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EU Biennial Report

Accompanying the document

Commission Communication

SIXTH NATIONAL COMMUNICATION AND FIRST BIENNIAL REPORT FROM THE EUROPEAN UNION UNDER THE UN FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)

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Part 2 EU's first Biennial Report

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SIXTH NATIONAL COMMUNICATION AND FIRST BIENNIAL REPORT FROM THE EUROPEAN UNION UNDER THE UN FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)

1. BR INTRODUCTION

This Annex 1 to the EU's 6th National Communication (NC) under the UNFCCC is the 1st Biennial Report (BR) of the European Union (EU) under decision 2/CP.17 of the Conference of the Parties under the UNFCCC.

As defined in the UNFCCC biennial reporting guidelines for developed country Parties[1], the information is structured into:

- information on greenhouse gases (GHG) emissions and trends and the GHG inventory including in-formation on national inventory system (section 2),
- 3. Quantified economy-wide emission reduction target (section 3),
- progress in achievement of the quantified economy-wide emission reduction targets (section 3),
- projections (section 5) and
- provision of financial, technological and capacity building support to developing countries (section 6).

Tabular information as defined in the common tabular format (CTF) for the UNFCCC biennial reporting guidelines for developed country Parties (UNFCCC decision 19/CP.18) are enclosed in the CTF Appendix. For the CTF submission to the UNFCCC,

1 Annex I to UNFCCC decision 2/CP.17

the electronic reporting facility provided by the UNFCCC Secretariat has been used as required by UNFCCC decision 19/CP.18.

The 28 Member States of the European Union[2] submit separate BRs to the UNFCCC; however, in the EU's submission the chapters on Greenhouse gas inventory information (see section 2) and GHG projections (see section 5) reflect the sum of information compiled across the Member States.

In some sections of this 1st Biennial Report, the EU-15[3] is referred to next to EU-28. This is because the EU-15 has a common target for the first commitment period under the Kyoto Protocol.

2. INFORMATION ON GHG EMISSIONS AND TRENDS, GHG INVENTORY INCLUDING IN-FORMATION ON NATIONAL INVENTORY SYSTEM

2.1. Introduction and summary information from the national GHG inventory

The legal basis of the compilation of the EU inventory and the inventory methodology and data availability is briefly described. The greenhouse gas data presented in this chapter are consistent with the 2013 submission of the EU to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat[4] except for the EU-28 aggregates where the data for Croatia was added to the data for EU-27 to reflect the enlargement of the Union to 28 Member States. The data for Croatia was taken from its UNFCCC submission.

As of 1 July 2013, the European Union consists of 28 Member States after the accession of Croatia. As the 2013 EU inventory was submitted prior to this enlargement, it covers the EU-27 only. However, for this National Communication, the Union now covers the 28 Member States as will the inventory submission in 2014. The aggregates for the EU-15 with a collective arrangement for fulfilment of the Kyoto target under the first commitment period are not affected.

Summary tables of GHG emissions for the EU-15 and the EU-28 for emission trends by gas and by sector in the common tabular format are presented in CRF Tables 1 (a) and 1(b) in the CTF Appendix. These data and the complete submissions of the Member States under Council Decision 280/2004/EC are available on the EEA website (http://www.eea.europa.eu/).

The EU inventory was compiled from data delivered by the 27 EU Member States by 15th March 2013 under Council Decision 280/2004/EC and subsequent updates to these

2 Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom

3 Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom

4 European Environment Agency, Technical Report No 08/2013 Annual European Union Greenhouse Gas Inventory 1990–2011 and Inventory Report 2013.

data received by 15th May 2013. The data presented in this report takes into account the resubmission of the EU inventory to the UNFCCC of 18 November 2013. The data for Croatia, included in the EU-28 aggregates, was taken from its UNFCCC resubmission of 15 November 2013.

2.2. National inventory arrangements

2.2.1. Summary information on national inventory arrangements

The EU GHG inventory is the direct sum of the sectoral emissions data contained in the national inventories of the EU-28 and EU-15 Member States. The legal basis of the compilation of the EU inventory up to June 2013 was Council Decision No. 280/2004/EC concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol. From 8 July 2013, it was replaced by the Regulation No 525/2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change (hereafter referred to as the Monitoring Mechanism Regulation or MMR). More details of the Regulation are given in section 5.1.1 of this document. The Directorate General for Climate Action of the European Commission is the overall body responsible for preparing the inventory of the European Union.

The main institutions involved in the compilation of the EU GHG inventory are the Member States, the European Commission Directorate General for Climate Action, the European Environment Agency (EEA) and its European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM), Eurostat, and the Joint Research Centre (JRC).

More detailed information is given in section 3.3.1 of the EU's 6th National Communication.

2.2.2. Summary information on changes to national inventory arrangements since the last National Communication or Biennial Report

Since the 5th National Communication the following changes have occurred in the national inventory arrangements:

- In its initial report, the EU notified in relation to its national system that the Environment Directorate General of the European Commission (DG Environment) is responsible for preparing the inventory of the EU. In 2010, the overall responsibility for the preparation of the inventory of the EU moved from the DG Environment to the new DG Climate Action. This change had no impact on the functioning of the EU's national system as the DG Climate Action was created from the climate change branch of the DG Environment, which was already in charge of the EU's inventory.

- In section 3.5.2 of its initial report "The roles and responsibilities of various agencies and entities in relation to the inventory development process, as well as the institutional, legal and procedural arrangements made to prepare the inventory", the EU identified "The European Topic Centre on Air and Climate Change" as one of the entities that have an active role in the preparation of the annual EU inventory.

- Regulation (EEC) 401/2009 of 23 April 2009 on the European Environment Agency (EEA) and the European Environment Information and Observation Network (Eionet) describes, in its Article 4(4)-(6), European Topic Centres as part of the Agency's network. European Topic Centres (ETCs) are centres of thematic expertise contracted by the European Environment Agency (EEA) to carry out specific tasks identified in the EEA strategy. The contract between the EEA and the previous Topic Centre, the European Topic Centre on air and climate change (ETC/ACC), expired at the end of 2010. Its replacement, the new European Topic Centre on air pollution and climate change mitigation (ETC/ACM), was established by a contract between the lead organisation Rijksinstituut voor Volksgezondheid en Milieu (RIVM) in the Netherlands and the EEA. The framework agreement entered into force on 15/12/2010 and will expire on 31/12/2013. A new contract was put in place, to start from 01/01/2014, ensuring a seamless transition and smooth business continuity.

- The ETC/ACM assists the European Environment Agency (EEA) in its support of EU policy in the field of air pollution and climate change mitigation. The specific tasks of the ETC/ACM are detailed in the annual implementation plans agreed between the EEA and the ETC/ACM. The ETC/ACM involves 10 organisations and institutions from different European countries.

3. QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET

The EU and its Member States communicated an independent quantified economy-wide emission reduction target of a 20 per cent emission reduction by 2020 compared with 1990 levels. This is documented in the UNFCCC document FCCC/SB/2011/INF.1/Rev.1 of 7 June 2011. In the EU submission to the UNFCCC from 20 March 2012 (FCCC/AWGLCA/2012/MISC.1) the EU target is explained further.

The use of carbon credits from international market-based mechanisms is explained in the EU submission from 2012. With regard to the role of Land Use, Land-Use Change and Forestry (LULUCF), the EU pledge does not include emissions/removals from LULUCF.

More detailed information on the EU target is given in CTF Table 2 in the CTF Appendix.

4. PROGRESS IN ACHIEVEMENT OF THE QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGETS

4.1. Introduction and summary on mitigation actions and their effects

In the European Union, there are two distinct levels of policies and measures (PaMs) that have an impact on greenhouse gas emissions:

(1) European Union policies, which are proposed by the Commission and subsequently approved, amended or rejected by the Council of the European Union and the European Parliament. These common and coordinated policies and measures (CCPM) are applicable to all Member States, though Member States may implement Directives at different points in time. The EU's National Communication concentrates on these CCPMs

(1) National policies developed and implemented by Member States themselves. As such, these policies and measures are outside the scope of this National Communication.

The scope of this section comprises

- Descriptions of cross-sectoral PaMs and sectoral PaMs on energy[5], industry, agriculture, land use, land use change and forestry (LULUCF) and waste (sections 4.2 through 4.7),
- Descriptions of changes in domestic institutional arrangements (section 4.9),
- An assessment of the economic and social consequences of response measures (section 4.10),4.11. Estimates of emission reductions and removals (section 4.11) and
- Information on the use of units from the market-based mechanisms and land use, land-use change and forestry activities (section 4.12).

Complementing the descriptions of policies and measures in the respective sectoral chapters, quantifications of the PaMs' impacts on GHG emission reduction are summarised in CTF table 3 in **Error! Reference source not found.**. These (mostly) ex-ante estimates have been produced by the European Commission in individual policy impact assessments and assume full implementation of the CCPMs. However, estimates are not available for all CCPMs and all years covered in CTF Table 3. Some older estimates refer to the EU-15 while more recent estimates are for the EU-27 or the EU-

5 Energy related PaMs as defined in the BR reporting guidelines are split up into the sub-sectors 'Energy' and 'Transport' as the EU's 1st BR also serves as a part of the EU's 6th National Communication. In the UNFCCC reporting guidelines for National Communications, the split between 'Energy and 'Transport' PaMs is required.

28. In contrast, the estimates of expected GHG emission savings presented in the Projections (section 5) are uniquely derived from aggregating MS estimates.

4.2. Cross-cutting policies and measures

4.2.1. Overview

The following cross-sector policies are covered in this section:

- EU Emissions Trading Scheme
- Effort Sharing Decision
- CCS Directive
- Taxation of Energy Products and Electricity
- Research and Innovation in Climate and Energy
- Structural and Cohesion Funds
- National Emissions Ceiling Directive.

For information on impact of these cross-sector policies, please refer to CTF Table 3 in the CTF Appendix.

4.2.2. EU Emissions Trading Scheme

The European Union Emissions Trading Scheme (EU ETS) is one of the key policy instruments implemented in the EU to achieve its climate policy objectives. It was established by Directive 2003/87/EC (the Emissions Trading Directive) and entered into force on 1 January 2005. The EU ETS was established in the context of international mitigation commitments under the Kyoto Protocol and aimed at helping Member States reach their individual Kyoto targets in a cost-effective manner.

As part of the Climate and Energy package adopted in 2009, the Emission Trading Directive was revised through Directive 2009/29/EC (the amended ETS Directive) in order to help the EU achieve its commitment to cut its greenhouse gas (GHG) emissions by 20 % compared to 1990 levels by 2020.

During the second trading period from 2008-2012 the scope of the EU ETS covered on average 41 % of total GHG emissions in the EU-28 (39 % in the EU-15). The scheme

covered approx. 13 200 stationary installations in the energy and most industrial sectors, including power stations and other combustion plants, oil refineries, coke ovens, iron and steel plants and factories making cement, glass, lime, bricks, ceramics, pulp, paper and board. Since 2012 about 1 200 aircraft operators have also been included in the scheme.

A discussion on interactions with other policies and measures is published in section 4.12 of the EU's 6th National Communication under the UNFCCC. More detailed information on the first and second period of the EU ETS is available in the EEA Trends and Projections Report 2013[6].

4.2.2.1. General information

The EU ETS is based on a "cap and trade" approach whereby a total limit (cap) on CO_2 emissions is set for the regulated installations. During the first two trading periods, most emissions allowances were allocated for free by governments according to national allocation rules and a small amount of allowances was auctioned. By the end of April each year, an amount equivalent to the emissions from the previous year must be surrendered by installation operators. Operators holding more allowances than is required to cover their verified emissions may either sell allowances to other operators or bank them for use in future years.

The first trading period of the EU ETS covered the years 2005–2007 and was widely seen as a pilot period. It was followed by a second trading period (2008–2012) corresponding to the first commitment period under the Kyoto Protocol. In 2013, the EU ETS entered its third trading period, which will run until 2020.

Throughout the trading periods there has been a change in scope of the scheme with regard to participating countries and installations, sectors and gases: The EU ETS started with the EU-25 in 2005, but the number of countries it covers has since increased to 31: Bulgaria and Romania entered the EU ETS in 2007. Norway, Iceland and Liechtenstein joined in 2008, stationary installations from Iceland are participating in the EU ETS from 2013 onwards[7]. Croatia joined the European Union on 1st of July 2013 and has been participating in the EU ETS since 1st January 2013.

During the first trading period fewer installations participated in the EU ETS than in the second trading period. There are different reasons for this:

- Some countries allowed for opt-outs (temporary exclusion of installations) during the first trading period of the EU ETS (United Kingdom, Netherlands and Belgium).

6 EEA 2013 Trends and Projections Report, http://www.eea.europa.eu/publications/trends-and-projections-2013

7 Decision of the EEA Joint Committee amending Protocol 23 to the EEA Agreement concerning the cooperation between the surveillance authorities (Article 58). Official Journal of the European Union, L(100), 99–100

- For the second trading period, the definition of combustion installations was clarified by the European Commission[8]. This resulted in the inclusion of additional installations in the EU ETS from 2008 onwards in several Member States which had applied a more restrictive definition from 2005 to 2007.

Since 2012 aviation has been included in the scheme (see section 4.2.2.3). Additional sectors and gases covered from 2013 onwards include[9]:

- Capture, transport and geological storage of GHG emissions,
- CO_2 emissions from the petrochemicals, ammonia and aluminium production,
- Nitrous oxide emissions (N_2O) from the production of nitric, adipic and glyoxylic acid,
- Perfluorcarbon (PFC) emissions from aluminium production.

Furthermore, from 2013 onwards, some countries used the possibility included in Article 27 of the Emissions Trading Directive to exclude small installations (emitting less than 25 000 tonnes CO_2 per year) from the scheme.

Industrial installations and aircraft operators covered by the EU ETS are required to have an approved monitoring plan, according to which they monitor and report their emissions during the year. In the case of industrial installations, the monitoring plan forms part of the approved permit that is also required. The data in the annual emissions report must be verified before 31 March of each year by an accredited verifier. Once verified, operators must surrender the equivalent number of allowances by 30 April of the same year. This annual procedure of monitoring, reporting and verification (MRV), as well as all processes connected to these activities, are known as the "compliance cycle" of the EU ETS. New rules have applied to emissions from 1 January 2013 concerning EU ETS monitoring and reporting, accreditation and verification[10]. In case of non-compliance a penalty must be paid for any emissions in excess of the number of EUAs surrendered. For phase I the penalty was set at €40/tonne CO_2eq, while for phase II it was €100/tonne CO_2eq. Payment does not release the operator from the obligations to surrender an amount of allowances equal to the excess emissions.

Countries participating in EU ETS have a national registry to track verified emissions, free allowances and annually surrendered units by installations and aviation operators. At the European level a European Union Transaction Log (EUTL) records the issuance,

8 Communication from the Commission — 'Further guidance on allocation plans for the 2008 to 2012 trading period of the EU Emission Trading Scheme', COM(2005) 703 final

9 Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community (OJ L 140, 5.6.2009, p. 63–87)

10 Commission Regulation (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council.

transfer, cancellation, retirement and banking of allowances under the EU ETS[11], which has also been connected with the UNFCCC International transaction Log (ITL) since October 2008.

4.2.2.2. Emission caps

The emissions target of the EU ETS – the cap – is determined by the total amount of European Union Allowances (EUAs) which are available to the regulated entities either through free allocation or purchases or auctions. In the first and second trading periods, the exact number of these allowances depended on the National Allocation Plans (NAPs) drawn up by participating countries, which had to be reviewed and accepted by the European Commission. The individual caps of EU Member States as a total form the EU-wide cap. From the third trading period onwards, a single EU-wide cap determines the amount of emissions allowed to be emitted by EU ETS sectors[12]. Furthermore, from 2013 onwards, a linear reduction factor of - 1.74 % per annum applies.

Table [BR1] Error! ***No text of specified style in document.****.1* shows caps for all participating countries in the second trading period. This amount is equal to the sum of allowances allocated for free and allowances auctioned or sold. The amount of allowances issued is compared to average ETS emissions in 2005 (scope corrected), the start date of the EU ETS. This comparison illustrates which countries had caps that set them on a path of reducing emissions between 2005 and 2012 and which countries had caps that allowed their emissions to grow during that period. The rationale for these diverging caps lies in the fact that national circumstances (growth trend development and carbon intensity trend development between 2005 and 2010) in the respective countries were considered when setting the caps[13]. Overall the cap implied a reduction target for EU-27 of 6 % compared to ETS emissions in the year 2005 (9 % for EU-15).

11 http://ec.europa.eu/environment/ets/welcome.do?languageCode=en

12 Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community (OJ L 140, 5.6.2009, p. 63–87)

13 Communication from the Commission to the Council and to the European Parliament on the assessment of national allocation plans for the allocation of greenhouse gas emission allowances in the second period of the EU Emissions Trading Scheme accompanying Commission Decisions of 29 November 2006 on the national allocation plans of Germany, Greece, Ireland, Latvia, Lithuania, Luxembourg, Malta, Slovakia, Sweden and the United Kingdom in accordance with Directive 2003/87/EC, COM(2006) 725 final

Table [BR1] ***Error! No text of specified style in document.****.1 Cap for the second trading period of the EU ETS*

	2005 verified emissions (scope corrected)	Free allocation 2008-2012	Auctions and sales 2008-2012	Total EUAs issued 2008-2012	Total EUAs issued 2008-2012
	(Average) million EUA/year				as share of 2005 emissions
Austria	33.7	30.5	0.4	30.9	-8%
Belgium	60.6	56.7	1.9	58.6	-3%
Bulgaria	39.2	39.7	0.0	39.7	1%
Cyprus	5.1	5.5	-	5.5	8%
Czech Republic	82.5	86.1	0.5	86.6	5%
Denmark	26.5	23.9	0.6	24.5	-8%
Estonia	12.9	13.1	-	13.1	2%
Finland	33.5	37.5	-	37.5	12%
France	136.0	132.0	-	132.0	-3%
Germany	486.1	400.3	44.0	444.3	-9%
Greece	71.3	64.6	3.8	68.3	-4%
Hungary	27.6	25.0	1.5	26.5	-4%
Ireland	22.4	20.9	0.1	21.0	-6%
Italy	231.9	201.9	-	201.9	-13%
Latvia	2.9	4.6	-	4.6	61%
Liechtenstein	0.0	0.0	-	0.0	-1%
Lithuania	6.7	7.9	0.7	8.6	29%
Luxembourg	2.6	2.5	0.0	2.5	-4%
Malta	2.0	2.1	-	2.1	9%
Netherlands	84.3	84.3	3.2	87.5	4%
Norway	17.8	8.1	7.0	15.1	-15%
Poland	208.1	205.7	0.0	205.8	-1%
Portugal	37.2	32.0	-	32.0	-14%
Romania	69.6	74.2	0.1	74.3	7%
Slovakia	27.0	32.5	-	32.5	20%
Slovenia	8.7	8.2	-	8.2	-6%
Spain	189.9	152.2	-	152.2	-20%
Sweden	21.1	22.2	-	22.2	5%
United Kingdom	271.7	220.8	24.6	245.4	-10%
EU-15	1 708.5	1 482.1	78.5	1 560.6	-9%
EU-27	2 200.6	1 986.7	81.5	2 068.2	-6%
All EU ETS countries	2 218.5	1 994.8	88.5	2 083.3	-6%

Note: Croatia has been included in the EU ETS since 1st January 2013

Source: EEA 2013 Trends and Projections Report, NAP table decision

During the **first trading period**, almost all allowances were allocated for free to EU ETS installations (less than 1 % was auctioned or sold). The allocation level for each installation was mainly based on historical emissions. In the **second trading period**, 95 % of emission allowances were freely allocated. In many countries (e.g. Denmark, Germany, the United Kingdom), benchmarks were used to allocate allowances to

electricity generators, while allocation was still largely based on historic emissions for industrial sectors. As a result, free allocation (relative to emissions) tended to be higher for industrial sectors compared to electricity generation.

While auctions played a very minor role in the first trading period, in the second trading period about 5 % of the total ETS cap for the second trading period was auctioned or sold. Most countries implemented rather simple auctioning procedures with single round, single price auctions. EUAs were auctioned or sold by 16 auctioning countries throughout the 2008-2012 period. The volume of auctioned EUAs increased from 53 million EUAs in 2008 to 125 million EUAs in 2012.

In the **third trading period** auctioning is the default method for allocating allowances instead of free allocation: More than 40 % of allowances will be auctioned in the 2013-2020 period with progressively rising shares each year:

- For the power generation sector, the rule is that operators no longer receive any free allowances but have to buy them. The experience of the first two trading periods shows that power generators have been able to pass on the national cost of allowances to customers even when they received them for free; however eight Member States which joined the EU since 2004 have made use of a derogation.

- In sectors other than power generation, the transition to auctioning is taking place progressively. Manufacturing industry will receive 80 % of its allowances free of charge in 2013 but this will decrease annually to 30 % in 2020. Allowances not allocated for free will be auctioned. In the aviation sector, however, only 15 % of aviation allowances will be auctioned over the whole 2013-2020 period.

The auctioning of allowances is governed by the EU ETS Auctioning Regulation[14]. For free allowances, harmonised allocation rules apply which are based on ambitious EU-wide benchmark of emission performance, which are laid down in the Benchmark Decision[15].

In accordance with the rules set out in the Benchmarking Decision, all Member States and EEA-EFTA countries have carried out a preliminary calculation of the number of free allowances to be allocated to each installation in their territory and have notified these so-called national implementation measures (NIMs) to the Commission.

14 Commission Regulation No 1031/2010 on the timing, administration and other aspects of auction of greenhouse gas emission allowances pursuant to Directive 2003/87/EC of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowances trading within the Community.

15 2011/278/EU: Commission Decision of 27 April 2011 determining transitional Union-wide rules for harmonised free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council (notified under document C(2011) 2772).

The Commission carried out in-depth assessments of each notification to ensure completeness and compliance with the relevant legal provisions. The EFTA Surveillance Authority did the same for EEA-EFTA notifications. As the preliminary allocation through NIMs exceeded the maximum amount of allowances available, a cross-sectoral correction factor has been calculated and has to be applied (Article 10a.5 of the revised ETS Directive). On the basis of the NIM Decision[16] EU Member States and EEA-EFTA countries can take final allocation decisions and issue the allowances for 2013. The allowances allocated for free in 2013 can be used for compliance for 2013 emissions to be reported in 2014, but not for 2012 emissions.

Five percent of the total quantity of allowances will be put into a reserve for new installations or airlines that enter the system after 2013 ("new entrants"). The allocations from this reserve should mirror the allocations to corresponding existing installations. In principle, any allowances remaining in the reserve shall be distributed to Member States for auctioning. The distribution key shall take into account the level to which installations in Member States have benefited from this reserve.

By setting cap levels under the EU ETS, EU Member States as well as Iceland, Liechtenstein and Norway have shared their national efforts required to reach their Kyoto target among the sectors covered by the ETS and other sectors. These caps correspond to a certain number of Kyoto units being transformed into EU emission allowances and allocated/sold to EU ETS operators. In doing so, these countries have fixed the overall contribution of the EU ETS to reach their burden-sharing or Kyoto target, and they have indirectly determined the number of Kyoto units that remain for the other sectors not covered by the EU ETS (such as buildings, transport or agriculture). Hence, they have assigned themselves a 'non-ETS emissions budget' for 2008 to 2012, equivalent to their initial assigned amount reduced by the ETS cap that they have determined. In other words, governments have split their Kyoto emission budgets into two: one budget is allocated to the sectors covered by the ETS, where total emissions are capped under EU or national law and the distribution of abatement measures among sources is determined by market forces within the trading mechanism; the remaining budget is allocated to non-ETS sectors. This is one main outcome of the introduction of the ETS, which affects the reaching of the Kyoto target for all countries included in EU ETS. It sets a pressure on reductions in Non-ETS sectors, which are mostly covered by the Effort Sharing Decision (see section 4.2.3).

16 Commission Decision of 5 September 2013 concerning national implementation measures for the transitional free allocation of greenhouse gas emission allowances in accordance with Article 11(3) of Directive 2003/87/EC of the European Parliament and of the Council (OJ L 240, 7.9.2013, p.27–35).

4.2.2.3. Inclusion of aviation

Since 1 January 2012 aviation has been part of the EU ETS[17]. In principle the EU ETS covers all flights arriving at and departing from airports in all EU Member States, Norway, Iceland, and Liechtenstein. However, in 2012 only flights within the EU Member States, Norway, Iceland, Liechtenstein and between closely related territories were covered[18]. This "stopping the clock" decision was taken in order to facilitate negotiation of a global agreement on aviation emissions, which should be decided in autumn 2013 by the General Assembly of the International Civil Aviation Organisation (ICAO).

After the 38th ICAO meeting in autumn 2013, the EU Commission has published a proposal for a European Regional Airspace Approach, taking into account the ICAO Resolution A38-17/2. This proposal would need to be agreed between the European Parliament and Council. The key features of the revised ETS scheme resulting from this proposal would be that 1) all emissions from flights between airports in the European Economic Area (EEA, covering the 28 EU Member States plus Norway and Iceland) would continue to be covered; 2) from 2014 to 2020, flights to and from countries outside the EEA would benefit from a general exemption for those emissions that take place outside EEA airspace. Only emissions from the part of flights taking place within EEA airspace would be covered; 3) to accommodate the special circumstances of developing countries, flights to and from third countries which are not developed countries and which emit less than 1 % of global aviation emissions would benefit from a full exemption[19].

The cap on aviation is based on average historic emissions in this sector between 2004 and 2006 (221.4 million t CO_2 for all participating countries[20]). The cap for 2013-2020 equals 95 % of the baseline emissions[21]. It thus expands the total ETS cap by approximately 10 %. The predominant method of distribution will be free allocation to aircraft operators (82 % in 2013-2020), 15 % will be auctioned and the remaining 3 % are allocated to the special reserve for new entrants and fast growing airlines[22]. Free allocation is based on benchmarks which were calculated by dividing the total number

17 Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC.

18 Decision No 377/2013/EU of the European Parliament and of the Council of 24 April 2013 derogating temporarily from Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community.

19 European Commission Memo: Commission proposal for European Regional Airspace Approach for the EU Emission Trading for Aviation- Frequently asked questions. 16th October 2013; http://europa.eu/rapid/press-release_MEMO-13-905_en.htm.

20 Commission Decision of 7 March 2011 on historical aviation emissions pursuant to Article 3c(4) of Directive 2003 87 EC of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowance trading within the Community".

21 Directive 2008 101 EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003 87 EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community.

22 Directive 2008 101 EC.

of allowances to be allocated for free by the sum of the tonne-kilometre data reported by aircraft operators in their applications for free allocation[23].

Aircraft operators receive specific allowances, called EU Aviation Allowances (EUAAs). Whereas aircraft operators may use aviation allowances as well as common EU allowances (EUAs) from the stationary sectors, stationary installations are not allowed to use aviation allowances for compliance. In addition, a certain quantity of international credits may be used by aircraft operators: up to 15 % of their verified emissions in 2012; from 2013 onwards "each aircraft operator shall be entitled to use international credits up to a maximum of 1.5 % of its verified emissions during the period from 2013 to 2020, without prejudice to any residual entitlement from 2012."[24]

4.2.2.4. Linking the EU ETS to the international carbon market

The EU ETS is directly linked with the Kyoto Protocol's project mechanisms according to Directive 101/2004/EC. Any trading or transfer of EU allowances (EUAs), which serve the purpose of proving compliance of an operator under the EU ETS, implies the transfer of an equal quantity of assigned amount units (AAUs) under the KP between Member States or within a Member State. In addition, operators that are liable under the EU ETS are allowed to use credits from both Clean Development Mechanism (CDM) and Joint Implementation (JI) projects to comply with their legal obligation, as emission reduction units (ERUs) originated by JI projects and certified emission reductions (CERs), originated by CDM projects are converted into EUAs by Member States.

