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COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 19.11.2008  
COM(2008) 651 final/2

**CORRIGENDUM**

Annule et remplace le document COM(2008)651 du 16.10.2008  
Concerne uniquement la version EN

**COMMUNICATION FROM THE COMMISSION**

**PROGRESS TOWARDS ACHIEVING THE KYOTO OBJECTIVES**

**(required under Article 5 of Decision 280/2004/EC of the European Parliament and of the Council concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol)**

{SEC(2008) 2636}

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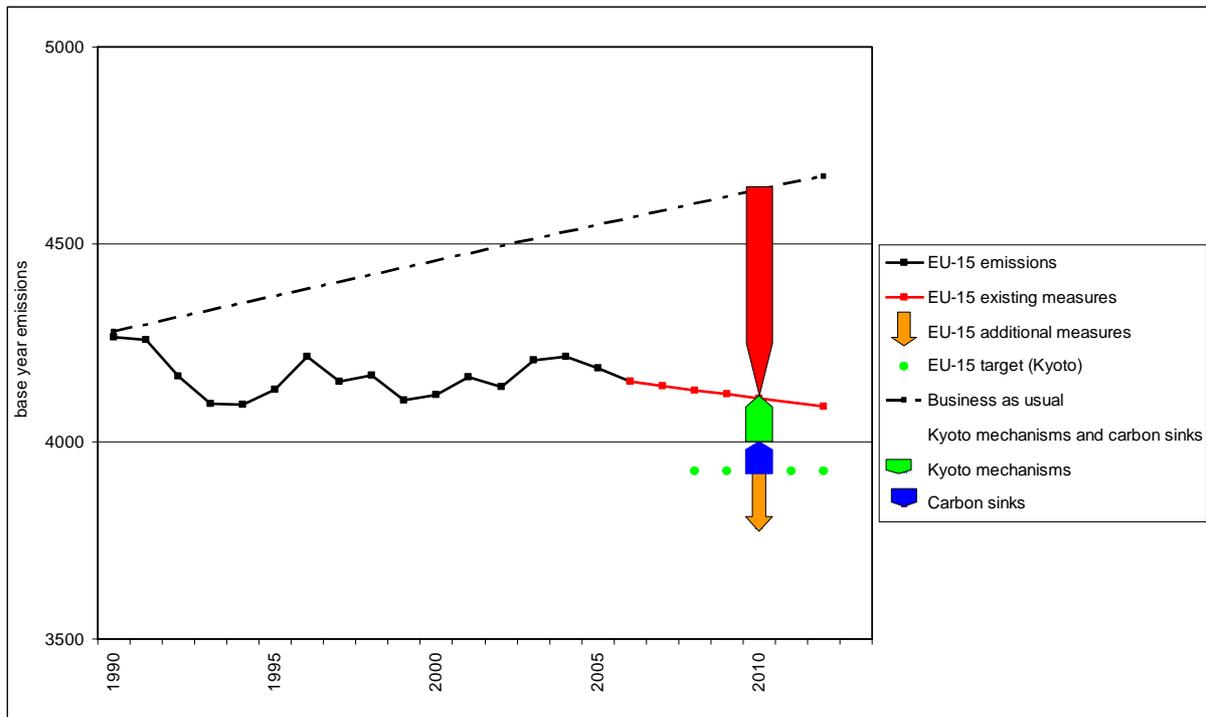
## 1. SUMMARY

### *On track to reach the Kyoto target, 2008-2012*

Under the Kyoto Protocol, the EU-15 has agreed to reduce its greenhouse gas (GHG) emissions by 8% by 2008–12 compared to base year levels<sup>1</sup>. Based on the latest available inventory data of 2006<sup>2</sup>, total GHG emissions in the EU-15 were 2.7% below base year emissions without Land Use, Land Use Change and Forestry (LULUCF). Since 1990, the EU-15 economy (expressed as GDP) grew by almost 40%. In 2006, EU-15 GHG emissions decreased by 0.8% compared to 2005 while the EU-15 economy grew by 2.8%.

Projections<sup>3</sup> as shown in Figure 1 indicate that the Community will reach its Kyoto target. In addition, the sectors covered by the EU ETS are also expected to contribute 3.3% of reductions - currently not fully captured in the projected estimates (for details see Table 11 in the Staff Working Document (SWD)).

**Figure 1: Actual and projected emissions for EU-15**



By 2010, eight Member States (MS) out of the EU-15, Belgium, Germany, Greece, Ireland, the Netherlands, Portugal, Sweden and the United Kingdom, are currently projected to achieve their targets using existing policies and measures, carbon sinks and the Kyoto mechanisms. In addition, four MS (Austria, Finland, France and Luxembourg) are projected to reach their targets when also accounting for additional policies and measures planned. There are currently three MS (Denmark, Italy and Spain) which are projected not to achieve their Kyoto target. However, the gaps between these countries' projections and their respective targets have been significantly reduced since last year, in particular for Spain and Italy. Furthermore the EU ETS and its effect on national emissions in Denmark and Spain, not accounted for in projections this year, should make a significant contribution towards helping these countries achieving their target.

