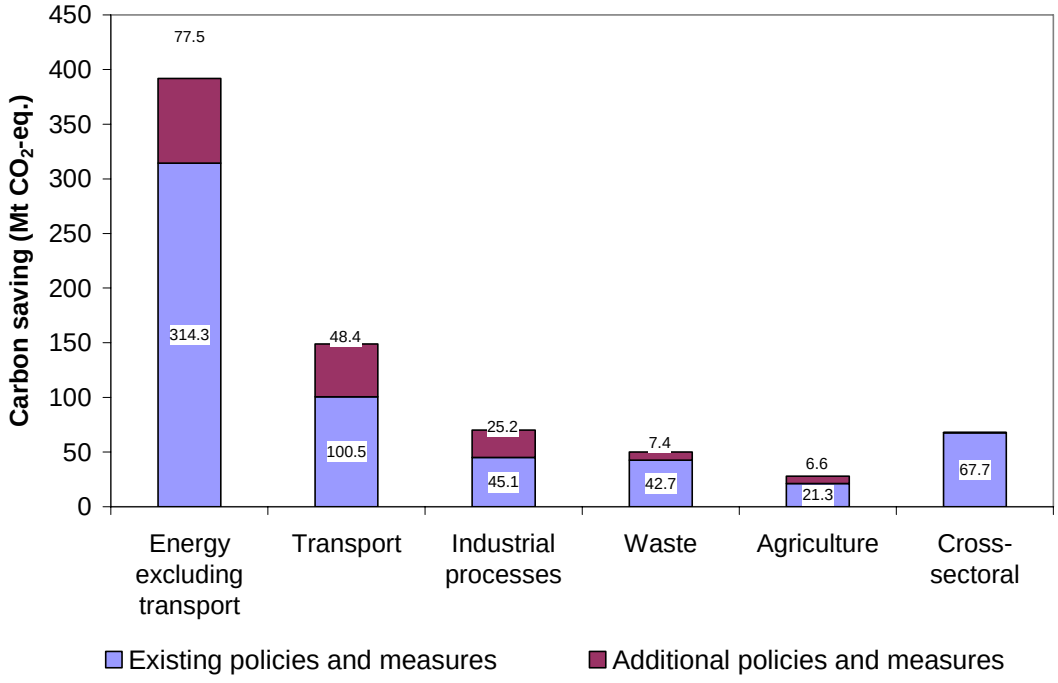
A 2.2.2 Savings at sectoral level in the EU-15

- Policies and measures in the energy sector (all energy-related emissions except transport) are projected to deliver the majority of greenhouse gas emission savings. The majority of these measures are targeted at moving to cleaner and more efficient energy production and making energy use more efficient.
- Transport measures are expected to deliver the second highest savings, although these dropped significantly compared to 2006 projected savings.
- Calculated projected savings from all sectors have decreased by 11% compared to reported savings potentials in 2006.

Figure 85 provides an overview of the estimated effects of domestic policies and measures on total EU-15 greenhouse gas emissions in each of the main sectors. Not all Member States have provided a sectoral breakdown of their latest projections or quantified the savings by sector from all policies and measures. Total EU-15 savings from additional policies and measures is known to be 165 Mt CO_2-eq. through deduction of the 'with measures' and 'with additional measures' projections. Total 'with measures' savings (562 Mt CO_2-eq.) may be an under estimate of savings from policies and measures (Figure 85). Calculated projected savings from all sectors have decreased by 11 % compared to reported savings potentials in 2006.

Only seven Member States have provided information on the savings from at least some implemented policies and measures in their 2007 Monitoring Mechanism submission (a drop in reporting compared to the ten reporting in 2006), including Denmark, Finland, Austria, Sweden, the United Kingdom, Spain and the Netherlands.

Figure 85 EU-15 Projected annual greenhouse gas emission savings by sector in 2010



Note: Projected savings from policies and measures in 2010 are estimated by comparison with a hypothetical reference case in which no measures were implemented since the base year.

Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in fourth national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

Policies and measures in the energy sector (all energy-related emissions except transport) account for 56 % of the total savings from implemented domestic measures and 47 % of the planned domestic measures savings for the EU-15 as a whole (compared to 56% and 57% respectively in 2006). The high contribution of this sector is because the majority of both implemented and planned policies and measures are targeted at moving to cleaner and more efficient energy production or making energy use more efficient.

Transport measures are expected to deliver the second highest savings, followed closely by the effect of measures on industrial processes and those falling in to the cross-sectoral category. As transport is the most rapidly growing source of greenhouse gases, the measures implemented and planned by Member States only go a small way to addressing this and provide 18% and 29% of the total savings from implemented and planned policies and measures respectively. This is broadly similar to 2006, where the share of savings, particularly from planned transport policies, was more significant at 16 % and 28 % of the total projected savings. Most projected savings from implemented transport policies can be attributed to France, Germany and the United Kingdom, while greatest savings from planned transport policies are from Italy and Germany.

In 2006, the vast majority of projected savings from industrial processes came from measures in Germany and France to address nitrous oxide emissions from industry. In 2007, however, reported savings are predominantly from Austria, France, Spain and Italy. Finally, savings from measures in the waste and agriculture sectors are expected to be small over the period from 2008-2012. Projected savings from the waste sector have decreased by 25% compared to reported savings potentials in 2006. This can be attributed largely to the fact that Germany did not provide a sectoral breakdown of projections for the waste sector.

Comparing the results between 2007 and 2006 findings reveals that:

- Reported emissions savings from existing policies and measures have fallen by 9 % compared to 2006 and reported emissions savings from additional policies and measures have fallen by 17 % compared to 2006;
- the savings from the energy sector (excluding transport) have decreased by 43 Mt for existing policies and measures, and increased by over 30 Mt for additional policies and measures compared to 2006;
- savings with existing measures in the Transport sector fell by over 34 Mt between 2005 and 2006 for existing measures and by 23 Mt for planned policies; between 2006 and 2007 projected savings have risen by 2 Mt for existing policies and have decreased by 8 Mt for planned policies;
- projected savings in the transport, industrial process and waste sectors have substantially decreased (67 Mt in total) but may be accounted for in the new category of 'cross-sectoral' which accounts for 67 Mt savings in 2007

A 2.3 Main savings from existing and additional domestic policies and measures of the EU-12 Member States

A 2.3.1 Savings at EU-12 by level and Member States

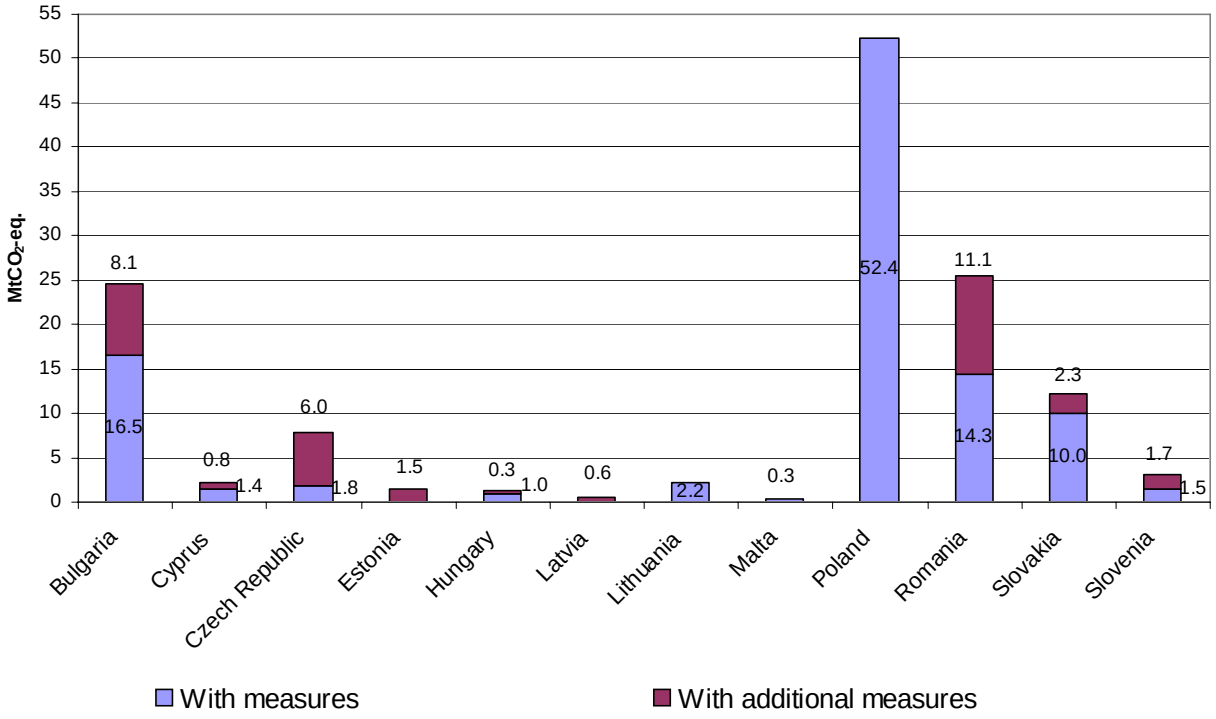
- EU-12 emission savings in 2010 from policies and measures are projected to total to 134 Mt CO2-eq. with 24 % (32 Mt CO2-eq.) of this saving projected to come from additional measures.
- The greatest absolute savings are projected to occur in Poland, Romania and Bulgaria.

EU-12 Member States are also required to provide information on the policies and measures (PAM) included in their 'with existing measures' projections and in their 'with additional measures' projections, with quantitative estimates of the effect of policies and measures on emissions by sources and removals by sinks of greenhouse gases between the base year and subsequent years, including 2005, 2010 and 2015.[23]

Figure 86 illustrates expected emission savings from existing and planned policies and measures for each of the EU-12 Member States. EU-12 emission savings in 2010 from policies and measures are projected to total to 134 Mt CO_2-eq. with 24 % (32 Mt CO_2-eq.) of this saving projected to come from measures not implemented or adopted as yet ('additional measures'). The greatest absolute savings are projected to occur in Poland, Romania and Bulgaria. In the cases of Romania and Bulgaria, a large proportion of these savings will come through additional measures.

[23] Article 3(2), 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.

