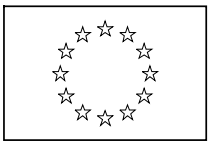

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REPORT

under Council Decision 1999/296/EC for a monitoring mechanism of Community greenhouse gas emissions

(presented by the Commission)

REPORT

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1. EXECUTIVE SUMMARY

This is the first progress report under Council Decision 99/296/EC amending Decision 93/389/EEC for a monitoring mechanism of Community CO2 and other greenhouse gas emissions. The report presents the results of the evaluation process under the decision and assesses the actual and projected progress of Member States and the Community towards fulfilling their greenhouse gas (GHG) emission commitments under the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Convention was aimed at the stabilisation of greenhouse gases (at 1990 level) while the Kyoto Protocol set a target of –8 % (from the 1990 level) for the EU.

The evaluation is based largely on documents provided by Member States. These include documents produced specifically for submission under the Monitoring Mechanism and other documents, such as national climate change strategies and National Communications to the UNFCCC. In the case of projected progress, the evaluation has also taken into account the results of Community-wide projections of greenhouse gas emissions.

The report covers data on actual GHG emissions up to and including 1998 as well as emissions projections up to 2010, the mid-point of the Kyoto Protocol's first commitment period (2008-2012).

The Commission has seen good progress in Member States' reporting on emission inventories and some progress with regard to national policies/measures and projections. However a lot remains to be done with regard to the completeness, accuracy and comparison of the data especially those on projected progress. Further work on these issues is currently ongoing under the Monitoring Committee and its two subgroups. Improvements are therefore to be expected for next year.

Main findings:

- **The EU's GHG emissions fell by 2.5% between 1990 and 1998.** This suggests that the EU as a whole is on track to meet its commitment under the UNFCCC to stabilise emissions at 1990 levels by 2000. However, this positive evolution is due mainly to large one-off emission reductions in Germany and the UK.

- **The majority of Member States are far away from their target paths towards Kyoto.** Moreover, all Member States but one experienced emission **considerable increases from the transport** sector, the fastest-growing GHG emission source.

- Current projections suggest that existing policies and measures ('business as usual') would **at best reduce overall EU GHG emissions in 2010** by 57 Mt CO2 equivalent, taking emissions **to 1.4% below the 1990 level**, and at worst merely stabilise them at 1990's level. In addition, the projected savings are only obtained with **uneven contributions from Member State**s, with **most of them falling short of showing satisfactory emission reduction** trends.

- This leaves a **considerable way to go to meet the EU's obligation** under the Kyoto Protocol to reduce GHG emissions to 8% below the 1990 level by 2008-2012 and the individual commitments by Member States under the burden sharing agreement.

- **Additional policies and measures** identified by Member States are projected to **yield further reductions close to 7% (below 1990 levels). One third** of these additional savings, however, are due to projected reductions by **Germany and the UK** alone. This development should not be taken for granted by the other 13 Member States, as each of them is responsible for meeting its own target.

- All **projections must be treated with caution** due to considerable uncertainty related to a lack of quantified data on additional measures (half of the Member States did not submit any data), and a lack of comparability of methodologies used including their underlying assumptions. In addition, there are **uncertainties over the implementation** of these policies and measures.

- In view of the difficulties that the Member States face in meeting their commitments under the burden sharing agreement common and co-ordinated policies and **measures at EU level will become an increasingly important element to supplement and reinforce national climate strategies**. Such policies and measures have already been proposed, e.g. on energy taxation, renewables, energy efficiency, car emissions and land filling. Preparatory work to intensify such ongoing work and to develop additional EU policy measures is currently being undertaken in the framework **of the European Climate Change Programme**.

2. CONCLUSIONS

The first progress report under Council Decision 99/296/EC reflects an improvement in the functioning of the EC monitoring mechanism. The Committee and its two working groups have established guidelines and procedures to assist Member States in fulfilling their obligations under the decision. Consequently, the Commission has seen good progress in Member States' reporting on emission inventories and some progress with regard to national policies/measures and projections.

Evaluation of actual progress was undertaken successfully with the main emission data available for all Member States. Nevertheless the final analysis suffered from data gaps on fluorinated gases and land-use change and forestry, and lack of transparency of methane and nitrous oxide emissions. Assessing projected progress was more difficult since the lack of detail concerning quantification of policies and measures, methodologies used and underlying assumptions is still considerable and varies widely between Member States. More than half of the Member States has not provided adequate quantification of projected progress. This makes it difficult to draw firm conclusions on whether the Member States individually and the Community as a whole are likely to achieve the Kyoto target.

Member States' projections were generally supported by Community-wide projections on future progress. However, the unevenness of data provision among Member States, a general lack of quantitative assessments of policies and measures and uncertainties related to methodologies used (both at national and European level) suggest to apply a "safety margin" when identifying remaining EU emission reduction obligations towards achieving the EU Kyoto target. To be certain of complying with its Kyoto commitments the EU should therefore consider further reductions for which additional policies will have to be developed.

A precise assessment of the effects of common and co-ordinated policies and measures (CCPMs) and their contribution towards the EU target proved difficult because of a lack of data on the quantitative assessment of such measures. This data gap is evident both at Member State and Commission level, but is being narrowed thanks to reinforced activity under the EC monitoring mechanism.

The following chapters provide more specific conclusions.

2.1. Compliance on reporting

- With regard to emission inventories Member States need to complete their data submissions by providing complete and higher quality data on fluorinated gases, methane and nitrous oxide emissions as well as emissions and removals from land-use change and forestry (LUCF).

- Concerning information on policies/measures and projections, many Member States need to improve the quantitative assessment of these measures, preferably at the level of individual policies.

- Also other aspects of reporting on policies/measures and projections, such as information on the modelling methodologies and their underlying assumptions, need to be improved.

- The newly adopted guidelines, both on emission inventories and on policies/measures and projections, should be applied fully in order to have a more complete progress report in 2001.

- Information for the next progress report should be improved with regard to the clarity of documents, for example by adopting common format tables for key information.

2.2. Actual progress of the EU

- Greenhouse gas emissions in the European Union have decreased by 2.5 % since 1990. Whereas CO_2 emissions almost stabilised between 1990 and 1998 (+0.2 %), CH_4 and N_2O emissions decreased by 16.5 % and 9.9 % respectively. These figures suggest that in 1998, the European Union, as a whole, was in line with its target paths for both 2000 and 2008-2012. However, this positive situation is mainly due to large 'one-off' emission reductions in Germany and the UK. Together with Luxembourg they were the only Member States well below their emissions target paths in 1998. France and Sweden were near but all other Member States were well above their target paths. A cautious approach in interpreting progress in the EU as a whole is therefore needed.

- CO_2 emissions per capita for the EU-15 fell slightly between 1990 and 1998, again largely due to reductions in Germany and the UK. Although Portugal still has the lowest per capita emissions, it showed the largest percentage increase between 1990 and 1998. The largest decrease was in Luxembourg.

- All Member States but one saw increases in the transport sector with particularly strong growth in Ireland, Greece, Portugal and Spain. Increases in emissions in other sectors, such as energy industries, manufacturing industries and small combustion, were also widespread but generally lower than in the transport sector.

- The data currently missing data on fluorinated gases is not likely to change the overall emission trend substantially since contributions from these gases are relatively small (1.6% of total GHG emissions).

- The question of whether data on land-use change and forestry is affecting the emission trend in Member States and the EU will be largely dependent on the decision taken on sinks at the 6th Conference of the Parties in The Hague in November 2000.

2.3. Projected progress of the EU

Progress based on Member States projections

- With existing policies and measures (business-as-usual) Member State projections suggest a decrease of total EU emissions of greenhouse gases (excluding Land use change and forestry) by 1.4 % (with increases of CO_2 by 2.9 % and of fluorinated gases by 73.4 % and decreases of CH_4 and N_2O by 29.8 % and 16.1 % respectively) over the period 1990 to 2010. **This would translate into a remaining gap of –6.6 % to reach the Kyoto target**. However, due to considerable uncertainty related to the implementation of policies and methodologies used, concern about the accuracy of this figure must be expressed.

- Additional policies and measures identified by the Member States are calculated to result in further savings of about 270 Mt CO_2 equivalent. However, eight Member States have not yet adequately identified or assessed additional policies and measures. In addition, the effect of these policies and measures is subject to a significant degree of uncertainty arising from their nature (these tend to be policies in the early stage of development) and the methodologies used.

- Due to the lack of information on projected progress in more than half of the Member States it appears the Kyoto target could only be achieved through an over delivery (against their targets under the burden sharing agreement) by Germany and the UK. If these two countries were to meet, but not exceed, their commitments under the EU burden sharing agreement then the savings from additional measures would total only 184 Mt - about two thirds of the necessary reductions. It cannot be assumed that to achieve the Kyoto target over delivery by some Member States compensates for under-delivery by others.

