Greenhouse gas emission trends and projections in Europe 2003 Summary

Tracking progress by the EU and acceding and candidate countries towards achieving their Kyoto Protocol targets

European Environment Agency

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Key messages

The EU reduced its greenhouse gas (GHG) emissions by 2.3 % between 1990 and 2001. This means it is only just over one quarter of the way towards achieving the 8 % emissions reduction from base-year levels required by 2008–12 under the Kyoto Protocol. Ten Member States (Austria, Belgium, Denmark, Finland, Greece, Ireland, Italy, the Netherlands, Portugal and Spain) are not on track to meet their national targets with domestic policies and measures.

From 1990 to 2001 EU greenhouse gas emissions decreased from most sectors (energy supply, industry, agriculture, waste management); however emissions from transport increased by nearly 21 % in the same period.

The latest projections show that neither existing domestic policies and measures by Member States to reduce emissions, nor additional domestic measures being planned, will be sufficient for the EU to reach its Kyoto target. Existing domestic policies and measures will reduce total EU GHG emissions by only 0.5 % from 1990 levels by 2010. This estimate is worse than reported last year due to updated German projections, which now show a slight shortfall on its national target rather than the large over-delivery shown last year. Sweden and the United Kingdom project that existing domestic policies and measures will be sufficient to meet their burden-sharing targets and they may even over-deliver on their target. If these two countries did no more than meet their agreed targets, the EU reduction would be just 0.2 %. When the additional domestic policies and measures being planned by Member States are taken into account, an EU emissions reduction of 7.2 % is projected. However, this relies on several Member States cutting emissions by more than that required to meet their national targets, which cannot be taken for granted. If no over-delivery of these Member States is considered, the EU will achieve a 5.1 % reduction with additional policies and measures.

Policies and measures that are projected to help most in achieving the targets include the EU greenhouse gas emissions trading scheme, promotion of electricity from renewable energy, promotion of combined heat and power (CHP), improvements in the energy performance of buildings and energy efficiency in large industrial installations, and promotion of the use of energy-efficient appliances. However, the EU renewable energy target (22 % of gross electricity consumption) and the EU target for CHP (18 % share in total electricity production) for 2010 are unlikely to be met under current trends. Other key policies and measures include promotion of biofuels in transport and reducing the average carbon dioxide emissions of new passenger cars, the recovery of gases from landfills and reduction of fluorinated gases.

Based on the limited information available, Member States' plans so far for using the Kyoto Protocol's flexible mechanisms and carbon sinks to achieve further emissions savings will make a minor contribution towards meeting the EU target.

Emissions have declined substantially in almost all acceding and candidate countries and in 2001 emissions were 36 % below the base-year level, mainly due to the introduction of market economies and the consequent restructuring or closure of heavily polluting and energy-intensive industries. Almost all acceding and candidate countries (except Slovenia) were on track in 2001 to meet their Kyoto targets. Carbon dioxide emissions from transport decreased by 19 % between 1990 and 1995 but increased afterwards and in 2001 exceeded 1990 levels for the first time (by 4 %). Most acceding and candidate countries project that existing domestic policies and measures will be sufficient to meet their Kyoto targets by 2010, but Slovenia projects increasing emissions by 2010 and therefore a shortfall of its Kyoto target.

1. Introduction

This report presents an assessment of the actual (1990 to 2001) and projected progress (by 2010) of the European Community (EC) and its Member States and of acceding and candidate countries[1] towards achieving their emission targets under the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol.

The report serves to support and complement the annual evaluation report of the European Commission to the Council and European Parliament, which is required under Council Decision 1999/296/EC for a monitoring mechanism of Community carbon dioxide (CO_2) and other greenhouse gas emissions.

In this report, the assessment of whether Member States are on track to reach their targets is based mainly on an analysis of domestic policies and measures, because the extent to which Member States are preparing to use the flexible mechanisms of the Kyoto Protocol or to use land-use change and forestry activities ('carbon sinks') to fulfil their commitments is not included in the mandatory reporting under the existing (1999) EU greenhouse gas monitoring mechanism. However, a preliminary assessment of the use of Kyoto flexible mechanisms and carbon sinks for meeting Member States' commitments is included.

This year (2003) the report is published for a second time. The information in the report published at the end of 2002 on trends and projections has been updated with the most recent emission inventories, emission projections and national programmes submitted by all Member States (in 2003) and on voluntary reporting by acceding and candidate countries.

1 This report covers the ten central and eastern European acceding and candidate countries (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia), which are in this report further referred to as 'acceding and candidate countries'. The report does not cover the other three acceding and candidate countries: Cyprus, Malta and Turkey.

2. The Kyoto Protocol targets

Combating climate change and minimising its potential consequences are key objectives of the UNFCCC and represent a high priority for the EU.

Achieving 'sustainable' atmospheric greenhouse gas concentrations, avoiding dangerous interference with the climate system without sacrificing economic development, would require substantial (50 to 70 %) reductions in global greenhouse gas emissions. As a first step, Parties to the UNFCCC in 1997 adopted the Kyoto Protocol. This requires developed countries, as a whole, to reduce their emissions of a basket of six greenhouse gases to 5.2 % below their levels in a given base year (1990 in most cases) by the period 2008–12.