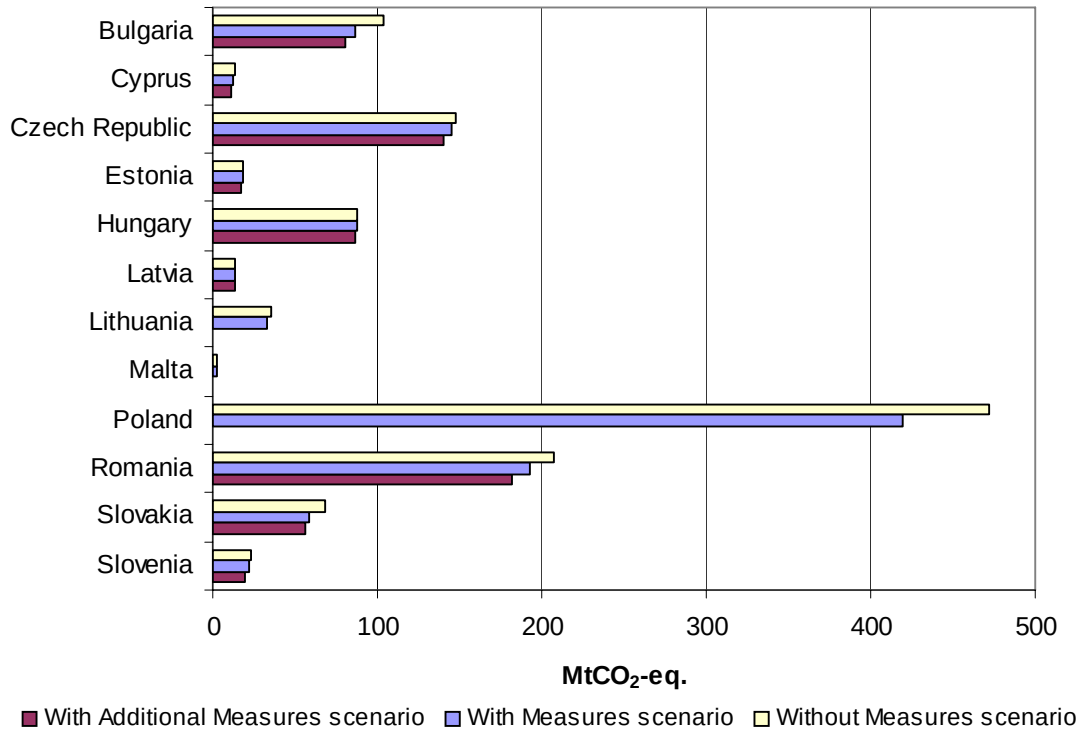
Figure 86 EU-12 Projected annual greenhouse gas emission savings from policies and measures in 2010



Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in latest national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

Figure 87 displays 2010 projections under 'with measures', 'with additional measures' (where one exists) and 'without measures' scenarios.

Figure 87 Contribution of policies and measures in EU-12 to projections in 2010



Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in latest national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

A 2.3.2 Savings at sectoral level in the EU-12

- Policies and measures acting on the energy sector (including transport) are projected to provide by far the biggest savings in the EU-12, with 88 % of savings from existing measures coming from energy policies.

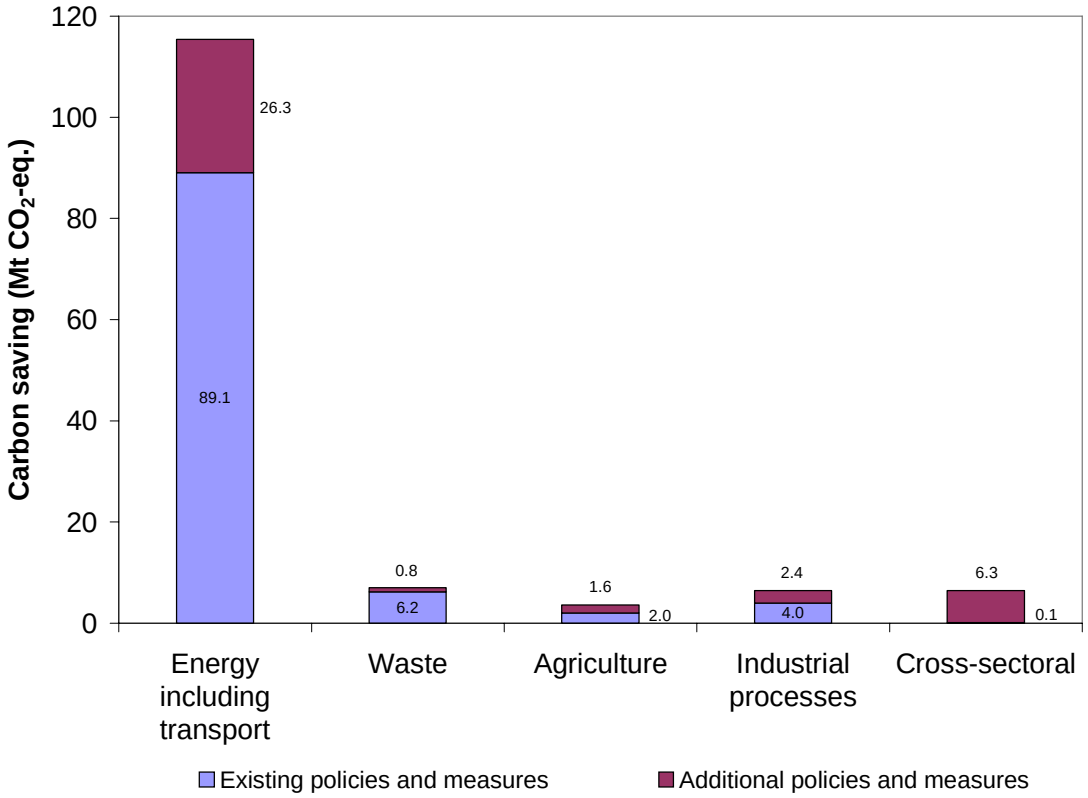
Figure 88 provides an overview of the estimated effects of domestic policies and measures on total EU-12 greenhouse gas emissions in each of the main sectors. In the majority of cases, reporting was split along the CRF sectors: energy, waste, agriculture and industrial process, with no further breakdown within the energy sector. Therefore, the savings for the new Member States have been presented in Figure 6 for these four key sectors, plus cross-sectoral.

Not all Member States have provided a sectoral breakdown of their latest projections or quantified the savings by sector from all policies and measures. Total EU-12 savings from additional policies and measures is known to be 32 Mt CO_2-eq. through deduction of the 'with measures' and 'with additional measures' projections and this concurs with Figure 6. Total 'with measures' savings displayed in figure 6 (101 Mt CO_2-eq.) may be an under estimate of savings from policies and measures. Calculated projected savings from all sectors for the EU-12 as a whole have increased significantly compared to reported savings potentials in 2006 for the EU-10. This is largely due to a change of methodology, where Member States bottom-up quantifications of policies are not used anymore where possible. Indeed, only two Member States have provided information on the savings from at least some implemented policies and measures in their 2007 Monitoring Mechanism submission, including Cyprus and Slovenia.

Due to the smaller size of these Member States compared to the EU-15 bloc, and also to the limited quantification of savings by Member States, the total savings reported are more than five times less than those in the EU-15.

Policies and measures acting on the energy sector (including transport) provide by far the biggest savings, with 88% of savings from existing measures coming from energy policies. Savings in each of the remaining sectors are low, with agriculture, waste and industrial processes each contributing a saving of 7 Mt or below.

Figure 88 EU-12 projected greenhouse gas emission savings by sector in 2010



Note: Projected savings from policies and measures in 2010 are estimated by comparison with a hypothetical reference case in which no measures were implemented since the base year.

Source: Information submitted under the EC greenhouse gas monitoring mechanism in 2007, in latest national communications to the UNFCCC and in demonstrable progress reports under the Kyoto Protocol. Individual Member States detail can be found in Table 4 of the Country Profiles (Annex 8).

A 2.4 Key EU policies and measures

- 95% of the savings from all policies coordinated across the EU (CCPMs) are projected to be delivered by thirteen main CCPMs.
- The RES-E Directive and EU ETS are projected to deliver the greatest savings across EU-27 Member States.
- CCPMs are estimated to account for 50% of all projected savings from policies and measures (implemented and planned) in 2010 in the EU-27.

This section examines the contribution of EU Common and Coordinated Policies and Measures (CCPMs) to greenhouse gas emission reductions across the EU. The CCPMs are generally EU-wide Directives, which are then transposed into national policies and measures by each Member State. Table 11 provides a full description of the key CCPMs referred to in this section.

As in 2006, data on Member States' savings for the key CCPMs was obtained from the European Climate Change Programme (ECCP) database on policies and measures in Europe. Data was not available for seven Member States (Belgium, Luxembourg, Cyprus, Latvia, Malta, Poland and Romania). In 2007 for the first time, there is sufficient quantification of CCPM savings for data to be presented for the EU-12. The figures in this section for EU-12, EU-15 and EU-27 simply represent the sum of those reported by Member States. For additional information on methodological issues relating to the calculation of savings from CCPMs, please refer to Annex 6 The reporting scheme.

A 2.4.1 Estimated savings from CCPMs at EU-27, EU-15 and EU-12 level

Across the EU-27, a matrix assessment of Member States' policies and measures identified eight policies (CCPMs) that are both widespread and are projected to deliver significant greenhouse gas emissions savings (from 20 to 90 Mt CO_2 equivalent per policy). In the energy supply and use sectors these are the RES-E Directive (related to the promotion of electricity produced from renewable energy sources) and Directives on the energy performance of buildings, promotion of co-generation (combined heat and power), and energy taxation. There are also two cross-cutting measures being the EU Emission Trading Scheme (ETS) and Kyoto Protocol project mechanisms, and in the transport sector, the Biofuels Directive and EU-wide ACEA Agreement with car manufacturers.

In addition to these eight key policies and measures a further five CCPMs were identified that are also predicted to deliver important savings across the EU (from 4 to 6 Mt CO_2 equivalent per policy). These five policies are the Directive on Integrated pollution prevention and control (IPPC), efficiency requirements for new hot-water boilers, F-gas regulation, the Directive on HFC emissions from air conditioning in motor vehicles, and the Landfill Directive.

It was also assessed which policies were projected to deliver the most savings within the EU-15 and within the EU-12. For the EU-15, these are the same as for the EU as a whole, as the vast bulk of estimated EU-27 savings are derived from EU-15 Member States. For the EU-12, the top eight policies (those projected to deliver the most savings) include three that are not included in the EU-27 thirteen key policies: these are the Directives on waste, large combustion plant and common rules for CAP direct support schemes.

The top eight policies account for 89% of the total savings attributed to CCPMs in the EU-27 and EU-15, and 84% in the EU-12. This highlights the importance of these key policies in helping Member States to achieve their emission reduction commitments.

In terms of differences between 2006 and 2007, the main finding is an overall increase in the projected impact of key CCPMs of around 40 $MtCO_2$-eq. in 2007 reporting.