The exact quantity of CDM or JI credits (CERs or ERUs) that can be used by operators is regulated on an installation level. The National Allocation Plans for the second trading period define the entitlements for the use of CERs and ERUs in general as a percentage of the free allocation for each operator in the 2008-2012 period. The exact percentage for each country is published in the NAP table decisions and varies from 4 % in Estonia to 22 % in Germany. These amounts must have been consistent with the individual Member State's supplementarity obligation under the Kyoto Protocol. In total, up to 1.4 billion CERs or ERUs could have been used by all participating countries in the second trading period. This corresponds to 14 % of the total free allocation (in all 30 countries) in the second trading period.

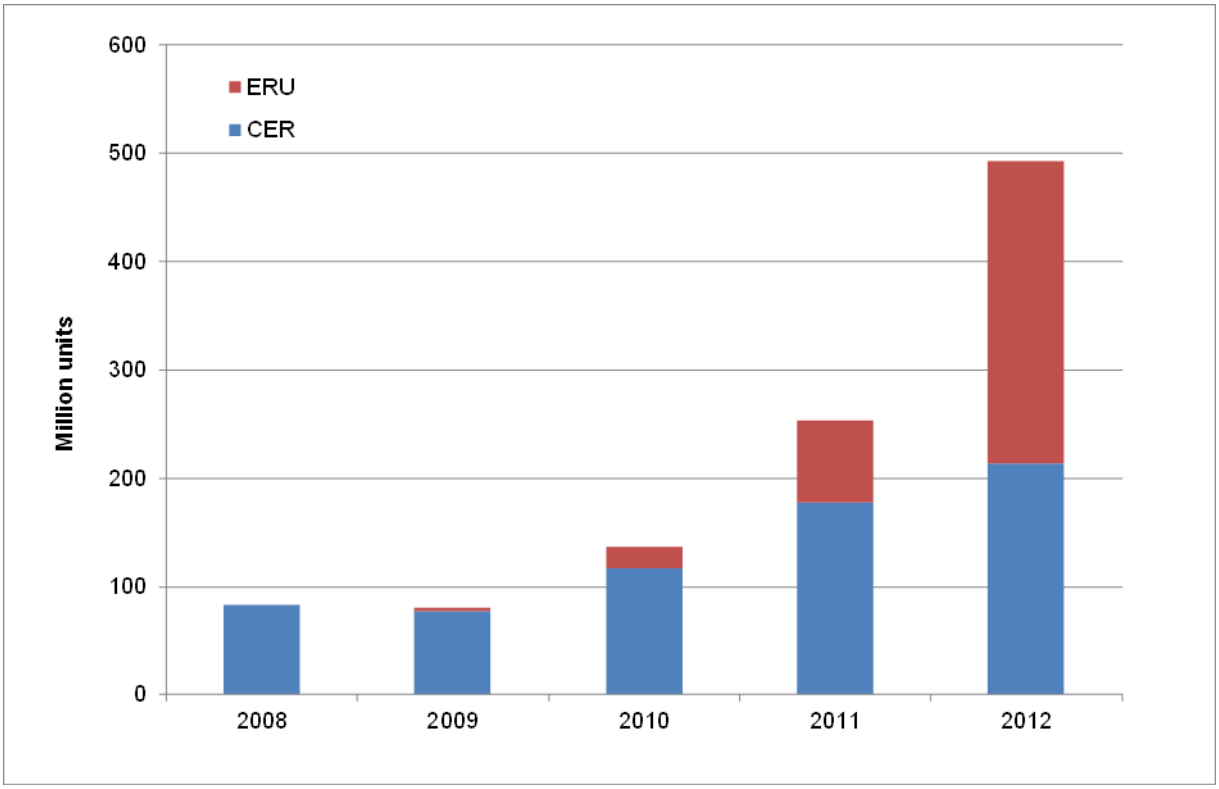
Operators in all countries, except Liechtenstein, have used project based credits so far. At the end of the second trading period 76 % of the allowable offsets had been used, adding up to 11 % of verified emissions for the whole period 2008-2012. Operators in the EU-27 used 663 million CER and 376 million ERUfor the 2008-2012 period to

23 Commission Decision of 26 September 2011 on benchmarks to allocate greenhouse gas emission allowances free of charge to aircraft operators pursuant to Article 3e of Directive 2003/87/EC of the European Parliament of the Council.

24 Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC.

comply (EU-15: 528 million CER and 281 million ERU). The annual amounts are shown in *Figure [BR1] Error!* ***No text of specified style in document.****-1*.

Figure [BR1] ***Error! No text of specified style in document.****-1 Credits from CDM & JI surrendered in 2008–2012*



Source: EEA 2013 Trends and Projections Report[25]

For information on the total use of CER and ERU by Member States please refer to section 4.11.

Unused entitlements from the second period can be carried over to the third trading period. The exact amount per operator for the second and third period is determined in line with the methodology set out in the amended EU ETS Directive (Article 11a(8)) and is further specified in the Regulation on determining international credit entitlements (RICE)[26]. Operators from some countries that received comparatively low entitlements for the use of CERs and ERUs for the second trading period (e.g. operators in the United Kingdom) will be allowed to use additional credits from 2013 onwards.

25 EEA 2013 Trends and Projections Report, http://www.eea.europa.eu/publications/trends-and-projections-2013

26 Commission regulation on determining international credit entitlements pursuant to Directive 2003/87/EC of the European Parliament and of the Council (OJ L 299, 9.11.2013, p.32-33).

http://ec.europa.eu/clima/policies/ets/linking/docs/rice_regulation_20131107_en.pdf

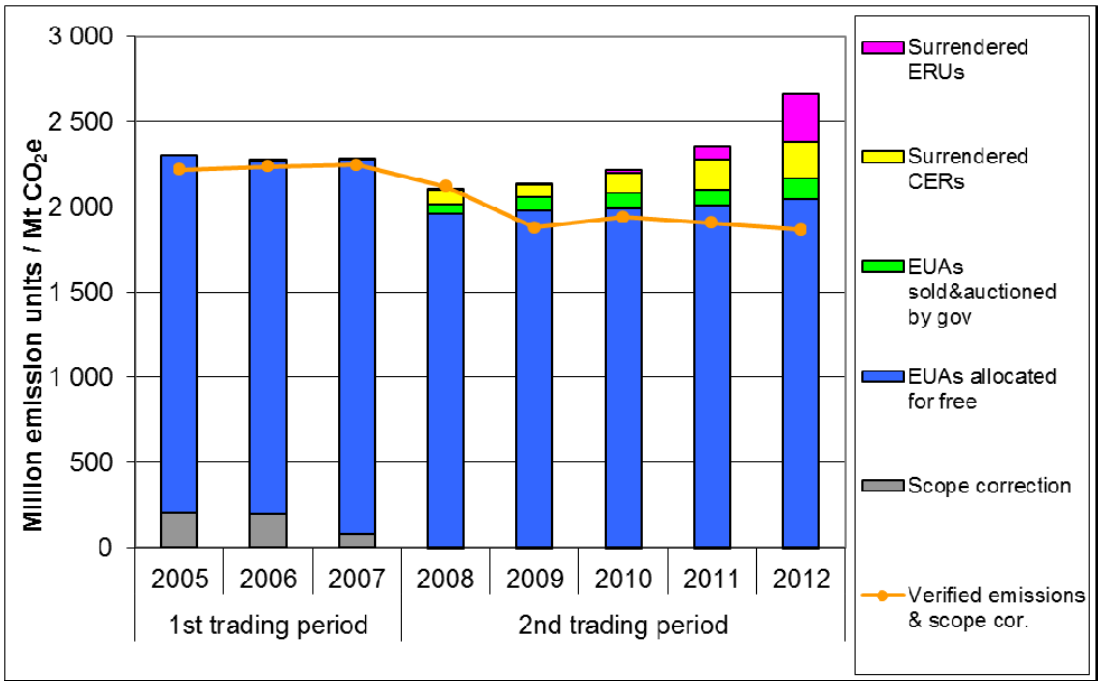
EU ETS participants operating stationary installations will be entitled to use international credits during the 2008-2020 period up to the higher of either the international credit entitlement specified in the National Allocation Plan for the second trading period or 11 % of the free allocation of EU allowances granted to them in that period. Operators of stationary installations who were new entrants during the second trading period and operators of stationary installations newly included in the scope of the EU ETS in the third trading period which did not receive free allocations nor entitlements for international credit use in the second period, will be able to use international credits up to a maximum of 4.5 % of their verified emissions in the third period. The Regulation also sets out special provisions for operators of stationary installations with a significant capacity extension and operators of stationary installations which received free allocation during the second trading period which carry out activities newly included in the EU ETS in the third period. Finally, aircraft operators are entitled to use international credits beyond those allowed in 2012, up to a maximum of 1.5 % of their verified emissions in the third period.

4.2.2.5. Emission trends, demand and supply balance and discussion on backloading

Between 2005 and 2012, verified emissions in stationary installations decreased by 16 %, taking into account the change in ETS scope between the two first trading phases (see *Figure [BR1] Error!* ***No text of specified style in document.****-2* below). In the first trading period, emissions increased slightly between 2005 and 2007. During the second trading period, they decreased significantly in 2008 and 2009, with a significant proportion of this decrease due to the financial and economic crisis. In 2008 emissions were 5 % below 2005 levels. They decreased to 15 % below 2005 levels in 2009 and stayed at this level in 2010 (-13 %), 2011 (-14 %) and 2012 (-16 %). The most important sector with regard to number of installations and verified emissions is sector 1 "Combustion installations", which mainly consists of installations for electricity and heat generation.

During the first trading period permits supplied by governments exceeded verified emissions in all three years. Since banking was not possible between the first and the second trading periods, no surplus could be carried over into 2008. In 2008, the amount of EUAs freely allocated, auctioned or sold was not sufficient to cover verified emissions during this year. Operators additionally surrendered CERs. The remaining shortfall was covered by borrowing, i.e. using a number of emissions permits available for 2009. From 2009 to 2012, however, the supply of permits made available by the governments consistently exceeded demand in each year. The additional use of CERs and ERUs contributed to the accumulating surplus.

Figure [BR1] ***Error! No text of specified style in document.****-2 Supply and demand balance 2008–2012, all EU ETS countries*



Source: EEA 2013 Trends and Projections Report, including scope correction from EEA

In total a cumulated surplus of nearly 1.8 billion EUAs can be observed at the end of the second trading period. Since banking is allowed between the second (2008–2012) and third trading period (2013-2020), this surplus is carried over to the next stage of the scheme.

As a short-term measure, the Commission has taken the initiative of proposing that the auctioning of 900 million allowances is postponed from the years 2013-2015 until 2019-2020, when it is expected that demand will have picked up. This 'back-loading' of auctions would be accomplished by amending the EU ETS Auctioning Regulation and is currently under discussion in the Council and European Parliament[27].

4.2.2.6. Use of revenues

The revised EU ETS Directive stipulates that at least half of the revenues from the auctioning of general allowances and all of the revenues from auctioning aviation allowances should be used to combat climate change in Europe or other countries. Member States are obliged to inform the Commission of how they use the revenues. Following this, some national climate funds are set up to establish separate budget

27 COM (2012) 652 final http://ec.europa.eu/clima/policies/ets/reform/docs/com_2012_652_en.pdf

structures to finance national and international climate-related expenditures, as is the case with the German "Special Energy and Climate Fund".

On EU level the so-called "NER300" is one of the world's largest funding programmes for innovative low-carbon energy demonstration projects. It is based on Article 10(a) 8 of the revised Emission Trading Directive 2009/29/EC. The programme is conceived as a catalyst for the demonstration of environmentally safe carbon capture and storage (CCS) and innovative renewable energy (RES) technologies on a commercial scale within the European Union. It is funded from the sale of 300 million emission allowances from the new entrants' reserve (NER) set up for the third phase of the EU ETS. The funds from the sales are to be distributed to projects selected through two rounds of calls for proposals, covering 200 and 100 million allowances respectively. Under the first call for proposals the European Commission in December 2012 granted funding to 23 renewable energy projects, totalling €1.2 billion. This amount is estimated to have leveraged additional funding of over €2 billion from private sources. The projects that have been awarded funding are now moving towards implementation. They must reach their final investment decisions by December 2014 and enter into operation by December 2016. Detailed information is available from the project website[28].

4.2.2.7. Linking with external emission trading schemes and further extensions

The EU recognises that linking the EU ETS to GHG emission trading schemes in third countries will increase the cost-efficiency of achieving the EU emission reduction targets[29]. In October 2007 the first such linking was effected by the EU and Norway, Iceland and Liechtenstein. Switzerland and the EU are currently discussing the possibility of linking their two schemes, which would operate on the basis of mutual recognition of emission allowances. Since the beginning of 2013, the Swiss ETS is based on a new and revised CO_2 Act, which was devised with a view to making the two trading schemes more compatible and hence making linking possible.

In addition, Australia and the European Commission announced their agreement in August 2012 on a pathway towards fully linking their emissions trading schemes. An interim link will be established in July 2015 allowing Australian operators to use EU allowances for some of their compliance. It has been announced that the full link, which would also allow operators in the EU ETS to use Australian certificates for compliance, will "start no later than 1 July 2018"[30].

The European Commission is a founding member of the International Carbon Action partnership (ICAP)[31] which was set up in October 2007. ICAP is a partnership of 30 governments with the aim of providing a forum to share experiences and knowledge

28 http://www.ner300.com/

29 Directive 2003/87/EC of the European Parliament and of the Council of 13th October 2003 establishing a scheme for GHG emission allowance trading within the Community and amending Council Directive 96/61/EC. Recital 18.

30 http://ec.europa.eu/clima/policies/ets/linking/index_en.htm

31 http://icapcarbonaction.com/

among countries and regions that have implemented or are actively pursuing the implementation of carbon markets through mandatory cap and trade systems.

In addition the extension of the scope of the EU ETS to other sectors is actually discussed as one option in the report from the Commission to the European Parliament and the Council on the state of the European carbon market in 2012[32].For instance, a further extension of the EU ETS to cover emissions from international shipping is being discussed as well as alternative ways to regulate shipping emissions.

The EU has stated its priorities for linking the EU ETS as: environmental effectiveness, economic efficiency, avoidance of leakage and fairness and accessibility. Factors such as impacts on competition, employment and administrative costs are considered important as well[33].

4.2.3. Effort Sharing Decision

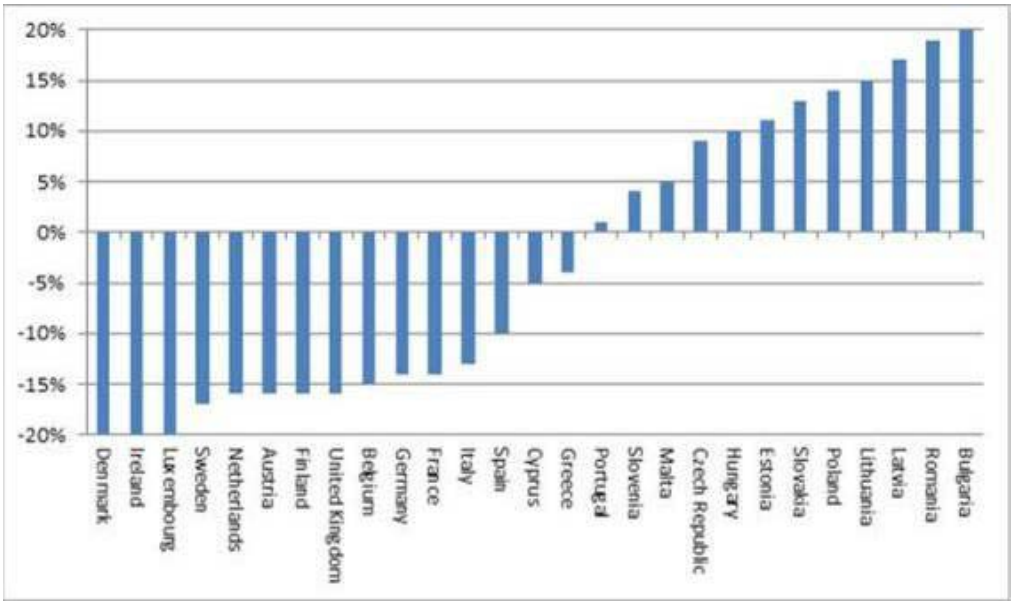
The Effort Sharing Decision (Decision No 406/2009/EC[34] - ESD) establishes annual targets for the greenhouse gas (GHG) emissions of Member States between 2013 and 2020, which are legally binding and only refer to GHG emissions that are not included within the scope of the EU ETS (i.e. transport (except aviation), buildings, agriculture (excluding LULUCF) and waste). Each Member State must define and implement national policies and measures (i.e. promotion of public transport, energy performance standards for buildings, more efficient farming practices and conversion of animal waste to biogas) to limit the GHG emissions covered by the ESD. The inclusion of the ESD within the EU's climate and energy package ensures that the abatement potential from non-ETS sectors contribute to the delivery of the EU-wide target of reducing GHG emissions by 20 % below 1990 levels by 2020.

32 COM (2012) 652 final.

33 SEC(2008) 52 Commission staff working document on Accompanying document to the Proposal for a Directive of the European Parliament and the Council amending Directive 2003/87/EC so as to improve and extend the EU greenhouse gas emission allowance trading system. Impact Assessment – COM(2008) 16 final.

34 OJ L 140, 5.6.2009, p. 136.

Figure [BR1] ***Error! No text of specified style in document.****-3 Member State GHG emission limits in 2020 compared to 2005 levels*



Source: Decision No 406/2009/EC

Article 3 (1) of the ESD states that 'Each Member State shall, by 2020, limit its greenhouse gas emissions at least by the percentage set for that Member State in Annex II to this Decision in relation to its emissions in 2005'. The emission limits set within Decision No 406/2009/EC were based upon the relative performance of each Member State with regards to their Gross Domestic Product per capita. Emission limits range from a 20 % emission reduction below 2005 levels by 2020 for the richest Member States (i.e. Denmark, Ireland, Luxembourg) to a 20 % increase for the least wealthy one (i.e. Bulgaria). The aggregated outcome of the national targets associated with the ESD should result in an EU-wide emission reduction of approximately 10 % below 2005 levels by 2020.

Article 3 (2) of the ESD lays down that annual emission allowances (AEAs), which are defined as 'the annual maximum allowed greenhouse gas emissions in the years 2013 to 2020', should follow a linear trajectory for all Member States that is calculated based upon their 'average annual greenhouse gas emissions during 2008, 2009 and 2010' from a 2009 starting point. The annual limits and compliance control ensure that Member States maintain progress in implementing policies and measures in order to reduce GHG emissions in accordance with the GHG emission limits for 2020. On the 26thMarch 2013 the European Commission adopted a Decision[35] determining the AEAs, in tonnes of CO_2 equivalents, for each Member State from 2013 to 2020 (calculated using two

35 OJ L 90, 28.03.2013, p. 106.

different global warming potential values from the second and fourth IPCC assessment reports).

The progress of Member States in meeting the emission reduction targets set in the Effort Sharing Decision is assessed as part of the European Semester.

4.2.4. CCS Directive

The Second European *Climate Change* Programme (*ECCP II*), launched in October 2005, set up a Working Group on Carbon and Capture and Geological Storage (CCS) with the mandate to explore this technology as a means of reducing climate change.

The need for the development of both policy and regulatory frameworks for CCS was stressed by the Working Group and by the European Commission[36]. On 17th December 2008 the European Parliament adopted its resolution on the proposal for a Directive on the geological storage of carbon dioxide[37] and amending previous Council Directives.[38]

The CCS Directive establishes a legal framework for the environmentally safe geological storage of CO_2 to facilitate and encourage the development of an important mitigation measure to reduce CO_2 emissions. Article 2 of the CCS Directive states that the legislation will apply to all geological formations located within the EU that store CO_2 and the requirements will need to be enforced over the entire lifetime of a storage site. The geological storage of CO_2 below a 100 kilotonne threshold for the purposes of research and development are exempted from the legislation. Key requirements within the CCS Directive include:

- Conditions for site selection: Article 4 (4) of the CCS Directive states that a site can only be selected for use 'if under the proposed conditions of use there is no significant risk of leakage and if no significant environmental or health risk exist.'

- Storage permits: Article 6 (1) of the CCS Directive makes clear that no geological storage of CO_2 will be possible without a storage permit.

- CO_2 stream acceptance criteria: Article 12 (1) of the CCS Directive outlines that the CO_2 stream must consist overwhelmingly of CO_2 to prevent any adverse effects on the security of the transport network or the storage site.

36 COM (2006) 843 final.

37 OJ L 140, 5.6.2009, p.114.

38 Council Directive 85/337/EEC, 96/61/EC, Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC and Regulation (EC) No 1013/2006.

- Monitoring and corrective measures: Article 13 of the CCS Directive states that operators must closely monitor their site and Article 16 obligates the operator to take corrective measures in the case that leakage does occur.

- Site closure: Article 17 of the CCS Directive contains provisions on closure and post-closure obligations, and sets out criteria for the transfer of responsibility from the operator to the Member State.

- Financial security: Article 19 of the CCS Directive outlines that financial security needs to be proven before a CCS plant starts operating to ensure that all of the requirements associated with the Directive can be fulfilled.

- Liability: Given that the operators of CCS plants are covered by the Emissions Trading Scheme – the liability for leakage is with the operator who would be required to surrender allowances for any leaked emissions.

Funding for CCS-related activities originates from, among other sources, the revenues generated from the auctioning of allowances under the EU ETS. Member States determine the use of these revenues. However, the legislation requires that at least 50 % of the revenues generated from the auctioning of allowances are used for specific activities among which is the environmentally safe capture and geological storage of carbon dioxide.

The construction and operation of twelve commercial demonstration projects including geological storage of carbon dioxide as well as the demonstration projects of innovative renewable energy technologies will be stimulated through the creation of a fund equal to 300 million allowances in the new entrants' reserve (NER) until 31st December 2015. Under the first call for proposals to the European Commission no CCS projects were funded in part due to the fact that many CCS projects were not sufficiently advanced; however unused funding has been carried over and is available following a second call for proposals that was launched in April 2013.[39]

Preliminary estimates of the impact of the proposed Directive are referred to in the European Commission Impact Assessment and indicate that 7 $MtCO_2$ could be stored by 2020 and up to 160 Mt by 2030. This assumes a 20 % reduction in GHG emissions by 2020, provided that CCS obtains private, national and European Community support and proves to be an environmentally safe technology. The CO_2 emissions avoided in 2030 could account for some 15 % of the reductions required in the EU[40].

39 http://ec.europa.eu/clima/policies/lowcarbon/ner300/index_en.htm

40 European Parliament, CCS, text adopted at the sitting of 17 DEC 2008 (P6_TA-PROV (2008) 12-17).

4.2.5. Taxation of Energy Products and Electricity

Directive 2003/96/EC (the Energy Taxation Directive) provides EU-wide rules for taxation of energy products and electricity[41]. The Directive covers all taxes on energy consumption, except for VAT and provides for common taxation rules and common minimum levels of taxation.

The Directive applies to energy products used as motor fuel or heating fuel and electricity. Energy products used for purposes other than as motor or heating fuel and situations when an energy product serves primarily as a raw material in industrial processing as well as electricity used in some energy-intensive industrial processes fall outside the scope of the Directive. Electricity is in general taxed at consumption; fuels and electricity used to generate electricity are exempt from taxation.

Based on their typical uses, the most important sectors affected by energy taxation are transport, households, services, agriculture and lighter industrial processes using energy for combustion. Finally, the Directive allows (under certain conditions) for exemptions or reductions to promote renewable sources of energy.

In April 2011 the Commission adopted a proposal for a directive revising the Energy Taxation Directive[42]. Its purpose is to bring the legal framework on taxation more closely in line with the EU's energy and climate change objectives and in particular it aims to:

(1) Ensure consistent treatment of energy sources within the Energy Taxation Directive in order to provide a genuine level playing field between energy consumers independent from the energy source used.

(2) Provide an adapted framework for the taxation of renewable energies.

(3) Provide a framework for the use of CO_2 taxation to complement the carbon price signal established by the EU Emission Trading Scheme while avoiding overlaps between the two instruments.

The Commission proposes to split the existing tax on energy products into a CO_2-related tax and a general energy consumption tax. The former tax is based on the reference emission factors and the latter is based on the net calorific value of the energy products. For electricity only the general energy consumption tax applies.

The amended Directive sets minimum levels of taxation for the CO_2 tax and the general energy consumption tax, which after the expiry of transitional periods should be the same for all energy products depending on their use (as heating fuel or motor fuel).

41 OJ L 283, 31.10.2003, p.51.

42 COM (2011) 169 final.

Biofuels and bio liquids which fulfil the sustainability criteria laid down in EU legislation are not subject to CO_2 taxation.

The proposed legal act falls under a special legislative procedure requiring a unanimous approval by the Council of the EU following consultations with the European Parliament and the European Economic and Social Committee. The Parliament and the Committee came forward with opinions but the Council has not yet agreed on the new act.

4.2.6. Research and Innovation in Climate and Energy

Research is a shared competence of the EU and its Member States. There are two types of RSO actions that can be distinguished: those that are implemented by MS and others that are coordinated at EU level. Actions coordinated at EU level only are reported in section 8 of EU's 6th National Communication.

The EU contributes to Research and Systematic Observation (RSO) through the involvement of multiple actors and through a suite of instruments, tools and programmes and across multiple sectorial policies including:

- EU Framework Programmes (FP) for Research and Technological Development,
- LIFE+ (EU's funding instrument for the environment),
- Competitiveness and Innovation Framework Programme,
- International Development Cooperation,
- Contribution to and/or financial support for major international institutions, research initiatives and programmes such as the UNFCCC, the Intergovernmental Panel on Climate Change (IPCC) and the Global Climate Observing System (GCOS), among others.

A new EU research and development programme (Horizon 2020) has been set up for the 2014-2020 period. It contains the objective of reaching 35 % climate related expenditures.

4.2.7. Structural and Cohesion Funds

The Structural and Cohesion Funds[43] are the financial instruments of European Union cohesion policy, which is intended to narrow the development disparities among regions and Member States. These funds participate fully, therefore, in pursuing the goal of economic, social and territorial cohesion. For the 2007-2013 period, the budget

43 http://europa.eu/legislation_summaries/glossary/structural_cohesion_fund_en.htm

allocated to regional policy amounted to around € 348 billion, comprising € 278 billion for the Structural Funds and € 70 billion for the Cohesion Fund. This represents 35 % of the Community budget and is the second largest budget item'.

Within the cohesion policy, there are two Structural Funds:

(1) European Regional Development Fund (ERDF) is currently the largest. Since 1975 it has provided support for the creation of infrastructure and productive job-creating investment, mainly for businesses;

(2) European Social Fund (ESF), set up in 1958, contributes to the integration into working life of the unemployed and disadvantaged sections of the population, mainly by funding training measures.