Comparison between Member States and Community wide projections

- While Member States project greenhouse gas emissions to decrease by about 1% through existing measures between 1990 to 2010 the latest Community-wide projections expect greenhouse emissions to be more or less stable when compared to 1990 emissions (but with an increase of 4% for CO_2, a decrease of 25 % and 12 % for CH_4 and N_2O respectively and an increase of 62 % for fluorinated gases.

- The Member States' 'with additional measures' projections suggest that by 2010 total annual emissions savings of about 270 Mt of CO_2 equivalent may be achieved. CO_2 emissions would be reduced by 3 % with CH_4 and N_2O emissions falling by 30 % and 17 % respectively. Such "additional measures" scenarios are not yet the subject of in-depth policy discussion. Interesting nevertheless is the fact that these results have been corroborated by preliminary results from a cost-effective reduction scenario to reduce greenhouse gas emissions at Community level.

Common and co-ordinated policies and measures

- With regard to common and co-ordinated policies and measures, Member States provided limited quantitative assessment of these measures. At EU level estimates of effects of some of these measures are available. The one Community measure known to have a substantial impact on CO_2 emission reduction, if implemented correctly and to its full extent, is the voluntary agreement with car manufacturers (the increase of CO_2 is limited to 4.1 % instead of 6.7%).

- In view of the difficulties for the majority of Member States to reach their burden sharing target, common and co-ordinated policies and measures will be an important supplement to reinforce and strengthen their national climate change strategy. However, it is necessary to improve the quantitative assessment of these measures both at Member State and Community level, both in terms of emission reduction and cost-impact.

3. EC MONITORING MECHANISM AND PURPOSE OF THE REPORT

3.1. The EC Monitoring Mechanism

The monitoring mechanism for anthropogenic CO_2 and other greenhouse gases was established in June 1993, following the adoption of Council Decision 93/389/EEC, by the Council of Environment Ministers. This was revised in April 1999, (Council Decision 99/296/EC) to allow for the updating of the monitoring process in line with the inventory requirements incorporated into the Kyoto Protocol (KP).

The monitoring mechanism is an instrument to assess accurately and regularly the extent of progress being made towards the Community's commitments under the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. Progress is evaluated by the Commission, in consultation with the Member States, and is based on National Programmes, updates supplied by the Member States as described in Article 2(2) of Council Decision 1999/296/EC and other relevant information. The National Programmes should include (a) information on actual progress and (b) information on projected progress.

Member States are required by 31 December each year to submit inventory data for the two previous years[1] and any updates of previous years (including the base year 1990[2]) and their most recent projected emissions for the years 2005, 2010, 2015 and 2020[3]. Any updates to the National Programmes e.g. new policy measures should also be reported to the Commission by 31 December. If no change has occurred, this should be formally indicated to the Commission.

For the purpose of facilitation and harmonisation of collection, reporting and evaluation of data the Monitoring Committee, established under Council Decision 1999/296/EC, set-up two Working Groups. These Working Groups developed a set of guidelines[4] covering both the collection and evaluation of emission inventories and national programmes. The Monitoring Committee approved the guidelines on 1 September 2000. Reporting by Member States for this report already includes many of the elements in the guidelines, but often to limited extent.

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1 Member States have to report annually their inventories to the Commission by 31 Dec year n: Anthropogenic CO2 emissions and CO2 removals by sinks for the year n-1; Emissions by source and removals by sinks of the other greenhouse gases; final data for the year n-2 and provisional data for the year n-1.

2 Base year is 1990, except for HFC, PFC, SF6 for which the base year can be selected by the Party to be either 1990 or 1995

3 Decision 99/296/EC requires reporting of projected emissions and removals for the period 2008 to 2012 and as far as possible, for 2005. However, in addition the Monitoring Mechanism "Guidelines for the methodology of the evaluation of progress towards the KP targets and for reporting of national programmes" require reporting of the projected emissions and removals also for the year 2015 and 2020.

4 Guidelines: Part 1: Guidelines for Member States and EC Annual Inventories; Part 2: Methodology for the Evaluation of Progress and for the Contents of National Programmes, Brussels, 1 September 2000

3.2. Purpose of this report

This report presents the results of the evaluation process under the EC Monitoring Mechanism and assesses actual and projected progress of Member States towards fulfilling the Community's commitments under the UNFCCC and the Kyoto Protocol.

Under Article 4 of the UNFCCC adopted in Rio de Janeiro in June 1992, the European Community agreed to adopt policies and measures with the aim of returning their anthropogenic CO_2 and other greenhouse gas emissions, individually or jointly, to 1990 levels by the year 2000.

More recently, at the third Conference of the Parties (COP3) to the UNFCCC held in Kyoto in December 1997, the Parties adopted the Kyoto Protocol to the UNFCCC, which sets different binding emission targets for a number of Parties including the European Community (EC). Under this agreement the EC agreed to reduce its greenhouse gas emissions by 8 % by 2008-2012, from 1990 levels. This overall target has since been distributed on a differentiated basis to individual Member States under an 'EU burden sharing' mechanism agreed upon by the Council of Ministers in June 1998. The agreed targets are shown in Table 1.

Table 1. Member States' commitments in accordance with article 4 of the Kyoto Protocol agreed upon by the Council of Ministers (EU burden sharing, June 1998)

Member State	Commitment (% change in emissions of the six GHG basket for 2008 to 20012 relative to 1990 base year levels)
Austria	-13
Belgium	-7.5
Denmark	-21
Finland	0
France	0
Germany	-21
Greece	+25
Ireland	+13
Italy	-6.5
Luxembourg	-28
Netherlands	-6
Portugal	+27
Spain	+15
Sweden	+4
United Kingdom	-12.5

The evaluation of progress towards these targets has two main components:

- **Evaluation of actual progress**

  The evaluation of actual progress is based on emission inventories of Member States and the Community and includes the comparison of base year inventories with the latest available inventories to establish actual trends of emissions and a comparison with emission objectives at Member State and Community level.

- **Evaluation of projected progress**

  Projected progress is assessed by the collection and evaluation of adopted and further (planned, or currently in discussion) policies and measures at both national and Community level. This evaluation is based on emission projections of Member States and the Community. It includes an assessment of the consistency and soundness of these projections and their key underlying assumptions and parameters in the context of National Programmes.

  The evaluation is based largely on documents provided by Member States. This includes documents produced specifically for submission under the Monitoring Mechanism and other documents, such as national climate change strategies and National Communications to the UNFCCC. The evaluation of projected progress has also taken into account the results of Community-wide projections of greenhouse gas emissions.

  The following chapters in this report evaluate compliance with reporting requirements. This is done by comparing the most recent information that is available from the Member States with the requirements under the Monitoring Mechanism and the draft Guidelines for reporting from the two Monitoring Mechanism Working Groups (Chapter 4). The report then summarises the results of the evaluation of actual progress, based on work done by the EEA (Chapter 5) and the evaluation of projected progress, based on the information as described above and as available by August 2000 (Chapter 6).

  Background data to the report with regard to country specific data common and co-ordinated policies and measures will be published in separate annexes (available on the commission's web site: http://www.europa.eu.int/comm/environment/climat/docs.htm).

4. MEMBER STATES COMPLIANCE WITH REPORTING REQUIREMENTS

4.2. Compliance with reporting requirements on actual progress[5]

4.1.1. Greenhouse gas emissions inventories

The evaluation of actual progress depends upon the availability of the relevant national inventories from which to compile a complete EC inventory covering all 15 Member States. By 1 April 2000, all Member States had reported data for 1998. Therefore the European Commission was able to compile a complete inventory for CO_2, CH_4 and N_2O emissions for the full period from 1990 to 1998. Data was provided in accordance with the 1996 Guidelines of the Intergovernmental Panel on Climate Change (IPPC) and, for a number of Member States, the newly introduced Common Reporting Formats (CRF) adopted at the 5th Conference of the Parties (COP 5) in 1999.

4.1.2. Data gaps on CO2, CH4 and N2O

A data gap filling procedure was used for Luxembourg for the years 1991-1993 in order to obtain complete 1991-1998 inventories for CO_2, CH_4 and N_2O emissions.[6]

4.1.3. Data gaps on fluorinated gases

Data gaps on the fluorinated greenhouse gases (HFCs, PFCs, SF_6) as reported by Member States by 1 April 2000 are still considerable both with regard to incomplete data on emissions and lack of information on chemical specification. No reliable trends for the EU total emissions of fluorinated gases could be compiled and these gases are excluded from the analysis in Chapter 3. However, some indicative emission estimates are provided, based on the available country data supplemented by results from Commission studies.

4.1.4. Data gaps on land use change and forestry (LUCF)

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 for two reasons: (a) inconsistent calculation methods of Member States and (b) outstanding methodological decisions on which CO_2 sinks are accepted under the Kyoto Protocol (possibly to be decided at COP6 of UNFCCC to be held in November 2000).