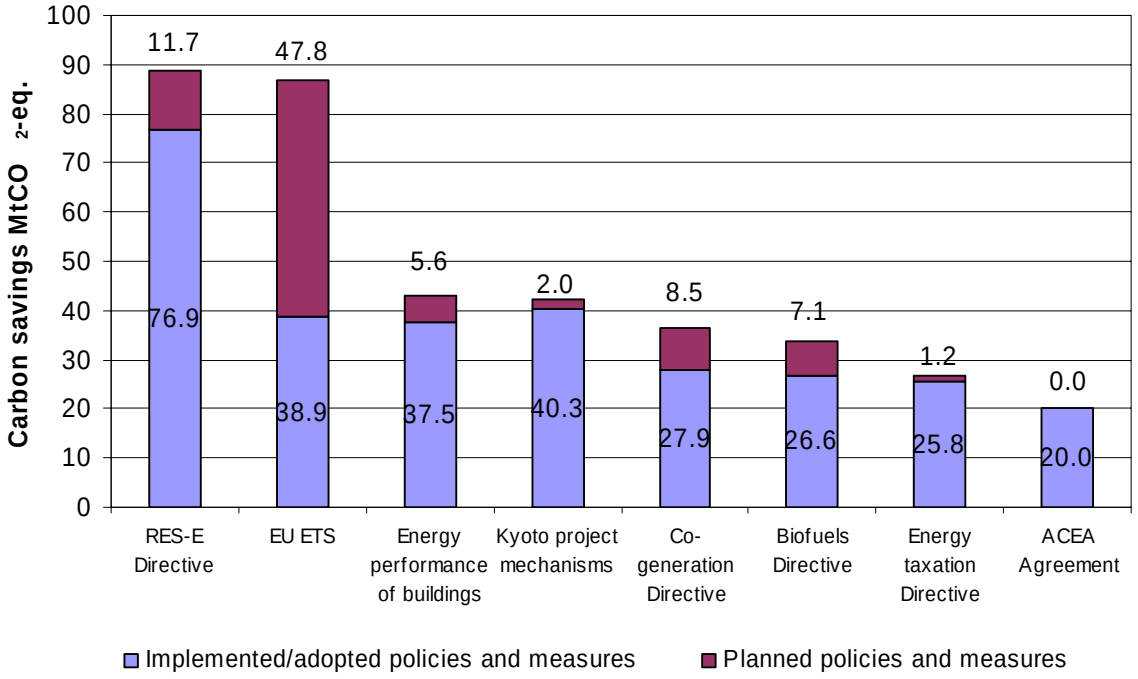
Total estimated savings for CCPMs equate to 50% of the total savings reported by Member States (through policies and measures or projections) for implemented and planned PAM in 2010 in the EU-27.

Table 11 Full description of key EU CCPMs referred to in this section

CCPM reference	CCPM full description
EU Emission Trading Scheme (ETS)	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
RES-E Directive	Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001on the promotion of electricity produced from renewable energy sources in the internal electricity market
Kyoto Protocol project mechanisms	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
Biofuels Directive	Directive 2003/30/EC of the European Parliament and the Council of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport
Co-generation Directive	Directive 2004/7/EC on the promotion of cogeneration
Energy performance of buildings	Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings
ACEA agreement	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 2008/09)
Directive on energy taxation	Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity
Efficiency of new boilers	Council Directive 92/42/EEC of 21 May 1992 on efficiency requirements for new hot-water boilers fired with liquid or gaseous fuels
Landfill Directive	Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste
F-gas regulation	Regulation (EC) No. 842/2006 of the European Parliament and of the Council of May 17, 2006 on certain fluorinated greenhouse gases
IPPC Directive	Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control
HFC motor vehicle air conditioning	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

Large combustion plant Directive	Council Directive 88/609/EEC of 24 November 1988 on the limitation of emissions of certain pollutants into the air from large combustion plants
Directive on waste	Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste
Common rules for CAP direct support	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

Figure 89 EU-27 estimated savings from top eight CCPMs in 2010, split by status (implemented/adopted or planned)

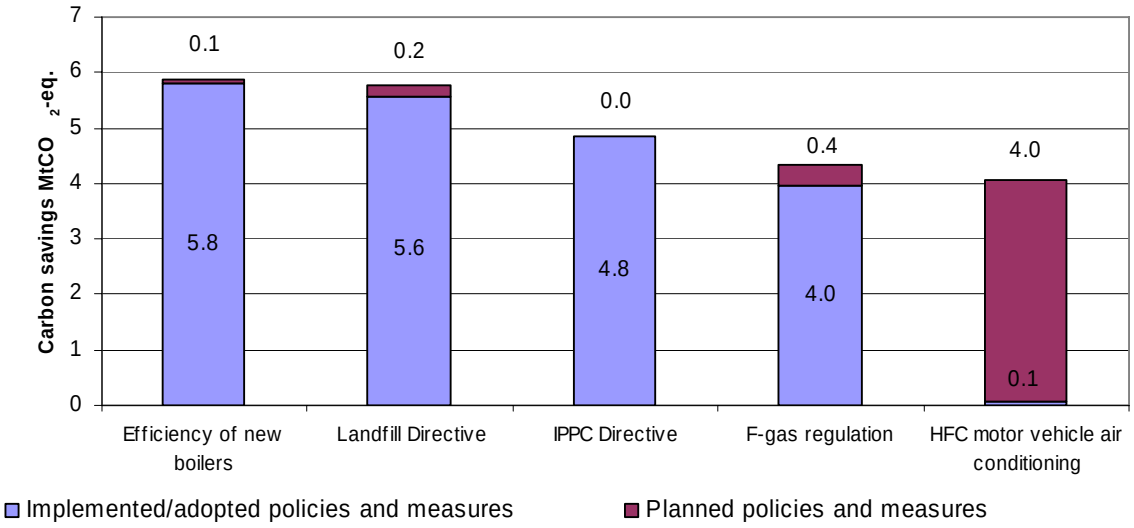


Source: European Climate Change Programme (ECCP) Database on Policies and Measures in Europe (www.oeko.de/service/pam/sector.php) as of 11 July 2007.

Of all the EU CCPMs, the RES-E Directive and EU ETS are predicted to deliver the greatest savings across EU-27 Member States (Figure 89). The RES-E Directive is estimated to deliver by far the greatest savings from policies and measures that have already been implemented or adopted.

The top seven policies identified in 2007 projections (excluding the ACEA Agreement) are estimated to deliver a total emission saving of 358 $MtCO_2$-eq. For comparison, the seven key policies (most of which remained in 2007) examined in the 2006 report were projected to deliver a total saving of 304 $MtCO_2$-eq by 2010.

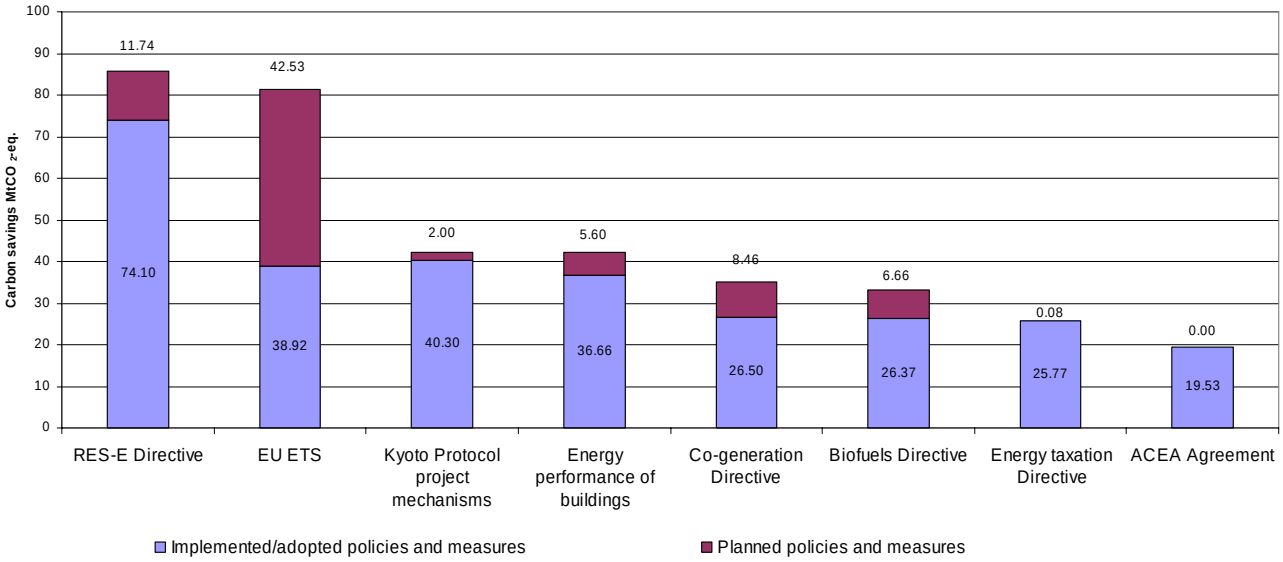
Figure 90 EU-27 estimated savings from next highest five CCPMs in 2010, split by status (implemented / adopted or planned)



Source: European Climate Change Programme (ECCP) Database on Policies and Measures in Europe (www.oeko.de/service/pam/sector.php) as of 11 July 2007.

In addition to the top eight key policies and measures, the next five CCPMs in terms of impact on emissions reductions across the EU were identified (Figure 91). Estimated savings from these five policies amount to 25 $MtCO_2$-eq, bringing the total of the top 13 CCPMs to 403 $MtCO_2$-eq, or 95% of the savings from all CCPMs across the EU.

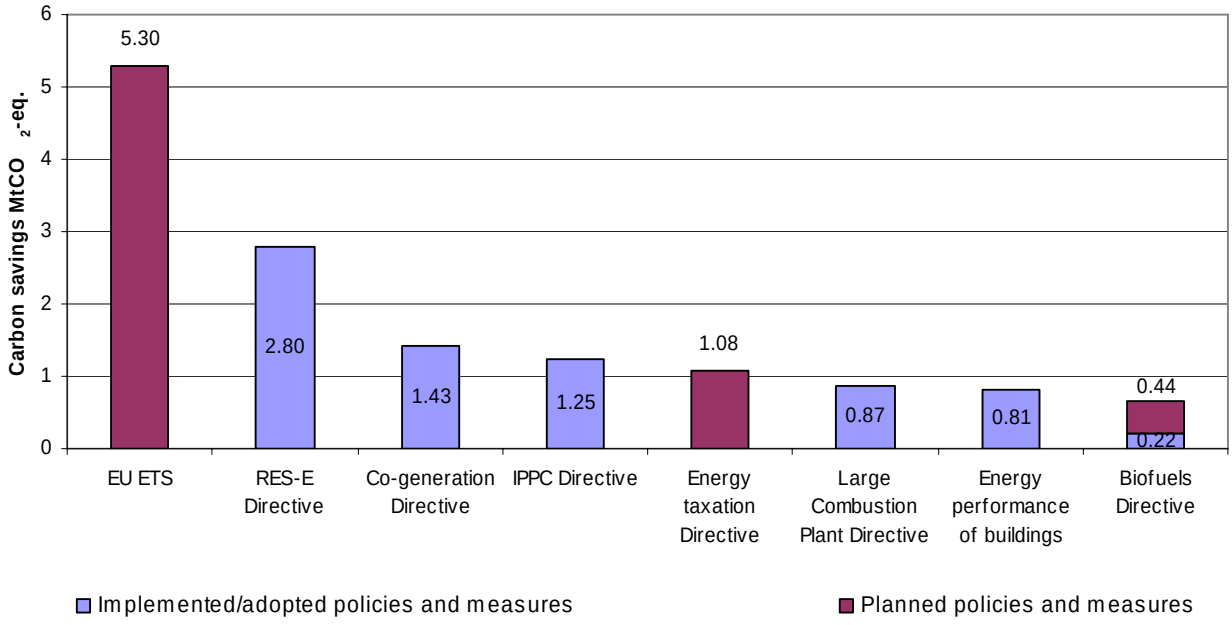
Figure 91 EU-15 estimated savings for top eight CCPMs split by status (implemented / adopted or planned)



Source: European Climate Change Programme (ECCP) Database on Policies and Measures in Europe (www.oeko.de/service/pam/sector.php) as of 11 July 2007.

As mentioned earlier, the top eight policies in the EU-15 match those for the EU-27 as the vast bulk of estimated EU-27 savings are derived from EU-15 Member States. Estimated savings from these eight policies amount to 365 $MtCO_2$-eq., or 89% of the 409 $MtCO_2$-eq. total savings from all CCPMs across the EU-15.