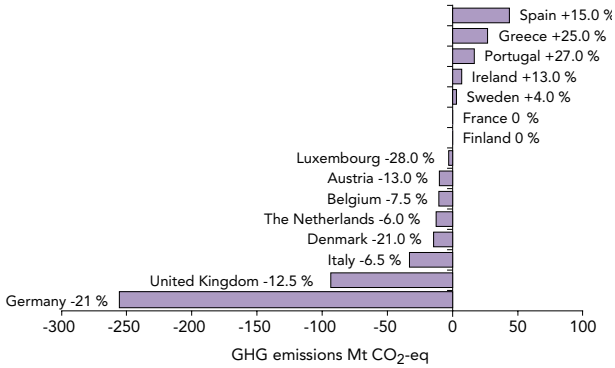
For the EU the Protocol sets the target of an 8 % emissions reduction from the base-year level by the 2008–2012 commitment period. Within this overall target, differentiated emission limitation or reduction targets have been agreed for each Member State under an EU accord known as the 'burden-sharing' agreement.

Acceding and candidate countries have differing targets under the Kyoto Protocol. Bulgaria, the Czech Republic, Estonia, Latvia, Lithuania, Romania, Slovakia and Slovenia have reduction targets of 8 % from the base year, while Hungary and Poland have reduction targets of 6 %.

☺ The EU, its Member States and all acceding and candidate countries (except Turkey) have ratified the Kyoto Protocol.

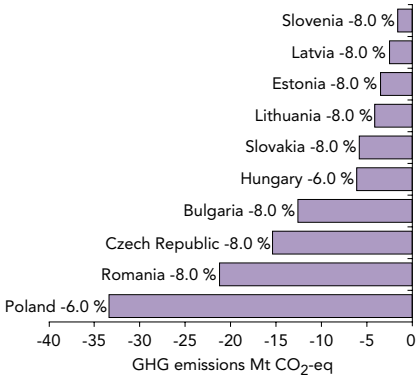
☹ The Protocol has not yet entered into force because neither the United States nor Russia has ratified.

Figure 1 **Greenhouse gas emission targets of EU Member States for 2008–2012 relative to base-year emissions under the EU burden-sharing decision**



Note: In the Council decision (2002/358/EC) on the approval by the EU of the Kyoto Protocol the various commitments of the Member States are expressed as percentage changes from the base year. In 2006 the respective emission levels will be expressed in terms of tonnes of CO_2-equivalent. In this connection, the Council of Environment Ministers and the Commission have in a joint statement agreed to take into account inter alia the assumptions in Denmark's statement to the Council Conclusions of 16–17 June 1998 relating to base-year emissions.

Figure 2 **Greenhouse gas emission targets of acceding and candidate countries for 2008–2012 relative to base-year emissions under the Kyoto Protocol**



Note: Countries with base years other than 1990 are Bulgaria (1988), Hungary (average 1985–87), Poland (1988), Romania (1989) and Slovenia (1986). Cyprus and Malta have no targets and Turkey is not a Party to UNFCCC.

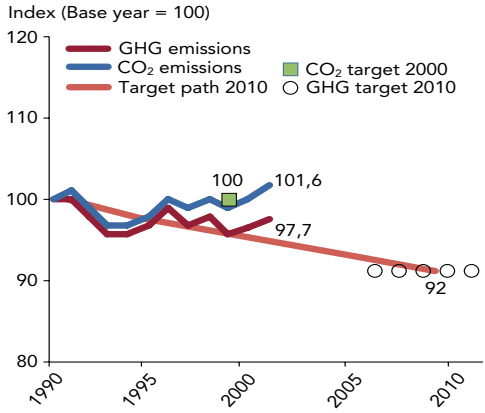
3. EU progress in limiting greenhouse gas emissions up to 2001

After an initial decrease in total greenhouse gas emissions in the early 1990s, emissions did not drop further in the second half of the 1990s and fluctuated slightly below the base-year level[2]. Emissions increased by 1 % from 2000 to 2001, which is a strong negative signal because this increase in only one year is large compared with the 8 % reduction target to be achieved over 20 years. The favourable situation in the 1990s was largely a result of considerable cuts in emissions in Germany and the United Kingdom. In Germany, the main reasons were increasing efficiency in power and heating plants and the economic restructuring of the five new federal states following German reunification. In the United Kingdom the reduction of greenhouse gas emissions was partly a result of the liberalisation of the energy market and subsequent changes in the choice of fuel used in electricity production from oil and coal to gas. Another important factor was significant reductions in emissions of non-carbon dioxide greenhouse gas emissions, including implementation of nitrous oxide abatement measures in the chemical industry.

- In 2001, greenhouse gas emissions in the EU were 2.3 % below the base-year level, taking the EU little more than a quarter of the way towards its greenhouse gas emission target.
- In 2001, five Member States (France, Germany, Luxembourg, Sweden and the United Kingdom) were on track to reach their burden-sharing targets with domestic policies and measures.
- In 2001, ten Member States were not on track to reach their burden-sharing targets with domestic policies and measures. Ireland, Portugal and Spain were heading towards exceeding their targets by more than 20 index points.