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5 The information in this section has been taken from "Annual European Community Greenhouse Gas Inventory 1990-1998, May 2000", prepared by the European Environment Agency and it's European Topic Centre on Air Emissions.

6 The data gap-filling procedure was to take the emissions reported for the most recent previous year as the first estimates. However, for CO_2 emissions from fossil fuel combustion, the method used the latest estimates reported by the Member States in combination with trend information for more recent years from latest calculations of CO_2 emissions from fossil fuels by Eurostat.

4.2. Compliance with reporting requirements on projected progress

The evaluation of projected progress requires information on all policies and measures under consideration and also on the emission projections for the Member States. Policies and measures under consideration include existing ones (in the process of being implemented) and additional ones (for future implementation). Projections include estimates of emission reduction effects of existing measures (a 'business-as-usual' scenario) and projections on the effects of additional measures. Table 2 gives details of the type and quality of information provided by Member States on their policies and measures while Table 3 provides details on the type and quality of information related to emission projections

Table 2. Type and quality of information from Member States on their policies and measures

Country	Policy name and Objective	What GHGs?	Status of implementation	Quantitative assessment of mitigation	Interaction with other P&Ms	Additional Information	National Programmes and updates
Austria	++	CO_2, CH_4, N_2O	+++	+++	++	Some info on policy costs None on non-GHG mitigation[7]	Draft Climate Strategy Report, 2000.
Belgium	+++	CO_2, CH_4, N_2O	+++	+	-	None on policy costs or non-GHG mitigation	Specific communication[8], June 2000
Denmark	+++	all	++	+++	-	Little or no costs data and non-GHG mitigation not included	Climate 2012 strategy, Mar 2000. Energy 21 reviews, June 1999
Finland	+++	all	+++	+	-	Little or no costs data and non-GHG mitigation not included	Specific Communication[8] April 2000
France	+++	all	++	++	+	Overall investment costs given but not for individual measures. Non-GHG mitigation not addressed	National climate change programme, February 2000
Germany	+	all	++	+	-	None on policy costs or non-GHG mitigation	Specific Communication[8] 1999, Interim report on climate strategy, 2000

[7] Some measures may include other benefits such as reduction in non-greenhouse gases e.g. sulphur dioxide. This comment refers to whether such information is included.

[8] This refers to Communications prepared specifically for the EC under the Monitoring Mechanism.

Country	Policy name and Objective	What GHGs?	Status of implementation	Quantitative assessment of mitigation	Interaction with other P&Ms	Additional Information	National Programmes and updates
Greece[9]	++	CO_2	+++	-	-	None on policy costs or non-GHG mitigation	Table compiled by NOA, May 1999
Ireland	++	CO_2, CH_4, N_2O	++	-	-	Abatement cost supply curve given but measures aggregated	2nd National Communication and national study
Italy	+++	all	++	++	+	Overall costs given.	2nd National Communication
Luxembourg	+++	all	+	-	-	None on policy costs or non-GHG mitigation	National strategy, May 2000
Netherlands	++	all	++	+++	-	Detailed info on policy costs. Non-GHG mitigation not addressed	Climate policy, June1999
Portugal	+++	CO_2, CH_4, N_2O	+	-	-	None on policy costs or non-GHG mitigation	Portuguese GHG projections, April 2000
Spain	+++	all	+	+	-	None on policy costs or non-GHG mitigation	2nd National Communication
Sweden[9]	+++	all	+++	++	-	Good info on policy costs. Non-GHG mitigation not addressed	Specific Communication[8] March 2000
UK	+++	all	+++	+++	+	Limited policy costs are included. Benefits other than GHG reductions discussed	Draft Climate strategy, March 2000

+ ;++;+++ Level of information available from the Member State increases as number of + signs increase**.**

- indicates no information available

The following conclusions can be drawn from Table 2:

- For Ireland, Italy and Spain the main source of information is the Second National Communication (1997/98).

- Austria, Denmark, France, Luxembourg, the Netherlands and UK submitted their most recent National Climate Change Programmes published in 1999 or 2000. Belgium, Finland, Germany, Sweden, Greece and Portugal prepared summaries of their recent policies and measures particularly for the purpose of the EU Monitoring Mechanism.

[9] Scores relate to the most recent information, although for older policies and measures more information is provided in the Second National Communication.

- Most countries provide a good level of detail on the objectives of policies and measures and the status of implementation. However, the information based on the Second National Communication is likely to be outdated.

- Quantification (in terms of greenhouse gas emissions savings in million tonnes) of policies and measures (including existing measures as well as additional measures) is very limited for the majority of MS. This holds also for information on policy costs.

- Ten Member States report on policies and measures to reduce all gases, four on CO_2, CH_4 and N_2O and one on CO_2 only.

- One third of the Member States still do not report on fluorinated gases.

- The split of policies and measures for the different gases (as far as they are given) and sectors is clearly presented.

Table 3. Type and quality of information from Member States on their projections

Country	Scenarios presented	Starting year for projections	Split of projections	Description of model (level of detail, approach and assumptions)	National Programmes and Updates
Austria	- without measures - with current measures -2 with additional measures[10] - a scenario for methane emissions	Not clear	+	++	Draft Climate Strategy Report, 2000.
Belgium	- without measures - planned policies ('with measures')	Not clear	++	+++	Specific Communication[8] June 2000
Denmark	-with measures -with addit. Measures	1998/1999	+++	++	Climate 2012 strategy, Mar 2000. Energy 21 reviews, June 1999
Finland	-'with measures' projections[11]- with additional measures	1995	+	+	2nd National Communication
France	-without measures - with measures - with additional proposed measures	1998	++	++	National climate change programme, February 2000
Germany	- with measures - without measures	Not clear	+++	+	Specific communication[8], 1999
Greece	5 scenarios[12]	Not clear	+	+	2nd National Communication
Ireland	- with measures - with additional measures	1990	++	+	2nd National Communication

[10] The two additional measures scenarios make different assumptions regarding the date of implementation of the policies and measures.

[11] The two scenarios are for energy-related emissions and are based on different assumptions about the fuel mix, particularly in the electricity generation sector.

[12] The 5 scenarios only cover CO_2, are drawn from number of different sources and make different assumptions about future energy and economic trends in Greece.

Country	Scenarios presented	Starting year for projections	Split of projections	Description of model (level of detail, approach and assumptions)	National Programmes and Updates
Italy	4 scenarios[13]	1995	++	++	2nd National Communication
Luxembourg	- without measures - with measures	1999	++	-	National strategy, May 2000
Netherlands	- without additional measures. - with additional measures	1996	++	++	Climate policy, June1999
Portugal	with measures	Not clear	+++	++	Portuguese GHG projections, April 2000
Spain	with measures	1990	+	+++	2nd National Communication
Sweden	with measures	1997	++	+++	Specific Communication[8], March 2000
UK	- with measures[14] - with additional measures	Not clear	+++	+++	Climate strategy, March 2000 Working paper, March 2000

The following conclusions can be drawn from Table 3:

- Sources of information on projections differ considerably: for five Member States this is still the 2nd National Communication (1997/98) which is likely to be outdated. For four Member States, information comes from specific communications to the European Commission. These normally contain a large amount of information but there is a lack of clarity and consistency. Five countries provided recently published National Climate Change Programmes, which is the most comprehensive set of data received.

- The basis for projections differs widely: some only use one scenario others use more than one but in most cases they are based on different assumptions. Six MS provide a 'without measures' scenario. Seven MS present projections 'with additional measures'.

- There is no comprehensive and clear information on the methodologies used for the projections and the assumptions underlying the scenarios.

- The starting point for the projections is often not clearly defined.

- A few countries give splits of projections by gas and by sector, those from the Second National Communication are generally aggregated.

Projections generally suffer from a lack of quantification of the effects of individual policies and measures as already discussed under Table 2. This is of particular concern in the evaluation of projected progress.

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13 One scenario represents current trends and might be regarded as a 'without measures' scenario, one is close to a 'with existing measures' projection, one 'with additional measures' and one includes additional proposed measures.

14 The UK with measures scenario includes policies and measures that have been implemented since Kyoto

5. EVALUATION OF ACTUAL PROGRESS[15]

5.1. Introduction

The purpose of this section is to contribute to the evaluation of progress of the European Community and its Member States towards meeting their greenhouse gas commitments under the UNFCCC and the Kyoto Protocol. The intention has been to perform a consistent and comparable assessment of the contribution of each Member State towards meeting greenhouse gas targets of the EC as a whole. The analysis does not aim at evaluating compliance of Member States with their targets, but at evaluating their contribution to the EC greenhouse gas emissions in 1998. The progress evaluation is carried out by comparing 1990-1998 greenhouse gas emission data of the EC and its Member States with two (hypothetical) linear target paths: (1) the UNFCCC target path for 2000; and (2) the Kyoto target path for 2008-2012. By calculating the deviations from these target paths in 1998, a measure of actual progress of the EC and its Member States in 1998 is established.