Figure 92 EU-12 estimated savings for top eight CCPMs split by status (implemented/adopted or planned)



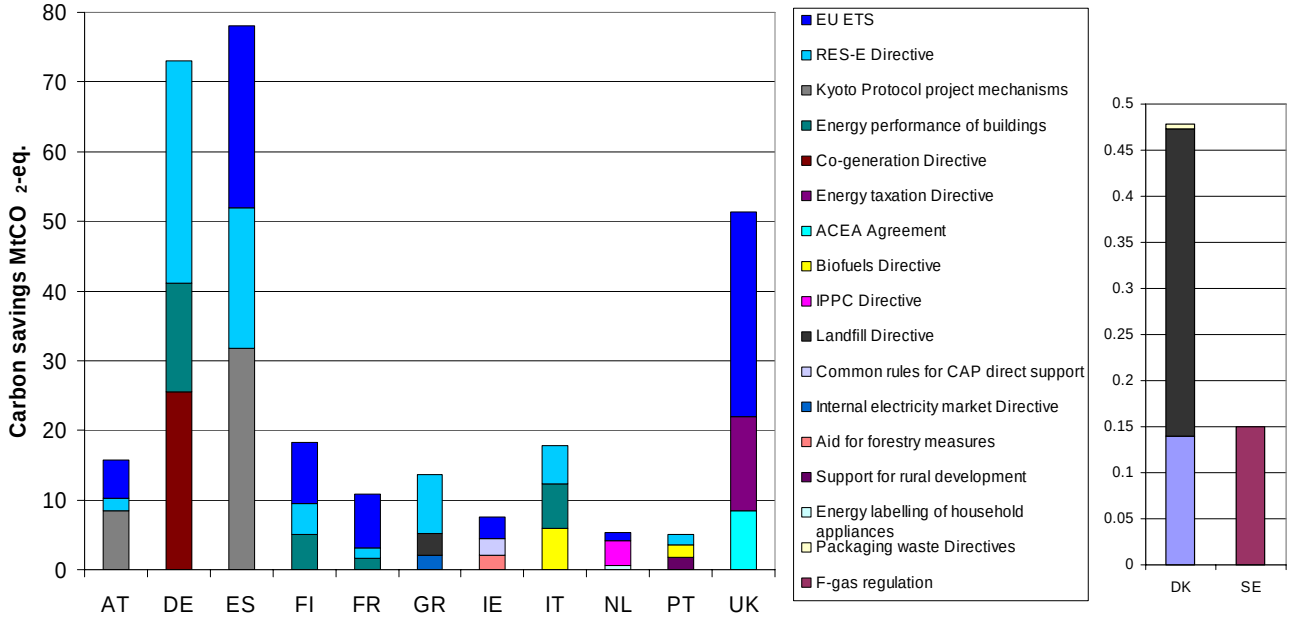
Source: European Climate Change Programme (ECCP) Database on Policies and Measures in Europe (www.oeko.de/service/pam/sector.php) as of 11 July 2007.

The data gathered on EU-12 estimated savings show that as for the EU-27 and EU-15, the EU ETS and RES-E Directive are the most important CCPMs in terms of expected emission reductions.

Estimated savings from these eight policies amount to 14.2 $MtCO_2$-eq., or 84% of the 16.9 $MtCO_2$ eq. total savings from all CCPMs across the EU-12.

A 2.4.2 Estimated savings from CCPMs at Member State level

Figure 93 CCPMs estimated to deliver the greatest savings in EU-15 Member States, 2010



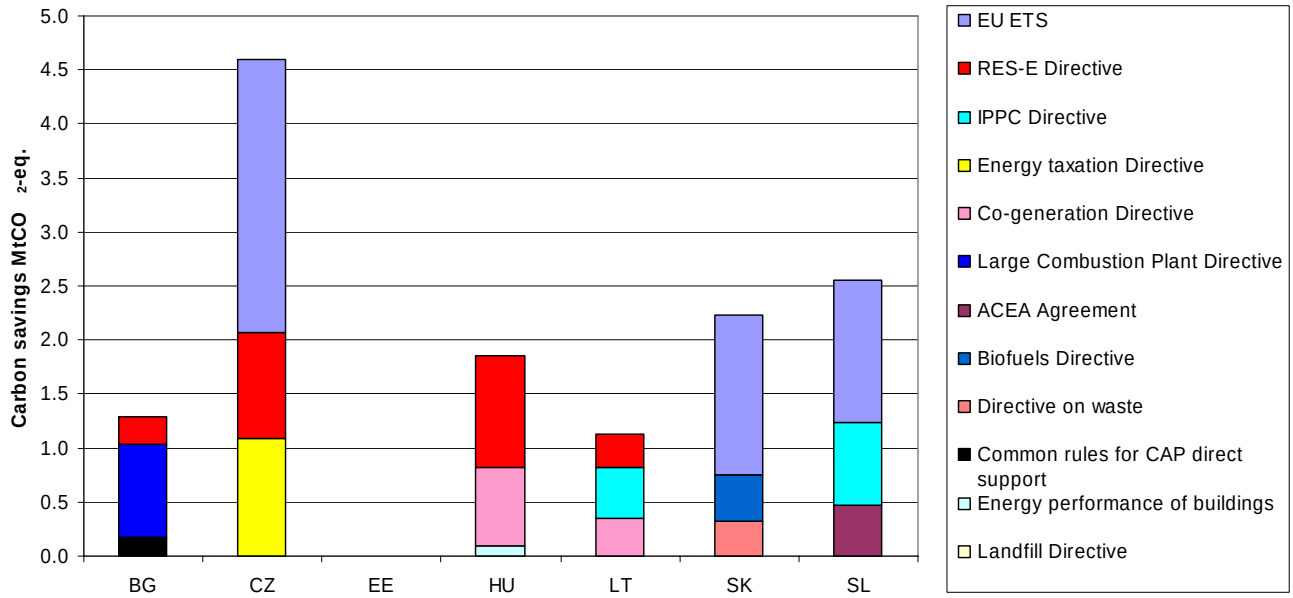
Source: European Climate Change Programme (ECCP) Database on Policies and Measures in Europe (www.oeko.de/service/pam/sector.php) as of 11 July 2007.

Figure 93 shows, for each EU-15 Member State for which data is available, the three policies that are projected to deliver the greatest savings in 2010.

Spain, Germany and the United Kingdom show the largest projected savings from the eight key policies, with the RES-E Directive being common to Germany, the United Kingdom, Austria, Finland, France, Greece, Italy and Portugal, and the EU ETS being common to Spain, the United Kingdom, Austria, Finland, France, Ireland and the Netherlands. Other significant CCPMs across several Member States include the energy performance of buildings Directive (Germany, Finland, France, and Italy) and Kyoto Protocol project mechanisms (Spain, Austria).

The equivalent data for EU-12 Member States for which data is available is shown on Figure 94.

Figure 94 CCPMs estimated to deliver the greatest savings in EU-12 Member States, 2010



Note: Estonia estimates savings of 0.0033 MtCO2-eq due to the Landfill Directive.

Source: European Climate Change Programme (ECCP) Database on Policies and Measures in Europe (www.oeko.de/service/pam/sector.php) as of 11 July 2007.

By a significant margin, the Czech Republic shows the largest projected savings from the eight key policies in the EU-12, largely due to the EU ETS. The ETS is also a significant contributor to projected savings in Slovak Republic and Slovenia, while the RES-E Directive is expected to deliver savings in Bulgaria, Czech Republic, Hungary and Latvia.

In terms of differences between 2006 and 2007 findings, most of the key CCPMs across the EU-27 are unchanged. However, the suite of directives relating to energy-efficient appliances is no longer one of the key measures, while the EU ETS and Kyoto mechanism directives are. Furthermore, the estimated impact on emissions reductions of the Directives on RES-E, Biofuels and Energy performance of buildings in 2010 is greater in 2007. The split between implemented/adopted and planned measures is somewhat skewed by the EU ETS being considered in one or the other category by different Member States. Without this effect, the projections of the impact of implemented/adopted measures have increased while those for planned measures have stayed at around the same level.

Member States have transposed EU CCPMs using a variety of domestic policies and measures. It has proved difficult to separate out savings for domestic policies and measures directly resulting from CCPMs, and the savings presented in this section on key policies may also cover measures not directly implemented as a result of a CCPM.

Some of the observed differences in estimated savings attributed to each CCPM from year to year may be due to different methods of assigning reported savings either to the CCPM or to national policies and measures that were in place before the CCPM (which are not considered here). In particular, this is likely to account for most of the apparent difference in the effect of the Landfill Directive, as several Member States had national measures in place before the introduction of the CCPM.

A 3 Use of Kyoto mechanisms

- For the EU-15, the use of Kyoto mechanisms amounts to 107.5 million tonnes of CO_2-equivalents per year of the commitment period.
- This represents approximately 31% of the total required emission reduction for the EU-15 under the Kyoto Protocol, or 2.5 percentage points of the EU-15 Kyoto target of -8 %.
- The intended acquisition of these units through JI, CDM or international emissions trading represents an investment of EUR 2 860 million for the whole five-year commitment period.

A 3.1 Flexible mechanisms under the Kyoto protocol (Kyoto mechanisms)

In addition to domestic measures, Member States are allowed to make use of the flexible mechanisms under the Kyoto Protocol (Kyoto mechanisms) to achieve their EU Kyoto or burden sharing targets by contributing to and/or benefiting from emission reductions taking place abroad.

The Kyoto Protocol defines three "flexibility mechanisms" to lower the overall costs of achieving its emissions targets. These mechanisms enable Parties to access cost-effective opportunities to reduce emissions, or to remove carbon from the atmosphere, in other countries. While the cost of limiting emissions varies considerably from region to region, the effect for the atmosphere of limiting emissions is the same, irrespective of where the action is taken. This system is aimed at fulfilling the cost-effectiveness promise of the mechanisms, while addressing concerns about environmental integrity and equity. The three Kyoto mechanisms are (see more detailed description below):

- the clean development mechanism (CDM),
- joint implementation (JI),
- emissions trading[24].

Domestic actions (as opposed to use of the mechanisms) must constitute a "significant element" of the efforts made by each Member State to meet its target under the Kyoto Protocol. Although no quantified proportion that is to be met through domestic action was set, Member States must demonstrate that their use of the mechanisms is "supplemental to domestic action" to achieve their targets.

[24] This "emissions trading" relates to trading of emissions between countries and should not be confused with the EU emissions trading scheme (EU ETS), which concerns trading of emissions between installations.

A 3.1.1 Joint implementation

Joint implementation (JI) is provided for under Article 6 of the Kyoto Protocol. It enables industrialised countries to work together to meet their emission targets. A country with an emissions reduction target can meet part of that target through a project aimed at reducing emissions in any sector of another industrialised country's economy. Any such projects need to have the approval of the countries involved and must result in emission reductions that would not otherwise have occurred in the absence of the JI project. The use of carbon sinks (e.g. forestry projects) is also permitted under JI.