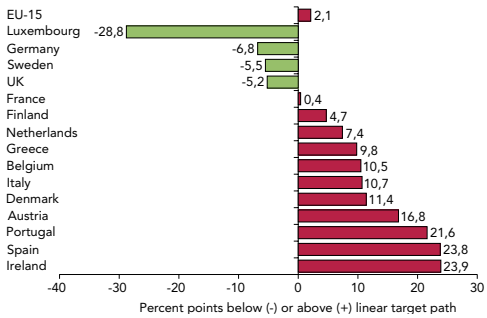
[2] In this report, total EU greenhouse gas emissions in the base year are assumed to be a combination of 1990 EU emissions of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) and 1995 EU emissions of fluorinated gases.

Figure 3 **Actual EU greenhouse gas emissions compared with targets for 2000 and 2008–2012**



Note: The target path is used to analyse how close 2001 emissions were to a linear path of emission reductions or allowed increases from the base year to the Kyoto Protocol target, assuming domestic measures are used. Data exclude emissions and removals from land-use change and forestry.

Figure 4 **Distance-to-target (burden-sharing targets) for EU Member States in 2001, based on domestic policies and measures alone**



Note: The distance-to-target indicator (DTI) measures the deviation of actual emissions in 2001 from a (hypothetical) linear path between base-year emissions and the burden-sharing target for 2010. A positive value suggests an under-achievement and a negative value an over-achievement by 2001. The DTI gives an indication of progress towards the Kyoto and Member States' burden-sharing targets. It assumes that the Member States meet their targets entirely on the basis of domestic measures.

Sectors and gases responsible for EU emission trends between 1990 and 2001

The main sectors contributing to total EU greenhouse gases emissions in 2001 were:

- Energy industries (electricity sector and refineries, mainly carbon dioxide), 28 %;
- Transport (mainly carbon dioxide from fossil fuel combustion, but also nitrous oxide), 21 %.
- Industry (mainly carbon dioxide fossil fuel combustion but also nitrous oxide and fluorinated gases from processes), 20 %;
- Other (carbon dioxide from fossil fuel combustion by households, small commercial businesses and services), 17 %;
- Agriculture (methane from cattle and nitrous oxide from agricultural soils), 10 %.

Since 1990 emissions have decreased in all sectors except transport and households. In particular, emissions from road transport have increased substantially.

☺ From 1990 to 2001 EU greenhouse gas emissions decreased in most sectors (industry, energy supply, agriculture, waste management).

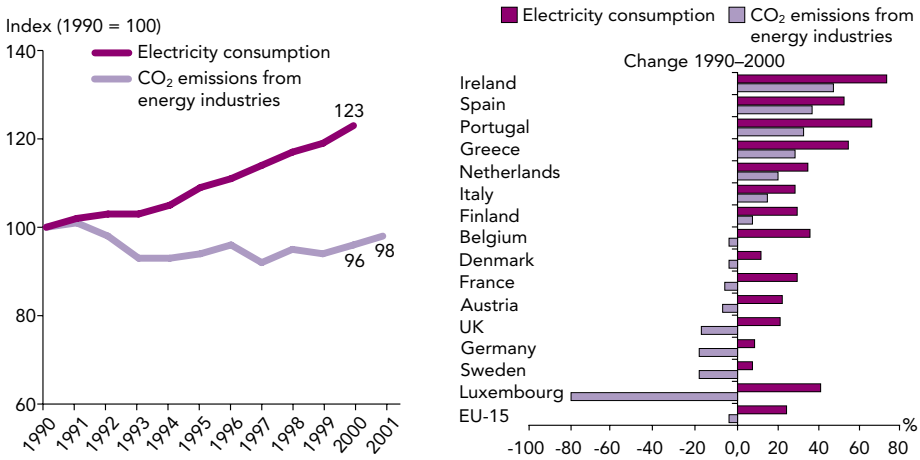
☹ EU emissions from transport increased by nearly 21 % in the same period.

Energy supply

Carbon dioxide emissions from the energy industries sector (electricity and heat production, accounting for 27 % of total EU emissions) fell slightly by 2 % between 1990 and 2001. Increasing emissions in recent years have largely offset an 8 % reduction achieved in the early 1990s. Over the same period electricity production and consumption grew considerably. This decoupling of emissions from production was mainly due to shifts in fuel use in power production from coal to natural gas, larger shares of electricity generation from renewable energy sources and nuclear power, and efficiency improvements. However, in 2001 CO_2 emissions from energy industries increased by 2 percentage points compared with 2000, mainly due to increased use of fossil fuels for power production.

Between 1990 and 2001, carbon dioxide emissions from energy industries declined by 2 % while final electricity consumption increased by 23 %, showing a decoupling in all Member States.

Figure 5 **EU CO_2 emissions from energy industries compared with electricity consumption**