In order to speed up economic, social and territorial convergence, the European Union set up a Cohesion Fund in 1994. It is intended for countries whose per capita GDP is below 90% of the Community average. The purpose of the Cohesion Fund is to grant financing to environment and transport infrastructure projects. However, aid under the Cohesion Fund is subject to certain conditions. If the public deficit of a beneficiary Member State exceeds 3 % of national GDP (Economic and Monetary Union (EMU) convergence criteria), no new project will be approved until the deficit has been brought under control.

These funds are used to co-finance regional development related measures between 2007 and 2013 in the framework of the three objectives, namely:

(1) The 'convergence' objective to accelerate the convergence of the least developed EU Member States and regions by improving growth and employment conditions. This objective is financed by the ERDF, the ESF and the Cohesion Fund. It represents 81.5 % of the total resources allocated. The co-financing ceilings for public expenditure amount to 75 % for the ERDF and the ESF and 85 % for the Cohesion Fund;

(2) The 'regional competitiveness and employment' objective to anticipate economic and social change, promote innovation, entrepreneurship, environmental protection and the development of labour markets which include regions not covered by the Convergence objective. It is financed by the ERDF and the ESF and accounts for 16 % of the total allocated resources. Measures under this objective can receive co-financing of up to 50 % of public expenditure;

(3) The 'European territorial cooperation' objective to strengthen cooperation at cross-border, transnational and interregional levels in the fields of urban, rural and coastal development, and foster the development of economic relations and networking between small and medium-sized enterprises (SMEs). This objective is financed by the ERDF and represents 2.5 % of the total allocated

resources. Measures under the Territorial Cooperation objective can receive co-financing of up to 75 % of public expenditure.

The economic crisis has inevitably hindered progress towards the achievement of the three objectives of the 2007-13 framework. The EU Commission states that there is evidence to suggest that the economic crisis and the responses to it are leading to widening regional disparities, e.g. between capital or manufacturing regions and less developed or peripheral regions.[44] In response to the financial crisis, approximately € 36 billion (11 % of the total funds) was reallocated from one thematic area to another by the end of 2012 to support the most important political priorities and strengthen certain interventions. The majority of this reallocation was diverted to the ERDF and Cohesion Fund (more than € 30 billion). Key priorities for increased spending included innovation and R&D, generic business support, sustainable energy (in particular towards energy efficiency), cultural and social infrastructure, roads and the labour market. The EU Commission also passed further anti-crisis measures to improve the flow of EU financing (i.e. reduction of national co-financing) to promote economic growth.

Despite the economic crisis, the delay in the start of the programme (due to the extension of the previous period) and a lack of administrative capacity the structural and cohesion policy has made several concrete achievements aggregated at the European level. For example, almost 400 000 jobs have been created to date, of which 190 000 since 2010.[45] Investments in energy efficiency and renewable energy sources of about € 10.3 billion have been planned over 2007-2013, of which the majority (i.e. € 9.5 billion) is to be delivered in convergence Member States and regions funded by the ERDF and Cohesion Fund. Key achievements include:[46]

- Up to the end of 2011, 23 185 renewable energy projects were reported to have been supported by 21 MS (Bulgaria did not report any achievements). 18 MS set targets (Cyprus, Estonia, Lithuania and Latvia did not).

- Overall the additional capacity in MW by renewable energy projects amounts to 1 222 MW for the whole of the EU, reported by 11 MS.

- Total achievements reported by 11 MS amount to a reduction in greenhouse emissions of 33 389 kt (Bulgaria, Poland, Romania and Slovakia did not report any achievements).

In addition several ambitious energy efficiency programmes in residential and public buildings also delivered significant energy savings, emission cuts and job creation in the construction sector. The EU Cohesion Policy overall contributes a great deal to mitigation and adaptation to climate change across the region through the breadth and depth of investments made.

44 COM (2013) 210 final.

45 COM (2013) 210 final.

46 http://ec.europa.eu/regional_policy/how/policy/doc/strategic_report/2013/factsheet4_energy.pdf .

4.2.8. National Emissions Ceilings

Directive 2001/81/EC[47] on National Emission Ceilings (NEC) for certain atmospheric pollutants sets upper limits for each Member State for the total emissions in 2010 of the four pollutants sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia that meet specified interim environmental and health objectives for acidification, eutrophication and ground-level ozone pollution in 2010.

'The interim environmental objectives set in the NEC Directive for 2010 are broadly met — based upon an assessment performed using the original 2001 scientific knowledge' (EEA, 2012)[48]. However, advances in the understanding of air pollution processes/impacts and modelling techniques over the last two decades (i.e. improvements in calculating the dispersion of air pollutants in the atmosphere on the regional scale have greatly improved) means that when the latest knowledge is applied a number of the NEC Directive's original objectives have not yet been achieved as better scientific understanding has revealed higher emissions intensity than originally assumed.

The European Commission plans to propose a revised NEC Directive by 2013 which will set emissions ceilings for 2020 and beyond for the four pollutants already regulated as well as for primary emissions of PM 2.5. The revised NEC Directive will take into account current EU legislation relating to specific source categories. For example, 'vehicles (Euro 5/6 and EURO VI), the revision of the IPPC- Directive and the decision of the European Council (March 2007) to reduce greenhouse gas emissions by 20 % and will factor in the 20 % renewables target'.[49] 'In the absence of new legislation, the NEC Directive remains in force and requires countries to keep emissions below national ceilings also in the years beyond 2010' (EEA, 2012[48]).

4.2.9. Cross-cutting policies and measures no longer in place

There are no policies that are no longer in place. However, it should be noted that the Monitoring Mechanism Decision has been replaced by the Monitoring Mechanism Regulation (cf. section 4.9.1).

4.3. Sectoral policies and measures: Energy

4.3.1. Overview

The following sections list the most important EU policies and measures related to renewable energy, energy efficiency and energy market policies. Besides the policies and measures listed here, energy efficiency is promoted through various funding

47 OJ L 309, 27.11.2001, p. 22.

48 EEA (2012) Evaluation of progress under the EU National Emission Ceilings Directive - Progress towards EU air quality objectives, EEA Technical report No 14/201.

49 http://www.apis.ac.uk/overview/regulations/overview_NECD.htm

instruments on EU level, including cohesion policy and enlargement funding, research funding, the Programme for European Energy Recovery (EEPR) and the Competitiveness and Innovation Funding (CIP). For further information on funding instruments, see section 4.2 above. An overview of the measures including information on their impact on CO_2 emissions can be found in CTF Table 3 in the CTF Appendix.

Overall, the policies related to energy efficiency aim at a 20 % reduction of primary energy consumption in the EU-28 compared to the business-as-usual scenario by 2020. In absolute terms this means that total EU-28 primary energy consumption shall not exceed 1 483 Mtoe in 2020, which corresponds to a reduction of 370 Mtoe in 2020[50].

The following policies and measures are covered in this section:

- Renewable Energy Roadmap
- Renewable Energy Directive (2009/28/EC)
- Biomass Action Plan
- Cogeneration Directive (2004/8/EC)
- Directive on Energy End-use Efficiency and Energy Services (2006/32/EC)
- Energy Performance of Buildings (Directive 2010/31/EU)
- Energy Efficiency Plan 2011 (COM/2011/109)
- Energy Efficiency Directive (2012/27/EC)
- Internal Market in Electricity Directive (2009/72/EC)
- Ecodesign Framework Directive (Directive 2009/125/EC)
- Energy Labelling Directive (Directive 2010/30/EU)
- Green public procurement
- Energy star programme
- Motor Challenge Programme
- Strategic Energy Technology Plan (SET plan)
- Intelligent Energy Europe II Programme

50 After Croatia's accession, the target has been adjusted on 13 May 2013 by Council Directive 2013/12/EU

- The Covenant of Mayors

The EU Emissions Trading Scheme is covered in section 4.2.2.

4.3.2. Renewable Energy Roadmap

One of the first key pieces of legislation was Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market[51] (repealed by Directive 2009/28/EC, see further below). The Directive set indicative targets, which were different for each Member State, for renewable electricity consumption in 2010, which should lead to an indicative target for the EU-15 of 22.1% renewable electricity in total. In 2003 Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport[52] was adopted. This Directive set a target of 5.75% of biofuel energy content of all petrol and diesel for transport purposes placed on the market by December 2010.

The Commission's Progress Report in 2006 showed that only a few Member States had met their indicative targets, many were behind schedule and the overall contribution of renewables to total electricity consumption in the EU-27 was only 15.7% in 2006[53]. The biofuel targets in the transport sector were not achieved either; the result was only 1% in 2005 instead of the indicative target of 2%[54]. For this reason, the European Commission published a new long-term strategy for renewable energy in 2007: "**Renewable Energy Roadmap** — Renewable energies in the 21st century: building a more sustainable future"[55].

In this roadmap, the Commission concluded that high investment costs and the non-consideration of positive externalities of renewable energies as well as administrative problems were holding back a quicker expansion of renewables. To counteract these obstacles, the Commission suggested that grid access for renewable energy sources should be supported and that transparency on the energy markets for energy suppliers, consumers and installers of renewable energies should be increased. These improvements should be implemented by a new legislative framework including mandatory targets. The Renewable Energy Roadmap set targets of a 20% share of energy from renewable sources in the gross final EU energy consumption by 2020 and a minimum target of a 10% share of biofuels in transport by 2020. As a result, these targets were adopted by the new Renewable Energy Directive.

51 OJ L 283, 27.10.2001, p. 33.

52 OJ L 123, 17.5.2003, p. 42.

53 The Renewable Energy Progress Report: Commission Report in accordance with Article 3 of Directive 2001/77/EC, Article 4(2) of Directive 2003/30/EC and on the implementation of the EU Biomass Action Plan. COM(2009)192 final.

54 Proposal for a Directive of the European Parliament and of the council on the promotion of the use of energy from renewable sources. COM(2008) 19 final.

55 Renewable Energy Road Map. Renewable energies in the 21st century: building a more sustainable future. COM (2006) 848 final.

4.3.3. Renewable Energy Directive 2009/28/EC

Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC[56] (further referred to as Renewable Energy Directive) is one of three Directives adopted as part of the EU Climate and Energy Package[57]. It had to be implemented by the Member States by 5 December 2010. As mentioned above, the Directive establishes a target of a 20% share of energy from renewable sources in the gross final energy consumption of the EU by 2020, a target which is also included in European 2020 strategy for growth.

The Directive also sets binding targets for individual Member States; these are based on their share of renewable energy in 2005, plus a flat rate increase of 5.5% per Member State, plus a GDP weighted increase, and then moderated to include a bonus for Member States who started their renewable energy development early. The Directive also includes a target of a minimum 10% share of renewable energy in all forms of transport, which can include biofuels, renewable electricity or hydrogen. Current contributions of renewable energy to the total final energy consumption in the EU-27 and its Member States, along with the 2020 targets, are shown in the EU's 6th National Communication, main body section 2.7.1.

The Renewable Energy Directive focuses on the support of regional and local development initiatives and structural funding, because renewable sources are often embedded in decentralised and small and medium-sized enterprise (SME) structures.

The key requirement of the implementation of the Renewable Energy Directive is the preparation of **National Renewable Energy Action Plan (NREAP)** by Member States every two years. In the NREAPs, Member States define sectoral targets (electricity, heating and cooling, and transport) and the policies and measures to achieve their national targets by 2020.

Member States are encouraged to cooperate towards achieving their renewable energy targets, so that targets can be achieved in the most cost-efficient manner. For instance, Member States which are planning to go beyond their national targets will be able to sell their surpluses. Flexibility measures may be introduced which take the form of "statistical transfers" of renewable energy from one country to another, joint projects between Member States and/or joint support schemes.

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56 OJ L 140, 5.6.2009, p. 16.

57 On 17th December 2008 the European Parliament agreed on the EU Climate and Energy Package, which for the first time provides an integrated and ambitious package of policies and measures to tackle climate change. The Climate and Energy Package included the 20-20-20 targets, which set the following key objectives:

To reduce greenhouse gas emissions by at least 20 % compared to 1990 by 2020, with a firm commitment to increase this target to 30 % in the event of a satisfactory international agreement being reached;

To achieve 20 % of energy from renewable sources by 2020 (as a share of total EU gross final energy consumption), supplemented by a target to achieve a minimum of 10 % renewable transport fuel; and

A commitment to save 20 % of total primary energy consumption by 2020 com-pared to a Business as Usual baseline.

The Directive creates a sustainability regime for biofuels and bioliquids which includes a minimum GHG threshold that increases over time. The raw material for biofuels and bioliquids shall not be derived from land with a high level of biodiversity or with high carbon stocks. Further sustainability provisions (including broader environmental and social aspects) and indirect effects of biofuels will be monitored by the Commission.

The Commission estimates that achievement of EU renewable energy targets will cost € 13-18 billion per year. This investment will, however, help to bring down the price of those renewable energy technologies which are expected to form a growing part of global energy supply. By 2020, the implementation of the Directive is expected to achieve savings of 600 to 900 Mt CO_{2eq} emission per year[58], with the transport sector being responsible for a reduction of 48 Mt CO_{2eq} by 2020[59].

The most recent progress report (2013)[60] from the Commission states that there still exist barriers preventing the planned expansion of renewable sources, namely with regard to administrative simplification and permitting procedures for infrastructure development and operation, but also because of the consequences of the economic crisis. At present, with a share of 12.7% of renewable energy, the EU Member States are still on track to achieve the 2020 targets but the growth of renewables is slower than expected. Given the current growth rates, the targets will not be reached in 2020. The report states that any disruption of investment policies will have significant impacts in the future and that at present more effort and further measures will be necessary on the part of Member States to achieve the 20% target. The progress report also shows that based on national reporting the 4.7% share of biofuels achieved in 2010 led to savings of 25.5 Mt CO_{2eq} in the EU.

4.3.4. Biomass Action Plan

European biomass policy plays a crucial role in any scenario designed to meet the European target of increasing the share of renewable energies to 20% by 2020. In December 2005 the **Biomass Action Plan[61]** set out a series of Community actions aimed at increasing the demand for biomass, improving supply, overcoming technical barriers and developing research. Biomass from improved forest management, wastes and agricultural crops shall be promoted as an energy source for heating, electricity generation and transport fuel.

The Biomass Action Plan identified a potential for biomass use in the EU of approx. 150 Mtoe by 2010 (compared to approx. 69 Mtoe biomass consumption in 2006). The impact assessment estimated that this increase would lead to GHG emission reductions

58 Directive on the promotion of energy from renewable sources – Citizens' Summary http://ec.europa.eu/energy/climate_actions/doc/2008_res_citizens_summary_en.pdf

59 Impact Assessment accompanying the document - Proposal for a Directive of the European Parliament and of the Council amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources. SWD(2012) 343 final.

60 Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Renewable Energy Progress Report COM(2013) 175 final.

61 Biomass Action Plan. COM (2005) 628 final.

of 148 million tonnes CO_2 eq (in comparison to the BAU scenario) in 2010[62] and would cost approx. € 9 billion per year.

4.3.5. Cogeneration Directive (2004/8/EC)

On 11 February 2004, Directive 2004/8/EC of the European Parliament and of the Council on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC[63] was adopted. This Directive will be repealed by Directive 2012/27/EU on energy efficiency (see further below) as of June 2014.

Directive 2004/8/EC creates a framework for the promotion and development of high efficiency cogeneration of heat and power. It does not include targets but urges Member States to carry out analyses of their potential for high efficiency cogeneration and to evaluate progress towards increasing the share of this technology.

In the 2006 Action Plan for Energy Efficiency[64] the Commission proposed a number of measures to promote cogeneration in the future: harmonizing calculation methods and guarantee of origins, improving metering and establishment of European standards, minimum performance requirements and regulations for district heating and micro cogeneration.

In 2007, as part of the implementation of the original Directive, the Commission established harmonized efficiency reference values for the separate production of electricity and heat. These harmonized values were reviewed for the first time in February 2011[65], and will be reviewed every four years thereafter, to take account of technological developments and changes in the distribution of energy sources.

The impact assessment accompanying the proposal for the new Energy Efficiency Directive concluded in 2011[66] that the share of electricity from high efficiency CHP increased from 10.5% in 2004 to 11.0% only in 2008. As a result of a lack of clarity concerning minimum requirements, the national transposition of the Directive (in terms of efforts) made varied substantially across Member States.

4.3.6. Directive on Energy End-use Efficiency and Energy Services (2006/32/EC)

In 2006, Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council

62 Impact Assessment – Annex to the Communication from the Commission - Biomass Action Plan. SEC(2005) 1573.

63 OJ L 52, 21.2.2004, p. 50.

64 Communication from the Commission – Action plan for Energy Efficiency: Realising the Potential. COM(2006)545 final.

65 Commission Implementing Decision of 19 December 2011 establishing harmonized efficiency reference values for separate production of electricity and heat in application of Directive 2004/8/EC of the European Parliament and of the Council and repealing Commission Decision 2007/74/EC. 2011/877/EU.

66 Impact Assessment accompanying the document Directive of the European Parliament and of the Council on energy efficiency and amending and subsequently repealing Directives 2004/8/EC and 2006/32/EC. SEC(2001) 779 final.

Directive 93/76/EEC[67] was adopted, to be implemented in Member States by 2008. The Directive will expire on 04 June 2014 and will be repealed by Directive 2012/27/EU on energy efficiency (see further below).

The purpose of Directive 2006/32/EC is to make the end-use of energy more economic and efficient by:

- establishing indicative targets, incentives and the institutional, financial and legal frameworks needed to eliminate market barriers and imperfections which prevent efficient end-use of energy;

- requiring Member States to issue National Energy Efficiency Action Plans specifying how they intend to achieve energy savings in energy consumption[68]; and

- creating the conditions for the development and promotion of a market for energy services and for the delivery of energy-saving programmes and other measures aimed at improving end-use energy efficiency. Member States must ensure that the public sector adopts measures to improve energy efficiency, inform the public and businesses of the measures adopted and promote the exchange of good practice.

The Directive covers all forms of energy, and applies to providers of energy efficiency measures, energy distributors, distribution system operators and retail energy sales companies as well as to all non-ETS energy users. The Member States have to set themselves indicative national targets of at least 9% of energy savings for the ninth year of implementation (2016) of the Directive, based on the average final energy consumption of the last available five years.

The impact assessment accompanying the proposal for the new Energy Efficiency Directive concluded in 2011[69] that the Member States would achieve their 9% target in 2016, but were nevertheless not on track to achieve the 20% objective in 2020. According to the assessment, energy savings of only 50-95 Mtoe would be reached in 2020, instead of the required 368 Mtoe.

4.3.7. Energy performance of buildings (2010/31/EU)

Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings[70] (further referred to as Buildings Directive) was adopted in 2010 and repeals Directive 2002/91/EC on the energy performance of

67 OJ L 114, 27.4.2006, p. 64

68 For an assessment of national Energy Efficiency Action Plans, please see Commission Staff Working Document, Synthesis of the complete assessment of all 27 National Energy Efficiency Action Plans as required by Directive 2006/32/EC on energy end-use efficiency and energy services. Moving forward together on saving energy. SEC(2009) 889.

69 Impact Assessment accompanying the document Directive of the European Parliament and of the Council on energy efficiency and amending and subsequently repealing Directives 2004/8/EC and 2006/32/EC. SEC(2001) 779 final.

70 OJ L 153, 18.6.2010, p. 13

buildings. Compared to the repealed Directive 2002/91/EC, this Directive has a broader scope and helps citizens to improve the energy efficiency of their houses and the construction industry to build buildings with energy efficient envelope and heating systems. The Buildings Directive is one of the main instruments which have been put in place to reach the EU's 20% reduction target for primary energy consumption by 2020.

The Directive obliges Member States to set minimum standards for the energy performance of new buildings and for existing buildings that are subject to major renovation work to achieve cost optimal levels. The Member States have to develop a methodology to calculate the energy performance of buildings considering, for example, thermal characteristics, heating insulation, hot water supply, air-conditioning installation, but also aspects that have a positive influence on the energy performance such as natural lighting. New buildings have to comply with these requirements and shall undergo a pre-assessment before construction work begins. By 31 December 2020, all new buildings shall be "nearly zero-energy buildings". New buildings occupied and owned by public authorities shall comply with the same criteria by 31 December 2018.

However, there are buildings that are not affected by this Directive, e.g. officially protected buildings (such as historic buildings), churches, temporary buildings, very small buildings.

All new technical systems and building elements shall comply with energy performance requirements as well. Regular inspections of heating and air-conditioning systems in buildings must be guaranteed.

Member States had to put in place a system for the energy performance certification of buildings by 9 July 2012. The energy performance indicator of the certificate has to be included in all sales or letting advertisements, and the certificate (along with its energy saving recommendations) has to be part of the sales and letting documents. Member States shall ensure that, when buildings are constructed, sold or rented out, an energy performance certificate is made available to the owner or by the owner to the prospective buyer or tenant, as the case might be. The specific energy performance requirements are implemented in national or regional building codes.

The Directive requires Member States to develop plans for increasing the numbers of low or zero energy and zero carbon buildings, such as passive houses.

The Commission's proposal for the Directive included an impact assessment[71] of the Directive to estimate expected reductions in energy consumption and CO_2 emissions. The minimum total impact of the options identified as being most beneficial and for which quantification was possible, was estimated to be 160 - 210 Mt/year CO_2 savings in 2020 compared to the 'business as usual' scenario. This corresponds to a reduction of 5-6% of the EU's final energy consumption in 2020.

71 Impact assessment – Accompanying Document to the Proposal for a recast of the Energy Performance of Buildings Directive (2002/91/EC). SEC(2008) 2864.

4.3.8. Energy Efficiency Plan 2011 (COM/2011/109)

The Energy Efficiency Plan 2011[72] was adopted by the European Commission in March 2011 in the framework of the European Energy 2020 Strategy which aims at reducing primary energy consumption by 20% by 2020. The Energy Efficiency Plan 2011 is the overall background document related to energy efficiency. It is the result of a revision of the Action Plan on Energy Efficiency 2006 after the Commission found in 2011 in its progress report[73] that this plan would not sufficiently help to achieve the 20% target.

The main fields of action with the highest energy saving potential are the public and private building sector (including appliances) followed by the transport and industry sectors.

During the first implementation phase from 2011 to 2013 Member States have to set indicative national targets and develop energy efficiency programmes. After the first phase the Commission will assess whether the 20% objective is likely to be achieved. Otherwise, the Commission will set mandatory targets for each Member State during the second stage. Besides, additional measures will be implemented through new legislative proposals and measures. One of these new policies and measures is Directive 2012/27/EU on energy efficiency.

The Commission's proposal for the Energy Efficiency Plan included an impact assessment of the Directive in terms of expected reductions of energy consumption and of CO_2 emissions[74]. According to this assessment the 20% reduction in primary energy consumption would lead to a decrease of 740 Mt CO_2 annually in 2020. In addition, it is expected that the efficiency measures could generate financial savings of up to € 1000 per household per year and create about 2 million jobs in the EU[75].

4.3.9. Energy Efficiency Directive (2012/27/EU)

The European Parliament and the Council adopted Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC[76]. The Energy Efficiency Directive is one of the main instruments (apart from the Buildings Directive and the Eco-design and Energy Labelling Directives) which have been put in place to achieve the EU's 20% reduction target of primary energy consumption by 2020.

72 Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions – Energy Efficiency Plan 2011. COM(2011) 109 final.

73 Progress report of the Energy Efficiency Action Plan 2006. SEC(2011) 275 final.

74 Impact Assessment accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Energy Efficiency Plan 2011. SEC(2011) 277 final.

75 http://ec.europa.eu/energy/efficiency/action_plan/action_plan_en.htm.

76 OJ L 315, 14.11.2012, p. 1.

The Directive establishes a common framework of measures for the promotion of energy efficiency and is an act of legislation which supports the Energy Efficiency Plan 2011. It aims at keeping the EU's energy efficiency target on track and explicitly sets goals of 1 474 Mtoe of primary energy consumption and 1 078 Mtoe of final energy consumption by 2020. Due to Croatia's accession to the EU on 1 July 2013, the target has been adjusted to 1 483 Mtoe of primary energy consumption and 1 086 Mtoe of final energy consumption.[77] In case the EU is not on track to achieve these targets, the Commission is to propose further measures.

The key elements of the Directive are briefly described below:

- National targets and National Energy Efficiency Action Plans:

Each Member State has to establish indicative national energy efficiency targets for 2020 by April 2013 and report every year onwards on the progress made/the main measures taken in order to achieve the target. In addition Member States have to submit National Energy Efficiency Action Plans (NEEAP) every three years; the next NEEAPs will be due in 2014. Subsequently, the Commission has to assess the progress achieved in the EU and the MS and, if needed, will propose further measures.

- Removal of market barriers:

One aim of the Directive is to reduce barriers in the energy market and avoid market failure that are preventing increased energy efficiency at all stages of the energy chain. Such measures include, for instance, network tariffs and regulations but also the implementation of energy efficiency obligation schemes for energy suppliers. According to the Directive, energy distributors will have to save 1.5% of the energy sold to final customers every year from 1 January 2014 onwards. Member States can set up a certificate scheme in order to enable a trade of these energy savings with other sectors and customers.

- Energy audits and energy management systems:

High quality energy audits or energy management systems which include energy audits will become mandatory for large companies and the Member State will promote them especially in SMEs, e.g. by establishing support schemes. All enterprises other than SMEs will be obliged to carry out an energy audit every four years from 2015 onwards. If enterprises have implemented an energy management system that includes energy audits, they are excluded from the auditing obligation.

Member States have to ensure that the energy audits are performed by independent entities with qualified personnel in a cost-effective manner and that energy management systems include appropriate energy audits.

- Public sector:

77 OJ L141, 28.05.2013, p. 29

The public sector plays a leading role when it comes to setting an example of energy efficiency. Every year 3 % of the floor area in their central government buildings has to be renovated to reach at least the minimum performance level in compliance with Directive 2010/31/EU (see section 4.3.7). Public bodies are encouraged to purchase only products, services and buildings with a high energy-efficiency performance.

- Private sector:

Member States must provide a long-term strategy for investments in building renovation by April 2014, including policies and measures.

There is an additional focus on the reduction of barriers for consumers by improving access to information on their energy consumption, e.g. through smart metering and billing. Smart metering shall be provided to customers of electricity, natural gas, district heating and cooling and hot water if technically and economically feasible. This keeps customers informed about their energy use. In January 2017, this right shall be extended to residents of buildings with common heating/cooling/hot water systems. With regard to billing, consumers shall be informed about their energy bills at least every 6 months.

- CHP and district heating/cooling:

The Energy Efficiency Directive also includes changes concerning cogeneration and district heating/cooling (repealing the Cogeneration Directive 2004/8/EC). All Member States are obliged to assess their potential for high efficiency cogeneration and efficient district heating/cooling by 31 December 2015. The Member States have to develop policies which promote efficient heating and cooling systems on the local and regional level especially in connection with high efficiency cogeneration.

The impact of the EED on CO_2 emissions was projected using PRIMES model runs in the EU Reference Scenario 2012/13.

4.3.10. Internal Market in Electricity Directive (2009/72/EC)

The creation of a genuine internal market for energy is one of the EU's priority objectives. The existence of a competitive internal energy market is a strategic instrument, both in terms of giving European consumers a choice between different companies supplying gas and electricity at reasonable prices, and of making the market accessible for all suppliers.