A 3.1.2 Clean development mechanism

Article 12 of the Kyoto Protocol sets out a clean development mechanism (CDM). This is similar to joint implementation, but project activities must be hosted by a developing country. As with JI, CDM projects must result in reductions that are additional to those that would have been achieved in the absence of the project. They also have the additional aim of promoting sustainable development in the host developing country. The CDM is supervised by an Executive Board, which approves projects. CDM projects have been able to generate credits since January 2000 and these can be banked for use during the first commitment period (2008–12). The rules governing CDM projects allow only certain types of sinks project (afforestation and reforestation), and countries will not be able to use credits generated by nuclear power projects towards meeting their Kyoto targets. To encourage small-scale projects, special fast-track procedures are being developed.

A 3.1.3 Emissions trading

Article 17 of the Kyoto Protocol allows countries that have achieved emissions reductions over and above those required by their Kyoto targets to sell the excess to countries finding it more difficult or expensive to meet their commitments. In this way, it seeks to lower the costs of compliance for all concerned.

A 3.2 Projected emission reductions through Kyoto mechanisms

Twenty Member States provided information on their intended use of the Kyoto mechanisms in 2007 through a questionnaire under the EC mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol (Council Decision 280/2004/EC). For the remaining seven Member States (Germany, Greece, Hungary, Italy, Latvia, Luxembourg and Poland) the approved use of Kyoto Mechanisms in the second national allocation plan under the European emissions trading Directive (2003/87/EC) has been used.

Eleven Member States have decided to use the Kyoto mechanisms (Table 12). With the exception of Slovenia, all of the countries belong to the EU 15. The contribution of Kyoto mechanisms by these countries is considered for the closure of the gaps between greenhouse gas projections and 2010 targets. For the EU-15, the use of Kyoto mechanisms amounts to 107.5 million tonnes of CO_2-equivalents per year of the commitment period. This amount corresponds to approx. 31% of the total required emission reduction for the EU-15 of 342 million tonnes CO_2-equivalents per year during the first commitment period or 2.5 percentage points of the EU-15 Kyoto target of -8 %. In Slovenia, the exact amount of units to be bought depends on the actual development of greenhouse gas emissions, especially in the transport sector.

Table 12 Planned use of Kyoto mechanisms by EU Member States

Member State	Planned use of Kyoto mechanisms	Type of Kyoto mechanisms (ET, CDM, JI)	*Achievement of Kyoto target planned through domestic action only (no use of Kyoto mechanisms)*	*Projected emission reduction 2008–12 through the use of Kyoto mechanisms [Mt CO_2-equivalent per year]*
Austria	Yes	JI, CDM, ET	No	9.0
Belgium	Yes	JI, CDM, ET	No	7.0
Bulgaria	No	-	Yes	-
Cyprus	No	-	Not applicable[a]	-
Czech Rep.	No	-	Yes	-
Denmark	Yes	JI, CDM, ET	No	4.2
Estonia	No	-	Yes	-
Finland	Yes	JI, CDM, ET	No	2.4
France	No	-	Yes	-
Germany	No	-	Yes	-
Greece	No	-	Yes	-
Hungary	No	-	Yes	-
Ireland	Yes	JI, CDM, ET	No	3,6[b]
Italy	Yes	JI, CDM, ET	No	19.0
Latvia	No	-	Yes	-
Lithuania	No	-	Yes	-
Luxembourg	Yes	JI, CDM, ET	No	4.7
Malta	No	-	Not applicable[a]	-
Netherlands	Yes	CDM, JI	No	20.0
Poland	No	-	Yes	-
Portugal	Yes	JI, CDM, ET	No	5.8
Romania	No	-	Yes	-
Slovak Republic	No	-	Yes	-
Slovenia	Yes	JI, CDM, ET	No	< 0.6 [b]
Spain	Yes	JI, CDM, ET	No	31.8
Sweden	No	(JI, CDM)	Yes	(1.2)[c]
United Kingdom	No	-	Yes	-
EU-15	**Yes**	**JI, CDM, ET**	**No**	**107.5**

Notes:

[a] Cyprus and Malta are non-Annex I Parties to the Kyoto Protocol and do not have an emissions target for the period 2008-12.

[b] The value depends on the actual development of emissions, especially in the transport sector.

[c] 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 1.2 Mt CO_2-eq/yr through the Swedish CDM and JI programme. This figure has not been considered in the target assessment for Sweden and the EU-15.

Source: Questionnaires submitted under the EC greenhouse gas Monitoring Mechanism; second national allocation plans

A 3.3 Allocated budgets

Twelve Member States allocated resources for the use of Kyoto mechanisms (Table 13). Out of these only Germany and Sweden do not intend to use the units for meeting their Kyoto targets. The German government decided to support prototype funds to assist the establishment of a carbon market. Sweden has not yet made a final decision on the use of Kyoto mechanisms but projects to achieve its target through domestic action alone. Austria, Luxembourg, the Netherlands, Portugal and Spain allocated the largest budgets (EUR 319, EUR 300, EUR 693, EUR 354 and EUR 310 million, respectively, for the five-year commitment period). In Slovenia, the budget has not yet been decided because the quantity of allowances to be bought is still unknown.

Together the twelve countries decided to invest EUR 2 860 million for the acquisition of allowances through JI, CDM or international emissions trading for the whole five-year commitment period.

A 3.4 Legal arrangements

Most Member States have also started to implemented legal arrangements such as the preparation of national legal frameworks or bilateral/multilateral agreements for JI/CDM programmes (Table 13). In addition, Estonia, Lithuania, Romania and Slovak Republic reported that they would host JI projects and/or use international emissions trading to sell emission certificates. Malta reported that so far no CDM projects are under development.

Outside the EU, Norway will acquire minor quantities through the Prototype Carbon Fund and the Testing Ground Facility as well as through bilateral projects.

Table 13 Preparations for the use of project based activities by EU Member States

Member State	Preparation of JI/CDM programmes	Bilateral / multilateral agreements, memorandum of understanding or contracts arranged with countries		Allocated budget
		JI	CDM	
Austria	5 projects in operation (1 JI / 4 CDM) 22 under construction (9 JI / 13 CDM) 4 approved (1 JI / 3 CDM)	Bulgaria, Czech Republic, Estonia, Hungary, Latvia, New Zealand, Romania, Slovak Republic	Argentina, Bolivia, China, Colombia, Ecuador, Indonesia, Mexico, Morocco, Peru, Tunisia, Vietnam	EUR 319 million
Belgium	Federal Government: second JI/CDM tender 2007, 1 project under construction Brussels-Capital Region: Planned investment in CDCF Flemish region: 1 project in operation Walloon region: participation in CDCF	Flemish Region: Bulgaria	Belgium: China Federal Government: None Walloon region: Countries of the World Bank's CDCF portfolio	EUR 104 million
Denmark	10 projects in operation (8 JI / 2 CDM) 10 under construction (6 JI / 4 CDM) 14 approved or pending final approval (3 JI / 11 CDM)	Bulgaria, Czech Republic, Estonia, Latvia, Poland, Romania, Slovak Republic, Ukraine	Albania, Armenia, Georgia, Moldova Under negotiation: Argentina, Azerbaijan, Brazil, Chile, China, India, Indonesia, Kyrgyzstan, Malaysia, Nicaragua, Russia, South Africa, Thailand	EUR 152 million
Finland	8 projects in operation (4 JI / 4 CDM) 1 approved (CDM)	Bulgaria, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Ukraine	China, Costa Rica, El Salvador, Nicaragua	EUR 120 million
France	No programmes to date	Romania	Argentina, Brazil, Chile, China, Colombia, Gabon, Morocco, Mexico, Senegal, Tunisia, Uruguay	No arrangements yet
Germany	Participation in BASREC and initiation of climate fund	Norway, Finland, Sweden, Denmark, Estonia, Lithuania, Latvia, Poland and Russia through BASREC	No arrangements yet	EUR 18 million for climate fund EUR 5 million for BASREC
Greece	Studies on use of JI/CDM initiated	--	--	No arrangements yet

Member State	Preparation of JI/CDM programmes	Bilateral / multilateral agreements, memorandum of understanding or contracts arranged with countries		Allocated budget
		JI	CDM	
Ireland	Legislation in place Intended investment into EIB and WB funds	European Investment Bank: Multilateral Carbon Credit Fund World Bank / European Investment Bank: Carbon Fund for Europe	World Bank: BioCarbon Fund (Second Tranche)	EUR 290 million
Italy	Multilateral and Regional Financial Institutions: participations in CDCF[25], ICF[26], BCF[27], MEDREP[28], MEDREC[29], Trust Fund for the Environment in Asia and China (GEF), bilateral agreements	Bulgaria, Croatia, Moldavia, Kazakhstan, Slovenia, Romania	Algeria, China, Cyprus, Cuba, Egypt, Israel, Morocco, El Salvador, Argentina, Brazil, Mexico, Uruguay, Panama, Congo, Nigeria, Laos, Serbia and Montenegro	EUR 169.5 million already allocated: EUR 58.7 million for World Bank funds EUR 8.5 million for GEF Trust Fund EUR 10.3 million for MEDREP[28] EUR 8.5 million for MEDREC[29] EUR 79 million for China-Italian Facility EUR 4.5 million various funds
Luxembourg	Kyoto Fond funded through a 1 cent levy on gasoline implemented.			EUR 300 million
Netherlands	ERUPT CERUPT Financial Institutions, Private Financial Institutions, Participation in PCF[30], CDCF, bilateral contracts 8 Mt CO_2 already paid for 36 Mt contracted, unpaid 37 neither contracted nor paid	Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Romania, Slovak Republic, Ukraine, New Zealand	Argentina, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Indonesia, Mexico Nicaragua, Panama, Uruguay	EUR 693 million

[25] Community Development Carbon Fund
[26] Italian Carbon Fund
[27] BioCarbon Fund
[28] Mediterranean Renewable Energy Program
[29] Mediterranean Renewable Energy Centre
[30] Prototype Carbon Fund of the World Bank

Member State	Preparation of JI/CDM programmes	Bilateral / multilateral agreements, memorandum of understanding or contracts arranged with countries		Allocated budget
		JI	CDM	
Portugal	Subscription of Luso Carbon Fund and Carbon Fund for Europe Negotiations with Asia Pacific Carbon Fund and Natsource LLC Investments	-	Argentina, Brazil, Cape Verde, Colombia, El Salvador, Guinea-Bissau, Mexico, Mozambique, Tunisia	EUR 354 million
Slovenia	Legal framework planned to be established 1 CDM project under way	-	Macedonia	Not yet decided
Spain	40 CDM projects in operation 7 CDM projects under construction 1 CDM project signed Participation in WB's BCF, CFCD, MCCF, APCF Iboamerican Initiative for Carbon	-	Argentina, Bolivia, Brazil, Chile, China, Colombia, Costa Rica, Dominican Republic, Ecuador, Egypt, El Salvador, Guatemala, Honduras, Mexico, Morocco, Nicaragua, Panama, Paraguay, Peru, Uruguay	EUR 310 million
Sweden	5 projects in operation (1 JI / 4 CDM) 3 under construction (1 JI / 2 CDM) Participation in TGF, PCF MCCF (Questionnaire, p.7)	Bilateral agreements with Bulgaria, Estonia, Romania Multilateral agreement in Baltic Sea Region for high quality JI projects with ICE, NOR, SWE, DEN, GER, FIN, EST, LAT, LIT, POL Negotiations with Russia	Brazil, China, India	EUR 25 million
United Kingdom	None	None		

Sources: Questionnaires submitted under the EC greenhouse gas Monitoring Mechanism in 2007 or 2006; Luxembourg second national allocation plan under the EU ETS

A 3.5 Type of projects

Table 14 gives an overview on the type and size of CDM and JI projects. It is based on the UNEP/Risoe CDM/JI pipeline, which includes all projects that have reached the public commenting period during project development. Overall 2 434 projects are expected to deliver 2 359 Mt CO_2eq until the end of the first commitment period under the Kyoto Protocol. The largest share of CERS and ERUs will be generated from projects reducing non-CO_2 gases. This is mainly due to

- high global warming potential[31] for non-CO_2 gases (CH_4: 21, N_2O: 310; HFC-23: 11 700),
- point sources with large emissions, and
- cheap abatement costs.