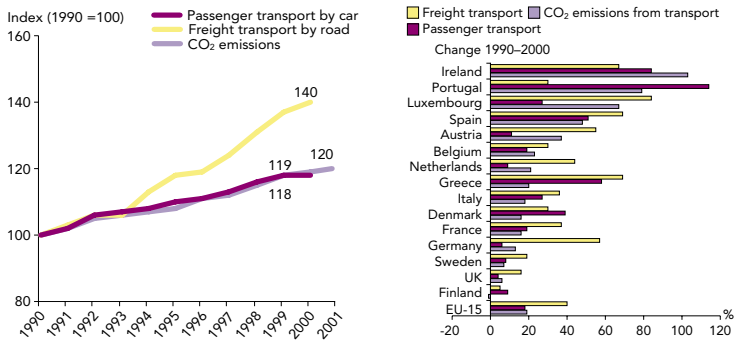


Transport

The largest increase in emissions between 1990 and 2001 was from transport, with road transport by far the biggest transport emission source. Emissions increased continuously due to high growth in both passenger and freight transport by road (by 40 % and 18 %, respectively, between 1990 and 2000). Carbon dioxide emissions from transport account for 20 % of total EU emissions. The increase in carbon dioxide emissions from international aviation and navigation was even higher (an 82 % increase from 1990 to 2001 of emissions from international aviation), but these are currently not addressed in the Kyoto Protocol or in EU policies and measures. Nitrous oxide emissions from transport account for only a small part of total EU greenhouse gas emissions but they increased substantially after the introduction of catalytic converters for petrol-driven cars. This is a negative aspect of an otherwise effective policy for improving air quality in Europe. The importance of this effect is, however, diminishing as catalytic converters improve.

- Between 1990 and 2001, EU carbon dioxide emissions from domestic transport (mainly road) increased by 20 %.
- EU carbon dioxide emissions from international aviation and navigation (not addressed under the Kyoto Protocol) made up 6 % of total emissions in 2001, and increased by 44 % from 1990 levels.

Figure 6 **EU CO_2 emissions from transport compared with transport volumes (passenger transport by car and freight transport by road)**



Agriculture

Between 1990 and 2001 nitrous oxide emissions from agricultural soils declined, mainly because of a decrease in the use of nitrogen fertiliser. This was a consequence of the reform of the EU's common agricultural policy (CAP) and the implementation of the nitrate directive, aimed at reducing water pollution. Methane emissions from enteric fermentation (by cattle) also fell, mainly due to a drop in the number of cattle, but also as a result of CAP reform.

☺ Between 1990 and 2001, EU nitrous oxide emissions from agricultural soils fell by 8 % and EU methane emissions from enteric fermentation (by cattle) declined by 9 %.

Industry

During the early 1990s carbon dioxide emissions from fossil fuel use in manufacturing industries decreased, mainly due to fuel efficiency improvements, economic restructuring in Germany and relatively low economic growth in the EU. A substantial cut in nitrous oxide emissions was achieved through emission reduction measures in the adipic acid production industry in France, Germany and the United Kingdom. Very large increases in emissions of hydrofluorocarbons occurred as they replaced chlorofluorocarbons, which are being phased out because of their damage to the ozone layer. This is a negative side-effect of an otherwise effective policy to protect the ozone layer.

☺ Between 1990 and 2001 EU carbon dioxide emissions from fossil fuel use in manufacturing industries and nitrous oxide emissions from chemical industries decreased by 9 % and 54 %, respectively.

☹ Between 1995 (base year for fluorinated gases) and 2001, EU hydrofluorocarbon emissions, currently accounting for 0.8 % of total EU greenhouse gas emissions, increased by a factor of four.

Waste management

Since 1990 methane emissions from landfills have fallen. The decrease is mainly due to the (early) implementation of the landfill waste directive and similar national legislation intended to reduce the amount of untreated biodegradable waste disposed of in landfills and install landfill gas recovery at all new sites.

☺ Between 1990 and 2001, EU methane emissions from landfills declined by 28 %.

Households

Carbon dioxide emissions from households have held more or less stable around 1990 levels but jumped to 7 % above this level in 2001 due to a relatively cold winter in most Member States. Over the period the number of households increased continuously. The decoupling of emissions from growth in households seen until 2000 results from energy efficiency improvements due to thermal insulation, fuel switching to natural gas and an increase in district heating using biomass.

☹ Carbon dioxide emissions from households increased by 7 % from 1990 to 2001 after falling below 1990 levels in 2000, while the number of dwellings increased by 12 %, showing some decoupling.

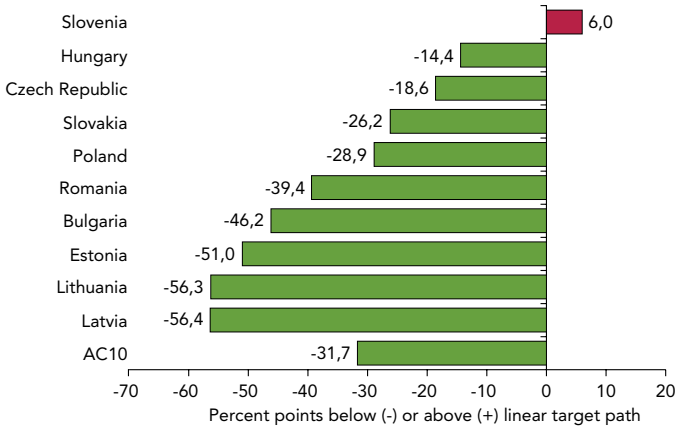
4. Progress by acceding and candidate countries in limiting greenhouse gas emissions up to 2001

Although acceding and candidate countries have to reach their Kyoto targets individually, this report shows the overall aggregated trends in these countries to facilitate comparison with the EU. Since 1990 total emissions have declined substantially in almost all acceding and candidate countries, mainly due to the introduction of market economies and the consequent restructuring or closure

of heavily polluting and energy-intensive industries. Emissions from transport increased in the second half of the 1990s and exceeded the 1990 level in 2001. The acceding and candidate countries seem to be repeating the experience of the EU cohesion states (Greece, Ireland, Portugal and Spain) in that, starting from relatively low transport levels, high general economic growth brings strong growth in transport and hence in greenhouse gas emissions from transport.