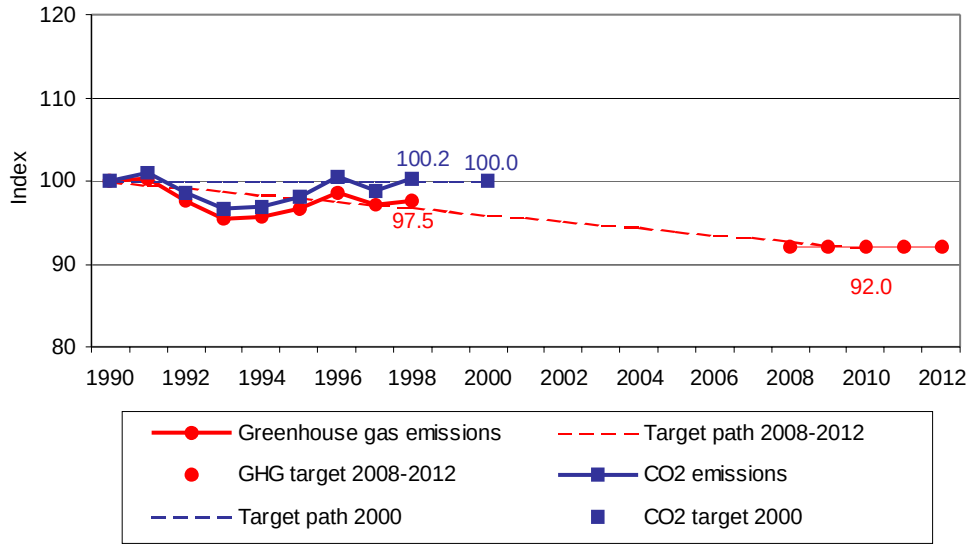
5.2. Progress in the European Union

5.2.1. Progress at European Union level

For the European Union as a whole greenhouse gas emissions were 4,046 Mt CO_2 equivalent in 1998, a decrease of 104 Mt CO_2 equivalent or 2.5 % since 1990 (Figure 1 and Table 4). About 82 % of EU15 greenhouse gas emissions are CO_2; CH_4 and N_2O account for about 9 % each. Whereas CO_2 emissions almost stabilised between 1990 and 1998 (+7 Mt CO_2 equivalent or +0.2 %), CH_4 and N_2O emissions decreased by 16.5 % and 9.9 % respectively. Therefore, in 1998, the European Union as a whole was in line with its target paths for both 2000 and 2008-2012.

[15] Information in this chapter is based on 'EC and Member States Greenhouse Gas Emission Trends 1990-1998', Topic Report 6 (July 2000), prepared by the European Environment Agency and the European Topic Centre on Air Emissions. Unless stated otherwise, greenhouse gas emission data, in this chapter, include neither industrial fluorinated gases (HFCs, PFCs, SF_6) nor emissions and removals from LUCF. Greenhouse gas emissions are estimates and are therefore subject to some uncertainty. The uncertainty is lowest for CO2. The absolute uncertainty in one year is higher than the uncertainty in the trends from year to year because the variations tend to cancel each other out. The uncertainty in the trend from 1990 to 1998 is indicatively estimated to be in the order of 2 to 5%. The national estimates for CO2 emissions from fossil fuel have been compared with estimates prepared by Eurostat showing good agreement (within 2%)

Figure 1: EU15 greenhouse gas emissions compared with targets for 2000 and 2008-2012 (excl. industrial fluorinated gases and land use change and forestry)



Note: The linear target path is not intended as an approximation of past and future emission trends. Therefore, it does not deliver a measure of (possible) compliance of the EC with its greenhouse gas targets in 2008-2012, but aims at evaluating overall EC greenhouse gas emissions in 1998

5.2.2. Progress at Member State level

At Member State level however the situation is different. Table 4 shows that in all but three MS (Germany, Luxembourg and the UK) total greenhouse gas emissions increased between 1990 and 1998. The substantial reductions that took place in Germany and the UK are mainly due to increased energy efficiency, the economic restructuring of the new Länder in the case of Germany and changes in the UK electricity generation mix (from coal to gas). The increase of CO_2 emissions in nine of the MS is even stronger than the increase of total greenhouse gas emissions and soared up to over +20% for three countries (Ireland, Portugal and Spain). Fortunately, this rise in CO_2 levels was at least partly compensated by the reduction of emissions of methane and nitrous oxides.

Table 4. Greenhouse gas emissions and CO_2 emissions in the EU in Mtonne of CO_2 equivalent (excl. industrial Fluorinated gases and LUCF)[16]

Member State	Total greenhouse gas emissions			CO_2 emissions		
	1990 $MtCO_2$ eq	1998 $MtCO_2$ eq	Trend 90/98 %	1990 $MtCO_2$ eq	1998 $MtCO_2$ eq	Trend 90/98 %
Austria	75,4	78,5	4.1	62,1	66,6	7.2
Belgium	136,0	144,6	6.3	113,9	121,9	7.0
Denmark (1)	69,5	75,6	8.7	52,8	60,1	13.7
Finland	72,5	76	4.7	59,3	63,9	7.8
France	538,5	543,6	1.0	387,5	412,8	6.5
Germany	1,201,1	1,011,6	-15.8	1,014,5	886,4	-12.6
Greece	103,9	119,5	15.0	85,2	100,3	17.7
Ireland	53,4	63,7	19.1	31,5	40	26.8
Italy	514,6	538,1	4.6	429,6	458,3	6.7
Luxembourg(2)	14,1	5,8	-58.4	13,3	5,1	-61.1
Netherlands (1)	208,9	225,9	8.2	161,4	181,4	12.4
Portugal	62,6	73,7	17.8	43,1	53,8	24.9
Spain	301,9	360,4	19.4	226	273	20.8
Sweden	69,4	70,2	1.2	55,4	56,9	2.7
United Kingdom	727,1	657,7	-9.5	584,2	546,3	-6.5
EU-15	**4 149,5**	**4 045,6**	**-2.5**	**3 320,4**	**3 327,5**	**0.2**

(1) Data has not been adjusted for temperature variations or electricity trade.
(2) Reported reduction is partly due to use of different methodologies for transport emissions in 1996 and 1998

Table 5 provides more information on the increase or decrease of greenhouse gas emissions for different sectors such as energy industries (mainly electricity production), manufacturing industries, transport and small combustion for all Member States and the EU as a whole. Seven MS (France, Greece, Italy, Ireland, the Netherlands, Portugal and Spain) show increases in all sectors. Emissions from the transport sector increased in 14 Member States and for seven of them (Austria, Belgium, Greece, Ireland, the Netherlands, Portugal and Spain) increases were more than 20 % (1990 and 1998). The majority of MS also experienced increases in the energy (10 MS) and manufacturing sector (11 MS) however, these were generally lower than in the transport sector. Eleven Member States see increases in emissions from small combustion. (See also chapter 5.2.3 on CO_2 emissions.)

16 MS submitted their national inventories under the UN Framework Convention on Climate Change by 15 April 2000. Slight differences between these inventories and those submitted under the Decision 99/296/EC can be observed. This is due to changes made by some MS after 1 April which is the date for submission under the Monitoring Mechanism.

Table 5. Variations of greenhouse gas emissions 1990-1998 of EU15 and the Member States in percent (excl. fluorinated gases and LUCF)

	EU15	**AT**	**BE**	**DK**	**FI**	**FR**	**DE**	**GR**
Greenhouse gases	-2.5%	+4.1%	+6.3%	+8.7%	+4.7%	+1.0%	-15.8%	+15.0%
CH_4	-16.5%	-14.5%	-3.6%	+3.0%	-42.1%	-15.0%	-36.2%	+5.9%
N_2O	-9.9%	+13.0%	+11.6%	-12.7%	+33.9%	-12.2%	-27.5%	-0.3%
CO_2	+0.2%	+7.2%	+7.0%	+13.7%	+7.8%	+6.5%	-12.6%	+17.7%
Energy industries	-6.2%	-5.9%	-14.4%	+20.2%	+16.3%	+3.6%	-17.9%	+15.9%
Manufacturing industries	-5.7%	+9.6%	+19.4%	+4.2%	+8.4%	+0.7%	-25.0%	+7.0%
Transport	+15.3%	+23.5%	+20.1%	+15.6%	+3.4%	+13.8%	+11.4%	+29.4%
Small combustion	+3.0%	+11.6%	+22.3%	-6.7%	-8.8%	+9.6%	-6.0%	+30.0%
	IE	IT	LU[17]	NL	PT.	ES	SE	UK
Greenhouse gases	+19.1%	+4.6%	-58.4%	+8.2%	+17.8%	+19.4%	+1.2%	-9.5%
CH_4	+6.2%	+4.0%	-4.8%	-17.6%	-0.2%	+26.0%	-99%	-28.3%
N_2O	+10.8%	-14.8%	-31.0%	+8.8%	+6.8%	+6.3%	-1.2%	-14.8%
CO_2	+26.8%	+6.7%	-61.1%	+12.4%	+24.9%	+20.8%	+2.7%	-6.5%
Energy industries	+36.1%	+9.2%	-96.5%	+11.3%	+17.8%	+5.9%.	+9.9%	-17.1%
Manufacturing industries	+2.2%	+2.0%	-74.8%	+5.7%	+15.1%	+23.0%	-6.5%	-6.3%
Transport	+76.8%	+15.2%	-56.2%	+21.6%	+41.9%	+35.1%	+13.3%	+5.3%
Small combustion	+2.5%	+2.4%	+49.3%	+2.1%	+34.0%	+16.7%	-9.9%	+5.6%

Table 6 summarises the results of comparing the greenhouse gas emissions of Member States with their linear target paths for 2000 and for 2008-2012.

