# Summary

## 1. Which targets have to be achieved and what is the progress on ratification of the Kyoto Protocol?

Climate change, and avoiding its potential consequences, is addressed by the United Nations Framework Convention on Climate Change (UNFCCC) and remains a high priority in the EU. Achieving 'sustainable' atmospheric greenhouse gas concentrations, avoiding dangerous interference with the climate system but allowing economic development, would require substantial (50 to 70 %) global reductions in total greenhouse gas emissions. To take the first steps towards stabilisation of the world's climate, or at least a moderate sustainable climate change, Parties adopted the Kyoto Protocol, which requires by 2008–12 a 5 % reduction from 1990 levels of developed countries' emissions of six greenhouse gases. The Kyoto Protocol sets the EU a target of an 8 % reduction from the 1990 level by 2008–12. The EU and its Member States agreed in 2002 on different emission limitation and reduction targets for each Member State, called the 'burden sharing' agreement. In 2001 agreement was reached within the UNFCCC on many of the rules and guidelines for use of the Kyoto mechanisms (joint implementation, clean development mechanism, international emissions trading) and of 'carbon sinks' for meeting the Kyoto targets, thereby allowing countries to ratify the Protocol.

The European Commission has acknowledged the need for further emission reductions beyond 2012, by suggesting an EU target to reduce emissions by an average of 1 % per year up to 2020 and a global target of 20 to 40 % reduction by 2020, both from 1990 levels.

Candidate countries have different 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 several candidate countries have ratified the Kyoto Protocol.**

☹ **The Protocol has not yet entered into force because not enough other industrialised countries have ratified, including countries with economies in transition such as Russia.**

## 2. What is the actual progress of the EU and candidate countries in limiting greenhouse gas emissions?

### 2.1. Progress in reaching EU and Member States 'burden-sharing' targets from 1990 to 2000

After an initial decrease of total greenhouse gas emissions in the early 1990s, emissions were more or less stabilised in the second half of the 1990s. Less positive, however, is the fact that emissions increased from 1999 to 2000.

The favourable situation in the 1990s was largely a result of considerable cuts in emissions in Germany and the United Kingdom. The main reasons for this favourable trend in Germany were increasing efficiency in power and heating plants and the economic restructuring of the five new federal states following German reunification. The reduction of greenhouse gas emissions in the United Kingdom 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, and partly due to significant reductions in emissions of non-carbon dioxide greenhouse gas emissions, including implementation of nitrous oxide abatement measures in the chemical industry. In both Member States the special circumstances mentioned above accounted for about half of the emission reductions for all six greenhouse gases, whilst specific policies and measures account for the remaining half.

☺ **Between 1990 and 2000, greenhouse gas emissions in the EU were reduced by 3.5 %, nearly half the greenhouse gas emission target.**

☺ **In the second half of the 1990s, EU carbon dioxide emissions stabilised, with emissions in 2000 being slightly (0.6 %) below 1990 levels. This means that the aim of stabilising carbon dioxide emissions at 1990 levels by 2000 was achieved.**

☺ **In 2000, six Member States (Finland, France, Germany, Luxembourg, Sweden and the United Kingdom) were on track towards reaching their burden-sharing target.**

☹ **In 2000, nine Member States (Austria, Belgium, Denmark, Greece, Ireland, Italy, the Netherlands, Portugal and Spain) were not on track towards reaching their burden-sharing target.**

### 2.2. Sectors and gases responsible for EU emission trends between 1990 and 2000

Over the last decade emission decreases in most sectors, in particular energy industries (power and heat generation), industry and waste management were offset by substantial emission increases in transport, with road transport being the largest source.

☺ **Over the last decade greenhouse gas emissions in the EU decreased in most sectors (industry, energy supply, agriculture, waste management and households).**

☹ **EU emissions from transport showed an increase in emissions of nearly 20 % in the same period.**

**Energy supply**

During the 1990s carbon dioxide emissions from energy industries (mainly electricity production) declined, while at the same time electricity production and consumption increased. This decoupling was due to several factors. Almost half of the reduction was due to shifts in fuel use in power production from coal to natural gas whilst larger shares of electricity generation from renewable energy sources and nuclear power accounted for about one third of the reduction. Improved efficiency due to a switch to high-efficiency gas-turbine combined-cycle technology was responsible for the remaining reductions.

☺ **Between 1990 and 2000, EU carbon dioxide emissions from energy industries declined by 5 %, while final electricity consumption increased by 19 %, showing a decoupling of electricity consumption and environmental pressure.**

**Transport**

The largest increase in emissions during the 1990s was from transport, with road transport being by far the largest transport emission source. Emissions increased due to large increases in both passenger and freight transport carried out by road. Carbon dioxide emissions from international aviation are also growing rapidly, but 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 the total EU greenhouse gas emissions but emissions increased substantially due to an increase in transport carried out by petrol cars equipped with catalysts, which generate emissions of nitrous oxide. This is a negative aspect of an overall effective policy for improving air quality in Europe.