Total EU-27 GHG emissions were, in 2006, 10.8% below base year levels without emissions and removals by LULUCF and 0.3% lower compared to 2005. The EU-27 economy grew by 3.0% in 2006.

Despite the fact that in most of the EU-12 new MS, emissions are projected to increase between 2006 and 2010, nine of them that have a Kyoto target are projected to meet or even over-achieve their Kyoto targets using only existing policies and measures. Slovenia projects that it will only meet its Kyoto target when also accounting for planned additional policies and measures, the use of Kyoto mechanisms and carbon sinks.

### ***New measures required to reach the EU's ambitious 2020 target***

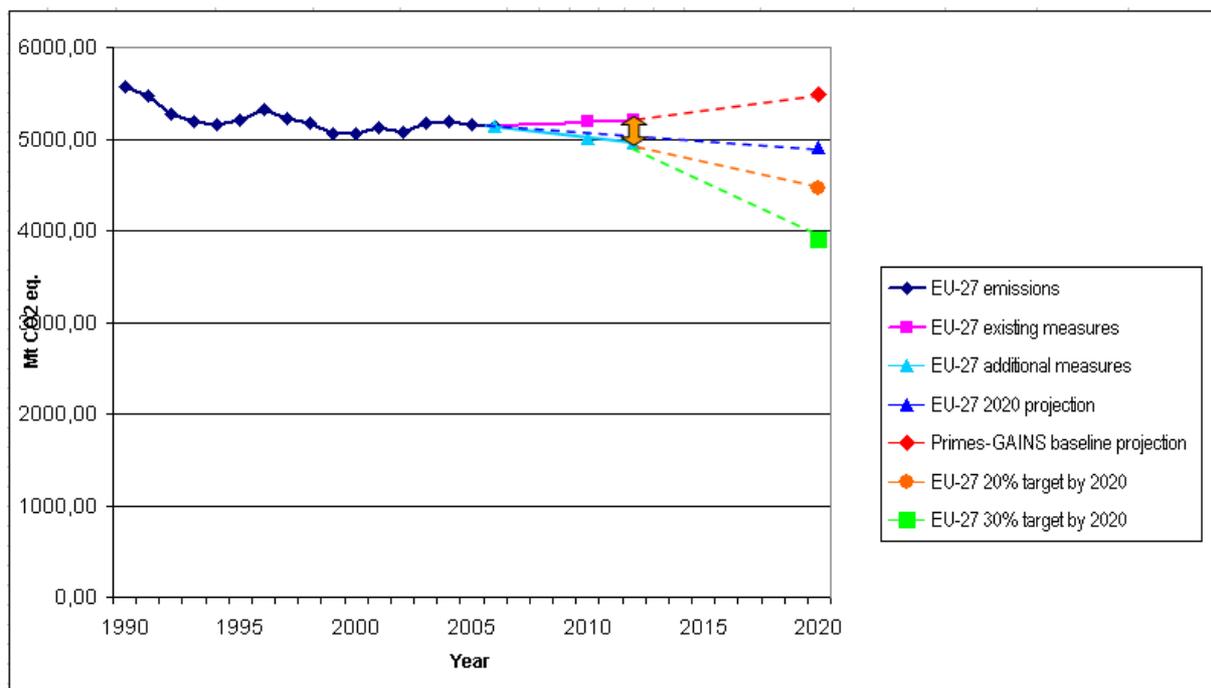
In spring 2007, the European Council adopted the unilateral commitment to reduce EU-27 GHG emissions by at least 20% by 2020 compared to 1990 levels and by 30%, provided that other developed countries commit themselves to comparable emission reductions, and that economically more advanced developing countries to contribute adequately according to their responsibilities and respective capabilities.

As a follow up to its commitment, the European Commission put forward in January 2008 the climate change and energy package including new legislative measures covering the main sectors of the EU economy. The proposed measures include: a) an improved emissions trading system (ETS), b) an emission reduction target for industries not covered by the ETS (e.g., agriculture, buildings, transport, waste) - emissions covered by the EU ETS are to be reduced by 21% from 2005 levels by 2020 and those not covered by the EU ETS by 10%, with differentiated targets per MS according to relative levels of current and projected GDP/capita, c) legally enforceable targets for increasing the share of renewables in the energy mix, and d) new rules on carbon capture and storage and on environmental subsidies.

In addition to the package, the European Commission also proposed a comprehensive new strategy to reduce CO<sub>2</sub> emissions from new cars and vans sold in the European Union. The new strategy will enable the EU to reach its long-established objective of limiting average CO<sub>2</sub> emissions to 120 grams per km<sup>4</sup> by 2012 - a reduction of around 25% from current levels. The new strategy is followed with a revision of the EU fuel quality standards. The fuel quality Directive<sup>5</sup> will not only make the fuels themselves 'cleaner' but will also allow the introduction of vehicles and machinery that pollute less. The Directive is expected to lead to GHG emission reductions of 10% between 2011 and 2020. This would cut emissions by 500 million tonnes of CO<sub>2</sub> by 2020.