In 1998, only Germany, Luxembourg and the United Kingdom were well below their greenhouse gas emission target paths (Table 6). However future improvements in Germany and the UK are not likely to be of a similar size and therefore the downward trend cannot be expected to be maintained. France and Sweden were near to their linear Kyoto target paths. All other Member States were well above their greenhouse gas emission limitation and reduction paths. Ireland, Spain and the Netherlands were more than 10 index points above their linear Kyoto target paths in 1998.

[17] The reason for the apparent reduction shown in the national figures seems to be that figures for 1990 are based on overall sales data whereas the figures for 1998 are adjusted to take account of the cross-border sales. In general Luxembourg has seen an increase in the number of passenger cars and in freight transport between 1990-1997. Luxembourg is currently revising its estimates.

Table 6. Progress of EU15 and the individual Member States in 1998

	In line with	
	CO_2 emission target path for 2000	**Greenhouse gas emission target path for 2008-2012**
EU15	**O**	**O**
Austria	☒	☒
Belgium	☒	☒
Denmark	☒	☒
Finland	No target	☒
France	No target	**O**
Germany	No target	☑
Greece	☒	☒
Ireland	☒	☒
Italy	☒	☒
Luxembourg	☑	☑
Netherlands	☒	☒
Portugal	No target	☒
Spain	☒	☒
Sweden	☒	**O**
United Kingdom	☑	☑

Note: The ratings are awarded according to the deviation of the CO_2/ greenhouse gas emissions from the relevant linear target path in 1998. The following ratings apply:

☑ more than 2 index points *below* linear target path (positive contribution to the EU trend)

☒ more than 2 index points *above* linear target path (negative contribution to the EU trend)

o in a range of plus/minus 2 index points of linear target path

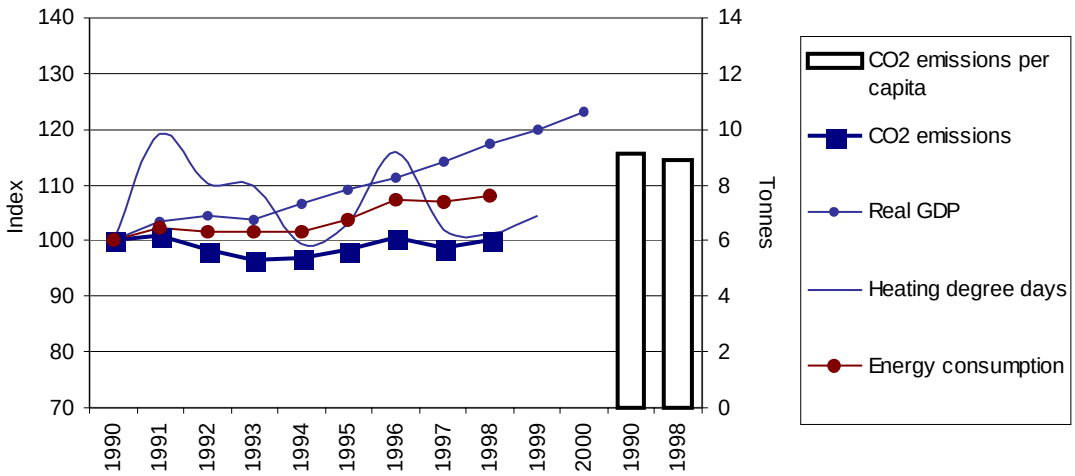
5.2.3. CO2 Emissions

Table 4 shows that there are large variations in CO_2 emission trends between Member States. Only three Member States reduced their emissions: Luxembourg (-61.1 %), Germany (-12.6 %) and the UK (-6.5 %). Together, they accounted for a reduction of 174 Mt, while in all other Member States emissions increased during the same period by 181 Mt. The largest absolute decrease in CO_2 emissions occurred in Germany (128 Mt) and the United Kingdom (38 Mt). The largest relative increases occurred in the cohesion States Ireland (+26.8 %), Portugal (+24.9 %) and Spain (+20.8 %). The largest increases in absolute terms were in Spain and Italy with 47 Mt and 29 Mt respectively.

Fossil fuel energy consumption is the main driving force behind CO_2 emissions. Two factors strongly influence energy consumption: economic growth and outdoor temperature.

CO_2 emissions decreased in the early 1990s due to slow economic growth throughout all Member States and due to large reductions in Germany and the United Kingdom. Emissions were highest in 1991 and 1996 - the two coldest years in the 1990s. In recent years, temperature corrected CO_2 emission trends appear to be rising again: in 1998, CO_2 emissions were third highest in the 1990s, but with relatively mild temperatures (Figure 2).

Figure 2: EU15 CO_2 emissions and driving forces (real GDP growth, heating degree days and energy consumption)



Note: The figure shows the trends of CO_2 emissions, real GDP, heating degree days (low outdoor temperature, mean high numbers of heating degree days) and gross inland energy consumption as an index, with 1990=100 (left side of the figure) and the CO_2 emissions (in tonnes) per capita (right side of the figure). Real GDP figures for 1998-2000 are estimates; the index of energy consumption for 1998 has been calculated on the basis of monthly data

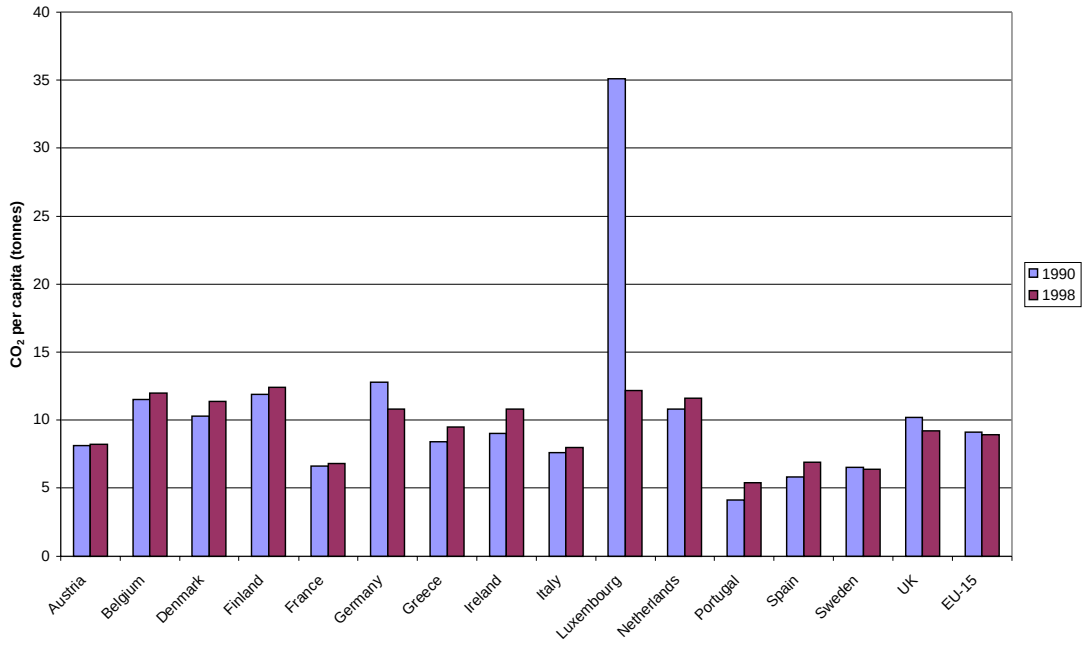
Between 1990 and 1998, GDP increased by 17.4 % and gross inland energy consumption grew by 8.2 %, but the growth in CO_2 emissions was limited to 0.2% implying a decrease in carbon intensity of both GDP and energy consumption. The main reasons for the de-carbonisation were: (1) large energy efficiency improvements after the German unification and the related economic restructuring in the new Ländern; (2) changes in UK electricity generation; (3) a general switch from coal to gas, renewable energies and nuclear power.

However, the reliance on fossil fuels in the EU is still high, although their share of gross inland energy consumption declined slightly from 81 % in 1990 to 79 % in 1997 (oil: 42 %, gas: 21 %, solid fuels: 16 %). Of the remainder, nuclear power accounts for approximately 15 % and renewable energy for a further 6%.