- In the ten acceding and candidate countries total greenhouse gas emissions in 2001 were 36 % below the base-year level.
- All acceding and candidate countries except Slovenia were on track in 2001 to meet their Kyoto targets.
- Carbon dioxide emissions from transport decreased by 19 % between 1990 and 1995 but increased afterwards and in 2001 exceeded 1990 levels for the first time (by 4 %).

Figure 7 **Distance-to-target (Kyoto Protocol) for acceding and candidate countries (AC) in 2001**



Note: The distance-to-target indicator (DTI) measures the deviation of actual emissions in 2001 from a (hypothetical) linear path between base-year emissions and the target for 2010. For Bulgaria, Hungary, Lithuania and Slovenia a data gap-filling procedure was followed in order to have a complete estimate for all ten countries. The target for all ten acceding and candidate countries together was calculated for the purposes of this report alone and does not have any legally binding implication.

5. Projected EU progress in limiting greenhouse gas emissions with existing and additional domestic policies and measures

Comparing Member States' projections for 2010 based on existing domestic policies and measures with their EU burden-sharing commitments reveals that these measures will not be sufficient for the EU to reach its Kyoto target. This is mainly due to a slight shortfall in Germany's projections as reported this year, compared with last year when Germany showed a large over-delivery on its burden-sharing target. Additional domestic policies and measures planned by several Member States would almost allow the target to be achieved, but would rely on over-delivery by several Member States, which cannot be taken for granted.

- With existing domestic policies and measures, projections for the EU show total greenhouse gas emissions decreasing only slightly by 0.5 % between 1990 and 2010. This leaves a shortfall of 7.5 % in reaching the EU target of an 8 % reduction.
- Sweden and the United Kingdom project that existing domestic policies and measures will be sufficient to meet their burden-sharing targets.
- Austria, Belgium, Denmark, Finland, France, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain are all projected to fall short of their burden-sharing targets for 2010 with existing domestic policies and measures. Germany projects it will almost reach its target with existing domestic measures.
- Savings from additional domestic measures being planned by Member States would result in total emission cuts from domestic policies and measures of 7.2 %. This is still almost 1 % short of the EU target and would rely on over-delivery by some Member States (Finland, France, Greece, Ireland, Sweden and the United Kingdom) compared with their burden-sharing targets.

Figure 8 **Greenhouse gas emission trend and projections for EU-15**

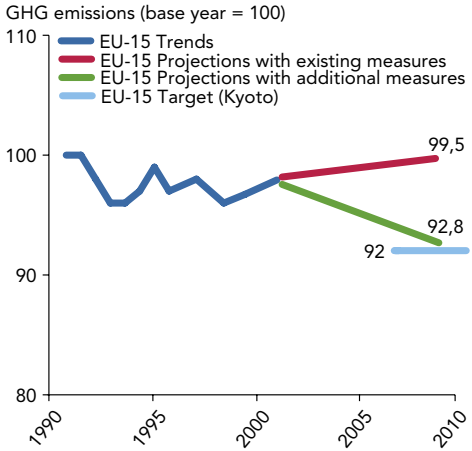
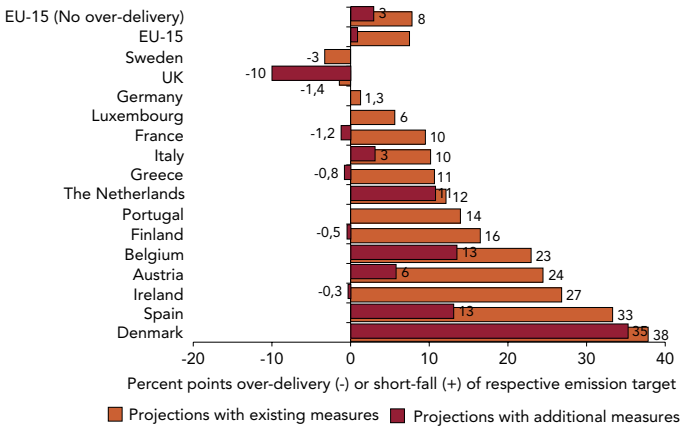


Figure 9 **Relative gap (over-delivery or shortfall) between projections based on existing and additional domestic policies and measures and 2010 targets for EU-15 and Member States**



Comparing national projections with EU-wide projections

Because the national projections are not fully comparable between Member States, due to different underlying assumptions, the aggregated national projections have been compared with recent EU-wide emission projections. Projections for EU-wide energy-related carbon dioxide emissions, covering about 80 % of total emissions, confirm the national projections. Both show a 4 % increase by 2010, assuming only existing domestic measures are taken. National projections for Member States with large contributions to total EU emissions (France, Germany, United Kingdom) differ relatively little from the EU-wide projections. However there are big differences between the estimates for Belgium, Denmark, Finland, Italy, Luxembourg and Spain. To reduce these differences in the future, further work is needed to improve both EU-wide and Member State projections.