Figure 2 illustrates the significant gap between MS projections for 2020 and the EU's 2020 targets requiring the EU to get onto a much steeper emission reduction path after 2012 as compared to 1990. Depending on the actual target, in 2020 emission reductions will have to amount to 1,000 – 1,500 Mt CO<sub>2</sub> equivalents compared to current projections. This underlines the need for the EU and its MS to adopt and implement as soon as possible the new legislation.

**Figure 2: Actual and projected emissions for EU-27**



## 2. ACTUAL PROGRESS 1990-2006

### 2.1. GHG emission trends

The overall EU GHG emission trend is strongly influenced by the two largest emitters Germany and the United Kingdom, accounting for about one third of total EU-27 GHG emissions. These two MS have achieved total GHG emission reductions of 339 million tonnes CO<sub>2</sub> equivalents compared to 1990.

The main reasons for the favourable trend in Germany are increasing efficiency in power and heating plants and the economic restructuring of the five new Länder after the German reunification. The reduction of GHG emissions in the United Kingdom was due to significant improvements in energy efficiency driven by a wide range of policies across the main energy using sectors and, partly resulting from the liberalisation of the energy market, the major shift away from more carbon intensive fuels such as coal and oil towards lower or zero carbon electricity generation, such as gas, nuclear and renewables as well as N<sub>2</sub>O emission reduction measures in the adipic acid production.

Italy and France are the third and fourth largest emitters both with a share of 11%. Italy's GHG emissions were about 10% above 1990 levels in 2006. The observed increases since 1990 in Italy's GHG emissions are primarily due to road transport, electricity and heat production and petroleum-refining. France's emissions were 4% below 1990 levels in 2006. In France, large reductions were achieved in N<sub>2</sub>O emissions from the adipic acid production, but CO<sub>2</sub> emissions from road transport increased considerably between 1990 and 2006.

Spain and Poland are the fifth and sixth largest emitters in the EU-27, both accounting for about 8% of total EU-27 GHG emissions. Spain increased emissions by 51 % between 1990 and 2006. This was largely due to emission increases from road transport, electricity and heat

production, and manufacturing industries. Poland decreased GHG emissions by 12 % between 1990 and 2006 (-29% since the base year, which is 1988 in the case of Poland). Main factors for decreasing emissions in Poland — as for other Central and Eastern European MS — was the decline of energy inefficient heavy industry and the overall restructuring of the economy in the late 1980s and early 1990s. The notable exception was transport (especially road transport) where emissions increased.

In 2006, 10 MS had GHG emissions above base year levels whereas the remaining 15 MS had emissions below base year levels. Cyprus and Malta do not have emission reduction commitments under the Kyoto protocol. In those countries, emissions in 2006 were above 1990 levels. The percentage changes of GHG emissions from the base year to 2006 range from -55.7% (Estonia) to +49.5 (Spain).

## **2.2. Per capita emissions and GHG intensities in 2006**

In 2006, an EU citizen emitted in average 10.4 tCO<sub>2</sub>-eq. In the EU-15, the average was 10.7 tCO<sub>2</sub>-eq. per capita, a decrease of 0.2 tCO<sub>2</sub>-eq. compared to 2005. However, GHG emissions per capita show significant differences across European countries. Emissions per capita are correlated to the energy intensity (primary energy consumption per capita) and the energy mix (affecting the level of emissions by energy unit produced) of each country.

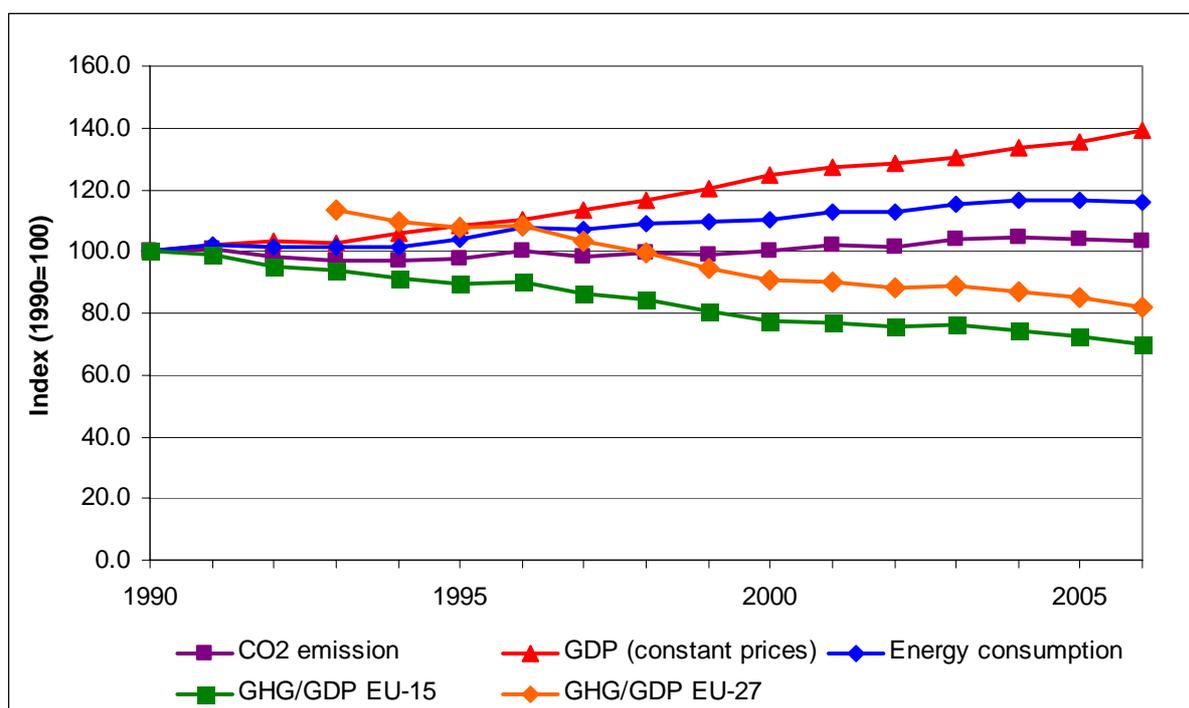
In the current economic conditions, increasing emissions per capita can be explained by higher energy consumption per capita stemming from increasing living standards, while decreasing emissions per capita can be explained by improvements in energy efficiency and increasing shares of renewable energy sources in the energy mix of a country.