Eighteen projects for the destruction of HFC-23, a by-product of HCFC-22 production, are expected to generate 21% of the overall emission allowances from project-based mechanisms. The second largest source for emission reductions are 45 projects abating N_2O, which contribute with 11% to the overall quantity of emission allowances. The use or flaring of methane from coal beds and mines, fugitive emissions from oil and gas installations and landfills contribute with another 21% of the overall expected quantity of emission reductions. Projects targeting energy efficiency in own generation, fossil fuel switch, biomass energy and renewable energy from wind and hydro reduce emissions of CO_2 and have a share between 5-9% each. Eleven project types have average emission reductions of less than 500 kt CO_2eq until the end of 2012; a total of 1 700 projects (70%) belong to these sectors and are expected to deliver 635 Mt CO_2eq (27%). Five project types have average emission reductions above 1.5 Mt CO_2 eq until the end of 2012; 228 (9%) installations belong to these project types and are expected to deliver 1 213 Mt CO_2eq (51%) of all project based credits.

Table 14 Overview on CDM and JI projects by project type

	All CDM projects		All JI projects		CDM & JI			
Type	Number of projects	Reduction until 2012 [Mt CO_2 eq]	Number of projects	Reduction until 2012 [MtCO_2eq]	Number of projects	Reduction until 2012 [MtCO_2eq]	Share [%]	units/ project [MtCO_2eq]
Afforestation	0	0.0	1	0.4	1	0.4	0%	0.4
Agriculture	177	44.3	0	0.0	177	44.3	2%	0.3
Biogas	123	36.8	4	2.3	127	39.1	2%	0.3
Biomass energy	431	157.7	18	10.2	449	167.9	7%	0.4
Cement	28	29.3	0	0.0	28	29.3	1%	1.0
Coal bed/mine methane	39	153.9	9	14.6	48	168.6	7%	3.5
Energy distribution	3	1.0	9	8.8	12	9.7	0%	0.8
EE households	5	0.5	1	0.4	6	0.9	0%	0.1
EE industry	100	19.5	12	14.1	112	33.6	1%	0.3
EE own generation	225	211.9	1	7.8	226	219.7	9%	1.0
EE service	11	0.3	0	0.0	11	0.3	0%	0.0
EE supply side	25	13.7	10	9.5	35	23.2	1%	0.7
Fossil fuel switch	71	140.1	8	11.8	79	151.9	6%	1.9
Fugitive	21	77.7	17	52.8	38	130.5	6%	3.4
Geothermal	10	11.6	3	0.8	13	12.4	1%	1.0
HFCs	18	501.4	0	0.0	18	501.4	21%	27.9
Hydro	500	212.7	28	6.9	528	219.6	9%	0.4
Landfill gas	155	194.1	24	12.9	179	207.0	9%	1.2
N_2O	41	249.0	4	11.9	45	260.8	11%	5.8
PFCs	2	0.9	0	0.0	2	0.9	0%	0.5

[31] The global warming potential is used to convert emissions of different greenhouse gases with different warming effects into the unit CO_2 equivalent, which is the global warming effect of one ton of carbon dioxide.

Reforestation	8	5.5	0	0.0	8	5.5	0%	0.7
Solar	7	1.1	0	0.0	7	1.1	0%	0.2
Tidal	1	1.1	0	0.0	1	1.1	0%	1.1
Transport	4	2.0	0	0.0	4	2.0	0%	0.5
Wind	255	116.3	25	11.3	280	127.6	5%	0.5
Total	**2 260**	**2 182.4**	**174**	**176.5**	**2 434**	**2 358.9**	**100%**	**1.0**

Notes: EE: energy efficiency
The table includes all projects that have reached the validation stage (CDM) or the determination stage (JI). Not all of these projects will be realised and the actual reduction of greenhouse gases might differ from the expected reduction included in the project description.

Source UNEP Risoe CDM/JI Pipeline Analysis and Database, July 2007

Table 15 Number of projects and total amount of emission allowances by average project size

Average emission allowances per project type	Number of projects	Share in total number of projects	Total emission allowances [Mt CO_2 eq]	Share of total emission allowances
less than 500 kt CO2 eq.	1 700	70 %	635	27 %
between 500 kt CO2 eq. and 1.5 Mt CO2 eq.	228	9 %	511	22 %
more than 1.5 Mt CO2 eq.	506	21 %	1 213	51 %
Total	2 434	100 %	2 359	100 %

Notes: The table includes all projects that have reached the validation stage (CDM) or the determination stage (JI). Not all of these projects will be realised and the actual reduction of greenhouse gases might differ from the expected reduction included in the project description.

Source UNEP Risoe CDM/JI Pipeline Analysis and Database, July 2007

A 3.6 Host regions for CDM projects

The Clean Development Mechanism is not only intended to help Annex I Parties in achieving their reduction obligations but also to support sustainable development in non-Annex I Parties. Projects in the large advanced developing countries Brazil, China and India together generate 75% of the total CERs (Figure 95). Sub-Saharan Africa only hosts 1% of all projects generating 4% of total CERs. The main reason for this uneven distribution is that the largest and most cost efficient projects are those which reduce emissions of industrial gases, especially HFC-23 and N_2O. Most of the least developed countries do not have industrial installations emitting these gases and are therefore not able to profit from the CDM as much as advanced developing countries.

This relationship is also reflected if population size is taken into account. Projects in Africa will generate less than 0.15 CERs/capita until 2012, in China and Brazil about 0.8 CERs/capita (Table 16). These values show that the CDM can only be one building block of a sustainable development strategy of a country. Assuming a CER price of EUR 10 and that the expected CERs are generated for a five-year period, the CDM leads to a transfer of funds in the order of EUR 0.30 per year and person in Africa and EUR 1.60 in China.

Figure 95 Host regions for CDM projects by share of expected CERs until 2012

Source UNEP Risoe CDM/JI Pipeline Analysis and Database, July 2007

Table 16 Overview on CDM projects by region

Total in CDM Pipeline	Number of projects	Share [%]	Reduction until 2012 [kt CO_2 eq]	Share [%]	Population million	Reduction until 2012 [t CO_2 eq per capita]
Latin America	576	25%	339 533	16%	559	0.61
Brasil	*230*	*10%*	*150 772*	*7%*	*190*	*0.79*
Asia & Pacific	1 602	71%	1 715 839	79%	3 529	0.49
China	*669*	*30%*	*1 147 679*	*53%*	*1 322*	*0.87*
India	*695*	*31%*	*339 972*	*16%*	*1 130*	*0.30*
Europe and Central Asia	21	1%	7 902	0%	149	0.05
Sub-Sahara Africa	30	1%	79 989	4%	752	0.11
North Africa & Middle-East	31	1%	39 103	2%	278	0.14
Total	**2 260**	**100%**	**2 182 365**	**100%**	**5 266**	**0.41**

Source UNEP Risoe CDM/JI Pipeline Analysis and Database, July 2007; CIA online world fact book, 25 July 2007

A 4 Accounting of carbon sinks

- Activities under Art. 3.3 and 3.4 in EU-15 Member States are projected to reduce emissions by 39.1 million tonnes CO_2 per year of the commitment period.
- This is equivalent to 11% of the EU-15 reduction commitment of 342 million tonnes CO_2 per year of the commitment period compared to base-year emissions, or 0.9 % percentage points of the EU-15 Kyoto target of -8 %.

A 4.1 Carbon sinks under the Kyoto Protocol

In addition to reducing or limiting emissions of greenhouse gases, Member States can make use of CO_2 removals by land use change and forestry (LUCF) activities, or "carbon sinks" under the Kyoto Protocol to achieve their UNFCCC and EU 'burden-sharing' targets. These carbon sinks include:

- mandatory activities covered by Article 3.3 of the Protocol (afforestation, reforestation and deforestation),
- voluntary activities under Article 3.4 (forest management, cropland management, grazing land management and revegetation).

The rules about how carbon sinks are accounted for under the Kyoto Protocol are described in Articles 3.3 and 3.4 and in the UNFCCC Marrakech Accords (2001).

A 4.1.1 Article 3.3 activities

Article 3.3 describes how net changes in greenhouse gas emissions by sources and removals by sinks resulting from certain land-use change and forestry activities are accounted for in meeting the Kyoto Protocol targets. These activities are defined as direct human-induced land-use change and forestry activities, limited to afforestation, reforestation and deforestation (ARD) since 1990.

A 4.1.2 Article 3.4 activities

Article 3.4 identifies additional human-induced activities related to changes in greenhouse gas emissions by sources and removals by sinks in the agricultural soils and other land-use change and forestry categories, which a country may choose to use in order to meet its Kyoto Protocol target. In the Marrakech Accords, activities under this Article were defined as forest management, revegetation, cropland management and grazing-land management. The extent, to which Parties can account for emissions and removals from these activities, for the first commitment period, is limited by a capping system.

A 4.2 Information from Member States on the use of carbon sinks

Member States are asked to report voluntarily on their projected estimates of annual net carbon stock changes under Article 3.3 and 3.4 during the first commitment period of the Kyoto Protocol. In 2007, ten Member States submitted updated estimates while information for four additional countries (Austria, Belgium, Italy, and Portugal) had been submitted in the previous years (Table 17).

Finland and Sweden expect additional emissions from activities under Article 3.3 (afforestation, reforestation and deforestation) during the commitment period. Austria, Denmark, Ireland, Italy, the Netherlands, Portugal, Slovak Republic, Slovenia, Spain and United Kingdom estimate net sequestration effects from these activities.

All EU Member States that are Annex I Parties under the Kyoto Protocol have submitted their initial report under the Kyoto Protocol, in which they report on which activities under Art. 3.4 they will elect:

- nine Member States decided not to elect any activities under Art. 3.4,
- 16 Member States elected forest management,
- three Member States elected cropland management,
- two Member States elected grazing-land management.
- Romania is the only Member State which elected revegetation.

A 4.3 Use of sinks for achieving the EU's Kyoto target

So far, a total net sequestration of about 13.5 million tonnes CO_2 per year of the commitment period from afforestation and reforestation activities (under Article 3.3 of the Kyoto Protocol) has been identified by EU-15 Member States and an additional sequestration of 0.4 million tonnes CO_2 per year by Slovenia.