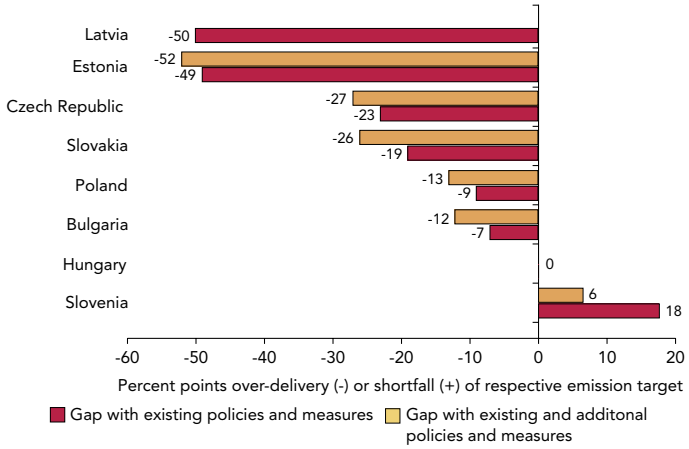
EU-wide projections of energy-related CO_2 emissions show an increase of 4 % between 1990 and 2010, which is in line with the aggregated Member State projections.

6. Projected progress by acceding and candidate countries in limiting greenhouse gas emissions with existing domestic policies and measures

Greenhouse gas emissions in six acceding and candidate countries are projected to decrease further with existing domestic policies and measures. In part, these projected reductions are the result of the economic restructuring that has already taken place in these countries. However, Slovenia has reported a projected increase in emissions. Recent strong growth in emissions from transport in all acceding and candidate countries is a cause for concern for the future. All countries have policies and measures in place to reduce greenhouse gas emissions and four countries have identified additional policies and measures.

☺ Greenhouse gas emissions in seven acceding and candidate countries are projected to decrease sufficiently by 2010 to meet their Kyoto targets with existing domestic policies and measures. But Slovenia projects increasing emissions by 2010 and therefore will miss its Kyoto target.

Figure 10 **Relative gap (over-delivery or shortfall) between projections and targets for 2010 for acceding and candidate countries**



Note: Projections for Poland include only the energy sector.

7. Effects of domestic policies and measures in the EU

The European Commission has identified additional common and coordinated policies and measures to be implemented by Member States. Several of these are included in the Member States' projections. Policies and measures in the energy sector, targeted at moving to cleaner and more efficient energy production and use, account for the majority of the total expected savings by 2010. Transport policies and measures account for a small part of total expected savings, although transport is the most rapidly growing source of greenhouse gases. The industry (processes, excluding energy use) and waste management sectors also contribute small amounts to total savings.

The following key common and coordinated policies and measures are either implemented (existing) or are additional but in an advanced stage of adoption. Several are also included in the Member States' reporting on policies and measures.

Energy supply and use:

- EU CO_2 emissions trading scheme (directive, 2003)
- promotion of electricity from renewable energy (directive, 2001)
- promotion of combined heat and power (proposal for a directive, 2002)
- promotion of energy-efficient appliances (various directives)
- improvement of energy performance of buildings (directive, 2002)
- improvement of energy efficiency in large industrial installations (integrated pollution prevention and control directive).

Transport:

- reduction in the average CO_2 emissions of new passenger cars (agreement between the Commission and car manufacturers (EU, Japan and Korea), 1998)

- promotion of biofuels in the transport sector (directive, 2003).

Industry (non-energy use): reduction of certain fluorinated gases (proposal for a regulation, 2003).

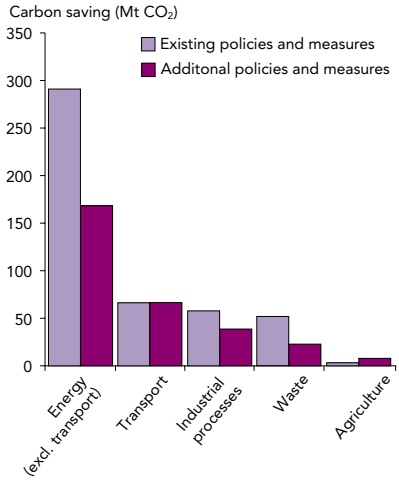
Waste management: recovery of gases (methane) from biodegradation of waste in landfills (directive, 1999).

The Commission has proposed additional common and coordinated policies and measures — some of which the EU has already adopted — which would result in additional emission reductions potentially sufficient to bridge the gap between projected emissions with existing domestic measures and the EU target.

Policies and measures in the energy sector account for the majority of the total expected savings (62 % of savings from existing domestic measures and 58 % of savings from additional domestic policies and measures).

Transport policies and measures account for only a small part of the total expected savings (14 % of existing domestic measures savings and 23 % of additional domestic policies and measures savings).

Figure 11 **EU-15 projected greenhouse gas emission savings by sector by 2010**



Note: The figure includes savings only for those policies and measures for which Member States reported quantified reductions of emissions.