☹ **Between 1990 and 2000, EU carbon dioxide emissions from transport (mainly road) increased by 18 %.**

☹ **EU carbon dioxide emissions from international aviation and navigation were 6 % of total emissions in 2000, growing by almost 50 % from 1990 levels.**

**Agriculture**

Between 1990 and 2000, nitrous oxide emissions from agricultural soils declined slightly, mainly because of a decrease in the use of nitrogen fertiliser. This was a consequence of the reform of the common agricultural policy (CAP) of the EU and the implementation of the nitrate directive, aimed at reducing water pollution. Methane emissions from enteric fermentation (by cattle) also declined, mainly due to a decrease in the number of cattle, which also arose through the CAP reform.

☺ **Between 1990 and 2000, EU nitrous oxide emissions from agricultural soils declined by 4 % and EU methane emissions from enteric fermentation (by cattle) declined by 9 %.**

**Industry**

During the early 1990s carbon dioxide emissions from manufacturing industries decreased, mainly due to fuel efficiency improvements, economic restructuring in Germany and relatively low economic growth in the EU. The substantial reduction in

nitrous oxide emissions was due to emission reduction measures in the adipic acid production industry in France, Germany and the United Kingdom. The very large increase in hydrofluorocarbon emissions is due to replacement of chlorofluorocarbons, which are being phased out to protect the ozone layer. This is a negative side-effect of an overall effective policy to protect the ozone layer.

☺ **Between 1990 and 2000 EU carbon dioxide emissions from manufacturing industries and nitrous oxide emissions from chemical industries decreased by 8 % and 56 %, respectively.**

☹ **Between 1990 and 2000, EU hydrofluorocarbon emissions, accounting for 0.7% of total EU greenhouse gas emissions, grew by a factor of 80.**

**Waste management**
During the last decade methane emissions from landfills decreased. The decrease is mainly due to the (early) implementation of the landfill waste directive and similar national legislation by reducing the amount of untreated biodegradable waste disposed of in landfills and installing landfill gas recovery at all new sites.

☺ **Between 1990 and 2000, EU methane emissions from landfills declined by 26 %.**

**Households**
Carbon dioxide emissions from households decreased slightly from 1990 to 2000, although the number of dwellings increased. The reductions were due to fuel switches to natural gas, increase in district heating using biomass, energy efficiency improvements though thermal insulation and increased use of solar thermal for heating.

😐 **Carbon dioxide emissions from households decreased by 3 % from 1990 to 2000 although the population as well as the number of dwellings increased.**

### 2.3. Progress of candidate countries in reaching their targets from 1990 to 1999

Although candidate countries have to reach their Kyoto targets individually, for comparison with the EU, the overall aggregated trends in these countries are also presented in this report. Over the past decade total emissions have declined substantially in almost all candidate countries, mainly due to the restructuring process towards market economies, which led to changes in or the closure of heavily polluting and energy-intensive industries. Emissions from transport increased in the second part of the 1990s, although their level in 1999 was still below the 1990 level. The experience from the EU cohesion states (Greece, Ireland, Portugal, Spain) shows that starting from relatively low transport levels, high economic growth can lead to strong growth in greenhouse gas emissions from transport. This may also occur in candidate countries in future. There is a need to improve emission data and energy and transport statistics in several candidate countries because these are not currently consistent.

☺ **In the 10 candidate countries total greenhouse gas emissions declined by 34 % between the base year and 1999.**

☺ **All candidate countries except Slovenia were on track in 1999 to meet their Kyoto targets.**

😐 **Transport carbon dioxide emissions decreased by 19 % between 1990 and 1995, but increased afterwards.**

## 3. Is the projected progress of the EU and candidate countries sufficient to achieve targets in 2010?

### 3.1. Projected progress of the EU with existing and additional policies and measures

The comparison of projections based on existing domestic (1) policies and measures (also sometimes called 'baseline') reported by Member States for the year 2010 with their EU burden-sharing commitments reveals the gap between what current domestic policies and measures are expected to deliver and the commitments.

Existing measures will not be sufficient for the EU to reach its Kyoto target. Additional, planned policies and measures would achieve

(1) The extent to which Member States are prepared to use the flexible mechanism of the Kyoto Protocol to fulfil their commitments is not included in the reporting under the monitoring mechanism and could therefore not be assessed in this report. Also the extent to which Member States intend to make use of carbon sinks to fulfil their commitments is not assessed in this report, due to lack of information and because methods for data collection are not yet internationally agreed.

the target, but would rely on over-delivery by several Member States, which cannot be taken for granted.