The use of activities under Article 3.4 is projected to contribute another 17.6 million tonnes CO_2 per year of the commitment period in the EU-15; in addition, Slovenia expects a removal of 1.3 million tonnes CO_2 per year of the commitment period. These figures take the maximum allowance for forest management into account but do not include Spain due to the lack of detailed data.

Together with the Spanish aggregate all activities under Art. 3.3 and 3.4 in EU-15 Member States are projected to reduce emissions by 39.1 million tonnes CO_2 per year of the commitment period; Slovenia expects an additional reduction of 1.7 million tonnes CO_2 per year of the commitment period. For EU-15, this is equivalent to 11% of the EU-15 reduction commitment of 342 million tonnes CO_2 per year of the commitment period compared to base-year emissions.

Table 17 Projected net carbon stock changes under Articles 3.3 and 3.4 for the first commitment period of the Kyoto Protocol

	Article 3.3	**Article 3.4**			**Total**
	Net carbon stock change during 2008–12 [million tonnes CO_2 per year]	Election of activities[a]	Net carbon stock change during 2008–12 [million tonnes CO_2 per year]	Maximum allowance for forest management [million tonnes CO_2 per year]	[million tonnes CO_2 per year]
Austria	- 0.7	None	n.a.	n.a.	- 0.7
Belgium	No estimates available	None	n.a.	n.a.	
Bulgaria	No estimates available	None	n.a.	n.a.	
Czech Republic	No estimates available	FM	No estimates available	- 1.17	
Denmark	- 0.262	FM, CM, GM	FM: - 0.18 CM: - 1.82	- 0.18	- 2.3
Estonia	No estimates available	None	n.a.	n.a.	
Finland	+ 1.9 to + 2.4	FM	- 0.59	- 0.59	- 0.59[b]
France	No estimates available	FM	No estimates available	- 3.23	
Germany	No estimates available	FM	No estimates available	- 4.55	
Greece	No estimates available	FM	No estimates available	- 0.33	
Hungary	No estimates available	FM	No estimates available	- 1.06	
Ireland	- 2.07	None	n.a.	n.a.	- 2.1
Italy	- 6.480	FM	- 10.8	- 10.19	- 16.7
Latvia	No estimates available	None	n.a.	n.a.	
Lithuania	No estimates available	FM	No estimates available	- 1.03	
Luxembourg	No estimates available	None	n.a.	n.a.	
Netherlands	- 0.11	None	n.a.	n.a.	- 0.1
Poland	No estimates available	FM	No estimates available	- 3.00	
Portugal	- 3.36	FM, CM, GM	FM: - 0.8 CM&GM: - 0.5	- 0.81	- 4.7
Romania	No estimates available	FM, revegetation		- 4.03	
Slovak Republic	net sink	None	n.a.	n.a.	
Slovenia	-0.36	FM	- 1.32	- 1.32	- 1.7
Spain[c]	Not estimated separately	FM, CM	Not estimated separately	- 2.46	- 5.8

Sweden	Probably small net emissions	FM	Likely larger than max. allowance	- 2.13	- 2.13
United Kingdom	- 2.7	FM	- 8.5	- 1.36	- 4.1
EU-15[d]	**- 13.5**		**- 17.6**		**- 39.1**
EU-25[e]	**- 13.9**		**- 18.9**		**- 40.7**

Notes: Consistent with the reporting of emission inventories a negative sign '-' is used for removals and a positive sign '+' for emissions; n.a.: not applicable.
[a] FM: forest management; CM: cropland management; GM: grazing-land management.
[b] In addition to accounting for forest management up to the maximum allowance Parties may account for removals from forest management to compensate net emissions under Art. 3.3. In Finland, removals from forest management are projected to exceed the sum of emissions under Art. 3.3. and the maximum allowance for forest management.
[c] Spain only estimated the aggregated reductions of Articles 3.3 and 3.4 together.
[d] The sums for Art. 3.3 and 3.4 do not include the Spanish estimate.
[e] Cyprus and Malta are non-Annex I countries under the Kyoto Protocol and not included in this table.

Source: Questionnaires submitted by EU Member States; The European Community's initial report under the Kyoto Protocol (EEA Technical report No 10/2006); Initial reports under the Kyoto Protocol of Greece and Romania; Second national allocation plan under the EU ETS of Italy; Decisions 16/CMP.1 and 8/CMP.2 of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol.

A 5 The reporting scheme

A 5.1 Greenhouse gas inventories (1990-2005)

For the preparation of this report, EU-27 greenhouse gas inventories as compiled under the EU monitoring mechanism and submitted by the European Commission to the UNFCCC (May 2007) have been used (EEA, 2007a). All Member States reported data for 2005 except for Cyprus and Malta. Data availability has improved over previous years. Table 18 shows data gaps for the EU-27 Member States by May 2007. For the first time, all EU-15 Member States reported complete inventories in time. The reporting of greenhouse gas inventories has improved significantly as data from six Member States (CY, EE, LT. LU, MT, and PL) were missing in 2006.

Table 18 Gaps in reporting for the EU-27 Member States

Member State	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6
Cyprus				1990-2005	1990-2005	1990-2005
Malta	2001-05	2001-05	2001-05	1990-2005	1990-2005	1990-2005

Member States were gap filling has to be applied have the opportunity to provide feedback and incorporate the estimates in their national submissions. The following country-specific methods for gap filling were used (for more detail see EEA, 2007a).

Cyprus

HFC

Emissions estimated on basis of average per capita emissions of ES, GR, IT; PT for 2F1 'Refrigeration and air conditioning equipment' for 1990-2003 and extrapolated to 2004 and 2005

SF_6

Emissions estimated on basis of average emissions per electricity consumption of ES, IT; PT for 2F7 'Electrical equipment' for 1990-2003 and extrapolated to 2004 and 2005

Malta

CO_2, CH_4, N_2O: fuel combustion related

Extrapolation on basis of percentage change of Eurostat CO2 emissions for 2001-2005

CO_2, CH_4, N_2O: non-fuel combustion related

Linear trend extrapolation 1994-2000 for 2001-2005; in a some cases previous year values were used.

HFC

Emissions estimated on basis of average per capita emissions of ES, GR, IT; PT for 2F1 'Refrigeration and air conditioning equipment' for 1990-2003 and extrapolated to 2004

SF_6

Emissions estimated on basis of average emissions per electricity consumption of ES, IT; PT for 2F7 'Electrical equipment' for 1990-2003 and extrapolated to 2004

Data on CO_2, CH_4 and N_2O emissions used in this report do not include emissions and removals from land-use change and forestry.

A 5.2 Greenhouse gas emission projections (2010)

In order to support the evaluation of progress towards fulfilling the Kyoto targets, the EU Member States are required to report to the European Commission information on indicators as outlined in Council Decision 280/2004/EC (Art. 3(1)(j)) and Commission Decision 2005/166/EC (Annex II). Table 19 shows submission data and availability of information on indicators for the EU-27 Member States. Six Member States did not report any indicators (LU, CY, HU, MT, PL, and RO).

Table 19 Availability of indicators under the EC greenhouse gas Monitoring Mechanism

	Date	Priority indicators	Additional priority indicators	Supplementary indicators
Austria	15.01.2007	all (1990-2005)	all (1990-2005)	all except N°8 (1990-2005)
Belgium	14.02.2007	all (2005)	all (2005)	
Bulgaria	13.04.2007	N°1,2,4,5,6,7 (2005)	N°3,4,5,6 (2005)	N°5,6,9,10,11,12,13,14,15 (2005)
Czech Republic	05.01.2007	N°1,2,3,4,5,6 (2003-2005)	N°1,2,3,5 (2003-2005)	N°1,2,3,4,5,6,7,12,13,14,15 (2003-2005)
Denmark	15.01.2007 15.03.2007	all (2004, 2005)	all (2004, 2005)	all except N°13 (2004, 2005)
Estonia	02.05.2007	all (2004, 2005)	N° 3,6 (2004, 2005)	N°4,7,9,10,11,12,13,14,15 (2005)
Finland	15.03.2007 02.04.2007	all (1990-2005)	all (1990-2005)	
France	16.01.2007 20.02.2007	all (1990-2005)	all (1990-2005)	
Germany	05.04.2007 04.05.2007	N°1,2,3 (2005 and some before)	N°1,5,6 (2005 and some before)	N°1,2,3,4, 12,13,14,15 (2005 and some before)
Greece	30.03.2007	N° 1,2,4,5,6 (2005)	N°2,3,4,5,6 (2005)	N°7,9 (2005)
Ireland	14.02.2007	all (2005)	3 and 6 (2005)	1,2,4,5, 7,9,11,12,14,15 (2005)
Italy	15.05.2007	all (1990-2005)	all (1990-2005)	all (1990-2005)
	Date	**Priority indicators**	**Additional priority indicators**	**Supplementary indicators**
Latvia	15.01.2007 15.04.2007	all (1995-2005, some also before)	N°1 (1990-2005) N°2,3,4 (1995-2005) N°5,6 (1990-1998)	N°1,2,4,9,11, 14,15 (1990-2005) N°5,6 (1995-2005) N°3 (1995, 2000-2003)
Lithuania	16.01.2007	all (2004, 2005)	all (2004, 2005)	all (2004, 2005)
Netherlands	15.01.2007	N°1-6 (1990-2005) N°7 (1995-2005)	N°1-4 (1990-2005) N° 5,6 (1990-2003)	N°1,2,3,5,6,12,13,15 (1990-2005) N°9, 10 (1995-2005) N°14 (1990-2004)
Portugal	12.02.2007	all (1990-2005)	all (1990-2005)	all except N°8 (1990-2005)
Slovakia	06.04.2007	all (2005)	all (2006)	
Slovenia	13.03.2007 21.02.2007	N°1,2,4,5,6,7 (2003-2005) N°3 (2003-2004)	N°2-6 (2003-2005) N°1 (2003)	N°5,6,12,13,14,15 (2003-2005) N°1,2,9,11 (2003)
Spain	20.03.2007	N°1,2,4,6 (1995-2005) N°3,5,7 (1990-2005)	N°1 (1990-2005) N°2,3,4,6 (1995-2005)	N°1,2,11,12,13,14 (1990-2005) N°5,6 (1995-2005) N°4,9,10,15 (1990-2004)
Sweden	10.03.2007	all (2005)		
United Kingdom	16.01.2007	all (2005)	N°1,2 (2005)	N°1,2,3,4,9,12,14,15 (2005)

By March 15th 2007, Member States were required to report under the Monitoring Mechanism (Decision No 280/2004/EC and by Commission Decision 2005/166/EC), which is only required every second year. In 2007 eight Member States submitted in time. By the end of May 2007, 19 EU Member States and one EEA member country (Norway) had submitted information. The quality of reporting for Member States was of a variable quality in terms of level of detail provided.

Difficulties occurred with submissions because of incomplete projections, inconsistencies in data, for example the base year not being consistent with projections, and the use of the national language. As a result, data gaps occurred and Member States were asked to complete or correct their data in the draft country profile sent for review. Data from 2006 were used for Estonia, Latvia, Hungary, Greece, Iceland, Liechtenstein and Switzerland, as no new data on projections were available.

The level of reporting in 2007 has deteriorated slightly with 17 of the 27 EU Member States providing submissions (compared to 18 of 25 Member States in 2006, and 17 in 2005). This was not unexpected as all Member States except Cyprus, Malta and Luxembourg submitted a Fourth National Communication and/or Demonstrable Progress Report to the UNFCCC in 2005/2006. Some reports were submitted in November and December 2006 meaning that only a few months had passed by the March 2007 deadline for Monitoring Mechanism reports.