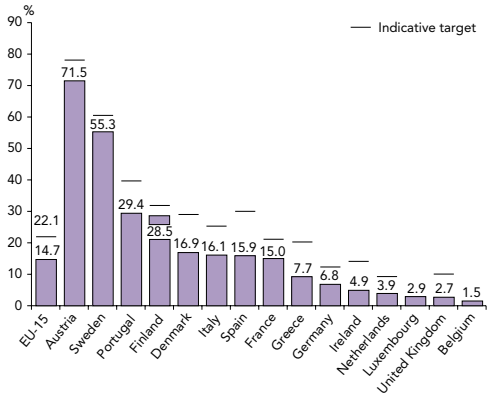
Energy supply and use in power generation, industry and households (excluding transport)[3]

Emissions from energy supply and use (excluding transport) are projected to decrease further by 2010, due to policies and measures in heat and power generation, industry and the commercial/services sector. Renewable energy is projected to increase its share, but the current growth rate of renewables will need to double to attain the EU target of a 22 % contribution of renewable energy to gross electricity consumption, assuming the share of large hydropower plants remains stable. Several national policies and measures have been successful, including 'feed-in' arrangements that guarantee a fixed favourable price for renewable electricity producers, suggesting that growth of the share of renewables can be accelerated. Combined heat and power (CHP) is projected to increase its share, although the current increase in CHP is not sufficient to achieve the EU target of an 18 % CHP share in total electricity production by 2010. Continuing improvements in energy intensity (ratio of energy use to value added) in industry are expected, as well as further energy savings by households, due to implementation of the directives on the energy performance of buildings, the appliances labelling scheme and schemes for energy efficiency standards.

- Emissions from energy supply and use (excluding transport) are projected to increase by 2 % by 2010 in projections based on existing domestic measures, but decrease by 6 % below 1990 levels by 2010 in the projections reflecting additional domestic measures.
- Renewable energy targets for the EU (22 % of gross electricity consumption) and Member States for 2010 are unlikely to be met under current trends.
- In the EU, the current rate of increase in combined heat and power (CHP) is not sufficient to achieve the EU target of an 18 % share of CHP in total electricity production by 2010.

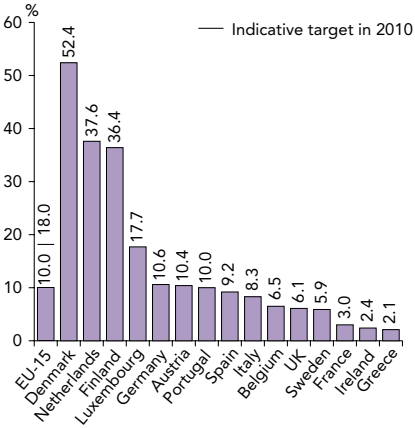
[3] Only eleven Member States (not including Germany, the largest emitter in several sectors) have reported sector projections.

Figure 12 **Electricity consumption from renewable energy sources: share in EU Member States in 2000 compared with targets for 2010**



Note: National indicative targets shown are reference values that Member States agreed to take into account when setting their indicative targets by October 2002, according to the EU renewable electricity directive.

Figure 13 **Share of gross electricity production from combined heat and power plants: situation in Member States in 2000 compared with EU target for 2010**



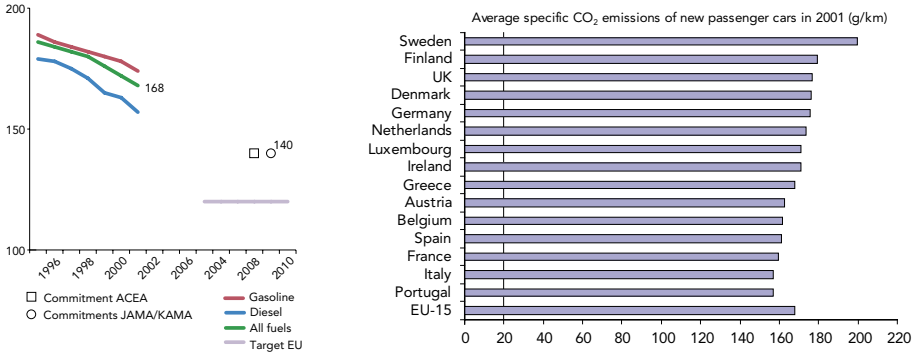
Note: The data include combined heat and power production from public electricity and heat producers as well as from autoproducers (at specific industrial sites). Eurostat has adopted a new methodology to calculate the share of CHP in gross electricity production designed to better identify electricity production from combined heat and power. This revision has resulted in different (lower) figures for some countries. The 18 % indicative target for 2010 was set by the European Commission in 1997 on the basis of a previous methodology and may therefore not be directly comparable with the new methodology. The proposed directive on CHP (2002) does not contain an indicative target.

Transport

Emissions from transport are projected to increase up to 2010, due to continued increases in both passenger and freight transport by road, despite policies and measures aimed at achieving the EU objective of shifting traffic from road to rail and inland waterways. A key EU policy is the agreement between the European Commission and the European, Japanese and Korean car industries to reduce carbon dioxide emissions from new passenger cars, by setting a target for 2008 (European industries) and 2009 (Japanese and Korean industries). Carbon dioxide emissions were reduced between 1995 and 2001, due to fuel efficiency improvements, mainly in diesel, and a shift in fleet composition from petrol to diesel passenger cars, which are more energy efficient but emit more air pollutants than petrol-fuelled cars. If these improvements in fuel efficiency continue, the EU target for carbon dioxide emissions from new passenger cars appears to be achievable. However, the continuous increase in passenger transport by road will make it difficult to limit absolute total emissions from that source.

- ☹ Emissions from transport are projected to increase by 34 % from 1990 levels by 2010 in the 'with existing domestic measures' projections.
- ☺ The average carbon dioxide emissions of new passenger cars were reduced by about 10 % from 1995 to 2001, suggesting that the EU target of 140 g carbon dioxide/km (by 2008/09 at the latest), agreed with the automobile industry, is achievable.
- ☹ Past and projected increases in passenger transport by road will make it difficult to limit overall carbon dioxide emissions from passenger cars by 2010.
- ☹ Nitrous oxide emissions from transport currently account for 0.6 % of total EU greenhouse gas emissions but are expected to rise in line with the projected increase in petrol cars equipped with catalysts.