In the 1990s, per capita emission trends have followed the overall decreasing trends for total GHG emissions. However after 2000, emissions per capita kept on decreasing in the EU-15 while they have been growing in the Central and Eastern European MS (-3.2% and +4.2% between 2000 and 2006, respectively). In the EU, GHG emissions per capita have increased most since 1990 in Spain, Portugal, Cyprus and Malta – although they although they have not reached yet the EU average.

Figure 3 shows that emissions in both EU-15 and EU-27 have been decreasing while the economy has grown significantly. This may indicate that a relative decoupling has been taking place in the EU-15 since 1993, and in the EU-27 since 1996. Between 1990 and 2006, GDP in the EU-27 grew by 40 % while emissions decreased by 7.7 % and during the same period in the EU-15, the GDP growth was almost 39 % with a 2.2 % reduction of GHG emissions.

All EU MS, except Portugal, have significantly reduced their emissions while their economy grew strongly between 1990 and 2006. Strong economic growth but decreasing emissions were in particular observed in the MS in Central and Eastern Europe, due to the transformations of the inefficient heavy industry based manufacturing sector.

**Figure 3:** GHG intensity for EU-15 and EU-27, GDP, energy consumption and CO<sub>2</sub> emissions for EU-15



### 2.3. GHG emissions in 2006 compared to 2005

Between 2005 and 2006, emissions within the EU-27 fell by 14 MtCO<sub>2</sub>-eq. (0.3%). This overall decrease is the consequence of two diverging trends, while emissions in the EU-15 decreased by 35 MtCO<sub>2</sub>-eq. (0.8%), they rose by 21 MtCO<sub>2</sub>-eq. (2.2 %) in the other MS. GHG emissions decreased or were stable in all EU-15 MS except for Finland and Denmark. Emissions increased in most other MS except in Estonia, Hungary and the Slovak Republic.

GHG emissions from aviation and shipping activities, international and domestic, continued to rise sharply in 2006. Contributions from these sectors, currently not fully included under the Kyoto Protocol, rose in the EU-15 by nearly 5.2 MtCO<sub>2</sub> (aviation) and 11.4 MtCO<sub>2</sub> (shipping).

Emissions from road transport continued to grow in most countries, especially in Spain and Poland, while they decreased notably in Germany. In Spain, the rise reflected an increased use of diesel (5.1%), which more than offset the decrease in gasoline use (-4.6%). In Poland, both gasoline and diesel consumption increased by 6.1% and 7.2%, respectively. The German emissions reductions mainly reflect lower gasoline consumption (-4.3%).

Four EU-15 MS contributed significantly to the overall decrease: France (14 MtCO<sub>2</sub>-eq.), Italy (10 MtCO<sub>2</sub>-eq.), Spain (8 MtCO<sub>2</sub>-eq.) and Belgium (5 MtCO<sub>2</sub>-eq.). The emission decreases were due in particular to lower consumption of gas and oil in households and services. This was a result of reduced heating needs in Europe due to a warmer year in 2006, together with higher gas prices. Electricity demand remained largely stable in households. In addition, Italy experienced significant reductions of N<sub>2</sub>O emissions from adipic acid production due to abatement techniques (5 MtCO<sub>2</sub>-eq.).

The decrease in 2006 EU-15 emissions was due mainly to lower CO<sub>2</sub> emissions from public electricity and heat production, households and services, and notably road transport.

Total GHG emissions grew most in Poland (14 MtCO<sub>2</sub>-eq.), Finland (11 MtCO<sub>2</sub>-eq.) and Denmark (7 MtCO<sub>2</sub>-eq.). These increases occurred mainly in the energy supply sector and reflect:

- increased electricity production in thermal power plants and increased fossil fuel consumption from households in Poland, as well as increased CO<sub>2</sub> emissions from the iron and steel industry;
- increased electricity production in coal-fired power stations, reduced electricity production from hydropower and decreased net imports of electricity in Finland;
- increased electricity production in coal-fired power stations and decreased net imports of electricity in Denmark.