The number of submissions received does not say anything about the quality and completeness of the reports. In case the 2007 submission could not be used or where not available, data of the Second National Allocation Plan were used and then Fourth National Communication or Demonstrable Progress Reports.

Beside projections, policies and measures Member States are required to report on uncertainty analysis, parameters and indicators. The reporting of indicators got better, but uncertainty and parameters are still weak points.

In 2007 for the first time, a template for reporting was developed and Member States were encouraged to use it. The use of the template should guarantee that Member States submit all required information and data in a consistent format, which allows the easier assessment of the submissions and compilation of report at hand. Seven of the EU-27 Member States made use of the template.

Table 20 Reporting of new information in 2007 for EU-27 Member States

Country	New policies and measures reported in 2007?	New projections reported in 2007?
Austria	Yes	Yes
Belgium	Yes	Yes
Bulgaria	Yes	Yes
Cyprus	Yes	Yes
Czech Republic	Yes	Yes
Denmark	Yes	Yes
Estonia	Yes	No
Finland	Yes	Yes
France	No	Yes
Germany	No	Yes
Greece	No	No
Hungary	No	No
Ireland	Yes	Yes
Italy	No	No
Latvia	Yes	No
Lithuania	Yes	Yes
Luxembourg	No	No
Malta	Yes	No
Netherlands	Yes	Yes

Country	New policies and measures reported in 2007?	New projections reported in 2007?
Poland	Yes	Yes
Portugal	Yes	Yes
Romania	Yes	Yes
Slovak Republic	Yes	Yes
Slovenia	Yes	Yes
Spain	Yes	No
Sweden	Yes	Yes
United Kingdom	Yes	Yes

Note: Updated projections data for Luxembourg and Malta were obtained from their Second National Allocation Plans, and for Italy from its Demonstrable Progress Report. These documents were submitted in late 2006 after completion of the Trends and Projections report.

In 2007 for the second time, EU-27 Member States were required to report to the European Commission information on indicators for projections to monitor and evaluate progress with policies and measures as outlined in Commission Decision 2005/166/EC (Annex III). Table 21 below shows availability of information on indicators for the EU-27 Member States.

Table 21 Reporting on indicators for projections by EU-27 Member States

Member State	Numerator and denominator reported	Year
Austria	N°1,2,3,4,5,8,9,10	2005,2010,2015, 2020
Belgium	N°1,2,4,5,6,7,8,9,10	2005,2010,2015, 2020
Czech Republic	Full set	2005,2010,2015, 2020
Denmark	Full set	2005,2010,2015, 2020
Finland	N°1,4,7	2005,2010,2015, 2020
Germany	N°1,2,3,4,5,6,7	Not all required years
Lithuania	Full set	2005,2010,2015, 2020
Netherlands	Full set	2005,2010,2015, 2020
Portugal	N°1,2,4,5,6,7,9,	Not all required years
Poland	N°1,7,8,9,10	2005,2010,2015, 2020
Slovak Republic	Full set	2005,2010,2015, 2020
Slovenia	Full set	2005,2010,2015, 2020
Sweden	N°1,2,4,5,7,8,9,10	2005,2010,2015, 2020
United Kingdom	N°1,2,3,4,8,9,10	2005,2010,2015, 2020

The number of countries reporting indicators for projections and the quality increased. In 2007, 14 countries provided indicator for projections, compared to 12 in 2006. Quality checks were undertaken by comparing indicators between countries and comparisons of 2005 inventory data and 2005 indicator for projections data. Inconsistencies are mainly due to the reporting of data in wrong units, which are specified in Annex III of the Implementing Provision. Partly these issues could be clarified with the countries during the review.

The more countries report indicators for projections the better the information can be used to assess at the EU-15 and EU-27 level. The indicators are used in the Chapter on Sectoral Trends in the Annex.

A 5.3 Methodological issues

A 5.3.1 Greenhouse gas emissions reporting categories

The sector categories used in this report are consistent with the reporting guidelines provided by the IPCC[32]. This nomenclature is used by all countries for reporting national greenhouse gas emissions to the UNFCCC.

Table 22 Main greenhouse gas source categories

Sector	Corresponding IPCC sector or source category and description
Energy supply and use excluding transport	IPCC sector 1 'Energy', except 1.A.3. 'Transport'. It includes mainly energy supply in electricity and heat production and refineries, and energy use in manufacturing industries, households and services. Fugitive emissions from energy are also included in this sector.
Transport	IPCC source category 1.A.3 'Transport'. It includes mainly road transport, but also rail and domestic aviation and navigation. It does not include international aviation and navigation.
Agriculture	IPCC sector 4 'Agriculture'. It includes mainly enteric fermentation and soils (it does not include energy-related emissions from agriculture).
Industrial processes	IPCC sector 2 'Industrial processes'. It includes mainly process-related emissions from mineral production (cement), the chemical industry (nitric and adipic acid production) and fluorinated gases (it does not include energy-related emissions from industry).
Waste	IPCC sector 6 'Waste'. It includes mainly emissions from landfills. It does not include waste incineration used for electricity and heat production, which is included in the energy sector.
Solvents and other products	IPCC sector 3 'Solvent and other product use' and IPCC sector 7 'Other'. Due to the low share of this sector, no detailed analysis of emissions from this sector is provided.

A 5.3.2 Gap filling procedures for projections

Gap filling is necessary, as several data sets are required to assess the progress of a Member State as well as the progress of the EU.

These data include:

- base year used for projection
- total "with existing measure" scenario and "with additional measure" scenario emission value
- sectoral and gas breakdown for base year and scenarios
- 2020 projection value

In the following, the applied procedures are shortly explained.

[32] The different GHG source categories are classified according to a specific IPCC nomenclature. See *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*: www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm

A sectoral breakdown for the emission of France and Luxembourg was not available for the base year used for projections. In both cases, the total base year used for projections is consistent with the base year in the initial report. Thus, the breakdown provided in the Initial report was used.

For France and Italy, a complete sectoral breakdown for required scenarios was missing. Here the relative allocation of savings from different policies and measures to specific sectors is used for the calculation of the sectoral projection breakdown.

All EU-15 reported total projections so gap filling was not necessary for EU-15 total projections for 2010. But not all new Member States provided projections so EU-27 figures could not just simply be added up. The procedure bases on the assumptions that the projected trend of the aggregated Member States available can be applied to the missing country. That means the 2005-2010 percent variation for the available EU countries is applied to the country with the gap to obtain a complete EU projection for 2010.

This year's report also contains an assessment of the situation in 2020. As only 23 out of the EU-27 Member States provided projections for 2020, the same procedure as described in the paragraph above is applied.

A 5.3.3 Calculating savings from national policies and measures

Throughout this report, projected savings from policies and measures in 2010 are estimated by comparison with a hypothetical reference case in which no measures were implemented since the base year.

Where possible, projected emission reductions from policies are calculated from the latest Member State (sectoral) projections. Hence, the 'with additional measures' projection is subtracted from the 'with existing measures' projection to reveal the effect of 'planned' policies and measures. Likewise, the 'with existing measures' projection is subtracted from the 'without measures' projection to reveal the effect of 'existing' policies and measures. Where the necessary (sectoral) projections were not reported, projected emission reductions from policies are based on bottom-up Member State quantification of the effect of individual policies and measures in 2010, in the chapter on policies and measures of the latest report available. In such cases, Member States may not have provided quantification for all policies and measures included in the projections. As a result, the reported effects of single quantified measures will not necessarily sum to the projections for the total effect of all reported measures. Additionally, any interaction effects between policies and measures may not be reflected. However, all policies and measures are included in the total projections and in the sectoral projections presented in this report.

A 5.3.4 Calculating savings from CCPMs

Data used to illustrate savings from individual CCPMs in this report is taken from European Climate Change Programme (ECCP) Database on Policies and Measures in Europe (www.oeko.de/service/pam/sector.php). Data includes savings projected by Member States for existing 'with measures' ('implemented/adopted') and 'with additional measures' ('planned') in 2010, by comparison with a hypothetical reference case in which no measures were implemented since 1990. Data used in this report is for CCPMs only and therefore does not include quantification of the effect of purely national policies. The ECCP database provides detail on PAM status, split by 'implemented/adopted' and 'planned' status. These categories do not necessarily correspond to the PAM included in Member States' 'with measures/additional measures' projections and the estimated savings from planned measures do not necessarily correspond to the

difference between the 'with measures' and 'with additional measures' projections. Since a large proportion of policies and measures have not been quantified, this is why hypothetical 'without measures' projections cannot be derived.

A 5.3.5 Calculating a 'without measures' projection scenario

'Without measures' projections are extracted from Member States' latest submissions in order to illustrate the effect of implemented policies and measures. Where a 'without measures' scenario is not reported by Member States, it has been estimated through a bottom-up addition of Member State quantifications of the effect of national PAM. In such a case, the WOM projection may under or over estimate the effect of measures.

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Glossary

ACEA	European Automobile Manufacturers Association (EU-wide agreement with ACEA and similarly also with Japanese (JAMA) and Korean (KAMA) automobile manufacturing industries)
ARD	afforestation, reforestation and deforestation
CCPMs	common and coordinated policies and measures at EU level
CDM	clean development mechanism as defined in the Kyoto Protocol, Article 12, meaning projects on the reduction of greenhouse gas emissions between industrialised countries and developing countries
CER	certified emission reduction unit caused by a CDM project
CFCs	chlorofluorocarbons
CHP	combined heat and power
CH_4	methane
CITL	Community Independent Transaction Log
CLRTAP	Convention on Long-range Transboundary Air Pollution
CO_2	carbon dioxide
COP	Conference of the Parties
CRF	common reporting format
DNA	Designated National Authority
DTI	distance-to-target indicator
ECCP	European climate change programme
EEA	European Environment Agency
ERU	emission reduction unit caused by JI projects
ETC/ACC	European Topic Centre on Air and Climate Change
ETS	Emission Trading Scheme
EUA	European Union Allowance
GDP	gross domestic product
GHG	greenhouse gases
HCFC	hydrochlorofluorocarbon
HFC	hydrofluorocarbon
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
IPPC	integrated pollution prevention and control
JAMA	Japanese Automobile Manufacturers Association
JI	Joint implementation as defined in the Kyoto Protocol, Article 6, meaning projects on the reduction of greenhouse gas emissions between industrialised countries and countries in transition
KAMA	Korean Automobile Manufacturers Association

KP	Kyoto Protocol
LUCLUF	Land-use, land-use change and forestry
Monitoring Mechanism	Council Decision No 280/2004/EC concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol
MoU	Memorandum of Understanding
MS	Member States
Mt	Mega (million) tonnes
NAP	National Allocation Plan
N_2O	nitrous oxide
PAM	policies and measures
PFCs	perfluorocarbons
RES	renewable energy sources
SF_6	sulphur hexafluoride
UNECE/EMEP	United Nations Economic Commission for Europe/Cooperative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe
UNFCCC	United Nations Framework Convention on Climate Change
WAM	with additional measures
WEM	with existing measures
WOM	without measure