The energy industry is the largest CO_2 emitting sector accounting for 32 % of total CO_2 emissions in 1998, although emissions have fallen by 6.2 % since 1990. Second was transport with 24 %, an increase of 15.3 % over 1990 levels. CO_2 emissions from small combustion account for 20 % (up 3% on 1990) and manufacturing industry accounts for 18 % (down 5.7 % from 1990). In general, a shift from energy and manufacturing industries to transport and small combustion can be observed. (See also Table 5 in chapter 5.2.2).

Figure 3 shows the development of CO_2 emissions per Capita between 1990 and 1998

Figure 3: EU15 CO_2 per Capita by Member State and as an average for the EU



The CO_2 emissions per capita for the EU-15 have fallen slightly, from 9.1 tonnes in 1990 to 8.9 tonnes in 1998 (-2%). This is again largely due to decreases in Germany (-16%) and the UK (-10%). There have also been decreases in Sweden (-2%) and Luxembourg (-65%), the latter being particularly marked. In the other Member States, the per capita emissions have increased between 1990 and 1998. The highest per capita emissions in 1998 were in Finland (12.4 tonnes) and the lowest in Portugal (5.4 tonnes). Portugal, Spain and Ireland show the largest percentage increase (+32%, +19% and +20% respectively).

5.2.4. CH4 Emissions

CH_4 emissions decreased almost steadily and were 16.5 % below 1990 levels in 1998. CH_4 emissions from agriculture were reduced by 6 %, but their share in CH_4 emissions increased to 49 % in 1998. Emissions from waste decreased by 24 %; their share in CH_4 emissions declined to 30 % in 1998. Fugitive emissions from fuels accounted for 17 % of CH_4 emissions in 1998. The most important reasons for declining CH_4 emissions are emission control from landfills (collection for flaring or power generation), leak reductions in gas distribution systems and reductions of coal mining.

There are large variations in CH_4 emission trends in the Member States: whereas Finland and Germany reduced their CH_4 emissions by 42 % and 36 % respectively, Spanish CH_4 emissions grew by 26 %. In absolute terms, Germany, the UK, France, and the Netherlands achieved the largest reductions, whereas Spanish CH_4 emission increases were the highest.

5.2.5. N2O Emissions

N_2O emissions were almost 10 % below 1990 levels. Agricultural N_2O emissions reduced only slightly (-2 %), but emissions from industrial processes declined by 36 % between 1990 and 1998. Accordingly, the share of agriculture in N_2O emissions increased to 61 % in 1998, whereas the share of industrial processes declined to 20 %. A small but rapidly increasing source of N_2O emissions almost doubling between 1990 and 1998 is the transport sector after the introduction of the catalytic converter.

Large N_2O emission reductions were achieved by Luxembourg (-31 %) and Germany (-27.5 %), whereas N_2O emissions in Finland increased by 33.9 % between 1990 and 1998. In absolute terms, Germany, the UK, France, and Italy achieved the largest reductions and Spain and Finland increased most. A large share of the German reductions was achieved in 1998 following the introduction of new N_2O emission reduction methods in two adipic acid manufacturing plants.

5.2.6. Fluorinated Gases

As noted in chapter 4.1.3 there is considerable uncertainty in the trends of emissions of fluorinated greenhouse gases, due to incomplete reporting by Member States. Based on the incomplete data received from those Member States that reported under the Monitoring Mechanism, the indicative (incomplete) EU emissions of fluorinated gases are estimated to be 37 Mt CO_2 equivalent in 1998. From other work for the Commission, total emissions of the fluorinated gases for the EU15 in 1995 were indicatively estimated to be 70 MtCO_2 equivalent. This corresponds to 1.6 % of the total EU15 emissions of the three gases considered in this section (CO_2, CH_4, N_2O). The main conclusions of this chapter are not expected to change significantly if emissions of the fluorinated gases were included.

6. EVALUATION OF PROJECTED PROGRESS

6.1. Comparison of Member states projections with the EU burden sharing agreement

This section compares the latest 'with existing measures' (business-as-usual) projections from Member States for the year 2010 with their EU burden sharing commitments. This comparison is useful in revealing the 'gap' between what current policies and measures are expected to deliver and the Member States and EU's commitment under the Kyoto Protocol. However, it should be noted that the 'with existing measures' scenarios for different Member States are not always strictly comparable as the cut-off date for inclusion of policies is different. Chapter 6.3 compares these projections prepared by the Member States, with the results of the latest Community-wide emission projection analysis.

Table 7 summarises the present situation, showing the individual Member State commitments and the most recent 'with existing measures' forecasts for 2010. Also shown is the gap i.e. the difference between the 'with existing measures' projections and the Commitment under the burden sharing agreement. Member States' projections suggest that for the EU as a whole, compared to the 1990 level, a 1.4 % reduction of greenhouse gases can be achieved with these measures. This would result in an expected gap of about 6.6 % (278 $MtCO_2$ equiv. in 2010 in absolute terms) between the effects of existing policies and measures and the Kyoto target.

However, a more detailed analysis shows that the contribution of existing policies and measures to national targets under the EU burden sharing agreement varies significantly across Member States, reflecting the different degree of policy development between countries (with only the UK showing an expected over-delivery with measures that have been announced since Kyoto). Comparison of the projections shown in the table is therefore difficult. In addition projections are subject to considerable uncertainty arising from both uncertainty in the assumptions made in the projections e.g. GDP growth and in the degree to which the policies and measures will finally deliver the assumed reductions. Overall the unequal contribution by MS towards their burden sharing commitments and the degree of uncertainty related to the projections as such raises concerns over the accuracy of the identified 6.6% gap between the EU burden sharing agreement and projected emissions in 2010.

For some Member States this uncertainty has been discussed in their national programmes/information, but for most the information is not sufficient to provide any quantification.

Table 7. Comparison of Member States' 'with measures' total emissions projections compared with the Kyoto commitments

	Base year emissions from projection[18] ($MtCO_2$)	**Base year emissions reported in May 2000 (from Table 3.1) ($MtCO_2$)**	**EU burden sharing agreement**	**Commitment implied by EU burden sharing agreement ($MtCO_2$)**	**Scenario With existing P&Ms ($MtCO_2$)**	**Scenario With existing P&Ms (2010) % change from 1990 emissions**	**Gap[19] ($MtCO_2$)**	**Gap (% of 1990 emissions)**
Austria	77.1	75.4	-13%	-10	+5.9	+7.7%	-15.9	-21%
Belgium[20]	114.4	136	-7.5%	-8.6	+15.5	+13.5%	-24.1	-21%
Denmark [21]	76.2	69.6	-21%	-16	-12.6	-16.5%	-3.4	-4%
Finland[22]	64.5	72.6	0%	0	+16.7	+25.9%	-16.7	-26%
France	526.1	538.5	0%	0	+59.1	+11.2%	-59.1	-11%
Germany	1201.3	1201.1	-21%	-252.3	-229.3	-19.1%	-23.0	-2%
Greece	99.2	103.9	+25%	+24.8	+28.8	+29.0%	-4.0	-4%
Ireland[22]	57.2	53.5	+13%	+7.4	+16.6	+29.0%	-9.2	-16%
Italy	543	514.7	-6.5%	-35.3	-1.8	-0.3%	-33.5	-6%
Luxembourg	12.4	14.1	-28%	-3.5	-2.9	-23.4%	-0.6	-5%
Netherlands	218.3	208.9	-6%	-13.1	+36.3	+16.6%	-49.4	-23%
Portugal	64	62.6	27%	17.3	+36.2	+56.6%	-18.9	-30%
Spain	302.3	301.9	15%	45.3	+56.9	+18.8%	-11.6	-4%
Sweden	70.9	69.5	+4%	+2.8	+12.1	+17.1%	-9.3	-13%
UK[23]	743.6	727.1	-12.5%	-93	-94[24]	-12.6%	+1.0	0%
Total EU	**4170.5**	**4149.5**	**-8.0%**	**-334.2**	**-56.5**	**-1.4%**	**-277.7**	**-6.6%**

18 Base year emissions are those quoted in Member States' projections, some of which are from the Second National Communications (1997/1998). In view of the inventory updates the base year values quoted often do not match with more recent 1990 estimates. Figures for CO_2 exclude the emissions and removals of land-use change and forestry. For most Member States, data include emissions of the fluorinated gases, the exceptions are Belgium, Finland, Greece, Ireland, Italy and Spain. For the fluorinated gases Member States have the option of using 1990 or 1995 as the base year. The Member States where fluorinated gases are included generally use a 1995 base year. The base year emissions shown comprise 1990 emissions for carbon dioxide, methane and nitrous oxide and 1995 emissions for the fluorinated gases.