In 2009, Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC[78] was adopted and had to be transposed into national law by March 2011. The Directive aims to introduce common rules for the generation,

78 OJ L 211, 14.8.2009, p. 55

transmission, distribution and supply of electricity. It also lays down universal service obligations and consumer rights, and clarifies competition requirements.

The rules for the organisation of the sector aim to develop a competitive, secure and environmentally sustainable market in electricity. Member States may impose on undertakings operating in the electricity sector public service obligations which cover, amongst other things, issues of environmental protection, energy efficiency, energy from renewable sources and climate protection.

In addition, Member States shall ensure that all customers have the right to choose their electricity supplier and to change their supplier easily, with the operator's assistance, within three weeks. They shall also ensure that customers receive relevant consumption data. Electricity suppliers are obliged to inform final customers about: (1) the contribution of each energy source; (2) the environmental impact caused; and (3) their rights in the event of a dispute.

Finally, the national regulatory authorities have to take all reasonable measures in order to promote the integration of large and small-scale production of electricity from renewable energy sources and in order to facilitate access to the network for new generation capacity, in particular removing barriers that could prevent access for new market entrants and electricity from renewable energy sources.

The political target for the completion of the internal energy market is 2014. The most recent Communication of the Commission[79] points out that – at present – the implementation is not on track and that many Member States are delayed with the adjustment of their national legislations. These delays have negative effects such as a high market concentration of the generation market or investments driven too often by subsidies. However, some achievements have been made: Competition has increased because more suppliers entered the market and cross-border trade is growing. It has been noted that consumer satisfaction is still at a low level but that the switching rates have increased.

The Commission concludes that action has to be taken and has published an Action Plan to enforce the implementation of the Third Energy Package. The Action Plan includes regular status updates on national implementation by the Member States and infringement procedures. Transparency shall be increased for Member States by providing best practice examples of implementation; and for consumers by putting in place web-based guidance on consumer rights.

79 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Making the internal energy market work. COM(2012)663 final.

4.3.11. Ecodesign Directive (2009/125/EC)

In order to reduce the environmental impact of energy using products, the EU has implemented two major pieces of framework legislation: Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products[80] (further referred to as Eco-design Directive), which is the key element of the Community strategy on Integrated Product Policy, and its complementary Energy Labelling Directive. The Framework Directive for the Eco-design of Products provides mandatory requirements for product design, whereas the Energy Labelling Directive aims at increasing consumer awareness.

The Directive establishing a framework for the setting of eco-design requirements for energy-related products aims to improve the environmental performance of products throughout their life-cycle by encouraging the integration of environmental aspects at the earliest stages of their design.

The first Directive on eco-design of energy-using products, Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council[81] entered into force in August 2005, and had to be transposed by Member States into national law by August 2007. As the name indicates, it targeted **energy-using** products. In October 2009 its scope was extended by a recast, Directive 125/2009/EC, in order to incorporate **energy-related** products (e.g. windows).

The Eco-design Directive is the main legal instrument and the overall framework in the EU for addressing the environmental performance of energy-related products. The main objective of the Eco-design Directive is to bring about improvements in environmental performance (including energy efficiency) throughout the entire product's life-cycle, from the mining of the raw material through to recycling at the end of a product's lifetime. Its focus is deliberately broad, covering, in principle, any product which – during its use – consumes energy (electricity, fossil fuel or renewable). However, there are some exemptions (e.g. means of transport – such as vehicles - for people and goods) which are not covered by this Directive.

The rules for the eco-design of energy-related products are the same across Europe, although they take into consideration national differences. Applicable criteria include water consumption, energy consumption and waste production as well as the extension of product life. For each phase of a product's life-cycle the following aspects have to be assessed:

- predicted consumption of materials, of energy and other resources;
- anticipated emissions to air, water or soil;

80 OJ L 285, 31.10.2009, p. 10.

81 OJ L 191, 22.7.2005, p. 29.

- anticipated pollution (noise, vibration, radiation, electromagnetic fields);
- expected generation of waste material;
- possibilities for reuse, recycling and recovery of materials or energy

All products placed on the market must undergo a conformity assessment to check compliance with the eco-design requirements and they must be marked with the CE sign.

As the Eco-design Directive is an overall framework directive, it does not provide mandatory requirements for specific products. Such requirements are specified in separate product-related regulations which exist for the following product groups:

- heating and water heating equipment[82]
- electric motors,
- lighting in the residential and tertiary sectors,
- domestic appliances,
- office equipment in the residential and tertiary sectors,
- consumer electronics,
- HVAC (heating, ventilation and air conditioning) systems, and
- water pumps.

Not all energy-related products have quantified environmental obligations. Quantified environmental obligations are defined for products based on volume of sales in the EU and on the environmental impact at European level.

The overall impact of the Eco-design Directive will depend on how many implementing regulations are adopted. The emission reductions achieved could be very substantial over time, reaching 211 to 265 Mt CO_2/year by 2020, when all currently installed equipment covered under Directive 2009/125/EC will have been replaced[83].

4.3.12. Energy Labelling Directive

As mentioned above, the Energy Labelling Directive complements the Eco-design Directive. Since coming into force in its original version[84] in 1992, Directive

82 Replacing, in some cases, older Directives specific to a certain product group such as Directive 92/42/EEC on Efficiency of new boilers.

83 Ökopool, Wuppertal Institute and Risk&Policy Analysts Ltd. (2010): Analysis of impact of efficiency standards on EU GHG emissions (eco-design directive), Task 3 report: Outlook on the estimated GHG emission reductions, Final Report (Sept 2010), p. 8.

84 Council Directive 92/75/EEC of 22 September 1992 on the indication by labelling and standard product information of the consumption of energy and other resources by household appliances. OJ L 297, 13.10.1992, p. 16.

2010/30/EU of the European Parliament and the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products (further referred to as Energy Labelling Directive) has been amended to include further energy-using household appliances such as refrigerators and freezers. In May 2010 the EU Parliament and the Council adopted the recast Directive[85] to extend the scope to energy-related products used in the industrial and commercial sectors, as well as other products which have an impact on energy consumption during their use. Member States have been obliged to apply the provisions of the Directive from 20 July 2011 onwards.

The Energy Labelling Directive aims at the introduction of a label in order to help consumers to purchase energy-saving products; the use of energy-saving products should also consumers to save money. In addition, industry should be encouraged to develop more energy efficient appliances.

The products must be marked with information about the consumption of electricity and other forms of energy. Furthermore, the supplier must provide a description of the product, results of design calculations, test reports and references allowing a comparison with similar products.

With regard to the label, it has to show how a product is ranked in terms of energy consumption/efficiency, using a scale from A (most energy efficient) to G (least energy efficient). Since the Energy Label has already existed in the EU for more than 20 years, 90% of the products concerned by the Directive have already reached class A. For this reason, new categories were introduced (A+ to A+++) in the most recent version of the Directive.[86]

The following products are covered by the Energy Labelling Directive:

- lamps and luminaires,
- household tumble driers,
- air conditioners,
- televisions,
- household washing machines,
- household refrigeration appliances,
- household dishwashers,
- household electric ovens,

85 OJ L 153, 18.6.2010, p.1.

86 Research on EU product label options (2012), a study by Ipsos MORI, London Economics and AEA for the European Commission: http://ec.europa.eu/energy/efficiency/studies/doc/2012-12-research-eu-product-label-options.pdf.

- household combined washer-driers, and
- household electric tumble driers.

Apart from addressing consumers, the Energy Labelling Directive also provides a legal basis for the harmonization of public procurement at EU and Member State level. Member States shall promote public procurement of products belonging to the highest energy class, and set minimum criteria for the procurement of energy-related products.

The impact assessment[87] of the amendment of the Energy Labelling Directive showed that the broadened scope can lead to an emission reduction of about 65-78 Mt CO_2 per year up to 2020, which corresponds to an increase of +20 Mt CO_2 compared to the repealed Directive.

4.3.13. Green Public Procurement

The EU promotes the use of public procurement in Member States as a means of kick-starting the market for eco-innovative goods and services and to achieve its environmental goals in a cost-efficient manner. Public authority spending in the EU is worth an estimated € 2 000 billion per year, approx. 19% of the EU's GDP. Green public procurement (GPP) is a voluntary instrument that can substantially reduce unsustainable production and consumption patterns and could help to place new environmental technologies on the market.

A 2003 Communication on Integrated Product Policy encouraged Member States to adopt national action plans on GPP by the end of 2006[88]. In March 2004, the EC adopted two new public procurement Directives[89], which included provisions regarding the integration of environmental considerations into public procurement strategies.

On 16th July 2008, the Commission presented the Communication "Public Procurement for a better environment"[90]. It provides guidance on how the public sector can reduce environmental impact and stimulate innovation in green technologies. The Commission set an indicative target that by 2010, 50% of the public tendering procedures should comply with the core GPP criteria. Core criteria are suitable for use by any contracting authority across the Member States and address the key environmental impacts. They are designed to be used with minimum additional verification effort or cost increases.

In the meantime, a new procedure for GPP criteria development that includes stakeholders at several stages was implemented and a handbook on GPP addressing public authorities was published.

87 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:DKEY=483101:EN:NOT.

88 Integrated product policy – Building on Environmental Life-Cycle Thinking. COM(2003) 302 final.

89 Directive 2004/18/EC on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts and Directive 2004/17/EC coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors. OJ L 134, 30.4.2004, p. 114.

90 Public Procurement for a better environment. COM(2008) 400 final.

The most recent Annual Public Procurement Implementation Review 2012[91] found that the indicative target set in 2008 was not reached. In 2009 and 2010 only 26% of public contracts signed included all core GPP criteria. Nevertheless, a positive trend is visible and the share of GPP is increasing.

The Directives are estimated to have an emission reduction potential of 25-45 Mt CO_2eq per annum, most of which by making investments that cost less than 20 €/ton CO_2eq[92].

The key role of public procurement is laid down in many EU policy frameworks (e.g. Integrated Product Policy, Energy 2020 strategy) and legislative acts (e.g. Energy Efficiency Directive, Directive on energy performance of buildings and the Energy Labelling and Eco-design Directives).

4.3.14. Energy star programme

Final energy consumption in offices is about to increase as new applications and functionalities regularly appear on the market. Due to a lack of information efficient appliances often do not become prevalent on the market.

In order to raise awareness in users and manufactures the voluntary energy labelling programme "Energy Star" was created in 2000, in the context of a coordinating agreement with the USA government. This first agreement[93] was set for an initiating period of 5 years to establish the programme. In April 2003, the Council approved the European Community Energy Star Board (ECESB) as managing body.

The second 5-year period of the programme started in 2006[94]. It takes into account lessons learned from the first period and includes improved energy efficiency criteria. The Energy Star programme is embedded in the EU's energy efficiency policy[95] and complements the Eco-design Directive for energy-related products (section 4.3.11) which sets mandatory minimum requirements.

When put on office appliances the Energy Star label shall help consumers to identify low energy consumption products. Moreover, it shall raise awareness in users and manufactures about energy use in offices. Office appliances certified by Energy Star shall use less energy in the stand-by as well as in the use phase. The manufacturers can test themselves or by an independent test laboratory if the performance of the product complies with the agreed specifications.

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91 Annual Public Procurement Implementation Review 2012. SWC(2012) 342 final.

92 http://ec.europa.eu/clima/policies/eccp/docs/second_eccp_report_en.pdf.

93 Regulation (EC) No 2422/2001 of 6 November 2001 on a Community energy efficiency labelling programme for office equipment. OJ L 332, 15.12.2001, p.1.

94 Decision 2006/1005/EC of 18 December 2006 concerning the conclusion of the Agreement between the Government of the United States of America and the European Community on the coordination of energy-efficiency labelling programmes for office equipment. OJ L 381, 28.12.2006, p. 24.

95 Regulation (EC) No 106/2008 of 15 January 2008 on a Community energy-efficiency labelling programme for office equipment. OJ L 39, 13.2.2008, p.1.

The ECESB is responsible for observing the testing of office equipment. If a product fails such checks the manufacturer is required to follow a plan provided by the ECESB to improve the product performance. In case of failing again the manufacturer will be excluded from the programme.

In February 2011 the US managing body (the Environmental Protection Agency) decided to toughen the certification procedure by introducing systematic checks by a third-party laboratory after the first approval. The EPA confirmed that EU products are not affected by these new requirements but in fact amendments of the programme require common agreement of both managing bodies. In addition, the EPA fears that US manufacturers would register their products in the EU to avoid increased efforts. Thus, it is expected that the current situation would not be acceptable for the US. For this reason the EU started analysing different options for the future of the Energy Star Programme.[96] In November 2012, the new agreement[97] was adopted by the Council for the next five year period. As the EU wants to protect SMEs from costly certification procedures, both approaches, self-certification in the EU and certification by a third-party in the USA, are kept. However, products sold on the US market have to undergo the third-party certification.

An assessment of the programme based on sales data for the years 2008-2011 estimates that the Energy Star succeeded in a 16% reduction (approx.) of the electricity consumption of new office equipment (approx. 3 Mt CO_2 avoided during the period 2008-2011).

4.3.15. Motor challenge programme

Launched in 2003, the Motor Challenge Programme[98] is a European Commission initiative to aid industrial companies to improve the energy efficiency of their electric motor driven systems. The programme focuses on compressed air, fan and pump systems, for which a large technical and economic potential for energy savings has been demonstrated.

The core of the programme is an Action Plan, by which a Challenge Partner commits to undertaking specific measures to reduce energy consumption. The participating company determines which production sites, and which types of systems, are covered by the commitment. The scope of the commitment is flexible, and can be limited to a single shop, or may include all of the company's European production sites.

96 Communication from the Commission on the implementation of the ENERGY STAR programme in the European Union in the period 2006 – 2010. COM(2011) 337 final.

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97 Council Decision of 13 November 2012 on the signing and conclusion of the Agreement between the Government of the United States of America and the European Union on the coordination of energy-efficiency labelling programmes for office equipment (2013/107/EU). L 63, 6.3.2013, p.5.

98 http://re.jrc.ec.europa.eu/energyefficiency/motorchallenge/index.htm.

Companies will receive aid, advice and technical assistance from the Commission and from participating National Energy Agencies to formulate and carry out their Action Plan.

An evaluation[99] of the Motor Challenge Programme in 2010 found that the participating companies cover a wide range of different industrial sectors: food (13%), metal and steel (12%) and water supply (9%). Most companies are large or medium-sized. According to the companies, 290 different energy efficiency measures had been implemented and approx. 87 kt of CO_2 had been saved annually.

4.3.16. Strategic Energy Technology Plan (COM/2007/723 and COM/2013/253)

The European Strategic Energy Technology Plan (SET-Plan)[100] aims to accelerate the development and deployment of cost-effective low carbon technologies to enable the EU to deliver EU 2020 and 2050 targets while ensuring a worldwide leadership in the production of energy technological solutions. The SET-Plan comprises measures relating to planning, implementation, resources and international cooperation in the field of energy technologies.

The following areas are covered by the SET-Plan: wind and solar energy, bio-energy, capture, transport and storage of CO_2, electricity grids, nuclear energy, fuel cells and hydrogen, which take the form of public-private partnerships or joint programmes between Member States. In addition, the SET-Plan includes the "Smart Cities" Innovation Partnership, which aims to improve energy efficiency and to step up the deployment of renewable energy in large cities.

4.3.17. Intelligent Energy - Europe II Programme

The Intelligent Energy — Europe II Programme (IEE II)[101] is a funding instrument dedicated to sustainable energy. It aims at fostering energy efficiency, promoting new and renewable energy sources and supporting energy diversification. It forms part of the overarching Competitiveness and Innovation Framework Programme (CIP)[102].

Grants and tenders were made available in four areas: energy efficiency and rational use of energy, new and renewable energy resources, energy in transport and integrated initiatives.

Through the participation of more than 3 000 public and private organisations across the EU, IEE II and its predecessor (IEE I) have become the main Community instruments in the field of energy efficiency and the use of new and renewable energy sources. They support the development and implementation of policies and Directives, support the

99 http://iet.jrc.ec.europa.eu/sites/default/files/documents/scientific_publications/2010/the_european_motor_challenge_programme_evaluation_2003-2009.pdf.

100 A European Strategic Energy Technology plan (SET-Plan). COM(2007) 723 final.

101 http://ec.europa.eu/energy/intelligent/index_en.htm.

102 Decision 1639/2006/EC of the European Parliament and of the Council of 24 October 2006 establishing a Competitiveness and Innovation Framework Programme (2007 to 2013). OJ L 310, 9.11.2006, p. 15.

creation of favourable market conditions, prepare the ground for investments, and help building capacities and skills. IIE II covers, for example, the ELENA facility and the BUILD UP Skills initiative. The European Local Energy Assistance (ELENA) facility provides financial and technical assistance to help local and regional authorities attract funding for sustainable energy projects. The BUILD UP Skills initiative was launched in 2011 in order to address the specific requirements of the on-site construction work force.

According to the 2012 performance report of the IEE[103], the projects under the ELENA facility are expected to result in an emission reduction of 570 000 tonnes of CO_2 equivalents. As another example, the "biogas regions" project under the IEE I programme, resulted in savings of 60 000 tonnes of CO_2 equivalents per year.

Currently the European Commission is planning a successor instrument to the IEE II programme, to cover the 2014-2020 period.

4.3.18. The Covenant of Mayors

After the adoption of the EU Climate and Energy Package, the European Commission launched the Covenant of Mayors[104] to endorse and support the efforts deployed by local authorities in the implementation of sustainable energy policies. The Covenant of Mayors plays an important role in mobilising local and regional actors around the fulfilment of the EU's climate and energy targets for 2020.

In order to translate their political commitment into specific measures and projects, Covenant signatories undertake to prepare and submit, within the year following their signature, a Sustainable Energy Action Plan (SEAP). The SEAP is the key document in which the Covenant signatory outlines how it intends to reach its CO_2 reduction target by 2020. It defines the activities and measures set up to achieve the targets, together with time frames and assigned responsibilities. By 2013, more than 4 000 mayors, representing more than 150 million inhabitants, have signed the Covenant. The SEAPs that were already submitted by the end of 2012 are expected to achieve a 29 % CO_2 emission reduction (on average) in 2020 compared to the base year (1990 is the recommended base year for the SEAPs, although it may differ in some cases). This corresponds to a reduction of approximately 150 million tonnes of CO_2.

4.3.19. Policies and measures no longer in place

There are no policies and measures (PaMs) no longer in place in the energy sector but there are directives and regulations included in the NC5 which have been replaced/repealed by new EU legislation. *Table [BR1] Error! **No text of specified style in document.**-2* shows the correspondence between "old" legislation and "new" legislation. Note that sometimes the content of the old legislation has been updated in more than one new piece of legislation. In this case the table includes the reference to the "main" new piece of legislation which replaces/repeals the old piece of legislation.

103 http://ec.europa.eu/energy/intelligent/files/doc/reports/iee-ii-performance-report-2007-2011-final_en.pdf.

104 http://www.covenantofmayors.eu/.

*Table [BR1] **Error! No text of specified style in document.**-2 PaMs included in NC5 and corresponding PaMs included in NC6*

PaM in NC5	**Corresponding PaM in NC6**
En1 – Developing the internal market (Directive 2003/54/EC, Directive 98/30/EC)	Internal Market in Electricity Directive (2009/72/EC)
En2 – Promotion of electricity from renewable energy sources (Directive 2001/77/EC)	Renewable Energy Directive (2009/28/EC)
En3 – Renewable Energy Directive (Directive 2009/28/EC)	Renewable Energy Directive (2009/28/EC)
En4 – Biomass Action Plan (COM (2005) 628 final)	Biomass Action Plan
En5- Action Plan on Energy Efficiency	Energy Efficiency Plan 2011 (COM/2011/109)
En6 – Directive on energy end-use efficiency and energy services (Directive 2006/32/EC)	Energy Efficiency Directive (2012/27/EC)
En7- Framework Directive Ecodesign (Directive 2005/32/EC)	Ecodesign Framework Directive (Directive 2009/125/EC)
En8- Cogeneration Directive (Directive 2004/8/EC)	Energy Efficiency Directive (2012/27/EC)
En9 – Motor Challenge Programme	Motor Challenge Programme
En10- Labelling Directive (Directive 2003/66/EC)	Energy Labelling Directive (Directive 2010/30/EU)
En11- Energy Performance of Buildings (Directive 2002/91/EC)	Energy Performance of Buildings (Directive 2010/31/EU)
En12- Strategic Energy Technology Plan (SET plan)	Strategic Energy Technology Plan (SET plan)
En13 – Green public procurement	Green public procurement
En14 – CCS storage	Moved to chapter on cross-cutting PaMs
En15- National Emission Ceilings Directive (2001/81/EC)	Moved to chapter on cross-cutting PaMs
En16 – Large Combustion Plant Directive	Integrated into the Industrial Emission Directive (2010/75/EU); moved to industry chapter
En17- EU Emission Trading Scheme (2003/87/EC)	Moved to chapter on cross-cutting PaMs

4.4. Sectoral policies and measures: Transport

4.4.1. Overview

In the following, the most important European initiatives in the transport sector are presented. Measures in the aviation industry have already been shown under the EU Emission Trading Scheme (see section 4.2.2), and measures relating to mobile air condition systems are discussed in section 4.5.4, below.

An overview of the measures including information on their impact on CO_2 emissions can be found in CTF Table 3 in the CTF Appendix.

The following policies and measures are covered in this section:

- Renewable Energy Directive (2009/28/EC)
- Strategy to reduce CO_2 from passenger cars and light-commercial vehicles (COM/2007/19)
- Regulation on CO_2 emissions from cars (443/2009)
- Regulation CO_2 emissions from light-commercial vehicles (510/2011)
- Biofuels Directive (repealed by Renewable Energy Directive)
- Fuel Quality Directive (2009/30/EC)
- Proposal for an amendment of the Fuel Quality Directive and the Renewable Energy Directive
- Euro 5 and 6 Standards (Regulation (EC) No 692/2008)
- Euro VI Standard for heavy duty vehicles (Regulation (EC) No 595/2009)
- Environmental performance requirements for motor vehicles and tyres (Regulations (EC) 661/2009, (EC) 1222/2009, EC 1235/2011, EC 228/2011 and (EU) 65/2012)
- Infrastructure charges for heavy goods vehicles (Directive 1999/62/EC as amended by Directives 2006/38/EC and 2011/76/EU)
- Clean Power for Transport package including the deployment of alternative fuel infrastructure
- Clean Vehicles Directive (2009/33/EC)
- Roadmap to a Single European Transport Area

- International maritime transport

4.4.2. Strategy to reduce CO_2 from light vehicles (COM/2007/19)

In 2007, the Commission adopted Communication COM(2007)19 final[105] outlining a comprehensive new strategy to reduce carbon dioxide emissions from new cars and vans sold in the European Union. Before 2007, the Community's strategy was based on three pillars: (1) voluntary commitments of the automobile industry; (2) consumer information (labelling); and (3) the promotion of fuel-efficient cars via fiscal measures (taxation). The new strategy was developed because the objectives of the pre-2007 strategy had only partly been achieved.

The 2007 strategy aimed at meeting the Community objective of an equivalent of 120 g CO_2/km by 2012 through a legislative framework which addressed supply-oriented measures. The package of measures contained the following elements:

- to fulfil the objective of 130 g CO_2/km for the average new car fleet by improvements in vehicle motor technology;
- setting minimum efficiency requirements for air-conditioning systems;
- compulsory fitting of accurate tyre pressure monitoring systems;
- setting maximum tyre rolling resistance limits in the EU for tyres fitted on passenger cars and light commercial vehicles;
- use of gear shift indicators, taking into account the extent to which such devices are used by consumers in real driving conditions;
- increased fuel efficiency in light-commercial vehicles (vans) in the aim of reaching 175 g CO_2/km by 2012 and 160 g CO_2/km by 2015;
- increased use of biofuels maximizing environmental performance.

In 2010 the European Commission published a progress report[106] on implementation of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles. It is unlikely that the objective of an equivalent of 120 g CO_2/km will be achieved in 2012. At the same time, according to EU monitoring data the manufacturers are on track to meeting the targets set in Regulation (EC) No 443/2009. Moreover, data shows that

105 Results of the review of the Community Strategy to reduce CO2 emissions from passenger cars and light-commercial vehicles, COM(2007)19 final.

106 Progress report on implementation of the Community's integrated approach to reduce CO2 emissions from light-duty vehicles. COM(2010) 656 final.

the average CO_2 emissions of 65% of newly registered cars were lower than 130 g CO_2/km in 2009.

In order to achieve these objectives a number of directives and regulations have been adopted in recent years. Most of them are described in the following sections.

4.4.3. CO_2 and cars (Regulation 443/2009)

In 2009, Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles[107] (further referred to as CO_2 and Cars Regulation) was adopted. This regulation is the cornerstone of the EU's strategy to improve the fuel economy of new cars sold on the European market.

Under the CO_2 and Cars Regulation, the fleet average to be achieved by all new cars is 130 grams of CO_2 per kilometre (g/km) by 2015 – with the target to be phased in from 2012 - and 95 g/km by 2020. The 2015 and 2020 targets represent reductions of 18% and 40% respectively, compared with the 2007 fleet average of 158.7g/km. In terms of fuel consumption, the 2015 target is approximately equivalent to 5.6 litres per 100 km (l/100 km) of petrol or 4.9 l/100 km of diesel. The 2020 target equates to approx. 4.1 l/100 km of petrol or 3.6 l/100 km of diesel[108].

Key elements of the CO_2 and Cars regulation are:

- Emission limits are set according to the mass of vehicle, using a limit value curve. The curve is set in such a way that a fleet average of 130 grams of CO_2 per kilometre is achieved by 2015. The limit value curve means that heavier cars are allowed higher emissions than lighter cars while preserving the overall fleet average. Only the fleet average is regulated, so manufacturers are still able to make vehicles with emissions above the limit value curve, provided that these are balanced by vehicles below the curve.

- The EU fleet average target of 130g CO_2 per km will be phased in between 2012 and 2015. In 2012, an average of 65% of each manufacturer's newly registered cars must comply with the limit value curve set by the legislation. This share will rise to 75% in 2013, 80% in 2014, and 100% from 2015 onwards.

- If the average CO_2 emissions of a manufacturer's fleet exceed its limit value in any year from 2012, the manufacturer has to pay excess emissions premiums for each car registered. These excess emissions premiums amount to € 5 for the first g/km of exceedance, € 15 for the second g/km, € 25 for the third g/km, and

107 OJ L 140, 5.6.2009, p.1.

108 http://ec.europa.eu/clima/policies/transport/vehicles/cars/index_en.htm.

€ 95 for each subsequent g/km. From 2019, the cost will be € 95 from the first gram of exceedance onwards.

- Manufacturers can come together to form a pool which can act jointly in meeting the emissions target.

A further emission reduction to 95 g CO_2/km is specified for the **year 2020**. Following a thorough review to define modalities to reach a long-term target, the Commission proposed legislation[109] in July 2012 which set out the modalities of how this target is to be fulfilled. The proposal includes the following provisions[110]:

- All manufacturers would be required to achieve the same level of reduction - 27% - from the 2015 target;
- The target would continue to be set on the basis of a vehicle's mass;
- Eco-innovations would continue to apply once the new test procedure for vehicle type approval is in place;
- Super-credits with a multiplier of 1.3 would apply in 2020-2023 for vehicles emitting less than 35 g/km; this benefit would be limited to a maximum of 20 000 cars per manufacturer over the period;
- The penalty would remain at € 95 per g/km from the first "gram of exceedance";
- Small-volume manufacturers would be given greater flexibility regarding when they can apply for their own reduction target;
- The smallest manufacturers, producing fewer than 500 cars per year, would be exempted from meeting the target;
- Niche manufacturers would receive a new target for 2020 – a 45% reduction from their 2007 level;
- The regulation would be reviewed by the end of 2014 in order to set reduction targets for post-2020.