☹ **With existing policies and measures, projections for the EU show total greenhouse gas emissions decreasing by 4.7 % between 1990 and 2010. This leaves a shortfall of 3.3 % to reach the EU target of an 8 % reduction.**

☺ **Germany, Sweden and the United Kingdom project that existing policies and measures will be sufficient to meet their burden-sharing targets.**

☹ **Austria, Belgium, Finland, Ireland, Italy, the Netherlands, Portugal and Spain are all projected to be significantly above their burden-sharing targets by 2010.**

😐 **Savings from additional measures being planned by Member States would result in further emissions reductions sufficient to cover the shortfall and thus meet the target. However, this relies on over-delivery by some Member States (Finland, France, Germany, Ireland, Italy, Sweden and the United Kingdom) compared with their burden-sharing targets.**

### 3.2. 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 also been compared with recent EU-wide emission projections. Preliminary EU-wide energy-related carbon dioxide projections (European Commission's new Primes energy baseline scenario, September 2002), covering about 80% of total emissions, show a difference from national projections. Aggregate Member States 'with measures' projections are for a slight decrease of energy-related carbon dioxide emissions (energy supply and use, including transport) by 2010, while the EU-wide projections show a small increase in these emissions. A small part of the difference is due to the inclusion of international transport in the EU-wide projections. The main explanation is the substantially larger decrease in the national 'with measures' projection of Germany compared to the projection for Germany in the EU-wide study. There is a need for further analysis of the reasons for the differences.

☹ **Aggregate Member States 'with existing measures' projections for 2010 are for a slight decrease by 2 % of energy-related carbon dioxide emissions (energy supply and use, including transport), while the EU-wide projections show an increase in these emissions of 4 %.**

### 3.3. Projected progress of candidate countries with existing policies and measures

Greenhouse gas emissions in five candidate countries are projected to decrease further with existing policies and measures. In part, these projected reductions are the result of the economic restructuring that has already occurred in these countries. However, a recent strong increase of emissions from transport is a cause of 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 six candidate countries are projected to decrease by 2010 with existing policies and measures, sufficient to meet their Kyoto targets.**

## 4. What are the effects of policies and measures in the EU to reduce greenhouse gas emissions by 2010?

**Common and coordinated policies and measures of the EU**

The Commission has identified additional common and coordinated policies and measures which would have to be implemented by Member States. Some 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 (75 %). Transport policies and measures account for only a small part of the total expected savings (16 %), although transport is the most rapidly growing source of greenhouse gases.

☺ **The Commission has identified additional common and coordinated policies and measures that would result in additional emission reductions, potentially covering the gap between the projection with existing measures and the EU target, mainly in energy-related**

**carbon dioxide emissions but also in emissions of fluorinated gases.**

**Energy supply and use in industry and households (excluding transport)**
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 22 %, 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 renewables share could be accelerated. Combined heat and power (CHP) is projected to increase its share, although the current rate of increase in CHP is not sufficient to achieve the EU target of 18 % by 2010. Continuing improvements in energy intensity (ratio of energy use and 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 be 16 and 20 % below 1990 levels by 2010 in, respectively, the 'with existing measures' projections and 'with additional measures' projections.**

☹ **Renewable energy targets for the EU (of 22 %) 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 18 % by 2010.**

**Transport**
Emissions from transport are projected to continue to increase up to 2010, due to continued increases in both passenger and freight transport carried out 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. These emissions were reduced between 1995 and 2000, 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. This suggests that the EU target for carbon dioxide emissions from new passenger cars is achievable.

☹ **Emissions from transport are projected to increase by 28 % from 1990 levels by 2010 in the 'with existing measures' projections.**

☺ **Average carbon dioxide emissions of new passenger cars were reduced by 7.5 % from 1995 to 2000, suggesting that the target, under the agreement with the car industry, of 120 g carbon dioxide/km (by 2005 or 2010 at the latest) is achievable.**

☹ **Nitrous oxide emissions from transport currently account for only 0.6 % of total EU greenhouse gas emissions, but emissions are projected to increase sharply due to the projected increase in transport carried out by petrol cars equipped with catalysts.**

**Agriculture**
Greenhouse gas emissions in agriculture are projected to decrease further up to 2010, mainly due to continuing reform of the common agricultural policy and the implementation of the nitrate directive resulting in reductions in fertiliser use and the number of cattle.

☺ **EU-wide greenhouse gas emissions in agriculture are projected to decrease to 7 % below the 1990 level in 2010 in the projection based on existing measures.**

**Industry (emissions of fluorinated gases and nitrous oxide)**
EU emissions of fluorinated gases and nitrous oxide from industrial processes are projected to further decrease 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. These reductions in nitrous oxide emissions offset substantial projected increases in hydrofluorocarbon emissions (72 % from the base year to 2010), due to

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

☺ **EU greenhouse gas (fluorinated gases and nitrous oxide) emissions from industrial processes are projected to decrease by 2010 by 10 % from 1990 with existing measures and by 43 % with additional measures.**

**Waste**

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

☺ **EU-wide greenhouse gas emissions in the waste sector are projected to decrease by about 60 % from 1990 by 2010.**

## 5. Is the reporting scheme of the EU sufficient for assessing the progress of greenhouse gas emission reductions?

Reporting of greenhouse gas inventories has improved, but needs to be more complete and include all gases, especially for 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 (2003). 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 most Member States provided greenhouse gas inventory data for 1990 to 2000 for all gases. Two Member States did not provide data on fluorinated gases (Ireland, Luxembourg).**

☹ **Several candidate countries did not provide greenhouse gas inventory data for 1990 to 2000 for all gases. Most candidate countries did not provide data on fluorinated gases.**

☺ **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 and proposals are being developed, as part of the process of revising the monitoring mechanism during 2002 and 2003.**