Romania (5 MtCO<sub>2</sub>-eq.) and the Czech Republic (2 MtCO<sub>2</sub>-eq.) also experienced notable increases in total GHG emissions, which occurred mainly in the power supply sector (Romania) and the chemical industry (Czech Republic). These two countries, along with Italy, experienced increases in CO<sub>2</sub> emissions from the iron and steel industry.

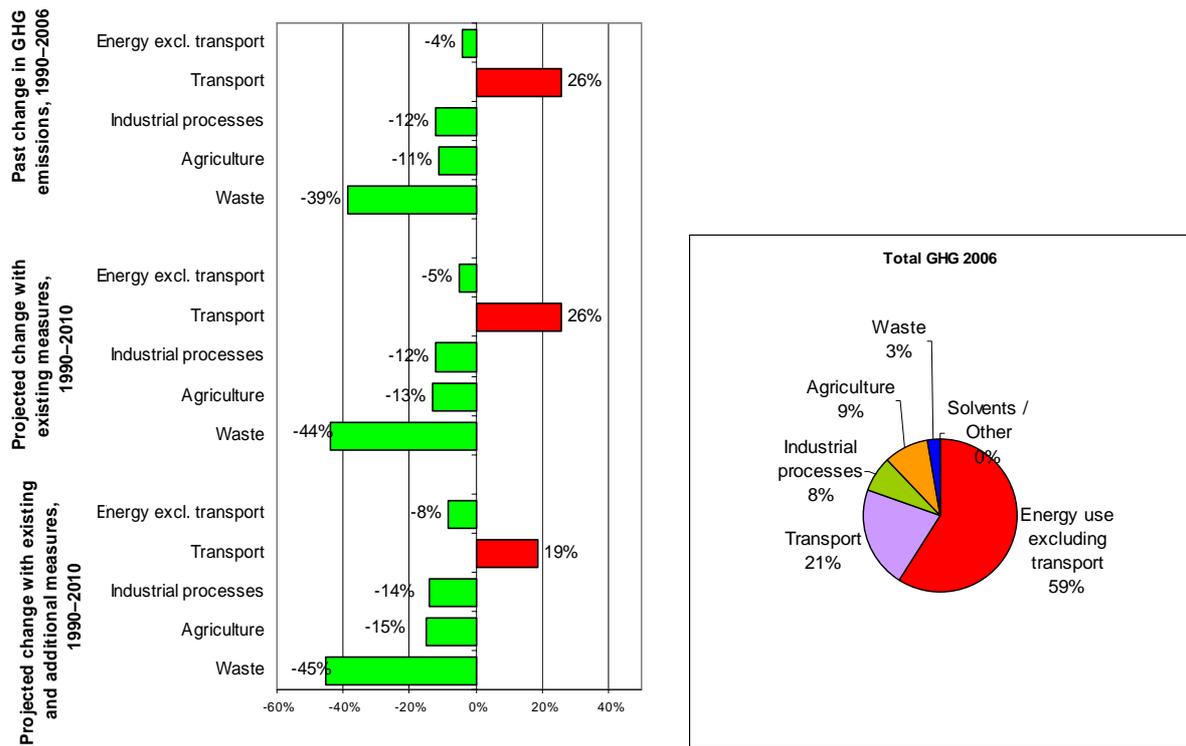
#### **2.4. Emission trends in the main sectors**

The most important sector, as highlighted in Figure 4, is energy (including transport) which accounted in 2006 for 80% of total EU-15 emissions. Transport is responsible for 21% of total GHG emissions, agriculture is responsible for 9%, industrial processes are responsible for 8% and waste for 3%.

The increase in the transport sector has been countered by significant decreases in other source categories except transport (for further details see also the SWD). In summary, compared to 1990, emissions in the EU-15 from:

- energy (excluding transport) decreased by 4%,
- transport increased by 26%,
- industrial processes decreased by 12% mainly due to lower emissions from adipic acid production and production of halocarbons and sulphur hexafluoride, but also due to lower emissions from nitric acid production and from iron and steel,
- agriculture declined by 11% due to declining cattle numbers and decreasing use of mineral fertiliser and manure,
- waste decreased by 39% due to lower CH<sub>4</sub> emissions from managed landfills.

**Figure 4:** Change in EU-15 GHG emissions by sector and share of sectors in 2006



Source:EEA.

### **3. PROJECTED PROGRESS TOWARDS MEETING THE KYOTO TARGET**

#### **3.1. Projections by Member States**

##### *3.1.1. EU-27*

By 2010, total EU-27 GHG emissions are projected to be about 10.1% below base-year levels (see Tables 7 and 8 in the Annex). This projection is based on the compilation of MS own estimates which take into account all existing domestic policies and measures. The projected decline is 13.4% when the effect of the Kyoto mechanisms and carbon sinks are accounted for and it could reach 16.3% if the additional domestic policies and measures currently under discussion were to be implemented on time and deliver as estimated.