19 This is the gap between the commitments under the EU burden sharing agreement and the projected emissions in 2010. Calculated using the base year emissions from the projections to maintain consistency.

20 Base year emissions taken from Belgium's information on emission projections include only emissions from fossil fuels"

21 For Denmark, the base year emissions from the projections take account of adjustments for electricity trade in 1990, because the Danish targets refer to adjusted data, however the 1990 data reported in the inventory from Denmark as presented in Table 4 is unadjusted. The figures given in the table for Netherlands, Sweden and Belgium are all uncorrected for temperature.

22 Finland and Ireland are currently updating their projections as part of a new national climate strategy.

23 The UK 'with measures' projection include estimates of the impact of some major policies introduced since Kyoto. These policies are expected to save about 24 $MtCO_2$ in 2010.

24 -71 Mt CO_2 before the post Kyoto measures (see footnote 23).

Table 8 shows the results of the 'with existing measures' projection, broken down by greenhouse gas. This reveals that for the EU as a whole, CO_2 emissions are expected to increase by 97 Mt or 2.9 % between 1990 and 2010, while emissions of methane and nitrous oxide are both projected to fall substantially (by 129 $MtCO_2$ equivalent (-30 %) and 61 $MtCO_2$ equivalent (-16%) respectively). Information for the fluorinated gases is less comprehensive and so it is difficult to draw firm conclusions. However, for those countries that have provided data, an increase of 37 Mt CO_2 equivalent or 73 % is projected by 2010 compared to the base year[25].

Table 8. Member State 'with measures' projections split by greenhouse gas

	Change in emissions between 1990 and 2010 ($MtCO_2$ equivalent)				**Change in emissions between 1990 and 2010 (%)**			
	CO_2	**CH_4**	**N_2O**	**Fluorinated gases [26]**	**CO_2**	**CH_4**	**N_2O**	**Fluorinated gases**
Austria	+6.9	-2.2	+0.5	+0.8	+11.1%	-19.9%	+23.2%	+47.1%
Belgium	+14.4	0	+1.1		+12.9%		+52.4%	
Denmark	-10.8	-0.6	-2.4	+1.2	-18.2%	-10.3%	-22.2%	+300.0%
Finland	+16.2	-1.2	+1.7		+30.1%	-22.6%	+30.8%	
France	+71.2	-11.7	-13.8	+13.4	+18.8%	-24.5%	-15.1%	+173.8%
Germany	-158.7	-61.8	-25.1	+16.3	-15.8%	-52.8%	-36.7%	+146.4%
Greece	+28.8				+34.1%			
Ireland	+12.6	+1.2	+1.5	+1.3	+41.0%	+7.2%	+16.8%	+446.7%
Italy	+10.4	-9.8	-2.4		+2.3%	-20.0%	-4.7%	
Luxembourg	-3.0	0	0	+0.1	-25.6%	+9.1%	+12.2%	+547.1%
Netherlands	+46	-14	+1.0	+3.3	+28.6%	-51.9%	+5.0%	+32.0%
Portugal	+29.8	+1.7	+2.8	+1.9	+69.0%	+11.8%	+44.4%	+1231.8%
Spain	+55.6	+4.6	-3.3		+24.5%	+10.0%	-11.0%	
Sweden	10.6	-1	+0.9	+1.6	+19.1%	-16.7%	+11.1%	+114.3%
UK	-33.5	-34.3	-23.0	-3.2	-5.7%	-44.9%	-34.8%	-18.8%
Total EU	**+96.5**	**-129.1**	**-60.5**	**+36.7**	**+2.9%**	**-29.8%**	**-16.1%**	**+73.4%**

[25] Community-wide projections for fluorinated gases are discussed in Chapter 6.3.

[26] Data on the fluorinated gases is only available for some Member States and therefore the EU total is not a true reflection of the actual position.

6.2. Summary of additional policies and measures for the member states

The previous section has suggested a 6.6% gap identified by Member States between expected results of existing policies and measures in 2010 and the EU's target under the Kyoto Protocol. The objective of Member States' current climate change programmes is to close this gap through the development and future implementation of additional policies and measures.

Table 9 compares the required emission reduction in order to reach the Kyoto target with the savings to be expected from additional policies and measures (where these have been quantified). The table shows that only seven Member States (Austria, Denmark, France, Germany, Italy, the Netherlands, and United Kingdom) have provided quantification of their additional measures. Eight Member States (Belgium, Greece, Finland, Ireland, Luxembourg, Portugal, Spain and Sweden) did not provide quantification of these measures.

In all Member States the savings from additional measures are expected to amount to about 266 million tonnes of CO_2 equivalent. The major contributors to these additional reductions are France, Germany, Italy, Netherlands and the UK. The UK and Germany expect to exceed their commitments under the EU burden sharing agreement by 66 Mt and 17 Mt respectively thereby accounting for one third of the reductions coming from additional measures. If Germany and the UK were to meet, but not exceed, their commitments under the EU burden sharing agreement then the savings from additional measures would total only 184 Mt. This would leave a gap to the EU's Kyoto commitment of 93 Mt CO_2 equivalent.

For those countries that have identified additional savings by greenhouse gas, most of these savings are expected to come from further reductions in CO_2. In many countries, the additional policies and measures are in the early stages of development and are subject to a larger degree of uncertainty than those discussed in the previous section.

Therefore, the same concern over the accuracy of the identified figures of 266 $MtCO_2$ equiv. applies here. The considerable uncertainty of projections both for the "business-as-usual" and the "with additional measures" scenario suggests that a safety margin be applied when identifying remaining EU emission reduction obligations towards meeting the Kyoto target. To be certain of complying with its Kyoto commitments the EU should therefore consider further reductions in order to allow for a safety margin.

Table 9. Comparison of the gap between Member States 'with measures' projections and their Kyoto commitments and the identified additional measures

	Gap ($MtCO_2$)	Additional measures ($MtCO_2$)[27]				
		Total	CO_2	CH_4	N_2O	Fluorinated gases
Austria	15.9	16				
Belgium	24.1	n.q.				
Denmark	3.4	2.5 to 4.1	1.8 to 3.2			0.7 to 0.9
Finland	16.7	n.q.				
France	59.1	59.6	48.9	-2.0	5.3	7.3
Germany	23.0	40				
Greece	4.0	n.q.				
Ireland	9.2	-				
Italy	33.5	31.7	28.1	3.6		
Luxembourg	0.6	n.q.				
Netherlands	49.4	50	50[28]			
Portugal	18.9	-				
Spain	11.6	-				
Sweden	9.3	n.q.				
UK	-1.0	65	65			
Total EU	**-277.7**	**266**[29]	**195.2**	**1.6**	**5.3**	**8.2**

- n.q. additional policies and measures have not been quantified

- no information on additional policies and measure

Table 10 summarises, for each Member State, the distribution of these additional policies and measures. The table shows that the majority of countries are currently planning additional measures to reduce greenhouse gas emissions and that these are generally spread across all sectors and sources of greenhouse gas emissions. The lack of information on the quantitative effects of these measures also means that data on the quantified effects by sector is not available for most Member States.

27 This includes additional measures i.e. those which are already implemented but not effective or where there is a firm implementation plan and proposed measures without firm implementation plans.

28 A further 25 $MtCO_2$ equivalent is planned to come through use of the Kyoto Mechanisms.

29 If Germany and the UK were to meet, but not exceed, their commitments under the EU burden sharing agreement then the savings from additional measures would total only 184 Mt which would mean a gap of 93 Mt.

Table 10. Summary of additional policies and measures

Country	Energy	Industry	Services	Households	Waste	Transport	Agriculture	Kyoto mechanisms
Austria	✓	✓	✓	✓	✓	✓	✓	✓
Belgium	✓	✓	✓	✓		✓		
Denmark	✓	✓	✓	✓	✓	✓	✓	✓
Finland	✓	✓	✓.	✓	✓	✓	✓	
France	✓	✓	✓	✓	✓	✓	✓	
Germany	✓	✓	✓	✓		✓	✓	
Greece	✓					✓		
Ireland								
Italy	✓	✓	✓	✓	✓	✓	✓	
Luxembourg		✓		✓		✓		
Netherlands	✓	✓	✓	✓	✓	✓	✓	✓
Portugal								
Spain								
Sweden	✓					✓		
UK	✓	✓	✓	✓	✓	✓	✓	✓

6.3. Community wide projections

The previous analysis in this report used scenarios and emission projections as prepared and submitted by Member States to assess the projected progress of the Member States and the EU towards meeting their commitments under the Kyoto Protocol. However, there are potentially a number of shortcomings with this approach, including the fact that Member States use very different and sometimes non-transparent models/methods for their projections. This can lead to results that in some cases actually can not be added (e.g. due to different definitions of sectors). Also energy systems and markets have EU-wide and international dimensions whose effects may not be captured in single country models.