The **impact assessment** carried out in 2012 related to a proposed amendment of Regulation (EC) No 443/2009 found that implementing the 2020 emission targets for cars and vans result in annual savings of 27 Mt CO_2 in 2020, and in 49 Mt CO_2 in 2030.

109 Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EC) No 443/2009 to define the modalities for reaching the 2020 target to reduce CO2 emissions from new passenger cars. COM(2012) 393 final. .

110 http://ec.europa.eu/clima/policies/transport/vehicles/cars/index_en.htm.

The cumulative savings in the 2020-2030 period were estimated at around 422 Mt CO_2[111].

The most recent **progress report** of the EEA[112] indicates that in 2012 manufacturers once more improved their performance in terms of the CO_2 emissions of passenger cars: the average CO_2 emissions of the new car fleet in 2012 was 132.2 g CO_2/km. This was 3.5 g CO_2/km less than in the previous monitoring year (135.7 g/km in 2011).

Some of the key changes observed in the fleet are:

- the dieselisation of the fleet continues (54.9% of the vehicles registered in 2012 in Europe are diesel vehicles);
- the average mass is the highest of the last nine years;
- the average engine capacity has decreased by 5% since 2007.

In spite of the increase in mass, dieselisation and improved vehicle technology have led to greater fuel efficiency and lower average CO_2 emissions per kilometre travelled.

4.4.4. CO_2 from light commercial vehicles (Regulation (EU) No 510/2011)

As part of the strategy to reduce CO_2 emissions from light-duty vehicles, the EU adopted legislation in 2011 which set CO_2 emission targets for new vans sold on the European market[113]. The Regulation is similar to the one for new cars. The CO_2 and Vans Regulation limits CO_2 emissions from new vans to a fleet average of 175 grams of CO_2 per kilometre by 2017 – with the target to be phased in from 2014 - and 147 g/km by 2020. These cuts represent reductions of 14% and 28% respectively, compared with the 2007 average of 203 g CO_2/km. In terms of fuel consumption, the 2017 target is approximately equivalent to 7.5 litres per 100 km (l/100 km) of petrol or 6.6 l/100 km of diesel. The 2020 target equates approximately to 6.3 l/100 km of petrol or 5.5 l/100 km of diesel[114].

Key elements of the legislation are[115]:

- Emission limits are set according to the mass of vehicle, using a limit value curve. The curve is set in such a way that a fleet average of 175 grams of CO_2 per kilometre is achieved by 2017. The limit value curve means that heavier vans are allowed higher emissions than lighter vans while preserving the

111 Impact Assessment accompanying the documents Proposal for a regulation of the European Parliament and of the Council amending Regulation (EC) No 443/2009 to define the modalities for reaching the 2020 target to reduce CO2 emissions from new passenger cars and Proposal for a regulation of the European Parliament and of the Council amending Regulation (EU) No 510/2011 to define the modalities for reaching the 2020 target to reduce CO2 emissions from new light commercial vehicles SWD(2012) 213 final Part II.

112 EEA (2013): Monitoring CO2 emissions from new passenger cars in the EU: summary of data for 2012. http://www.eea.europa.eu/publications/monitoring-co2-emissions-from-new-cars

113 Regulation (EU) No 510/2011 of the European Parliament and of the Council of 11 May 2011 setting emission performance standards for new light commercial vehicles as part of the Union's integrated approach to reduce CO2 emissions from light-duty vehicles. OJ L .145, 31.5.2011, p.1.

114 http://ec.europa.eu/clima/policies/transport/vehicles/vans/index_en.htm

115 http://ec.europa.eu/clima/policies/transport/vehicles/vans/index_en.htm

overall fleet average. Only the fleet average is regulated, so manufacturers will still be able to make vehicles with emissions above the limit value curve, provided these are balanced by vehicles below the curve.

- The EU fleet average target of 175 g CO_2/km will be phased in between 2014 and 2017. In 2014 an average of 70% of each manufacturer's newly registered vans must comply with the limit value curve set by the legislation. This share will rise to 75% in 2015, 80% in 2016, and 100% from 2017 onwards.

- The legislation affects light commercial vehicles, which means vehicles used to carry goods weighing up to 3.5 tonnes (vans and car-derived vans, known as "N1") and which weigh less than 2 610 kg when empty.

- If the average CO_2 emissions of a manufacturer's fleet exceed its limit value in any year from 2014, the manufacturer has to pay an excess emissions premium (EEP) for each van registered. The excess emissions premium amounts to € 5 for the first g/km of exceedance, € 15 for the second g/km, € 25 for the third g/km, and € 95 for each subsequent g/km. From 2019, the cost will be € 95 from the first gram of exceedance onwards. This value is equivalent to the EEP for passenger cars.

A further emission reduction to 147g CO_2/km is specified for the **year 2020**. Following a thorough assessment of its costs and benefits, the Commission proposed legislation in July 2012 confirming this target and setting out the modalities of how it should be reached[116]. The proposal includes the following provisions[117]:

- The feasibility of meeting the target by 2020 is confirmed;

- All manufacturers would be required to achieve the same level of reduction - 19% - from the emissions level in 2010;

- The target would continue to be set on the basis of a vehicle's mass;

- Eco-innovations would continue to apply once the new test procedure for vehicle type approval is in place;

- The penalty would remain at € 95 per g/km from the first gram of exceedance;

- Small-volume manufacturers would be given greater flexibility regarding when they can apply for their own reduction target;

116 Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) No 510/2011 to define the modalities for reaching the 2020 target to reduce CO2 emissions from new light commercial vehicles. COM(2012) 394 final.

117 http://ec.europa.eu/clima/policies/transport/vehicles/vans/index_en.htm

- The smallest manufacturers, producing fewer than 500 vans per year, would be exempted from meeting the target;

- The regulation would be reviewed by the end of 2014 in order to set reduction targets for post-2020.

The **impact assessment** carried out for the proposal for Regulation 510/2011 includes two options and various assumptions[118]. According to this study the annual CO_2 equivalent savings are expected to be 11.3 Mt CO_2 and 0.6 Mt CO_2 for passenger and freight respectively in 2020 and 3.7 Mt CO_2 for passenger vans and 1.6 Mt CO_2 for freight vans in 2030. The cumulative CO_2 emissions savings between 2020 and 2030 would amount to 26.5 Mt and 11.7 Mt for passenger and freight respectively.

4.4.5. Biofuels Directive (repealed by Renewable Energy Directive)

Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of renewable energy in transport[119] set indicative targets for biofuels and other renewable energy used in the transport sector. Member States were allowed to set their own targets, but indicative targets were set at a 2% biofuel share by 2005 and 5.75% by 2010. The Commission's progress report COM(2009)192[120] assessed the progress made towards achieving the 2010 targets set by Directive 2003/30/EC and showed that in 2007 the use of biofuels in road transport was below the target, namely at 2.6% for the EU as a whole.

Therefore, the Directive was repealed on 31.12.2011 by the Renewable Energy Directive (see section 4.3.3), which sets mandatory targets. By 2020, the share of renewable energy shall amount to 10 % of fuels consumed in the transport sector, which can include biofuels, renewable electricity or hydrogen originating from renewable sources.

In addition, the Renewable Energy Directive sets a number of sustainability criteria that must be met for biofuels and bioliquids to count towards the target, including a minimum threshold of GHG savings for biofuels: The life cycle GHG emissions of biofuels used must be at least 35% lower than from the fossil fuel replaced. This threshold will be raised to 50% in 2017. The Directive also lays down that biofuels must not derive from land with high carbon stocks or high biodiversity.

118 Impact Assessment accompanying the documents Proposal for a regulation of the European Parliament and of the Council amending Regulation (EC) No 443/2009 to define the modalities for reaching the 2020 target to reduce CO2 emissions from new passenger cars and Proposal for a regulation of the European Parliament and of the Council amending Regulation (EU) No 510/2011 to define the modalities for reaching the 2020 target to reduce CO2 emissions from new light commercial vehicles SWD(2012) 213 final Part II.

119 OJ L 123, 17.5.2003, p. 42.

120 The Renewable Energy Progress Report - Commission Report in accordance with Article 3 of Directive 2001/77/EC, Article 4(2) of Directive 2003/30/EC and on the implementation of the EU Biomass Action Plan, COM(2005)628. COM(2009) 192 final.

Furthermore, the Member States are encouraged to introduce certification schemes for biofuels to ensure that the sustainability criteria are implemented along the whole chain of custody.

4.4.6. Fuel Quality Directive (2009/30/EC)

Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC[121] (further referenced as Fuel Quality Directive) tightens the requirements for a number of fuel parameters. The Directive introduces a binding target for fuel suppliers to reduce life-cycle GHG emissions per unit of energy from fuel and energy supplied by up to 6% by 2020 compared to 2010, with intermediate targets of 2% by 2014 and 4% by 2017.

The reduction shall be obtained through the use of biofuels, alternative fuels or reductions in flaring and venting at production sites. Another indicative life cycle GHG emissions reduction of 4% (overall 10 %) shall be achieved by means of implementation of new technologies such as carbon capture and storage (CCS) and purchase of carbon credits from the Clean Development Mechanism (CDM). New technologies and CDM could contribute a 2% reduction each. Suppliers can choose to group together to meet these targets jointly.

The Directive applies to all petrol, diesel and biofuels used in road transport, as well as to gas oil used in non-road-mobile machinery. The blending of fuels and refinery efficiency are expected to be the main contributors to meeting the target[122].

To facilitate implementation of the target the amended Directive determines a reporting mechanism for the life-cycle GHG emissions from fuels (including fossil fuel and renewable fuels), which covers crude oil production, refining, distribution and retail as well as fuel combustion. Fuel suppliers shall report annually (starting from January 2011) the total volume of each fuel type and the life cycle GHG emissions per unit of energy to a designated authority. As the scope of the Directive covers fuel production right through to combustion of the fuel, biofuels will play a key part in achieving the targets. The Directive therefore incorporates the same sustainability criteria (and minimum GHG savings requirements) for biofuels as those introduced in the Renewable Energy Directive (see section 4.3.3).

To encourage and enable a more widespread use of biofuels, the Directive also implies fuel standards which allow the distribution of biofuels by means of higher blending rates within fossil fuels. The Directive will phase in a 10% blending limit for ethanol in petrol (E10), while continuing the production and supply of 5% bioethanol (E5) on the

121 OJ L 140, 5.6.2009, p. 88.

122 http://ies.jrc.ec.europa.eu/uploads/jec/JECBiofuels%20Report_2011_PRINT.pdf

market for older cars. For diesel, the maximum biodiesel blend will be increased from the current 5% to 7% (B7), with an option to increase it further in the future and allowing Member States to permit higher blends already.

The CO_2 emission saving potential but can be estimated as follows: If the Directive is properly implemented it will deliver savings of 6% of total well-to-wheel road transport CO_2 emissions in 2020, therefore the saving potential will amount to roughly 55 Mt CO_2 in 2020, excluding indirect land use change (ILUC) emissions.

4.4.7. Proposal for an amendment of the Fuel Quality Directive and the Renewable Energy Directive

It is planned that both the Fuel Quality Directive and the transport-related section of the RES Directive will be amended because GHG emissions related to indirect land use changes (ILUC) are not taken into account under the current legislation[123]. Indirect land use change can reduce the GHG savings associated with the use of biofuels and bioliquids.

Most of today's biofuels are produced from crops grown on agricultural land such as wheat and rapeseed. When agricultural or pasture land previously destined for the food, feed and fibre markets is diverted to the production of biofuels, the non-fuel demand will still need to be satisfied. Although this additional demand may be met through intensification of the original production, bringing non-agricultural land into production elsewhere is also possible. It is in the latter case that land-use change occurs indirectly (hence the term indirect land-use change). While most biofuel feedstocks are produced in the EU, the estimated indirect land-use change emissions are mostly expected to take place outside the EU, where the additional production is likely to be realised at the lowest cost. In the case that this production is realised through the use of additional land, its conversion could lead to substantial greenhouse gas emissions being released if high carbon stock areas such as forests are affected as a result.

The proposed Directive aims at limiting the contribution that conventional biofuels (with a risk of ILUC emissions) make towards attainment of the targets in the Renewable Energy Directive. In addition, the GHG performance of the biofuel production processes shall be improved. Therefore, a minimum threshold of 60% for the GHG emission savings is proposed for biofuel production installations starting operation after 1 July 2014.

Furthermore, food-based biofuels (1st generation biofuels) should be limited to a share of 5% of the total fuel consumption, which corresponds to the estimated share of 1st generation biofuels in the European Union in 2011. This implies that in order to fulfil the 10% target, the remaining 5%[124] would have to come from a combination of 2nd and 3rd generation biofuels which do not directly compete with food crops and are produced

123 Proposal for a Directive of the European Parliament and of the Council amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources. COM(2012) 595 final.

124 Increased energy efficiency measures in transport also contribute indirectly to achieving the 10% target by lowering the overall energy demand.

from waste, residues, non-food cellulosic material or ligno-cellulosic biomass and renewable electricity in road and rail. In order to promote the use of 2nd and 3rd generation biofuels the proposal includes a list of biofuel feedstocks that are counted multiple times towards fulfilling the target.

Finally, Member States and fuel suppliers will also be obliged to report the estimated life cycle greenhouse gas emission savings from biofuels and bioliquids, including the estimated indirect land use change emissions and the methodology for reporting will be reviewed and updated in the light of scientific developments.

The impact assessment[125] estimates that the proposed legislation leads to annual emission reductions of 48 Mt CO_2 in the year 2020, 27 Mt of which are expected to be ILUC emission reductions.

The proposal is at an early stage in the legislative process.

4.4.8. Euro 5 and 6 Standards (Regulation (EC) No 692/2008)

To limit pollution caused by road vehicles, Commission Regulation (EC) No 692/2008 of 18 July 2008 implementing and amending Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information[126] introduced new common minimum requirements for air quality emissions from motor vehicles and their replacement parts (Euro 5 and Euro 6 standards). Air quality emission limits are set separately for petrol and diesel vehicles. The Euro 5 standard came into force on 1 September 2009 for the approval and on 1 January 2011 for the registration of vehicles on the EU market, whereas the Euro 6 standard will be effective from 1 September 2014 for the approval of vehicles, and from 1 January 2015 for the registration and sale of new types of cars.

The Regulation applies to all passenger vehicles, vans, and commercial vehicles intended for the transport of passengers or goods or certain other specific uses (for example ambulances) weighing less than 2 610 kg. It limits emissions of carbon monoxide (CO), non-methane hydrocarbons and total hydrocarbons, nitrogen oxides (NO_X) and particulates (PM). It covers tailpipe emissions, evaporative emissions and crankcase emissions. There are different limits for (1) diesel vehicles and (2) petrol, natural gas and LPG vehicles. In addition, it sets requirements for the durability of pollution control devices.

The introduction of the Euro 6 standard will require substantial reductions of emissions of nitrogen oxides for all vehicles equipped with diesel engines. For example, NO_X emissions from diesel passenger vehicles will be capped at 80 mg/km (an additional reduction of more than 50% compared to the Euro 5 standard). Combined emissions of

125 Impact Assessment accompanying the document Proposal for a Directive of the European Parliament and of the Council amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources. SWD(2012) 343 final.

126 OJ L 199, 28.7.2008, p. 1.

hydrocarbons and nitrogen oxides will be capped at 170 mg/km for diesel passenger vehicles (compared to 230 mg/km under Euro 5).

However, the impact of implementing Euro 5 and Euro 6 standards on CO_2 emissions will be very low. Some air pollutant abatement technologies (such as lean NOx trap catalysts) could have a negative impact on fuel efficiency and CO_2 emissions. Other technologies (such as SCR catalysts) and overall improvements in energy design could improve fuel efficiency. It is broadly expected that the impact of the Euro 6 standards will not lead to a change in fuel efficiency. Overall the implementation of Euro 5 standards for light vehicles is expected to provide a small reduction of CO_2 emissions by 2020 (2 Mt of CO_2 equivalents by 2020). The implementation of Euro 6 standards is expected to deliver no discernible impact on CO_2 emissions relative to Euro 5.[127]

4.4.9. Euro VI Standard for heavy duty vehicles (Regulation (EC) No 595/2009)

Commission Regulation (EC) No 595/2009 of the European Parliament and of the Council of 18 June 2009 on type-approval of motor vehicles and engines with respect to emissions from heavy duty vehicles (Euro VI) and on access to vehicle repair and maintenance information and amending Regulation (EC) No 715/2007 and Directive 2007/46/EC and repealing Directives 80/1269/EEC, 2005/55/EC and 2005/78/EC[128] was adopted on 18 June 2009 and will apply from 31 December 2013. The regulation intends to reduce harmful exhaust emissions, including ozone precursors such as nitrogen oxides and hydrocarbons as well as particles. It replaces both the "Euro IV" limits (applied since November 2006), and the "Euro V" emission limits (applied since October 2008).

The Regulation provides harmonized technical rules for trucks, lorries and buses (heavy vehicles over 2 610 kg) for type approval and standards for the durability of pollution control devices. Among other things, it sets a limit value for total nitrogen oxides (NOx), which is 460 mg/kWh (80% less compared with Euro V), and the agreed particle mass limit which amounts to 10 mg/kWh - a 66% reduction compared with the Euro V stage limits.[129]

The impacts of implementing Euro VI standards on CO_2 emissions are very low. Tighter emission limits could have both direct and indirect effects on fuel consumption and greenhouse gas emissions. The direct impact is due to some forms of engine technology and after-treatment resulting in slightly higher CO_2 emissions in comparison with the Euro V stage. Given the nature of emission limits under consideration, and the likely technologies used to reach these limits, a small direct negative impact on CO_2 could be expected. According to the Regulation's impact assessment[130], it is expected that fuel consumption could be maintained close to the level in Euro V in the long term.

127 Impact Assessment for Euro 6 emission limits for light duty vehicles. http://ec.europa.eu/enterprise/automotive/pagesbackground/pollutant_emission/impact_assessment_euro6.pdf.

128 OJ L 188, 18.7.2009, p.1.

129 http://europa.eu/rapid/press-release_IP-08-1982_en.htm?locale=en

130 Annex to the Proposal for a Regulation of the European Parliament and of the Council on the approximation of the laws of the Member States with respect to emissions from on-road heavy duty vehicles and on access to vehicle repair information, Impact Assessment. SEC(2007) 1718.

In relation to heavy duty vehicles, the European Commission presented a proposal for an amendment of Directive 96/53/EC laying down maximum authorised dimensions in national and international traffic[131]. This proposal intends, among other things, to grant derogations from the maximum dimensions of vehicles for the addition of aerodynamic devices to the rear of vehicles or to redefine the geometry of the cabs for tractors, leading to the reduction of fuel consumption and greenhouse gas emissions.

4.4.10. Environmental performance requirements for motor vehicles and tyres (Regulations (EC) 661/2009, (EC) 1222/2009, EC 1235/2011, EC 228/2011 and (EU) 65/2012)

Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefore[132] entered into force on 20 August 2009. The regulation integrates both environmental and safety requirements for type approval of motor vehicles and tyres. It applies to vehicles of passenger transport (category M), transportation of goods (category N) and trailers (category O).

The fuel efficiency of motor vehicles shall be increased by introducing tyre pressure monitoring systems and gear shift indicators. Tyre pressure monitoring systems shall be mandatory only for passenger cars and provide the driver with information on the pressure of tyre over time.

Furthermore, tyres have to meet requirements regarding their safety, rolling resistance and rolling noise emissions. Manufacturers shall guarantee that all new vehicles sold on the market have to comply with the requirements of this regulation.

Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters[133] entered into force on 1 November 2012. The objective is to influence energy demand by promoting the market transformation towards fuel-efficient tyres, also known as low-rolling resistance tyres (LRRT). The labelling shall inform consumers about fuel efficiency, wet grip and external rolling noise. It will complement the type approval legislation on tyres that addresses the supply side by means of minimum requirements for tyre manufacturers. Tyre suppliers must provide this information by using a scale so that it is clearly visible on the product. The scale ranges from A (best) to G (bad) and is available for the fuel efficiency class and the wet grip class. Information on the external rolling noise value is indicated in decibels.

For fuel efficiency/rolling resistance the labelling class must be determined according to the scale specified in Annex I to the Regulation and measured in accordance with

131 Proposal for a Directive of the European Parliament and of the Council amending Directive 96/53/EC of 25 July 1996 laying down for certain road vehicles circulating within the Community the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic. COM(2013) 195 final.

132 OJ L 200, 31.7.2009, p.1.

133 OJ L 342, 22.12.2009, p. 46.

Annex 6 of UNECE Regulation No 117 and its subsequent amendments and aligned according to the procedure laid down in Commission Regulation (EU) No 1235/2011[134] amending Regulation (EC) No 1222/2009. For wet grip of C1 tyres (passenger cars), the test method is contained in the Commission Regulation (EU) No 228/2011[135] amending the Regulation (EC) No 1222/2009; for C2 and C3 tyres (light commercial vehicles and heavy duty vehicles respectively), the test method is contained in the Commission Regulation (EU) No 1235/2011 amending the Regulation (EC) No 1222/2009 (with reference to ISO15222 standard). Noise tests have to be performed in accordance with UNECE Regulation No 117.

Good quality tyres can reduce fuel consumption significantly as they account for 20 to 30% of fuel consumption. According to the impact assessment made when proposing these new regulations, the total CO_2 emission savings from all vehicle types are expected to range from 1.5 to 4 million tonnes annually by 2020.[136]

The equipment of manual gearbox vehicles with gear shift indicators is regulated by Commission Regulation (EU) 65/2012 implementing Regulation (EC) No 661/2009 of the European Parliament and of the Council as regards gear shift indicators and amending Directive 2007/46/EC of the European Parliament and of the Council[137]. The technical CO_2 reduction potential of gear shift indicators is estimated at 6% in case of 100% utilization rate[138].

4.4.11. Infrastructure charges for heavy goods vehicles

Directive 1999/62/EC of the European Parliament and of the Council of 17 June 1999 on the charging of heavy goods vehicles for the use of certain infrastructures[139] and its two amendments[140,141] set common rules on distance-related (tolls) and time-based (vignettes) road user charges for heavy goods vehicles. These rules stipulate how and to what extent the cost of construction, operation, maintenance and development of the infrastructure as well as the costs of traffic-related noise and air pollution can be borne (through tolls and vignettes) by road users.

The Directive lays down certain rules to be observed by Member States. Tolls must include an "infrastructure charge", which cannot exceed what is necessary to recover the costs of construction, maintenance,repair and operation of the tolled infrastructure; since the most recent amendment to the Directive, tolls may also include an "external cost

134 OJ L 317, 30.11.2011, p. 17

135 OJ L 62, 9.3.2011, p. 1

136 Commission staff working document - Accompanying document to the proposal for a directive of the European Parliament and of the Council on labelling of tyres with respect to fuel efficiency and other essential parameters - Impact assessment SEC(2008) 2860, p. 56.

137 OJ L 28, 31.1.2012, p. 24.

138 Progress report on implementation of the Community's integrated approach to reduce CO2 emissions from light-duty vehicles, COM(2010) 656 final.

139 OJ 187, 20.7.1999, p. 42.

140 Directive 2006/38/EC of the European Parliament and of the Council of 17 May 2006 amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures. OJ L 157, 9.6.2006, p.8.

141 Directive 2011/76/EC of the European Parliament and of the Council of 27 September 2011 amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures OJ L 267, 14.10.2011, p.1.

charge" which reflects the cost of air pollution and/or noise pollution, provided that the external cost charges respect maximum values defined in Annex IIIb to the Directive.

Evaluation studies that have been published on the tolling systems in several EU Member States suggest that road freight transport is sensitive to changes in transport prices and that the relevant actors respond to the price signals given by the tolls. Statistics on freight transport in two Member States show that the introduction of the tolls coincided with a decrease in the average distance travelled by trucks, notably resulting from the optimisation of road transport itself (reduction of empty running, increase in load factors).(see ex-post evaluation of the Directive[142]) While, in the same two countries, increase in rail freight transport activity has also been observed, it is difficult to establish a direct and general relationship between the introduction of road tolls and modal shift from road to other transport modes.

4.4.12. Clean Power for Transport package including the deployment of alternative fuel infrastructure

On 24 January 2013, the European Commission presented a Communication laying out a comprehensive European alternative fuels strategy[143] for the long-term substitution of oil as energy source in all modes of transport and a proposal for a Directive on the deployment of alternative fuels infrastructure[144]. The Directive requires Member States to adopt national policy frameworks for the market development of alternative fuels and their infrastructure, sets binding targets for the build-up of alternative fuel infrastructure, including common technical specifications, and defines the method of fuel labelling at refuelling points and on vehicles to ensure clarity in the consumer information on vehicle/fuel compatibility.

Minimum infrastructure shall be provided, differentiated according to needs and technological maturity, for electricity, hydrogen, and natural gas (in gaseous form as Compressed Natural Gas (CNG), and in liquid form as Liquefied Natural Gas (LNG):

- Electricity: 8 million charging stations for 4 million EVs with 10% publicly accessible. Individual MS binding target level calculated on car stock, urbanisation rate and EV stock. Total cost: € 8 billion. Infrastructure put in place by 31 December 2020. Common standard for Type 2 (AC) and Type 2 Combo (DC).

- Hydrogen: MS which already have hydrogen infrastructure in place at the date of entry into force of the directive shall ensure a sufficient number of publicly accessible refuelling stations available, not exceeding 300 km, to allow

142 Ex-post evaluation of Directive 1999/62/EC, as amended, on the charging of heavy goods vehicles for the use of certain infrastructures. Commission staff working document SWD(2013) 1 final.

143 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Clean Power for Transport: A European alternative fuels strategy, COM (2013) 17 final.

144 Proposal for a Directive of the European Parliament and of the Council on the deployment of alternative fuels infrastructure, COM(2013) 18 final.

circulation of hydrogen vehicles within the entire national territory by 31 December 2020 at the latest. Total cost: € 230 million.

- LNG for Road Transport: One station every 400 km in the TEN-T Core Network which is publicly accessible. Total cost: € 60 million.

- CNG: MS shall ensure that a sufficient number of publicly accessible refuelling points are available, with a maximum distance of 150 km, to allow the circulation of CNG vehicles union-wide by 31 December 2020. Total cost: € 164 million.

- LNG for Waterborne Transport: MS shall ensure that publicly accessible LNG refuelling points for maritime and inland waterway transport are provided in all of the maritime ports of the TEN-T core network by 31 December 2020 and in all inland ports of the core network by 31 December 2025. Total cost: € 2 billion.

Modelling carried out in the course of the impact assessment[145] for the proposed Directive suggests that the proposed measures will reduce CO_2 emissions from transport by up to 0.3% in 2020 and by up to 4.6% in 2050, compared to the baseline scenario. With this initiative the Commission intends to provide a sufficient infrastructure network for alternative fuels across the EU. The availability of infrastructure will enhance the take-up of the alternative fuelled transport systems market and the competitiveness of the European industry, so as to promote economic growth and employment. The initiative also aims to break the dependence on oil and contribute to the achievement of the **60% GHG** emission reduction target of the transport sector by 2050.