##### *3.1.2. EU-15*

The aggregate projections based on existing domestic policies and measures show that GHG emissions of the EU-15 will be 3.6% below base-year levels by 2010 (4.4% distance from the Kyoto target). When including the,

- (1) government use of the Kyoto mechanisms which are expected to deliver an additional 3% emission reduction, and
- (2) total removal due to Art. 3.3 and 3.4 activities in the EU-15 corresponding to a 1.3% reduction,

the EU-15 is projected to reduce its emissions by 8.0% by 2010, reaching the Kyoto target. Given, however, the existing uncertainties and the EU's ambitious reduction target of 20% by 2020, it is imperative that MS not only ensure the timely delivery of emissions reductions from existing policies and measures but also that they accelerate the development and full implementation of their planned policies and measures. Assuming that all these measures deliver as expected, the projected overall reduction of GHG emissions could be up to 11.3% compared to base year levels.

Moreover, it is estimated that the NAP decisions on allowance allocation for the 2nd trading period under the EU ETS would contribute an estimated 3.3% of the EU-15's Kyoto target which, as yet, has not been fully factored into all MS projections.

##### *3.1.3. EU-12*

Aggregate emissions from the other 12 MS are projected to increase after 2006 but will still be 28.4% below their base year levels by 2010. With additional measures, however, emissions are projected to be further reduced by 2%. Slovenia is the only MS out of the EU-12 that intends to invest in Kyoto mechanisms. Slovenia, Czech Republic and Poland intend to account for carbon sinks.

##### *3.1.4. Candidate countries*

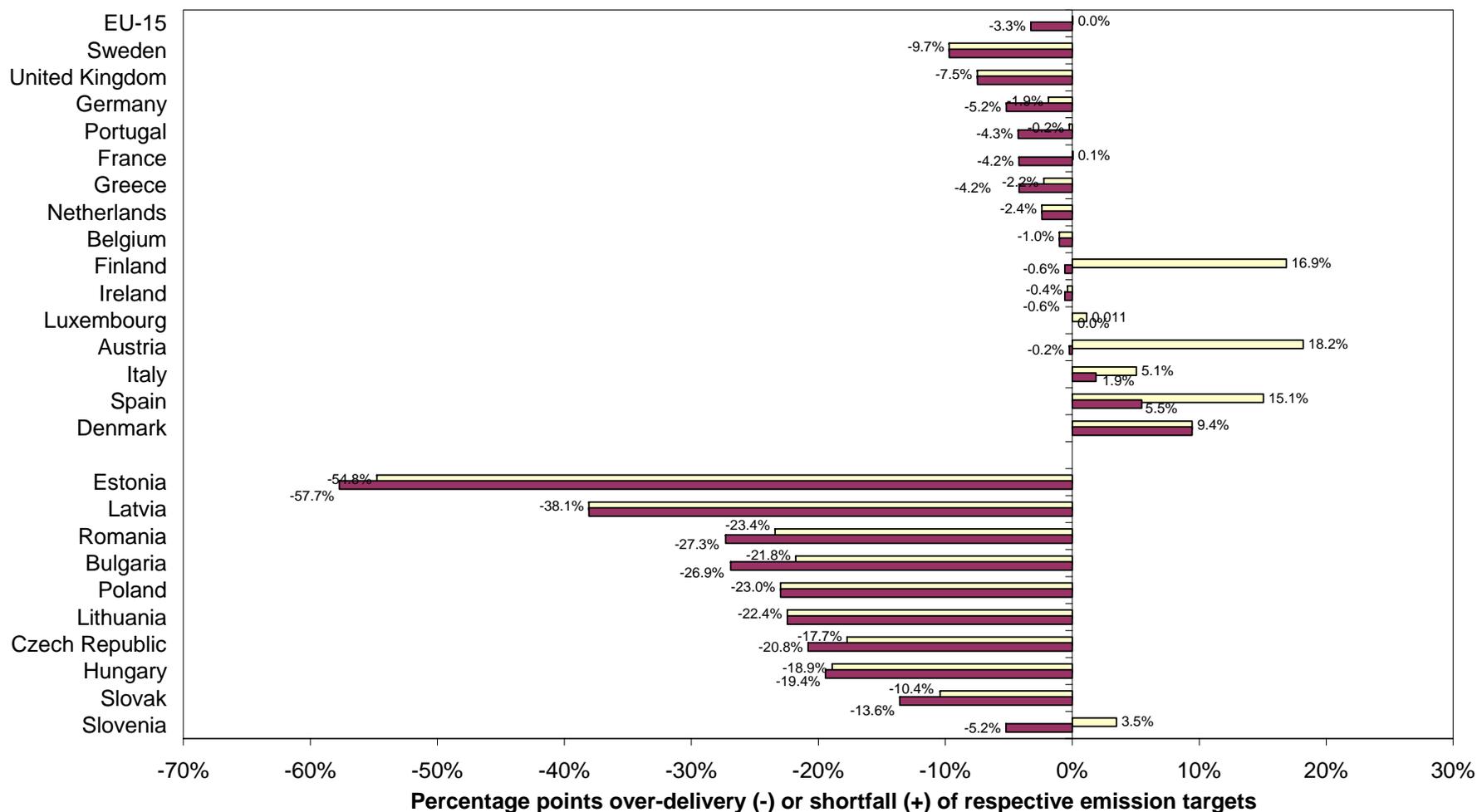
In 2006, Croatia's emissions were almost 31 MtCO<sub>2</sub>-eq., 14.4% below base year emissions. Croatia is projected to slightly exceed its Kyoto target taking into account existing measures and carbon sinks, but would meet and indeed overachieve the target with the effect of planned (additional) measures.