Figure 14 **Average specific CO_2 emissions of new passenger cars per fuel type and targets**



Note: Targets for the average carbon dioxide emissions of new passenger cars by 2008/2009 are agreed between the European Commission and the European Automobile Manufacturers Association (ACEA) and similarly with Japanese (JAMA) and Korean (KAMA) automobile manufacturing industries.

Agriculture

Greenhouse gas emissions from agriculture are projected to decrease further up to 2010, mainly due to expected reductions in the number of cattle and in fertiliser use as reform of the common agricultural policy and implementation of the nitrate directive continue.

Based on existing domestic measures, EU greenhouse gas emissions from agriculture are projected to decrease to 11 % below the 1990 level in 2010.

Industry (emissions of fluorinated gases and nitrous oxide)

EU emissions of fluorinated gases and nitrous oxide from industrial processes are projected to fall further up to 2010. This is mainly due to significant abatement of nitrous oxide emissions in the manufacture of adipic acid in a few Member States including France, Germany and the United Kingdom, but they are partly offset by substantial projected increases in hydrofluorocarbon emissions (86 % from the base year to 2010), due to continuing

replacement of chlorofluorocarbons which are being phased out to protect the ozone layer.

EU greenhouse gas (fluorinated gases and nitrous oxide) emissions from industrial processes are projected to fall by 2010 by 2 % from 1990 levels with existing domestic measures and by 22 % with additional domestic measures.

Waste

EU greenhouse gas emissions from the waste sector are projected to decrease further up to 2010, mainly due to implementation of the landfill directive.

EU greenhouse gas emissions from the waste sector are projected to decrease by about 50 % from 1990 by 2010 (with existing measures).

8. Use of Kyoto mechanisms

Eight Member States — Austria, Belgium, Finland, the Netherlands, Portugal, Spain, Sweden and the United Kingdom — have provided information on their intended use of the flexible mechanisms of the Kyoto Protocol (Kyoto mechanisms) to achieve their targets for the commitment period 2008–12.

The limited information available shows that so far around 21 million tonnes CO_2-equivalent of savings per year of the commitment period have been identified from the Kyoto mechanisms. This represents about 6 % of the total EU emission reduction required. These result from savings to be delivered by the Netherlands (20 million tonnes CO_2-eq./year) and Portugal. Sweden and the United Kingdom indicate that they will reach their burden-sharing targets without using the Kyoto mechanisms.

The Netherlands has been the most active in the implementation of joint implementation (JI) projects (with industrialised

countries with economies in transition) and clean development mechanism (CDM) projects (with developing countries), and has allocated one of the largest budgets (EUR 225 million for the 5-year commitment period). Other Member States have also started pilot projects and allocated budgets for JI or CDM projects (Austria a maximum of EUR 288 million, of which EUR 36 million are to be spent between 2003 and 2010, Finland EUR 8.5 million and Sweden EUR 37.5 million).

- The projected use of Kyoto mechanisms for achieving the EU target so far amounts to about 21 million tonnes CO_2-eq. per year of the commitment period (by the Netherlands and Portugal) or about 6 % of the total EU emission reduction required. Only a few countries have allocated financial resources for using the mechanisms (Austria, Finland, the Netherlands, Sweden)
- The Netherlands projects achieving its target by a combination of domestic policies and measures and use of the Kyoto mechanisms.

9. Use of carbon sinks

The same eight Member States that have provided information on their plans to use the Kyoto mechanisms have also done so for their intended use of carbon sinks to achieve their targets. This limited information shows that so far there are plans to remove, by 2008–12, around 10 million tonnes CO_2 per year through forestry activities and an additional 3 million tonnes CO_2 per year through agricultural activities. These removal estimates represent almost 4 % of the total EU reduction required. The European climate change programme estimates that potentially 93–103 million tonnes CO_2 could be sequestered through the enhancement of sink activities in the agricultural and forestry sectors.

- The projected use of carbon sinks for achieving the EU Kyoto target is so far limited, with an estimated removal by forestry and agricultural activities of 10 and 3 million tonnes CO_2 per year respectively.

10. The reporting scheme

Reporting of greenhouse gas inventories has improved, but needs to be more complete and include all gases, especially for acceding and candidate countries. A future challenge will be the reporting of additional information required under the Kyoto Protocol, including information on emissions and removals from land-use change and forestry after methods have been agreed internationally. The quality of reporting of emission projections and policies and measures has improved, but further improvements are needed regarding completeness, comparability, consistency and transparency.

- Under the EU monitoring mechanism all Member States provided greenhouse gas inventory data for 1990 to 2001 for all gases. Two Member States have gaps in their data on fluorinated gases (Greece, Luxembourg).
- Several acceding and candidate countries did not provide greenhouse gas inventory data for 1990 to 2001 for all gases (Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Slovenia).
- The quality of reporting of emission projections and policies and measures has improved for most Member States.
- Further improvements in reporting of inventories, projections and policies and measures are still needed. Proposals are being developed as part of the revision of the monitoring mechanism in 2003 and 2004.

European Environment Agency

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