4.4.13. Clean Vehicles Directive (2009/33/EC)

Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles[146] aims at a broad market introduction of environmentally-friendly vehicles. The Directive requires that energy and environmental impacts linked to the operation of vehicles over their whole lifetime, including CO_2 emissions, are taken into account in public procurement decisions. This also applies to contracting entities as defined by the public procurement Directives and to public transport operators as defined by the Regulation on public passenger transport service.

The Directive requires that lifetime operational energy consumption, emissions of carbon dioxide (CO_2), and emissions of oxides of nitrogen (NO_X), non-methane hydrocarbons (NMHC) and particulate matter (PM) are taken into account. For the first

145 Impact assessment accompanying the document „Proposal for a Directive on the deployment of alternative fuels infrastructure“, Commission staff working document, SWD(2013) 5 final.

146 OJ L 120, 15.5.2009, p.5.

time the Clean Vehicle Directive has thereby introduced sustainability obligations into public procurement law for the whole EU.

Two options are offered to meet the requirements: setting technical specifications for energy and environmental performance, or including energy and environmental impacts as award criteria in the purchasing procedure. If the impacts are monetised for inclusion in the purchasing decision, common rules shall be followed, as defined in the Directive for calculating the lifetime costs linked to the operation of vehicles.

The Directive is expected to result in a wider deployment of clean and energy efficient vehicles in the longer term. Increased sales will help reduce costs through economies of scale, resulting in progressive improvement in the energy and environmental performance of the whole vehicle fleet.

The impact assessment of the Clean Vehicles Directive proposal[147] showed that public procurement of clean efficient vehicles will result in savings of up to 1.9 million tonnes of CO_2 emissions per year in 2017 compared to the baseline scenario.

The first report on the application of the Directive[148] was published by the Commission on 18 April 2013. However, delayed transposition of the Clean Vehicle Directive by most Member States and lack of reporting obligations hampered this first assessment. Thus, it has not yet been possible to undertake verification of the impacts foreseen in the impact assessment.

4.4.14. Roadmap to a Single European Transport Area

The Commission periodically reviews EU transport policy in white papers, which take a global look at the developments in the transport sector, its future challenges and the policy initiatives that need to be considered. The first white paper in 1992 was essentially dedicated to market opening, while the 2001 white paper focused on managing transport growth by a more balanced use of all transport modes.

Based on an evaluation of developments in the recent past and on an assessment of current trends in the accompanying impact assessment[149], the latest white paper of 2011[150] "Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system" indicates that the EU transport system has already improved in many ways (e.g. further market openings, increased security, and passenger rights) but there is no structural change to reduce oil dependency and GHG emissions in the transport sector. Commission modelling analysis has shown that transport should reduce its GHG emissions in 2050 by around 60% below 1990 levels to meet the

147 Gargani, F. (2007): Impact assessment on a new approach for the Cleaner and More Energy Efficient Vehicles Directive Proposal, PriceWaterhouseCoopers Advisory.

148 Report from the Commission (…) on the application of Directive 2009/33/EC on the promotion of clean and energy efficient road transport vehicles, COM 2013(214).

149 Impact Assessment - Accompanying document to the White Paper Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system. SEC(2011) 358 final.

150 White Paper - Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system. COM(2011) 144 final.

objectives of the climate policy. However, considering business as usual, the emissions in 2030 are expected to be 25% higher than in 1990.

The 2011 White Paper, which forms an integral part of the "Resource Efficiency" initiative of the Commission, defines a long-term strategy to achieve a competitive and resource efficient transport system and presents a set of 10 goals to achieve the 60 % GHG emission reduction target for 2050. These goals can be grouped into three categories:

- Developing and deploying new and sustainable fuels and propulsion systems
- Optimising the performance of multimodal logistic chains, including by making greater use of more energy-efficient modes
- Increasing the efficiency of transport and of infrastructure use with information systems and market-based incentives

Implementing this long-term strategy requires an efficient framework for transport users and operators, an early deployment of new technologies and the development of adequate infrastructure. The white paper aims at a transport system with better integration between modes, fewer barriers to market entry, less dependency on oil and coherent infrastructure design. ICT and clean vehicles have been indicated as technical priorities, as well as the need for smarter pricing of infrastructure usage and better exploitation of rail transport. To achieve this, the white paper puts forward a list of 40 concrete initiatives for the next decade in four key areas:

- Internal market: Create a genuine Single European Transport Area by eliminating all residual barriers between modes and national systems.
- Innovation: EU research needs to address the full cycle of research, innovation and deployment in an integrated way.
- Infrastructure: EU transport infrastructure policy needs a common vision and sufficient resources. The costs of transport should be reflected in its price in an undistorted way.
- International: Opening up third country markets in transport services, products and investments continues to have high priority.

The Commission will prepare appropriate legislative proposals until 2020. Two years after adoption of the white paper, the Commission has already adopted significant proposals on about half of the initiatives.

4.4.15. International maritime transport

On 28 June 2013, the European Commission adopted a Communication[151] setting out a strategy for progressively including greenhouse gas emissions from maritime transport in the EU's policy for reducing its overall emissions. The strategy consists of the following consecutive steps:

- Establishing a system for monitoring, reporting and verifying (MRV) of CO_2 emissions;
- Setting reduction targets for the maritime transport sector;
- Applying further measures, including market-based instruments, in the medium to long term.

Relating to the first of these three steps, the Commission proposed a Regulation[152] establishing an EU-wide MRV system for large ships. This system would cover all ships over 5 000 gross tons that use EU ports, irrespective of where the ships are registered.

According to the proposed Regulation, ship owners will have to monitor and report the verified amount of CO_2 emitted by their ships on voyages to, from and between EU ports, Owners will also have to provide certain other information, such as data to determine the ships' energy efficiency.

It is proposed that the rules apply from 1 January 2018. They are designed to support a staged approach towards setting global energy efficiency standards for existing ships, as supported by several members of the International Maritime Organisation.

In an impact assessment[153] accompanying the proposal, several policy options – from an MRV system to levies and to emission trading schemes – were assessed. Under the MRV option, CO_2 emissions from the maritime transport sector are expected to be 2% lower than the baseline in 2030. Various levy options are expected to result in in-sector emission reductions of up to 16% by 2030, and a maritime emission trading scheme and an emissions reduction fund are expected to deliver emission reductions of 16 to 21% by 2030, compared to the baseline. These reductions are equivalent to an emission reduction of up to 10 % by 2030 compared to 2005 levels.

151 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Integrating maritime transport emissions in the EU's greenhouse gas reduction policies. COM(2013) 479 final.

152 Proposal for a Regulation of the European Parliament and of the Council on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport and amending Regulation (EU) No 525/2013. COM(2013) 480 final.

153 Impact Assessment – Part 1 Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport and amending Regulation (EU) No 525/2013. Commission staff working document SWD(2013) 237 final/2.

Given the large cost-effective abatement potential of the sector, the above mentioned emission reductions would lead to net cost savings for the maritime transport sector of up to € 12 billion per year (in 2030) for the EU scope. Other expected impacts are the creation of additional jobs in ship yards and the maritime supply industry as well as health benefits due to reduced emissions of SO_X, NO_X and particulate matter.

4.4.16. Policies and measures no longer in place

There are no policies and measures (PaMs) no longer in place in the transport sector but there are directives and regulations included in the NC5 which have been replaced/repealed by new EU legislation. *Table [BR1] Error! **No text of specified style in document.**-3* shows the correspondence between "old" legislation and "new" legislation. Note that sometimes the content of the old legislation has been updated in more than one new piece of legislation. In this case the table includes the reference to the "main" new piece of legislation which replaces/repeals the old piece of legislation.

*Table [BR1] **Error! No text of specified style in document.**-3 PaMs included in NC5 and corresponding PaMs included in NC6*

PaM listed in NC5	**Corresponding PaM in NC6**
TR1 - Directive on promotion of biofuels (Directive 2003/30/EC)	Renewable Energy Directive (2009/28/EC)
TR2 - Fuel Quality Directive (Directive 2009/30/EC)	Fuel Quality Directive (2009/30/EC)
TR3 - (New) Renewable Energy Directive (Directive 2009/28/EC) (transport measures)	Renewable Energy Directive (2009/28/EC)
TR4 - Taxation of energy products and Electricity (Directive 2003/96/EC)	Moved to chapter on cross-cutting PaMs
TR5 - Infrastructure charging for heavy goods vehicles (Directive 2006/38/EC)	Infrastructure charging for heavy goods vehicles (Directive 2011/76/EU)
TR6 - Voluntary agreements with European, Japanese and Korean car manufacturers	Regulation on CO_2 emissions from cars (443/2009)
TR7 - Strategy for car CO_2 & Regulation (EC) No 443/2009	Strategy to reduce CO_2 from passenger cars and light-commercial vehicles (COM/2007/19) Regulation on CO_2 emissions from cars (443/2009)
TR8 - EURO 5&6 standards (Regulation (EC) No 715/2007)	Euro 5 and 6 Standards (Regulation (EC) No 692/2008) Euro VI Standard for heavy duty vehicles (Regulation (EC) No 595/2009)

PaM listed in NC5	Corresponding PaM in NC6
TR9 - Tyre Labelling	Environmental performance requirements for motor vehicles and tyres (Regulations (EC) 661/2009, (EC) 1222/2009, EC 1235/2011, EC 228/2011 and (EU) 65/2012)
TR10 - Rolling Resistance Tyres (Regulation (EC) No 1222/2009)	
TR11 - Thematic Strategy on Urban Environment	Roadmap to a Single European Transport Area
TR12 - Directive on the promotion of clean and energy efficient road transport vehicles (Directive 2009/33/EC)	Clean Vehicles Directive (2009/33/EC)
TR13 - Freight Logistics Action Plan	Roadmap to a Single European Transport Area
TR14 - Aviation EU ETS (Directive 2008/101/EC)	Moved to chapter on cross-cutting PaMs
TR15 - Emissions from air conditioning systems in motor vehicles (Directive 2006/40/EC)	Moved to industry chapter

4.5. Sectoral policies and measures: Industrial processes

4.5.1. Overview

The following policies and measures are covered in this section:

- Regulation on certain fluorinated greenhouse gases (EU F gas Regulation No. 842/2006)
- Proposed revision of the F-Gas Regulation
- Emissions from air conditioning systems in motor vehicles (MAC-Directive 2006/40/EC)
- Industrial Emission Directive (2010/75/EU)
- Ecodesign Framework Directive (Directive 2009/125/EC)

The EU Emissions Trading Scheme is covered in section 4.2.2.

An overview table of these measures including information on their impact on CO_2 emissions can be found in CTF Table 3 in the CTF Appendix.

4.5.2. Regulation on certain fluorinated greenhouse gases (EU F-gas Regulation No 842/2006)

To control emissions from F-gases the European Union adopted two legislative acts in 2006: the Directive 2006/40/EC of the European Parliament and of the Council of 17 May 2006 relating to emissions from air conditioning systems in motor vehicles and

amending Council Directive 70/156/EEC[154] (further referred to as MAC Directive), and the Regulation (EC) No. 842/2006 of the European Parliament and of the Council of 17 May 2006 on certain fluorinated greenhouse gases[155] (further referred to as F-gas Regulation). The objective of the F-Gas Regulation is to contain, prevent and thereby reduce emissions of fluorinated greenhouse gases covered by the Kyoto Protocol. The F-gas Regulation follows two tracks of action:

- Improving the prevention of leaks from equipment containing F-gases. Measures comprise: containment of gases and proper recovery of equipment; training and certification of personnel and of companies handling these gases; labelling of equipment containing F-gases; reporting on imports, exports and production of F-gases (Articles 3, 4, 5, 6 and 7).

- Avoiding F-gases in some applications for which environmentally superior alternatives are cost-effective. Measures include restrictions on the placing on the market of certain products and equipment containing F-gases and certain use restrictions (Articles 8 and 9).

The Regulation has been supplemented by ten implementing acts or "Commission Regulations", which stipulate amongst other things reporting format, form of labels, standard leaking checking requirements, training of companies and personnel. Furthermore, reporting provisions have been introduced to facilitate monitoring of the Regulation's measures and ensure that its objectives are being met.[156]

In 2012 the European Commission proposed a revision of the F-gas Regulation to tighten its requirements (section 4.5.34.5.3).

In 2011 a study was published assessing the effectiveness of the F-Gas regulation[157] summarised in a Communication of the Commission[158]. It was found that the use and marketing restrictions (Articles 8 and 9) introduced by the Regulation achieved emission reductions of close to 3 million tonnes of CO_2 equivalents by the end of 2010.

154 OJ L 161, 14.6.2006, p.12.

155 OJ L 161, 14.6.2006, p.1.

156 Commission Regulation (EC) No 1493/2007 of 17 December 2007, OJ L 332, 18.12.2007

Commission Regulation (EC) No 1494/2007 of 17 December 2007, OJ L 332, 18.12.2007

Commission Regulation (EC) No 1516/2007 of 19 December 2007, OJ L 335, 20.12.2007

Commission Regulation (EC) No 1497/2007 of 18 December 2007, OJ L 333, 19.12.2007

Commission Regulation (EC) No 303/2008 of 2 April 2008, OJ L 92, 3.4.2008

Commission Regulation (EC) No 304/2008 of 2 April 2008, OJ L 92, 3.4.2008

Commission Regulation (EC) No 305/2008 of 2 April 2008, OJ L 92, 3.4.2008

Commission Regulation (EC) No 306/2008 of 2 April 2008, OJ L 92, 3.4.2008

Commission Regulation (EC) No 307/2008 of 2 April 2008, OJ L 92, 3.4.2008

Commission Regulation (EC) No 308/2008 of 2 April 2008, OJ L 92, 3.4.2008

157 Öko-Recherche GmbH et al., 2011: Preparatory study for a review of Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases. http://ec.europa.eu/clima/policies/f-gas/docs/2011_study_en.pdf

158 Report from the Commission on the application, effects and adequacy of the Regulation on certain fluorinated greenhouse gases (Regulation (EC) No 842/2006). COM(2011) 581. http://ec.europa.eu/clima/policies/f-gas/docs/report_en.pdf

However, the potential for further reductions in the applications covered by those restrictions is almost exhausted (section 4.1).

The evaluation of the effects of the containment and recovery provisions (Articles 3 and 4) was hampered by a lack of reliable and sufficiently long time-data series (at the time of study, i.e. 2010); however, a significant reduction of the leakage rates of affected equipment prior to 2010 seemed unlikely. If fully applied, a substantial reduction of leakage rates during the operation and end-of-life of affected equipment is expected, leading to emissions savings (section 4.1).

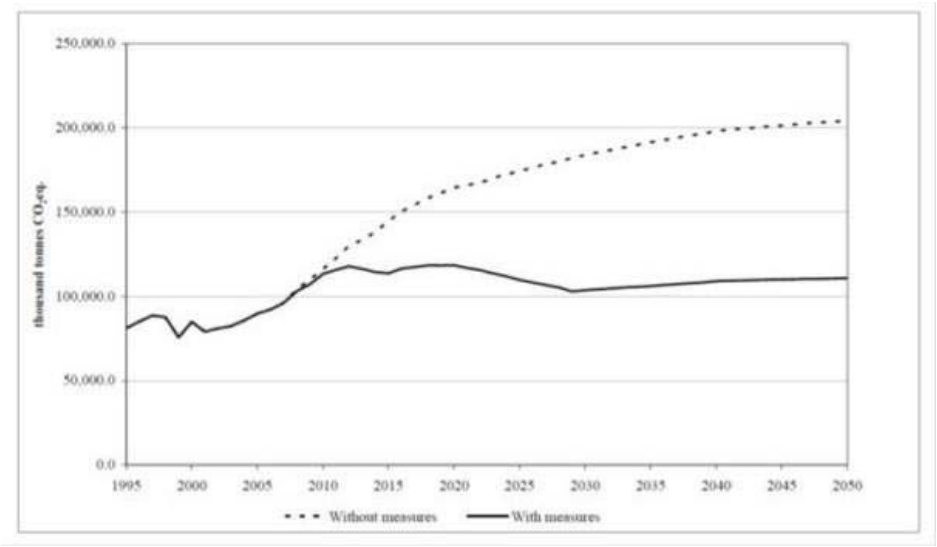
Table [BR1] ***Error! No text of specified style in document..****4 Achieved (by 2010) and expected emission reductions due to F-gas Regulation and MAC Directive (in kt CO_2 eq).*

		2008	2009	2010	2015	2020	2030	2050
MAC Directive		0	0	0	3 419	13 150	40 965	49 916
F-Gas Regulation	Art 3 and Art 4	0	0	0	24 357	29 478	35 609	38 815
	Art 8 and Art 9	909	2 687	2 861	3 012	3 223	3 750	4 616
Total		**909**	**2 687**	**2 861**	**30 787**	**45 850**	**80 325**	**93 347**

Source: Öko-Recherche GmbH et al., 2011: Preparatory study for a review of Regulation (EC) No. 842/2006 on certain fluorinated greenhouse gases

Figure [BR1] Error! ***No text of specified style in document.****-4* shows past and projected F-gas emissions in the EU without and with measures laid down in the F-gas Regulation and the MAC Directive. Without the legislation, emissions would have grown to twice the levels seen today, while the legislation will keep emission levels stable at ca. 110 million CO_2 eq.

Figure [BR1] ***Error! No text of specified style in document.****-4 Projections of F-gas emissions in the EU without and with the measures in the F-gas Regulation and the MAC Directive.*



Source: Öko-Recherche GmbH et al., 2011: Preparatory study for a review of Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases

With regard to the cost-effectiveness of the F-gas Regulation, abatement costs of 40.8 €/t CO_2 eq by 2015 and 41.0 €/t CO_2 eq by 2030 have been calculated on the basis of the existing legislation. Total costs for and from the implementation and application of the F-gas Regulation were estimated for industry, operators and authorities.

4.5.3. Proposed revision of the F-Gas Regulation

The current F-gas Regulation mainly focuses on reducing emissions of F-gases during the lifetime of equipment and its end-of-life treatment while it hardly restricts the use of F-gases in new equipment. At the same time, alternatives to F-gases that are safe and energy-efficient are already available today in nearly all fields of application.[159]

In November 2012 the European Commission proposed a revision[160] of the F-gas Regulation that would tighten its requirements. This was preceded by a review of the

159 Öko-Recherche GmbH et al., 2011: Preparatory study for a review of Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases.

160 Proposal for a Regulation of the European Parliament and of the Council on fluorinated greenhouse gases, COM (2012) 643 final, Brussels

adequacy of the Regulation[161], a public consultation in 2011 and an open stakeholder conference in 2012 on options for strengthening EU measures to reduce F-gas emissions in order to contribute to the transition to a low-carbon economy.

The new proposal anticipates bold steps to limit the use of F-gases in new equipment. The main new element is a phase-down measure that from 2015 would limit the total amount of HFCs that can be sold in the EU stepwise in order to reach one fifth of today's sales by 2030. In addition, F-gases would be banned in some equipment, such as household fridges, for which less harmful alternatives are widely available on the market today.

Existing legal requirements, such as the control of leaks, proper servicing of equipment and recovery of the gases at the end of the equipment's life are maintained and strengthened in the new proposal.

The proposal, mostly due to the phase-down approach, would save a further 72 Mt CO_2 eq by 2030 or two-thirds of today's emissions[162]. Cumulatively, an additional 625 million CO_2 eq would be saved from 2015 until 2030 (in addition to the savings resulting from existing legislation).

Overall effects on GDP (max. +/- 0.006%) and employment would be small. Administrative costs would be kept relatively low (total administrative costs of around € 2 million a year for a phase-down). This is because the reporting scheme under Regulation (EC) No. 842/2006 already provides most of the data needed to implement any policy options in the future. Average abatement costs are low (16 €/t CO_2 eq).

4.5.4. Emissions from air conditioning systems in motor vehicles (MAC-Directive 2006/40/EC)

Directive 2006/40/EC of the European Parliament and of the Council of 17 May 2006 relating to emissions from air conditioning systems in motor vehicles and amending Council Directive 70/156/EEC[163] aims at reducing emissions of specific fluorinated greenhouse gases in the air-conditioning systems fitted to passenger cars and light commercial vehicles.

The main objectives of the Directive are:

- the control of leakage of fluorinated greenhouse gases with a global warming potential (GWP) higher than 150 in MACs;
- the prohibition of MACs using those gases from a certain date onwards

161 Report from the Commission on the application, effects and adequacy of the Regulation on certain fluorinated greenhouse gases (Regulation (EC) No 842/2006), COM(2011) 581 final

162 Executive summary of the impact assessment "Review of Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases", SWD (2012) 363 final.

163 OJ L 161, 14.6.2006, p.12.

The MAC Directive lays down the requirements for the EC type approval or national type-approval of vehicles as regards emissions from, and the safe functioning of, air-conditioning systems fitted to vehicles. It also stipulates provisions on retrofitting and refilling of such systems.

The Directive is enforced in two phases:

(1) The first phase: since 21 June 2008 manufacturers have been unable to obtain a type approval for a new type of vehicle if fitted with MACs designed to contain F-gases with a GWP higher than 150 leaking more than 40 grams per year (one evaporator systems) and 60 grams per year (dual evaporator systems). As of 21 June 2009 this also applies to all new vehicles having been type-approved in the past.

(2) The second phase is the complete ban of MACs designed to use the above mentioned gases. This ban has been effective in principle for new types of vehicles (the manufacturers are unable to obtain a type approval for a new type of vehicle if it is fitted with this kind of systems) since 1 January 2011 and will be effective for all new vehicles from 1 January 2017. From that date onwards, new vehicles with these systems cannot be registered or sold, nor enter into service.

The MAC Directive is expected to achieve substantial emission reductions of approx. 13 million tonnes CO_2 equivalents by 2020 and almost 50 million tonnes by 2050.

4.5.5. Industrial Emissions Directive (2010/75/EU)

In December 2007 the Commission proposed a package (Communication[164] and Proposed Directive[165]) to streamline and improve the existing EC policy on industrial emissions. Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control[166] (further referred to as Industrial Emissions Directive – IED) entered into force on 6 January 2011 and had to be transposed into national legislation by Member States by 7 January 2013.

The directive is a recast of seven existing pieces of legislation aiming at achieving significant benefits to the environment and human health by reducing polluting emissions to the atmosphere, water and soil, as well as waste from industrial and agricultural installations across the EU, in particular through better application of Best Available Techniques (BAT).

164 Towards an improved policy on industrial emissions. COM(2007) 843 final.

165 Proposal for a Directive of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control). COM(2007) 844 final.

166 OJ L 334, 17.12.2010, p.17.

As of 7 January 2014 the Industrial Emissions Directive will replace:

- Directive 78/176/EEC on titanium dioxide industrial waste
- Directive 82/883/EEC on the surveillance and monitoring of titanium dioxide waste;
- Directive 92/112/EEC on the reduction of titanium dioxide industrial waste;
- Directive 1999/13/EC on reducing emissions of volatile organic compounds (VOCs);
- Directive 2000/76/EC on waste incineration;
- Directive 2008/1/EC concerning integrated pollution prevention and control.

As of 7 January 2016 the Industrial Emissions Directive will replace:

- Directive 2001/80/EC on the limitation of emissions of certain pollutants from large combustion plants.

The directive focuses on an integrated approach to prevention and control of emissions into air, water and soil, to waste management and to accident prevention. Greenhouse gas emissions will be affected by the use of techniques increasing energy efficiency.

The IED is the successor directive of the IPPC Directive, which aims at minimizing pollution from various industrial sources throughout the European Union. The directive addresses operators of more than 50 000 industrial installations (combustion plants (≥ 50 MW), waste incineration or co-incineration plants, certain installations and activities using organic solvents, installations producing titanium dioxide) operating activities covered by Annex I of the IED (energy industries, production and processing of metals, mineral industry, chemical industry, waste management, rearing of animals, etc.). These operators are required to obtain an integrated permit from the competent authorities in the EU countries. The permits must take into account the whole environmental performance of the plant, covering, for example, emissions to air including emission limits for polluting substances, water and land, generation of waste, use of raw materials, energy efficiency, noise, prevention of accidents, and restoration of the site upon closure.

The directive will lead to significant benefits for the environment and human health by reducing harmful industrial emissions across the EU, in particular through better application of Best Available Techniques. For the large combustion plants alone it will achieve net benefits of € 7-28 billion per year, including the reduction of premature deaths and years of life lost by 13 000 and 125 000 respectively[167].

The IED affects climate change in two ways:

- directly by regulating non-CO_2 greenhouse gases (CH_4, N_2O, fluorinated gases) to the extent they are not covered by the ETS and short-lived climate forces such as black carbon; and

- indirectly through energy efficiency measures and by making fuel switch more attractive;

by addressing CO (weak direct greenhouse gas) and indirect greenhouse gases (NOx, SOx, NMVOC) which produce the tropospheric greenhouse gas ozone via photochemical reactions in the atmosphere. The impact of reduced air emissions on climate change is complex and manifold depending on the air pollutant. CO and NOx react with other gaseous species in the atmosphere to form ozone[168]. The reduction of particles such as sulphates, nitrates and organic carbon will reduce global dimming hence impacting negatively on climate change.[169] CO, NOx and VOCs reduce the life-time of CH_4 via fast photochemistry of the hydroxyl free radical of OH radicals. It is well established that urban air pollution control policies are beneficial for human health and downwind ecosystems. As far as ancillary benefits are concerned, calculations suggest that air pollution policies may have only a small influence, either positive or negative, on mitigation of global-scale climate change[170].

The streamlining of permitting, reporting and monitoring requirements as well as a renewed cooperation with Member States to simplify implementation will lead to a reduction of unnecessary administrative burden of between € 105 and € 255 million per year[171].

4.5.6. Ecodesign Directive (2009/125/EC)

The Ecodesign Directive provides consistent EU-wide rules for improving the environmental performance of energy related products (ERPs).

167 Summary of the Impact Assessment accompanying the Proposal for a Directive of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) (Recast). SEC(2007) 1682.

168 V. Ramanathan, Y. Feng (2009): Air pollution, greenhouse gases and climate change: Global and regional perspectives. Atmospheric Environment 43 (2009) 37–50.

169 Rob Swart, Markus Amann, Frank Raes, Willemijn Tuinstra (2004): A Good Climate for Clean Air: Linkages between Climate Change and Air Pollution. An Editorial Essay. Climatic Change, October 2004, Volume 66, Issue 3, pp 263-269.

170 Ronald G. Prinn et al. (2005): Effects of Air Pollution Control on Climate. MIT Joint Program on the Science and Policy of Global Change.

171 Summary of the Impact Assessment accompanying the Proposal for a Directive of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) (Recast),SEC(2007) 1682.

For more details see section 4.3.11.

4.5.7. Interlinkages

The IED affects the waste and energy sector by reducing the amount of waste from industrial and agricultural installations. Maximising energy efficiency is a basic obligation for any industrial installation which carries out activities listed in Annex I to the Directive.

The proposal for a revised F-gas regulation also aims to ensure consistency in line with work the EU has conducted to encourage ecodesign and energy efficiency. Prohibitions of the placing on the market of specific products and equipment listed in Annex III of the proposed revised F-gas Regulation foresee an exemption for equipment based on lower lifecycle CO_2 emissions established by the ecodesign process.

4.5.8. Policies and measures no longer in place

Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control was repealed by Industrial Emission Directive (2010/75/EU) as of 7 January 2014 (cf. section 4.5.5).