In 2006, Turkey's emissions were 332 MtCO<sub>2</sub>-eq compared to 170 MtCO<sub>2</sub>-eq. in 1990, an increase of 95.1%. Turkey is an Annex I Party to the UN Framework Convention on Climate Change, but has no reduction commitments under Annex B of the Kyoto Protocol. Turkey has not yet ratified the Kyoto Protocol.

Between 1990 and 2006, per capita GHG emissions have increased in both Turkey and Croatia. However, at 4.6 tonnes per year, the per capita emissions in Turkey are less than half of the average EU-27 per capita emissions. In both countries, the emission level per GDP has also declined, indicating a decoupling of economic growth and resource consumption.

Currently, there is no information available for the Former Yugoslav Republic of Macedonia.

**Figure 5:** Relative gaps (over-delivery or shortfall) between GHG projections for 2010 and the respective 2010 targets based on ‘existing’ and ‘additional’ domestic policies and measures, the use of Kyoto mechanisms and carbon sinks, and in part the effect of the EU ETS.



□ Gap between 2010 projections (with the existing measures and including carbon sinks and Kyoto mechanisms) and Kyoto target  
■ Gap between 2010 projections (including additional measures, carbon sinks and Kyoto mechanisms) and Kyoto target

### 3.2. Implementation of the European Climate Change Programme (ECCP)

Across the EU-27, an assessment of Member States' policies and measures identified eight Common and Coordinated Policies and Measures (CCPMs) that are both widespread and are projected to deliver significant GHG emissions savings in the EU. These are the EU ETS Directive (estimated effect by the reporting MS: 123 MtCO<sub>2</sub>-eq.), in the energy supply sector the Renewables (RES-E) Directive (related to the promotion of electricity produced from renewable energy sources), in the transport sector the biofuels Directive and EU-wide ACEA agreement with car manufacturers, in the energy demand sector the Directives on the energy performance of buildings, energy taxation and promotion of co-generation (combined heat and power), and finally the Kyoto Protocol flexible mechanisms.

In addition to these eight key policies and measures, a further five CCPMs were identified that are also predicted to deliver important savings across the EU (from 4 to 7 MtCO<sub>2</sub>-eq. per policy). These five policies are the Landfill Directive, the efficiency requirements for new hot-water boilers, the Directive on Integrated pollution prevention and control (IPPC), the Directive on labelling of appliances and the Motor Challenge programme, aimed at improving the energy efficiency of industrial electric motors.

The top eight policies account for 86% of the total savings attributed to CCPMs in the EU-27. This highlights the importance of these key policies in helping MS to achieve their emission reduction commitments.

The 2007 and 2008 estimates are very similar. In 2007, 95% of all savings from CCPMs was derived from the top 13 policies, while in 2008 the figure was 94%.

#### Recent developments

The climate change and energy package was introduced in January 2008 and included:

- (1) **EU ETS:** A legislative proposal<sup>6</sup> to expand, strengthen and improve the functioning of the EU ETS post-2012.
- (2) **Effort Sharing:** A legislative proposal<sup>7</sup> for a framework for national commitments to reduce emissions which are outside the scope of the EU ETS.
- (3) **Renewables:** A legislative proposal<sup>8</sup> to increase the share of renewable energy in the EU's final energy consumption to 20% by 2020, and of biofuels in transport to 10%.
- (4) **CCS:** Policies<sup>9</sup> to encourage early demonstration of capture and geological storage of carbon including a legislative proposal for a regulatory framework<sup>10</sup>.

Other important developments have included:

- (5) **Aviation:** legislative proposal adopted by the European Parliament on 8 July 2008 integrating aviation into EU ETS. It is estimated that a total of 183 million tonnes of CO<sub>2</sub> will be saved per year on the flights covered by the scheme equal to a 46% reduction by 2020 compared with business as usual.
- (6) **Fluorinated gases:** adoption of a Regulation and Directive (July 2006) to limit emissions of fluorinated gases, including those from air-conditioning in cars. The

estimated effect of the Regulation and Directive by 2020 is around 40-50 MtCO<sub>2</sub>-eq. per annum with full benefits of phase out of HFC-134a in air-conditioning.