For these reasons, this section examines projected progress towards the Kyoto emissions commitment using the latest Community-wide greenhouse gas emissions projections taken from the ongoing study *Economic Evaluation of Sectoral Emission Reduction Objectives for Climate Change*'.[30]This study has the advantage that it uses a consistent methodology to forecast greenhouse gas emissions for the EU15 and is able to take account of EU-wide influences on the energy system.

According to the preliminary results of the study total greenhouse gas emissions in 2010 are expected to be approximately the same as levels in 1990 in a business-as-

30 Ecofys, AEA Technology Environment and National Technological University of Athens carry out this study for Environment DG. It will be published in latter part of 2000.

usual scenario. These results incorporate policies and measures in place at the end of 1997 as well as the effect of the agreements with car manufacturers to limit CO_2 emissions from passenger vehicles[31].

This projection is not fully in line with the results of the Member States analyses, which suggests that in 2010, total greenhouse gas emissions are expected to be just over 1% lower than their 1990 levels. Comparing the breakdown between greenhouse gases, the preliminary results of the Sectoral Objectives study project that CO_2 emissions will increase by 4.1 %[32], whereas the Member States' project a slightly lower increase of 2.9 %. For CH_4 and N_2O, emissions are projected to decrease substantially by both the Sectoral Objectives study and the Member States' forecasts, although for these gases it is the Member States who are projecting the larger fall.

Both sets of projections also expect emissions of fluorinated gases (although small in absolute values) to increase considerably between 1990 and 2010 (by 62 % in the case of the Sectoral Objectives study and by 73 % according to the Member States), although, as noted in Chapter 6.1, data for these gases from the Member States are incomplete. It should be noted that the methodology of estimating the emissions of fluorinated gases in the Sectoral Objectives study was also fairly crude. The Member States' 'with additional measures' projections suggest that over the period 1990 to 2010 CO_2 emissions will be reduced by 3 % compared to 1990 levels, with CH_4 and N_2O emissions falling by 30 % and 17 % respectively. The Sectoral Objectives study investigates the most cost-effective way to reduce EU15 emissions to meet the Kyoto target of an 8 % reduction in 2010, compared to 1990 levels. The preliminary results of the study corroborate the Member States 'with additional measures' projections. However, when final results are available a further analysis of the Member States and Community projections will be necessary.

6.4. Summary of EU level policies and measures

The first Community strategy to limit CO_2 emissions and improve energy efficiency was presented in October 1991 (SEC (91) 1744 final). The overall objective was to stabilise CO_2 emissions in the Community in the year 2000 at the 1990 level. In June 1992, a Communication from the Commission (COM (92) 246 final) proposed a mutually reinforcing package of measures and programmes. The strategy was based on four main areas:

- EC energy technology programmes and Trans-European networks
- Fiscal measures
- Complementary national programmes
- Monitoring mechanism for CO_2 and other greenhouse gases

The initial outline of this strategy was described in the Community's first Communication to the UN Framework Convention on Climate Change (UNFCCC).

31 The agreements have been made with European, Japanese and Korean car manufacturers associations.

32 This figure includes the effect of the environment agreement with vehicle manufacturers. CO2 emissions in 2010 are projected to be have been 6.7% higher than 1990 levels without the agreement.

Progress on the implementation of the strategy up to November 1997 was presented in the Community's second Communication to the UNFCCC (SEC (98) 1770). This section summarises the progress that has been made since that date and the future direction of the underlying policies and programmes.

In May 1999, the Commission presented a Communication to Council and Parliament, on 'Preparing for Implementation of the Kyoto Protocol' (COM (1999) 230 final) which outlined the necessary action within the EU to enable the full application of the Kyoto provisions. In response to this Communication, the Council stressed the need for action at Community level and underlined that Common and Co-ordinated Policies and Measures (CCPMs) would be a useful supplement to national strategies. To this end they urged the Commission to put forward a list of priority actions and policy measures to be implemented at European level. The Commission responded by coming forward with this list in October 1999 and by making proposals to advance the policies through the European Climate Change Programme. This programme is described in the Commission's recent Communication 'EU policies and measures to reduce greenhouse gas emissions: Towards a European Climate Change Programme' (COM (2000) 88 final).

The Commission’s European Climate Change Programme aims to bring together all relevant stakeholders to co-operate in the preparatory work for common and co-ordinated policies and measures to reduce greenhouse gases. The ECCP's overall objective is stated as: 'to identify and develop all those elements of a European Climate Change strategy that are necessary for the implementation of the Kyoto Protocol'. It will be implemented through a structure of working groups and sub-groups to which relevant stakeholders will be invited (i.e. representatives of the Commission, the Member States, industry and NGOs). It is envisaged that the output from the different Groups will then be able to be used by the Commission as a basis for increasing the pace of existing activities and also to help the DGs bring forward new policy proposals.

There is already a number of existing policy initiatives in support of a comprehensive Climate Change Strategy. Some of these measures, such as the agreement with car manufacturers on the energy efficiency of passenger cars, have been successfully concluded. A proposal for a Directive on the Promotion of Renewable Energy Sources in the context of the Internal Electricity Market and an Action Plan for Improved Energy Efficiency in the Community were recently approved by the Commission. Other initiatives such as the revision of the Common Transport Policy, a Green Paper on Urban Transport and the revision of the guidelines on state aid for environmental protection are in process. Not all of these policies are primarily geared to the reduction of greenhouse gases but will result in ancillary benefits for Climate Change. Table 11 shows potential emission reduction estimates for those policies and measures where an estimate has been carried out. Reduction estimates for other policies and measures will be further developed through the ECCP or elsewhere. The reductions estimate the effect of the policy across all Member States.

The ACEA / JAMA / KAMA agreement is included in the baseline projection discussed in Chapter 6.3, and the effect of this agreement and some of the other EU-level policies and measures, particularly the landfill directive, are included in some of the Member State projections.

Table 11. Potential reduction estimates for EU level policies and measures

Sector	P&M	Potential Reduction CO_2 equivalent	% Reduction from 1990 level	Comments
Cross-sectoral	• Restructuring of Community Excise Duty	20-60 Mt	0.5 – 1.5%	Proposal for Council Directive, 1997
Energy	• Energy Efficiency-Action Plan	200 Mt	5%	Published 2000; includes wide range measures
	• CHP	65 Mt	1.6%	Objective to reach 18% CHP by 2010 – strategy endorsed by Member States
	• Renewables – campaign for Take-off	400 Mt	10%	Objective to reach 12% contribution by 2010 – Action plan
Transport	• CO_2 and cars – voluntary agreements with ACEA, JAMA, KAMA	82 Mt[33]	2% (included in baseline in Section 4.3)	To improve average fleet efficiency by 2008
	• Reduction of fluorinated gases	20 Mt	0.5%	-
Waste	• Landfill Directive	95-150	2-4%	Being implemented in MS

33 The effects of the voluntary agreements with the car manufacturers are included in the baseline scenario of the Commission's EU wide projections for 2010 (see also footnote 24)

7. GLOSSARY, ABBREVIATIONS AND UNITS

Actual progress	Actual progress is based on emission inventories of Member States and the Community and includes the comparison of base year inventories with the latest available inventories to establish actual trends of emissions and a comparison with emission objectives at Member State and Community level
Projected progress	Projected progress is assessed by the collection and evaluation of adopted and further (planned, or currently in discussion) policies and measures at both national and Community level. This evaluation is based on emission projections of Member States and the Community
Emissions	Means the release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period of time
EU burden sharing	The Kyoto Protocol to the UNFCCC sets different binding emission targets for a number of Parties including the European Community (EC). The EC agreed to reduce its greenhouse gas emissions by 8 % by 2008-2012, from 1990 levels. This overall target has since been distributed on a differentiated basis to individual Member States under an 'EU burden sharing' mechanism agreed upon by the Council of Ministers in June 1998
Greenhouse gases	Means those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation
Industrial flourinated-gases	HFCs, PFCs, SF_6
Kyoto Protocol	see: **EU burden sharing**
Monitoring mechanism	The monitoring mechanism is an instrument to assess accurately and regularly the extent of progress being made towards the Community's commitments under the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol
Sink	Means any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere
Source	Means any process or activity which releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere
CCPMs	Common and Co-ordinated Policies and Measures at Community level
CH_4	Methane
CHP	Combined Heat and Power
CO_2	Carbon dioxide
COP	Conference of the Parties
CRF	Common Reporting Format

EEA	European Environment Agency
GDP	Gross Domestic Production
GHG	Greenhouse gas
HFCs	Hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
LUCF	Land Use Change and Forestry
N_2O	Nitrous oxide
PFCs	Perfluorocarbons
P&Ms	Policies and Measures
SF_6	Sulfur hexafluoride
UNFCCC	United Nations Framework Convention on Climate Change

t	1 ton (metric)	= 1 megagram (Mg)	= 10^6 g
Mg	1 megagram	= 10^6 g	= 1 ton (t)
Mt	1 megaton (Mt)	= 10^{12} g	= 1 teragram