4.6. Sectoral policies and measures: Agriculture

4.6.1. Overview

This chapter lists the most relevant climate change mitigation actions in the agriculture sector. The following areas of action are part of the Common Agricultural Policy (CAP):

- Agricultural Market and Income support (1st pillar of CAP)
- Rural Development Policy (2nd pillar of CAP)

In addition to the CAP, two environmental policy areas are described in this section, which are directly relevant to climate mitigation in agriculture:

- Soil Thematic Strategy
- Nitrates Directive

In addition to the policies and measures listed above, the Industrial Emissions Directive regulates the emissions of major pollution sources, including large agricultural facilities. For details on this Directive, please see section 4.5.5.

Agricultural land use is also included in LULUCF, please see section 4.7.

An overview of the measures can be found in CTF Table 3 in the CTF Appendix.

The European Common Agriculture Policy (CAP) is one of the main drivers of EU agricultural development. It was launched in 1962 and addresses many challenges: supporting food security, fair income for farmers, agricultural productivity, sustainable management of natural resources and climate change.

Since the eighties, the CAP has gone through a pathway of important reforms. The major ones are: 1984 (targeting surplus production), 1992 (shift from market support to producer support), Agenda 2000 (decoupling of support from production by introducing direct area payments granted to farmers on the condition of cross compliance[172]). The current policy framework for the period 2007-2013, reviewed in 2009, incorporates sustainability objectives, including mitigation efforts.

The CAP has two different set of policy instruments called pillars: the first one includes annual direct income support for farmers and measures aimed at better functioning of markets, the second pillar supports the development of rural areas on the basis on a multi-annual programming approach (rural development programmes) tailored to national and regional specificities.

In June 2013, a political agreement on the new legal framework for the CAP for the period 2014-2020 has been agreed on the basis of the proposals by the European Commission of October 2011[173]. The new CAP aims to achieve three basic objectives: viable food production, sustainable management of natural resources and climate action, and balanced territorial development of rural areas. The new CAP will further enhance the existing policy framework for sustainable management of natural resources on which agricultural activity depends, and which agricultural activity influences, contributing to both climate change mitigation and enhancing the resilience of farming to the threats posed by climate change and variability.

4.6.2. Agricultural Market and Income support (1st pillar of CAP)

Environmental considerations, including climate change mitigation, have been integrated into the CAP. The following actions under the first pillar, *inter alia*, contribute to reducing greenhouse gas emissions of the agriculture sector[174]:

- Cross-compliance links financial support via direct area payments to the respect of environmental and other regulatory standards, as well as the maintenance of agricultural land in Good Agricultural and Environmental Conditions (GAEC). Ensuring respect of Nitrates Directive provisions, protection of permanent grasslands, soil protection provisions, obligation to

172 Cross-compliance is a mechanism that links direct payments to compliance by farmers with basic standards concerning the environment, food safety, animal and plant health and animal welfare, as well as the requirement of maintaining land in good agricultural and environmental condition. (For further information see: http://ec.europa.eu/agriculture/envir/cross-compliance/index_en.htm,).

173 Legal proposals for the CAP after 2013: http://ec.europa.eu/agriculture/cap-post-2013/legal-proposals/index_en.htm; accessed 25 July 2013

174 The role of European agriculture in climate change mitigation. SEC(2009) 1093 final.

establish and maintain buffer strips along the water courses are important for reducing greenhouse gas emissions from agriculture and protecting organic carbon stocks in agricultural soils.

- Within the operational programmes in the fruit and vegetables sector, producers and producers' organisations can receive support for investments aimed at energy savings, generation and use of renewable energies, and introduction of co-generation systems.

At present, no comprehensive quantified estimates of the impact of current and future actions under the first pillar of the CAP on greenhouse gas emissions are available.

The recent reform of the CAP has introduced new elements contributing to a low emissions agriculture sector mainly a new mandatory 'greening' component of direct payments. In order to obtain up to 30% of direct payments farmers would be obliged from 2015 onwards to undertake certain environmental actions going beyond cross compliance requirements on their farms, such as protection of permanent pasture, respecting minimum crop diversification, and establishing "ecological focus areas" on at least 5% of the arable land. The “"ecological focus areas”" can include non-farmed land, green features such as for example hedges, groups of trees, ponds, or land in management beneficial for mitigation and production of renewable energies such as agro-forestry, unfertilised short rotation coppice or catch crops.

4.6.3. Rural Development (2nd Pillar of CAP)

The EU's rural development (RDP) has evolved as part of the further development of the CAP, from a policy dealing with the structural problems of the farming sector to a policy addressing the multiple roles of farming in society and, in particular, challenges faced in its wider rural context. The Agenda 2000 established rural development as the 2nd pillar of the CAP, to accompany the further reform of market policy[175].

Rural development represents the second pillar of the CAP, and receives at present about a fourth of the total budget allocated to the CAP.

Under a common legislative framework on support for rural development[176],Member States draw up and co-finance multiannual rural development programmes (RDPs), at national or regional level, choosing those measures that suit the needs of their rural areas best and taking into account EU priorities. These programmes are then approved by the Commission by means of an implementing act. Currently, the 2007-2013 rural development programmes (RDPs) are in final stages of implementation, with the completion of all the actions supported under the programmes foreseen for the end of 2015.

175 Factsheet The EU rural development policy 2007-2013, http://ec.europa.eu/agriculture/publi/fact/rurdev2007/en_2007.pdf,.

176 Council Regulation (EC) No 1698/2005 of 20 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)

In the current RDPs, the following actions, *inter alia*, are the most important in terms of their contribution to reducing agricultural GHG and protecting and enhancing organic soil carbon stocks[177]:

- Incentives for reduction of CH_4 and NO_2 emissions are provided through support measures aimed at improving management of animal waste

- Measures supporting specific land management practices, mainly through agri-environmental schemes, targeted to more efficient use of fertilisers and to improved soil management are important for reducing nitrous oxide emissions. In addition, measures which support erosion prevention and build up of soil organic matter help reducing emissions from agricultural soils and contribute to soil carbon sequestration.

- Improvement of energy efficiency, renewable energy generation and use, including biomass, can be supported through investment measures available to farmers, small and medium enterprises in agri-food industry, and rural communities.

Forestry measures which are also supported through RDP are presented in section 4.7.2.

The legal framework for the EU Rural Development for 2014-2020 has been reviewed as part of the political agreement for the CAP reform (June 2013); the new generation of programmes will be based on the revised legal provisions. The priorities set for the policy framework reflect the increased importance of a more sustainable development of agricultural activities and rural areas, which two of them focused on environment and climate mitigation and adaptation objectives. The objectives of the new rural development support are:

(1) Foster knowledge transfer and innovation

(2) Enhance competitiveness of all types of agriculture

(3) Promote food chain organisation and risk management

(4) Restore, preserve and enhance ecosystems dependent on agriculture and forest

(5) Promote resource efficiency, low carbon and climate resilient agriculture

(6) Promote social inclusion, economic development in rural areas

The increased strategic emphasis on addressing climate change is the most important element of the future rural development, with mitigation and increasing resilience to climate change as a cross-cutting objective that needs to be considered across all

177 The role of European agriculture in climate change mitigation, SEC(2009) 1093 final.

priorities and actions. Similarly to the current period, the proposal for the 2014-2020 period[178] lists a number of individual measures from which Member States will be able to choose. The scope of the measures has been enlarged, with addition of new forms of support for cooperation in different areas (economic, environmental and social) between a wide range of potential beneficiaries, further incentives for actions undertaken by groups of farmers, and the horizontal priority of fostering knowledge and innovation, including action over climate change.

The Common Monitoring and Evaluation Framework of the EU Rural Development takes into account monitoring and evaluation of the measures addressing climate change, both mitigation and improving resilience of agriculture to the climate change and variability. Based on the results of monitoring of RDPs for the period 2007-2011 support for such measures was provided through RDPs on 31.8 million hectares, representing about 18% of the Total Agricultural Area of the EU. This includes the area supported through forestry measures under RDPs, see section 4.7.2.

The ex-post evaluation of the RDPs will estimate the total production of renewable energy from agriculture and forestry supported via RDPs, as well as change in the GHG emissions from agriculture. However, no comprehensive methodology allowing for accurate monitoring of only mitigation impact of the measures of the RDPs is available at present.

It is proposed that the Common Monitoring and Evaluation System set up for the whole of the CAP (both 1st and 2nd pillar) for the period 2014-20 will refine monitoring and evaluation of results of climate mitigation actions under this policy. E.g. for the RDPs further indicators are being developed, such as level of soil organic matter in arable soils, reduction in energy use by supported farms and enterprises, reduction in emissions of methane and nitrate dioxide, and proportion of agricultural and forestry land subject to management measures contributing to carbon sequestration.

4.6.4. Soil Thematic Strategy

Soil is relevant for GHG emissions as a carbon pool that can act as a significant sink or source of carbon. The global soil carbon pool contains 1 500 gigatonnes (Gt) of soil organic and inorganic carbon. Many management interventions lead to a reduction of carbon stock and thus CO_2 emissions. Reducing these emissions can be a potent mitigation measure, and helps maintain soil productivity and resilience. Carbon sequestration in agricultural soils can also make an important contribution to climate change mitigation. Some sources estimate this to be around 2 Gt of carbon per year. As part of the Climate Change Programme, the potential of soils for carbon sequestration

178 Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on support for rural development by the European Agricultural Fund for Rural Development (EAFRD). COM(2011) 627 final/2.

was estimated to be equivalent to 1.5-1.7% of the EU's anthropogenic CO_2 emissions during the first commitment period of the Kyoto Protocol[179].

The European Commission adopted a Soil Thematic Strategy in September 2006[180], which was preceded by an extensive consultation process which had started in 2002. The Strategy tackles the full range of threats associated with soil degradation and creates a common framework for the protection of soil.

The general objectives of the Soil Thematic Strategy are:

- Preventing further soil degradation and preserving the soil's functions:
    - when soil is used and its functions are exploited, action has to be taken for soil use and management patterns, and
    - when soil acts as a sink/receptor of the effects of human activities or environmental phenomena, action has to be taken at source.
- Restoring degraded soils to a level of functionality consistent at least with current and intended uses, thus also considering the cost implications of the restoration of soil.

In 2006 the European Commission presented a proposal for a Soil Framework Directive[181], which is still being negotiated. The main challenge is that soil protection is a cross-cutting issue and therefore integrated in different EU and national policies. At Member State level, approaches to soil protection vary from one country to another. The proposed Directive aims at establishing a common strategy for the protection and sustainable use of soil based on the principles of integration of soil concerns into other policies, preservation of soil functions within the context of sustainable use, prevention of threats to soil and mitigation of their effects, as well as restoration of degraded soils to a level of functionality consistent at least with the current and approved future use[182].

The Soil Thematic Strategy is based on four pillars[183]:

- Awareness raising: As soil degradation generally goes unnoticed, measures to raise awareness of soil functions and their fundamental importance are taken, which will help to ensure that soil protection will be considered in all actions that are taken.

179 Thematic Strategy for Soil Protection, Impact Assessment of the Thematic strategy on soil protection, SEC(2006)620, page 13.

180 Thematic Strategy for Soil Protection, Impact Assessment of the Thematic strategy on soil protection, SEC(2006)620.

181 Proposal for a Directive of the European Parliament and of the Council establishing a framework for the protection of soil and amending Directive 2004/35/EC, COM(2006) 232 final..

182 Factsheet: Soil- a key resource for the EU, European Commission, Brussels, September 2010.

183 Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, The implementation of the Soil Thematic Strategy and on-going activities, COM(2012) 46 final.

Press release, Commission calls for stronger response to soil degradation, European Commission, Brussels, 13th February 2013.

- Research: Under the 7th Framework Programme for research around 25 projects have been funded specifically to address soil issues and help complete a knowledge basis for action.

- Integration: The Commission succeeded in integrating soil protection in different EU policies: e.g. Common Agricultural Policy, Industrial Emission Directive, Cohesion Policy, state aid for the remediation of soil contamination.

- Legislation: As the objective is to provide a common framework, an adoption of the proposed Soil Framework Directive from 2006 would be a major step forward. But a decision on this has not yet been taken by the Council.

An estimation of the mitigation impact based on existing literature is not available due to a lack of reliable data; in addition, conducting an assessment of future developments (sealing of soils, land use changes, erosion, etc.) has proved to be rather difficult.

The impact assessment under the Strategy focuses on the costs of soil degradation, and examines different policy options for their costs and benefits. Quantitative estimates of changes in soil carbon pools as a result of specific policies are not included.

4.6.5. Nitrates Directive

Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources[184] (further referred to as Nitrate Directive) is one of the earliest pieces of EU legislation aimed at preventing water pollution and improving water quality. The Nitrates Directive forms an integral part of the Water Framework Directive and is one of the key instruments in the protection of waters against agricultural pressures.

The purpose of the Water Framework Directive[185] is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater. Its objective is to get polluted waters clean and to ensure that clean waters are kept clean. It is designed to manage water quality, and water quantity (especially for groundwater), by also involving the citizens through public participation.

While nitrogen is a vital nutrient that helps plants and crops to grow, high concentrations are harmful to people and nature. The agricultural use of nitrates in organic and chemical fertilizers has been a major source of water pollution in Europe. Annual N fertilizer consumption in the EU is currently about 11 million tonnes – almost 30% below the peak of twenty five years ago. The average mineral N fertilizer use in 2008–2010 decreased by 6% compared to that in 2006–2007. Since 2010, N fertilizer

184 OJ L 375, 31.12.1991, p.1.

185 Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy

use has remained stable[186]. Generally, farming remains responsible for over 50% of the total nitrogen discharge into surface waters[187].

In order to meet its objective, the Nitrates Directive contains different actions and measures to be elaborated and implemented by the Member States, like monitoring of waters, identification of nitrates vulnerable zones (NZV), establishment of Codes of Good Agricultural Practices (CGAP) and implementation of actions plans.

These measures must ensure that, for each farm or livestock unit in the vulnerable zones, the amount of N applied in livestock manure to the land each year – including that deposited directly by grazing animals – shall not exceed 170 kg/ha.

Every four years the MS shall submit a report to the European Commission on their progress in implementation of measures and actions..

On the basis of the report received by Member States, the Commission publishes a summary report. The latest summary report is available for the period 2004-2007[188]; an update, relating to the reporting period 2008-2011, is expected in mid-2013.

Between 2000 and 2010, N_2O emissions from agricultural soils in the EU-27[189] saw a 10% decrease. The implementation of the Nitrate Directive contributed to this decrease. In particular, in a project report from Alterra[190], two scenarios were compared (with and without the Directive). According to this comparison, the total N_2O emission in EU-27 was 3.1% higher without Nitrates Directive than with it in 2000. In 2008, the effect increased to 6.3%. In particular, implementation of the Directive has decreased the N fertilizer input and the N excretion of dairy cattle, thus resulting in a decrease of N_2O emissions. The report also states that a further decrease in N emissions in the near future is expected as the implementation of measures set out in the Nitrates Directive is expected to increase because i) the area designated as NVZs ("Nitrate Vulnerable Zones") in EU-27 is expected to increase and ii) the time schedules for the measures foreseen in the Action Programmes will become stricter (e.g. fertilizer application standards).

Likewise, implementation of the Nitrates Directive has contributed to the establishment of better manure management systems in Europe, contributing to a reduction of greenhouse gases emissions originating from this sector.

186 Source: Eurostat and Fertilizers Europe.

187 Factsheet: The EU Nitrates Directive, European Commission, Brussels, January 2010.

188 Report from the Commission to the Council and the European Parliament on implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources based on Member State reports for the period 2004-2007, SEC (2011) 909.

189 Source: EEA dataviewer, accessed 28th March 2013.

190 The impact of the Nitrates Directive on gaseous N emissions, Effects of measures in nitrates action programme on gaseous N emissions, Contract ENV.B.1/ETU/2010/0009, Wageningen, 2010.

4.6.6. Interlinkages

The two pillars of the CAP are strongly strongly interrelated; for instance. cross compliance provisions apply to income support as well as many land based payment payments under rural development. Agricultural development is part of many policies (like health, enterprises, economy, and environment), but considered under the aspect of overlaps with other UNFCCC sectors: energy generation und energy use, forestry and land use change and waste have to be mentioned.

In terms of interlinkages the energy sector is of relevance when the agricultural sector provides renewable energy (e.g. biogas) and material (e.g. biomass) which contribute positively to climate change mitigation if used to substitute fossil sources of energy and energy intensive material, and the generation and use of renewable energy in agriculture, agri-food sector and rural areas are supported under pillar II of the CAP.

The **Soil Thematic Strategy** is relevant for biodiversity, water, waste and chemical management. In the Environmental Impact Assessment Directive, due to be reviewed soon, soil protection will be considered as well. Within the agriculture sector, the CAP measure also aim for prevention of soil erosion and maintaining and increasing organic matter in soils. A sustainable management of forest, as aimed for by the EU Forest Strategy, also contributes positively to an increase of the soil carbon pool.

The **Nitrates Directive** is closely linked with other EU policies which are relevant for climate change mitigation, such as the Common Agricultural Policy and the Water Framework Directive. The Common Agricultural Policy backs up the implementation of Nitrates Directive through the cross compliance conditions for receiving direct support and positive measures aimed at improved management of animal waste and reduction in use of synthetic fertilisers under RDPs. For example, several Member States have included nutrient management measures, such as reduction in use of synthetic nitrogen fertilisers or wider buffer strips around water courses in the agri-environmental schemes for which farmers can receive remuneration for their contribution to curb nitrate pollution beyond what is legally required.

There is also a link with the National Emission Ceilings Directive, which sets ceilings for NH_3 emissions; thus, efforts which are undertaken in accordance with the Nitrates Directive will also support the reduction of ammonia emissions.

4.6.7. Policies and measures no longer in place

Currently, no EU policies and measures in the agricultural sector are to be mentioned as no longer in place.

4.7. Sectoral policies and measures: Land use, land use change and forestry

LULUCF (Land use, land use change and forestry) policies target emissions and removals resulting from activities related to land use and land-use change on forest land, cropland, grassland, wetlands, settlement areas, and on other land. So, these activities have a strong link with the agriculture sector (see section 4.6) and cover much more than forestry.

While the Treaty on the Functioning the EU makes no reference to specific provisions for an EU forest policy, the EU has a long history of contributing through its policies to implementing sustainable forest management and to Member States' decisions on forests.

The following policies have not been included in the list of policies described in separate chapters below as their impact on climate change mitigation in this sector is estimated to be rather low within the EU:

- EU Biodiversity Strategy to 2020: Strategy with the aim of halting the loss of biodiversity and improving the state of Europe's species, habitats, ecosystems and the services they provide over the next decade: Target 3 of the strategy – "Increase the contribution of agriculture and forestry to maintaining and enhancing biodiversity" – is the most relevant target for climate change mitigation and will help to protect forests and promote an environmentally friendly agriculture.

- EU Timber Regulation[191]: This new piece of legislation prohibits the placing of timber on the EU market if it is illegally harvested. To achieve this, it sets out procedures which those who trade timber within the EU must put in place to minimize the risk of illegal timber being sold. It will thus help to fight deforestation, climate change and biodiversity loss.

- The EU Action Plan for Forest Law Enforcement, Governance and Trade (FLEGT): the basis for the EU Timber Regulation. It specifies a number of measures aimed at excluding illegal timber from markets, improving the supply of legal timber and increasing the demand for responsible wood products. A central element of the EU's strategy to combat illegal logging are trade accords with timber exporting countries, known as Voluntary Partnership Agreements, in order to ensure legal timber trade and to support good forest governance in the partner countries.

- The European Forest Fire Information System (EFFIS) supports the services in charge of the protection of forests against fires in the EU countries and provides the European Commission services and the European Parliament with

191 Regulation (EU) No 995/2010 of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market.

updated and reliable information on wildland fires in Europe. EFFIS provides assessments from pre-fire to post-fire phases, thus supporting fire prevention, preparedness, fire fighting and post-fire evaluations. These actions will contribute to the protection of forests from fire, and thereby reduce carbon losses.

On international level the so-called "FOREST EUROPE" initiative (formerly known as "The Ministerial Conference on the Protection of Forests in Europe") is driving the political process for the sustainable management of the continent's forests. FOREST EUROPE develops common strategies for its 46 member countries and the European Union on how to protect and sustainably manage forests. Since 1990, the collaboration of the ministers responsible for forests in Europe has had a great economic, environmental and social impact on national and international levels. FOREST EUROPE has led to achievements such as the guidelines, criteria and indicators for sustainable forest management[192]. At the FOREST EUROPE Ministerial Conference held in Oslo on 14-16 June 2011, ministers responsible for forests decided on the elaboration of a legally-binding agreement (LBA) on forests in the pan-European region. The negotiations to establish the LBA are currently on-going. The LIFE+ funding programme[193] (see further description in section 8.2.1.2 of EU's 6th National Communication) also covers forest related projects, as it replaces the former Forest Focus Programme. The programme covers topics like biodiversity, climate change, carbon sequestration, soils and protective functions of forests. Thereby projects funded by this financial instrument contribute to sustainable forest management.

The following policies and measures are covered in this section:

- EU Forest Strategy
- Forestry measures within Rural Development Plan
- LULUCF Accounting

An overview of the measures including information on their impact on CO_2 emissions can be found in CTF Table 3 in the CTF Appendix.

4.7.1. EU Forest Strategy

In September 2013 the Commission has adopted a new EU Forest Strategy[194] responding to the new challenges facing forests and the forest sector in the Horizon 2030. The Strategy emphasises a holistic view of forests, and promote sustainable forest management (SFM) and the multifunctional role of forests, improving competitiveness

192 Source: http://www.foresteurope.org/about_us/foresteurope, accessed 6 May 2013.

193 Regulation (EC) No 614/2007 of the European Parliament and of the Council of 23 May 2007 concerning the Financial Instrument for the Environment (LIFE+) -

194 Communication on a new EU Forest Strategy: for forests and the forest-based sector COM(2013) 659 final

and job creation, particularly in rural areas, while ensuring the protection and provision of ecosystem services that depend on forests. The Strategy is based on three principles:

- Sustainable forest management and the multifunctional role of forests, delivering multiple goods and services in a balanced way and ensuring forest protection;
- Resource efficiency, optimising the contribution of forests and the forest sector to rural development, growth and job creation.
- Global forest responsibility, promoting sustainable production and consumption of forest products.

It has a mid-term 2020 target "to ensure and demonstrate that EU forests are managed according to sustainable forest management principles and that the EU's contribution to promoting sustainable forest management and reducing deforestation at global level is strengthened, thus:

- - contributing to balancing various forest functions, meeting demands, and delivering vital ecosystem services and;
- - providing a basis for forestry and the whole forest-based value chain to be competitive and viable contributors to the bio-based economy.

The Strategy highlights that forests are not only important for rural development, but also for the environment - especially for biodiversity, for forest-based industries, bioenergy and in the fight against climate change. A mid-term review is foreseen in 2018.

Earlier developments include the 1998 EU Forestry Strategy and the 2006-2011 Forest Action Plan.

In 1998, the EU Council adopted an EU Forestry Strategy[195] which positions the application of sustainable forest management and the multifunctional role of forests as its overall principles. The Strategy was reviewed in 2005, and the Commission presented an EU Forest Action Plan in 2006 as the main instrument for implement the EU Forest Strategy. It covered activities from 2007 to 2011.The EU Forest Plan's four objectives are to:

- improve the long-term competitiveness of the forest sector and to enhance the sustainable use of forest products and services;
- maintain and appropriately enhance biodiversity, carbon sequestration, integrity, health and resilience of forest ecosystems at multiple geographical scales;

195 Council Resolution of 15 December 1998 on a forestry strategy for the European Union (1999/C 56/01).

- contribute to the quality of life by preserving and improving the social and cultural dimensions of forests; and

- improve coherence and cross-sectoral cooperation in order to balance economic, environmental and socio-cultural objectives at multiple organizational and institutional levels.

In terms of GHG mitigation, the second objective is of special relevance as it targets the carbon sink capacity of forests. For more information on the respective key action, see section 4.7.3, below).

In the Forest Action Plan[196] several key actions clearly refer to climate change mitigation:

- Key action 4: Promote the use of forest biomass for energy generation

- Key action 6: Facilitate EU compliance with the obligations on climate change mitigation of the UNFCCC and its Kyoto Protocol and encourage adaptation to the effects of climate change

- Key action 9: Enhance the protection of EU forests

- Key action 17: Encourage the use of wood and other forest products from sustainably managed forests.

Mitigation impacts have not been estimated as there are many policies that influence forestry activities and it is almost impossible to determine the mitigation potentials of one particular policy.

4.7.2. Forestry measures within Rural Development measures

Forestry is an integral part of rural development; support for sustainable and climate-friendly land use should encompass forest area development and sustainable management of forests. During the 2007-2013 programming period (see also section 4.6.3), a variety of measures were adopted covering different types of support for forestry investments and management.

Rural development programmes offer a range of possibilities for supporting sustainable forest management and the multifunctional role of forests, through measures aiming at:

- improving the long-term competitiveness of the sector,

196 Communication from the Commission to the Council and the European Parliament on an EU Forest Action Plan, COM(2006)302 final.

- protecting and enhancing of natural resources and
- preserving high natural value forestry systems [197].

Eight measures in the current rural development framework are specifically focused on forestry[198].

- Measure 122 – Improvement of the economic value of forests
- Measure 221 – First afforestation of agricultural land
- Measure 222 – First establishment of agro-forestry systems on agricultural land
- Measure 223 – First afforestation on non-agricultural land
- Measure 224 – Natura 2000 payments
- Measure 225 – Forest-environment payments
- Measure 226 – Restoring forestry potential and introducing prevention actions
- Measure 227 – Non-productive investments (forestry)

These eight forestry measures account for a budget of around € 9 billion for 2007-2013. The EAFRD contribution amounts to around € 5 billion. This allocation accounts for 5.8% of the total public expenditure (€ 154 billion) on rural development for 2007-2013 in the EU-27 level.

An estimation of the expected mitigation impact up to 2020 cannot be provided, but the proposed regulation will clearly contribute to the achievement of the objectives of the EU climate and energy package adopted in 2008. As regards the EU-wide overall 10 % reduction in the 2005-2020 period for sectors not covered by the ETS, the carbon sink function of forests is essential, along with the potential for forest biomass-based energies to replace fossil fuels, which would contribute to a decrease in emissions in the energy use sector.

Forestry has also been integrated in the rural development regulation for the period 2014-2020[199], which provides increased possibilities to support the mitigation potential of forests as well as adaptation; new types of support includes for instance actions for

197 ENRD 2012: Thematic Information Sheets 2007-2011, Nr. 06: Supporting Forestry, European Network for Rural Development (ENRD), updated in December 2012.

198 ENRD 2012: Thematic Information Sheets 2007-2011, Nr. 06: Supporting Forestry, European Network for Rural Development (ENRD), updated in December 2012.

199 Proposal for a regulation of the European Parliament and of the Council on support or rural development by the European Agricultural Fund for Rural Development (EAFRD), COM(2011)627 final/2.

mobilising wood, support to producer groups, conservation and promotion of genetic resources, and preventive actions against pests and diseases.

4.7.3. LULUCF accounting

Greenhouse gas emissions and removals from LULUCF activities are reported to the UNFCCC, but only partially accounted for. According to Article 3.3 of the Kyoto Protocol net carbon changes due to afforestation and deforestation since 1990 can be accounted for; carbon stock changes due to forest management can be accounted for as well, up to a nationally defined cap (Article 3.4 of the Kyoto Protocol).