- (7) **CO<sub>2</sub> and cars:** Communication (February 2007) setting out strategy for reducing emissions and legislative proposal (December 2007) to set standards for CO<sub>2</sub> emissions from cars.
- (8) **Transport fuels:** legislative proposal (January 2007) to revise the fuel quality Directive which includes targets for reducing GHG emissions associated with the production of petrol and diesel.
- (9) **Energy Efficiency:** Action Plan for Energy Efficiency (October 2006), which sets out 10 priority actions to realise up to 20% energy savings by 2020.
- (10) **Research:** the European Strategic Energy Technology Plan (SET Plan)<sup>11</sup> (November 2007) whose main goal is to accelerate the development and implementation of low carbon technologies, as these will play a vital role in reaching our energy and climate change targets.

### 3.3. Implementation of the EU Emissions Trading Scheme (EU ETS)

In 2007, the total amount of verified emissions from EU ETS installations in the EU-27 was 2.050 billion tonnes of CO<sub>2</sub>, 0.8% higher than the 2.034 billion tonnes recorded in 2006. However, when adjusted for the entry and closure of installations since 2006, which led to a net addition of 581 installations to the system, the overall emissions increase last year was only 0.68%.

#### 3.3.1. First trading period (2005 to 2007)

On average 10,675 installations participated in the first trading period. These installations received emission rights for 2,155 Mt CO<sub>2</sub> per year and on average emitted 3%<sup>12</sup> less (2,084 Mt CO<sub>2</sub> per year). The share of the EU ETS in 2005 was about 41% of total EU-25 greenhouse gas emissions. Almost two thirds of all installations are classified as combustion installations<sup>13</sup> and these are responsible for 72% of overall emissions. Verified emissions were higher than allocations in only six MS (Austria, Ireland, Italy, Slovenia, Spain and the United Kingdom).

#### 3.3.2. Second trading period (2008 to 2012)

Following the assessment of national allocation plans, the EU-wide cap for 2008 to 2012 amounts to 2.08 billion allowances per year, 10.4% or 243 Mt CO<sub>2</sub> lower than what was initially proposed in the national allocation plans submitted by the Member States to the Commission for approval. This implies a reduction compared to average emissions in 2005 to 2007 of 6%. This corresponds to an actual average reduction of 12.7% of the total allowances for 23 Member States, and the acceptance of NAPs without cuts for four MS (Denmark, France, Slovenia and the United Kingdom).

#### 3.3.3. Use of JI and CDM by operators

As part of the second NAPs, a limit was established by each MS for the maximum use of project based credits by operators (JI and CDM). In total, up to 278 million CERs or ERUs may be used per year by ETS installations from all MS in the second trading period. This

corresponds to 13.4 % of the EU-wide cap for the second trading period. In practice it appears unlikely that the full limit will be exploited.

### **3.4. Projected use of Kyoto mechanisms by government**

Thirteen MS updated or confirmed information on their intended use of the Kyoto mechanisms in 2008 through a questionnaire under the EC monitoring mechanism decision. For the remaining MS previously provided information through the questionnaire on the use of Kyoto mechanisms as indicated in the second national allocation plan under the ETS Directive (2003/87/EC) was used (Table 12 in the SWD).

Ten MS of the EU-15 and Slovenia have decided to use the Kyoto mechanisms to reach their Kyoto targets. Together these EU-15 MS would acquire 126.5 Mt CO<sub>2</sub>.eq. per year for compliance under the first commitment period under the Kyoto Protocol. This represents approximately 3 percentage points towards the EU-15 Kyoto target of -8 %.

These 11 MS together have decided to invest around €2.95 billion to acquire units through JI, CDM or emissions trading. Austria, Luxembourg, the Netherlands, Portugal and Spain allocated the largest budgets (€531 million, €400 million, €505 million, €354 million and €384 million, respectively, for the five-year commitment period).

### **3.5. Projected use of carbon sinks**

In addition to the policies and measures targeting various sources of GHG emissions, MS can make use of carbon sinks (see Table 13 in the SWD). In 2008, eleven MS submitted updated estimates while information for nine additional MS had been submitted in the previous years. Seven MS have never submitted the voluntary questionnaire.

The information provided so far indicates that the total net sequestration during the commitment period from afforestation and reforestation activities under Art. 3.3 of the Kyoto Protocol will be about 23.9 MtCO<sub>2</sub> per year; an additional sequestration of 0.4 million tonnes CO<sub>2</sub> per year has been reported by Slovenia. In addition, the use of activities under Art.3.4 is projected to contribute 25.7 MtCO<sub>2</sub> per year of the commitment period in the EU-15. These figures take the maximum allowance for forest management into account but do not include Spain due to the lack of detailed data. Together with the Spanish aggregate all activities under Art. 3.3 and 3.4 in the EU-15 MS are projected to reduce emissions by 57.5 million tonnes CO<sub>2</sub> per year of the commitment period equivalent to almost 17% of the EU-15 reduction commitment of 341 Mt CO<sub>2</sub> per year during the commitment period compared to base year emissions. Czech Republic, Poland and Slovenia expect an additional reduction of 5.9 million tonnes CO<sub>2</sub> per year during the commitment period.