When the EU Climate and Energy Package was agreed upon in 2008-2009, CO_2 emissions and removals resulting from LULUCF activities were not included, mainly due to a lack of accounting rules at the time. A process of dealing with this accounting deficiency was started in 2010, and in March 2012 a proposal for a decision was put forward by the European Commission[200].

In April 2013, the decision on accounting rules on greenhouse gas emission and removals resulting from activities relating to land use, land-use change and forestry and on information concerning actions relating to those activities has been adopted[201]. It provides the basis for a formal inclusion of the LULUCF sector in the EU's emission reduction targets, and ensures a harmonized legal framework across Member States, allowing the collection of reliable data by robust accounting and reporting in a standardized way. These data will be needed when LULUCF mitigation potentials are to be included in emission reduction targets as a second step after the setting the accounting rules.

The decision is in accordance with the UNFCCC framework, and based on the international rules for the second commitment period negotiated in Durban 2011 but will go further in enhancing environmental integrity and the completeness of accounting.

The objective of the Decision is to lay down rules for the accounting in the LULUCF sector in order to make use of the mitigation potential of the LULUCF sector by increasing the visibility of mitigation efforts in agriculture, forestry and related industries. It sets out the obligation for Member States to provide information on their LULUCF actions to limit or reduce emissions and to maintain or increase removals.

Besides accounting rules, Member States are required to draw up information on their current and future LULUCF actions to limit or reduce emissions and maintain or

200 Proposal for a Decision of the European Parliament and of the Council on accounting rules and action plans on greenhouse gases and removals resulting from activities related to land use, land use change and forestry, COM(2012) 93 final.

201 Decision No 529/2013/EU of the European Parliament and of the Council of 21 May 2013 on accounting rules on greenhouse gas emissions and removals resulting from activities relating to land use, land-use change and forestry and on information concerning actions relating to those activities. OJ L 165, 18.6.2013, p. 80..

increase removals (Art.10). The decision describes clearly which information is to be included in these reports (e.g. trends, projections, appropriate measures). The reports must be submitted by mid-2014, and must cover the period up to 2020 (end of first accounting period). The information on LULUCF actions is needed for four reasons[202]:

- to ensure that Member States include LULUCF in their wider climate change mitigation strategies;
- to raise the awareness and profile of such measures and their benefits;
- to enable a follow-up of trends in emissions and removals of carbon in the sector; and
- to complement and balance national renewable energy action plans as well as to develop adequate incentive structures, especially in the future Common Agricultural Policy.

The accounting rules do not have a direct influence on the mitigation of climate change, but will trigger policies which contribute to sustainable land and forest use, and increasing carbon stocks. A quantification of the impact is not possible.

4.7.4. Interlinkages

Due to the forest's socio-economic and environmental functions, interlinkages are given to other areas like agriculture, energy, climate, enterprise, etc. Interlinkages with measures of various fields are given:

- Energy-related measures: as forests are producing biomass, which can be used to replace fossil fuels
- Agriculture-related measures: especially the rural development policy, as it targets agricultural land as well as forests
- Soil- & water-related measures: forests contribute to prevent soil degradation and protect water resources
- Industry-related measures, if wood is used to substitute other raw materials, like metal, concrete or plastics.

202 Questions & Answers on accounting rules and action plans on greenhouse gas emissions and removals resulting from activities related to land use, land use change and forestry (LULUCF), MEMO/12/176, March 2012, Brussels.

4.7.5. Policies and measures no longer in place

The Forest Focus Regulation[203] ended in 2006, without follow-up.

4.8. Sectoral policies and measures: Waste

4.8.1. Overview

The direct and indirect benefits for climate change mitigations are directly correlated with the application of the waste hierarchy promoted by the Waste Framework Directive 2008/98 (Article 4). In other words, prioritization on the basis of the hierarchy delivers the best results for climate mitigation.

As a priority, the biggest reduction potential resides in waste prevention and sustainable consumption by the reduction in resource use, production patterns, transport, logistics and consumption behaviour along the chain.

Next, preparing for the re-use and recycling of waste has an important impact in substituting the extraction and transformation of primary raw materials as well as related transport.

Finally, climate-relevant policies and measures relating to solid waste disposal, biological treatment of waste, waste incineration and open burning of waste, as well as wastewater treatment and discharge, are relevant. One of the most relevant GHGs from this sector is methane (CH_4), which mainly arises from the treatment and disposal of solid waste. N_2O mainly arises from waste water treatment. CO_2 resulting from the combustion of non-fossil waste is not accounted for because of the biogenic origin of the waste. Emissions from the burning of waste containing fossil carbon are accounted for, either in this sector if the energy is not recovered, or in the energy sector if it is recovered.

The following policies and measures are covered in this section:

- Waste Framework Directive
- Landfill Directive
- Waste Incineration Directive
- EU policies targeting waste streams

203 Regulation (EC) No 2152/2003 of the European Parliament and of the Council of 17 November 2003 concerning monitoring of forests and environmental interactions in the Community (Forest Focus); OJ L 324, 11.12.2003, p. 1–8

- Management of Biodegradable Waste
- Urban Waste Water Directive.

An overview of the measures including information on their impact on CO_2 emissions can be found in CTF Table 3 in the Appendix.

4.8.2. Waste Framework Directive

In 1975, the first piece of legislation providing a framework for waste management was published (Council Directive 75/442/EEC of 15 July 1975 on waste[204]), which laid down the principles of waste management: (1) prevention of waste, (2) recovery of waste, and (3) its use as a source of energy.

In 2005, the Commission adopted a thematic strategy[205] which set the long-term goal for the EU to become a recycling society that seeks to avoid waste and uses waste as a resource. In 2006, this was followed by a new Waste Directive, the Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste[206], repealing the Directive of 1975.

In 2008, Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives[207] (further referred to as Waste Framework Directive) came into force, establishing a legal framework for the management of waste to cope with the challenge of decoupling economic growth from waste generation and promoting strict hierarchy of intervention for waste prevention and management.

The thematic strategy was reviewed in 2011[208]. The conclusion of the review was that significant progress has been achieved, e.g. that municipal solid waste generation has stabilized, overall waste recycling has increased, energy recovery from waste has also increased and less waste has been sent to landfills. However, even if more than 80% of waste is recycled in some Member States, indicating the possibilities of using waste as one of the EU's key resources, there are large differences between the Member States in terms of recycling performance and projections of waste generation and treatment trends indicate that without additional measures, waste generation is expected to increase by 7% from 2008 to 2020, which suggests a need for further consolidation of EU waste policies.

The Roadmap to a Resource Efficient Europe (COM(2011) 571), published in September 2011, outlines how we can transform Europe's economy into a sustainable

204 OJ L 194, 25.7.1975, p.39..

205 Taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste. COM(2005) 666 final.

206 OJ L 114, 27.4.2006, p.9.

207 OJ L 321, 22.11.2008, p.3.

208 Report from the Commission to the European Parliament, the Council the European Economic and Social Committee and the Committee of the Regions on the Thematic Strategy on the prevention and recycling of waste, COM(2011) 13 final.

one by 2050. It proposes ways to increase resource productivity and decouple economic growth from resource use and its environmental impact. It illustrates how policies interrelate and build on each other. The Roadmap includes a set of concrete waste-related proposals and aspirational objectives ("milestones") to be achieved by 2020:

- waste generated per person should be in decline;
- recycling and re-use should be at their maximum level;
- incineration should be limited to non-reusable or recyclable materials; and
- last but not least, landfilling should be virtually eliminated as a waste management option.

These objectives are also now transposed in the 7th Environment Action Programme (EAP), currently under discussion with the Council and the European Parliament.

Taking as a basis the aspirational objectives, the Commission is launching a review of key targets in EU waste legislation (in line with the review clauses in the Waste Framework Directive, the Landfill Directive and the Packaging Directive). The results of this review will be presented in 2014.

Directive 2008/98/EC sets out the basic concepts and definitions related to waste management, such as definitions of waste, recycling and recovery. It explains when waste ceases to be waste and becomes a secondary raw material (so-called end-of-waste criteria) and how to distinguish between waste and by-products. The Directive lays down some basic waste management principles[209]. it requires that waste be managed without endangering human health and harming the environment, and in particular without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest. Waste legislation and policies in the EU Member States should contain provisions for waste management which are in accordance with the priority order of the following waste management hierarchy:

209 Source of information: http://ec.europa.eu/environment/waste/framework/index.htm, accessed 26 April 2013)

Figure [BR1] ***Error! No text of specified style in document.****-5 Waste principles*

Source: http://ec.europa.eu/environment/waste/framework/index.htm.

The Directive introduces the "polluter pays principle" and the "extended producer responsibility". It contains provisions on hazardous waste and waste oils (thereby repealing old Directives on hazardous waste and waste oils with effect from 12 December 2010), and includes two new recycling and recovery targets to be achieved by 2020: re-use and recycling of at least 50% of certain waste materials from households and other origins similar to households, and re-use, recycling and other recovery of at least 70% of construction and demolition waste. The Directive requires that Member States adopt waste management plans and waste prevention programmes.

Following the hierarchy as set in Article 4 of the Waste Framework Directive proves to deliver the best results for climate mitigation, with waste prevention as a priority and the main contributor followed by preparing for re-use and recycling of waste for their impact in substituting the extraction and transformation of primary raw materials as well as related transport. Also as a result of the implementation of the waste hierarchy and the requirements for separate collection for bio-waste (Article 22), an important direct benefit for climate change mitigation could be achieved if biodegradable waste was no longer landfilled because during the decomposition of biodegradable waste methane is produced. Measures for landfill gas capturing and flaring are increasingly implemented, although they cannot completely avoid the release of CH_4 into the atmosphere.

Due to this Directive, the disposal and landfilling of bio-waste is gradually decreasing, and so are methane emissions.

The ARCADIS project[210] assessed different options to improve the management of bio-waste in the EU. Under the assumption of high prevention and recycling rates, a reduction of 40.1 million t CO_2 eq (excluding biogenic CO_2) for the EU by 2020 is projected.

4.8.3. Landfill Directive

In 1999, Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste[211] entered into force; Member States had to transpose it into national law by 2001.

Preceding relevant EU legislation were Council Decision 2003/33/EC which established the criteria and procedures for the acceptance of waste in landfills, and the Waste Framework Directive of 1975 (see above).

Studies on the implementation of the Directive in the EU, undertaken in 2005 and 2007[212], show that Member States had made strong efforts to bring their existing landfills in line with the requirements of the EU Landfill Directive. However, the studies also concluded that further efforts are still needed in several Member States (e.g. to eliminate illegal disposal sites).

The objective of the Landfill Directive is to prevent or reduce as far as possible negative effects on the environment resulting from the landfilling of waste - e.g. pollution of surface water, groundwater, soil and air, and the greenhouse gas effect – by introducing stringent technical requirements for waste and landfills.

The Landfill Directive defines the different categories of waste (municipal waste, hazardous waste, non-hazardous waste and inert waste) and applies to all landfills, defined as waste disposal sites for the deposit of waste onto or into land. Landfills are divided into three classes:

- landfills for hazardous waste;
- landfills for non-hazardous waste;
- landfills for inert waste.

Successive targets are introduced to reduce the landfilling of biodegradable municipal waste. By 2016, biodegradable waste going to landfills must be reduced to 35 %[213] of the total amount (by weight) of biodegradable waste produced in 1995. This measure is

210 Assessment of the Options to Improve the Management of Bio-Waste in the European Union, Study contract Nr 07.0307/2008/517621/ETU/G4 European Commission, DG ENV,ARCADIS Project number – 11/004759,Version C | 12-02-2010, available at: http://ec.europa.eu/environment/waste/compost/pdf/ia_biowaste%20-%20final%20report.pdf.

211 OJ L 182, 16.7.1999, p. 1.

212 European Commission, DG Environment. Follow-up study on the implementation of Directive 1999/31/EC on the landfill of waste in EU-25, Final Report - Findings of the Study, June 2007.

213 Under certain conditions fulfilment of the targets may be postponed by a maximum of four years.

designed to lead to decreasing amounts of degradable organic carbon being deposited, and contributes efficiently to decreasing methane production during the decomposition of waste.

In addition, the directive includes the requirement to collect landfill gas from all landfills receiving biodegradable waste. The landfill gas should be used to produce energy; if this is not possible it must be flared.

An EEA report[214] states that a net emission reduction from municipal solid waste management of 48 million tonnes CO_2 eq could be achieved between 1995 and 2008. In the business-as-usual scenario considering reduced landfilling, combined with increased recycling leads to a dramatic increase in avoided emission due to recycling and energy recovery operations. Net emissions in 2020 would be 44 million tonnes less than in 2008.

A second scenario considers the full implementation of the Landfill Directive (assuming that all countries meet the Landfill Directive's targets on reducing landfilling of biodegradable municipal waste), which leads to a net reduction of 62 million tonnes CO_2 eq compared to 2008.

4.8.4. Waste Incineration Directive

Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste[215] (further referred to as Waste Incineration Directive) came into force on 4 December 2000 to prevent or reduce the negative effects on the environment caused by the incineration of waste. In 2011, the Industrial Emissions Directive (IED) came into force, which brings together seven directives related to industrial emissions. One of these seven directives is the Waste Incineration Directive, which will be replaced by the IED from 7 January 2014 onwards. The IED applies to waste incineration or co-incineration plants, and stipulates environmental requirements. For further information on the Industrial Emission Directive, see section 4.5.5.

In addition, the Integrated Pollution Prevention and Control (IPPC) Directive applied to some waste management activities in the past (e.g. the treatment or storage of waste for disposal), but these activities are now also covered in the IED.

The objective of the Waste Incineration Directive is to prevent or to limit as far as practicable negative effects on the environment from the incineration and co-incineration of waste, in particular pollution by emissions into air, soil, surface water and groundwater, and the resulting risks to human health.

214 European Environment Agency (EEA) (2011). Waste opportunities: past and future climate benefits from better municipal waste management in Europe. Report no. 3/2011.

215 OJ L 332, 28.12.2000, p. 91..

Waste incineration plants are dedicated to the thermal treatment of waste with or without recovery of the combustion heat generated. In co-incineration plants waste is used as a regular or additional fuel for the generation of fuel or the production of material products; unlike incineration plants, the main purpose of which is waste treatment.

The IED requires that each plant has a permit ensuring compliance with the operator's basic obligations and environmental quality standards, such as emission limit values for polluting substances. Environmental inspections are prescribed for all installations. They have to be carried out by a competent authority.

It is assumed that the regulations on waste incineration (either Waste Incineration Directive or IED) will have a comparatively small impact on climate change, given that emission limits apply to air pollutants. But as air pollutants and greenhouse gases are interacting, indirect impacts on climate change will occur, but they cannot be quantified.

It is not clear to what extent regulations concerning waste incineration will influence the waste treatment choices: as an alternative for the treatment of non-recyclable or residual waste, if they lead to increased waste incineration instead of waste disposal on landfill sites CH_4 emissions will be avoided as these occur during biological decomposition in landfills.

4.8.5. EU policies targeting waste streams

In this section policies are grouped together which target different waste streams; the GHG reduction potential may become only visible in the whole life-cycle when emissions are avoided during primary production or due to less waste generation. Therefore, the policies mentioned in this section are not so significant for emissions reductions in the waste sector but are of importance for other sectors, e.g. transport, industry or energy.

The following list includes directives targeting specific waste streams which contribute to decreasing waste generation and less harmful substances in waste:

- **Packaging Waste Directive**: European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste[216];

- **WEEE Directive**: Directive 2012/19/EC of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment[217] and Directive 2012/18/EC of the European Parliament and of the Council of 4 July 2012 the control of major-accident hazards involving dangerous

216 OJ L 365, 31.12.1994, p.10.

217 OJ L 197, 24.7.2012, p. 38.

substances, amending and subsequently repealing Council Directive 96/82/EC[218];

- **End-of-life Vehicle Directive**: Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles[219];

- **Motor Vehicles Directive**: Directive 2005/64/EC of the European Parliament and of the Council of 26 October 2005 on the type-approval of motor vehicles with regard to their re-usability, recyclability and recoverability and amending Council Directive 70/156/EEC[220];

- **Disposal of spent batteries and accumulators**: Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC[221].

The overall aim of the policies listed above is to promote recycling, re-use and other forms of waste recovery in order to minimize waste generation and save primary resources. In terms of climate change mitigation the benefits are most relevant for the energy and industrial processes sectors in which GHG emissions are expected to be reduced through lower energy and resource use in primary production.

The Packaging Directive (94/62/EC) provides for measures aimed at limiting the production of packaging waste and promoting recycling, re-use and other forms of waste recovery. Final disposal of packaging waste should only be used as a last resort. Member States are required to introduce systems for the return and/or collection of used packaging to meet the targets set out in the Directive. In 2004, the Directive was reviewed to provide criteria clarifying the definition of the term 'packaging' and increase the targets for recovery and recycling of packaging waste. In 2005[222], the Directive was revised again to allow new Member States transitional periods for attaining the recovery and recycling targets.

The **WEEE Directive** (2012/19/EU) requires Member States to take measures to encourage producers to design and produce electrical and electronic equipment which take into account and facilitate dismantling and recovery. Separate collection and recovery systems for WEEE shall be set up to fulfil given minimum collection rates for 2016 and 2019. Member States shall prohibit the disposal of separately collected WEEE and ensure that all separately collected WEEE undergoes proper treatment.

218 OJ L 197, 24.7.2012, p. 1.

219 OJ L 269, 21.10.2000, p.34.

220 OJ L 310, 25.11.2005, p.10.

221 OJ L 266, 26.9.2006, p.1.

222 Directive 2005/20/EC of the European Parliament and of the Council of 9 March 2005 amending Directive 94/62/EC on packaging and packaging waste. OJ L 70, 16.3.2005, p. 17.

The **End-of-Life Vehicles Directive** (2000/53/EC) aims to reduce the amount of waste produced from vehicles when they are scrapped and to increase re-use, recycling and other forms of recovery of end-of-life vehicles and their components. In order to achieve these two objectives, the EU lays down new requirements for European vehicle manufacturers, which should design vehicles which are easy to recycle.

The **Directive on Reusing, Recycling and Recovering of Motor Vehicles** (2005/64/EC) builds on the End-of-Life Vehicles Directive. The provisions of this Directive will apply from 15 December 2008 for new types of vehicles put on the market, and from 15 July 2010 for models already in production.

The **Battery Directive** (2006/66/EC) concerns the disposal of spent batteries and accumulators and prohibits the placing on the market of most batteries and accumulators with a certain mercury or cadmium content and establishes rules for the collection, recycling, treatment and disposal of batteries and accumulators. Member States must take measures to ensure that a high proportion of spent batteries and accumulators are recycled.

An estimate of the mitigation impact of the policies mentioned would mostly consider the saved CO_2 reduction during primary production. Due to a lack of data, such an estimate is not available.

4.8.6. Management of biodegradable waste

Several EU legal instruments address the treatment of biodegradable waste (bio-waste): (1) The Landfill Directive requires Member States to reduce the biodegradable waste being deposited on landfills; (2) the Waste Framework Directive also contains specific elements related to bio-waste and (3) the Industrial Emission Directive lays down principles for controlling bio-waste treatment and incineration plants.

In 2008, a Green Paper on the Management of bio-waste in the EU[223] analysed whether there was a need for additional Community action to further develop the management of bio-waste. The Green Paper was followed by an Impact Assessment[224] assessing the different policy options. In 2010, the European Commission communicated future steps in bio-waste management[225] to enforce the use of the potential of bio-waste as a renewable source of energy and recycled material.

223 Green Paper on the management of bio-waste in the European Union, COM(2008) 811 final.

224 Assessment of the options to improve the management of bio-waste in the European Union, study contract NR 07.0307/2008/517621/ETU/G4, EC, DG ENV, Study undertaken by ARCADIS & EUNOMIA.

225 Communication from the Commission to the Council and the European Parliament on future steps in bio-waste management in the European Union, COM(2010) 235 final.

In 2011, a project[226] analysed the feasibility of setting bio-waste recycling targets in the EU by assessing different target scenarios and undertaking cost-benefit analyses. It was also discussed whether these targets should be recycling or collection targets.

Food waste is highlighted as a key priority in the Roadmap for a Resource-Efficient Europe[227]. The food and drink value chain in the EU causes 17% of our direct greenhouse gas emissions. However, in the EU alone, we waste 90 million tonnes of food every year or 180 kg per person. Much of this is food which is still suitable for human consumption. A combined effort by farmers, the food industry, retailers and consumers through resource-efficient production techniques, sustainable food choices (in line with the WHO recommendations on the amount of animal proteins, including meat and dairy products, consumed per person) and reduced food waste can contribute to improving resource efficiency and food security at a global level. The roadmap sets the following milestone: "By 2020, incentives to healthier and more sustainable food production and consumption will be widespread and will have driven a 20 % reduction in the food chain's resource inputs. Disposal of edible food waste should have been halved in the EU."

Currently Member States follow different strategies to manage their bio-waste. Some opt for recovery before incineration, others for composting, but still a notable amount of bio-waste is landfilled; which goes against the “waste hierarchy” set out in the Waste Framework Directive. Member States should take measures to prevent bio-waste and promote separate collection and biological treatment of waste, so that landfilling becomes the last option.

A further increase in composting and biogas production of bio-waste is expected in the years ahead, offering interesting potentials. It is likely that a target for biological treatment would have to go hand-in-hand with enhanced separate collection systems to ensure good quality of compost and digestate.

The suitability of setting targets is still under discussion, especially because respect for the principle of subsidiarity at Member State level should be ensured. Local conditions will determine the type of biological treatment best suited to a particular country. For example, centralized or decentralized composting or biogas production will depend on the availability of consumers of energy or compost but also on the availability of bio-waste.

The Commission’s analysis revealed that - although there are no policy gaps at EU level that would prevent Member States from taking appropriate action - additional supporting action at EU level would be valuable for creating significant economic and environmental advantages for the whole EU.

226 Assessment of feasibility of setting bio-waste recycling target in EU, including subsidiarity aspects, ENV.G.4/FRA/2008/0112, EC DG ENV, by VITO, Bio Intelligence Service and Arcadis.

227 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Roadmap to a Resource Efficient Europe, COM (2011)571 final,.

The study on assessing the feasibility of bio-waste collection targets[226], shows that within the EU GHG emissions could be reduced by 6 million t CO_2 eq by 2020 (excluding biogenic CO_2 emissions), 60% of food waste and 90% of garden waste are separately collected. A second scenario assuming a 36.5% collection ratio by 2020 would lead to emission reductions of 1.5 million t CO_2 eq (excl. biogenic CO_2 emissions). The emission reduction achieved as bio-waste is removed from residual waste treatment facilities, i.e. diverted from landfilling, thereby saving methane emissions; emission savings due to prevention of bio-waste are not included.

4.8.7. Urban Waste Water Treatment Directive

Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment [228] (further referred to as Urban Waste Water Treatment Directive) was adopted by the Council in 1991 and was amended once in 1998. The Directive concerns the collection, treatment and discharge of urban waste water and the treatment and discharge of waste water from certain industrial sectors.

The overall objective of the Directive is to protect the environment from the adverse effect of untreated waste water discharges of domestic and industrial origin. The required collection and appropriate treatment of wastewater contributes to a reduction of indirect N_2O emissions. Depending on the type of treatment - aerobically or anaerobically - CH_4 emissions can also be reduced by means of appropriate abatement measures.

In terms of climate change mitigation, waste water is relevant as a potential source of CH_4 and N_2O emissions. CH_4 is emitted when wastewater is treated or disposed anaerobically. N_2O arises from the nitrogen components in the waste water (such as urea, nitrate, protein), and is released during denitrification and nitrification processes. A distinction is made between indirect N_2O emissions – arising in effluents entering waterways, lakes or the sea – and direct N_2O emissions – arising at waste water treatment plants. The higher the N-elimination during treatment is, the higher the direct N_2O emissions and the lower the indirect N_2O emissions are.

The Directive requires agglomerations of a specified population size to provide collecting systems for urban waste water. It also requires waste water plants to provide biological or an equivalent treatment. If treated wastewater is to be discharged into sensitive areas, more stringent treatment is required. The discharge of industrial waste water (and its treatment) is also regulated and requires a permit.

As the Directive came into force in 1991 and the relevant dates for implementing specific requirements have already passed, the benefits (in terms of reduced GHG emissions) have already become apparent. No major impact on GHG reductions is expected in the future.

228 OJ L 135, 30.5.1991, p.40-52.

4.8.8. Interlinkages

There are links between all waste policies described in this chapter as the Waste Framework Directive provides a framework for any waste treatment or handling. For this reason, the estimated impacts of single policies probably overlap.

All waste policies supporting waste as a renewable energy source are relevant for the energy sector (i.e. waste incineration, biogas production) and thereby contribute to lower fossil fuel use.

The industry sector is affected when life-cycles of materials or goods are extended in order to save energy and/or primary material and to avoid waste; these are the targets of several waste stream policies.

Agricultural soils can benefit from increased compost production, which is a result of enhanced bio-waste treatment.

The Urban Waste Water Treatment Directive contains references to the sewage sludge regulations[229] for agriculture, but also to other waste policies, especially when it comes to the reuse/disposal of sewage sludge.

4.8.9. Policies and measures no longer in place

The table below lists policies and measures in the waste sector which were repealed by follow-up policies.

Table [BR1] ***Error! No text of specified style in document.****.5 Policies and measures no longer in place in the waste sector*

Waste Directive 2006/12/EC	Repealed by Waste Framework Directive (Directive 2008/98/EC)
Hazardous waste Directive 91/689/EEC	
Waste Oils Directive 75/439/EEC	
Waste Incineration Directive 2000/76/EC	Repealed by Industrial Emission Directive (2010/75/EU) as of 7th Jan 2014

229 Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture.

4.9. Changes in domestic institutional arrangements

4.9.1. Monitoring Mechanism Regulation

Regulation No 525/2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change (Monitoring Mechanism Regulation)[230] was adopted in May 2013, repealing Decision No 280/2004/EC (Monitoring Mechanism Decision). The new regulation which entered into force on 8 July 2013 represents an important change to the domestic institutional arrangement for monitoring and reporting of GHG emissions and climate related information in the EU, and evaluation of the progress towards the EU's economy-wide emission reduction target. The new Regulation significantly enhances the EU monitoring mechanism to meet requirements arising from current and future international climate agreements as well as the 2009 climate and energy package.

The main aims of the MMR are to improve the quality of the data reported and assist the EU and Member States with the tracking of their progress towards emission targets for 2013-2020. The revised mechanism improves the current reporting rules by introducing the following new reporting elements[231]:

- Member States' and the EU's reporting on low-carbon development strategies;
- Enhanced information related to GHG inventories;
- Reporting of approximated GHG inventories for the past year by 31 July each year (this will facilitate to obtain an earlier preliminary estimate of GHG emissions of the previous year (year X-1) compared to the regular inventory submission in which the most recent year is X-2);
- The introduction of an EU inventory review;
- The establishment of national and Union systems for the reporting of policies and measures and projections;
- Financial and technical support provided to developing countries;
- Member States' use of revenues from the auctioning of allowances in the EU Emissions Trading Scheme (EU ETS). Member States have committed to spend at least half of the revenue from such auctions on measures to fight climate change in the EU and third countries;
- Member States' adaptation to climate change.

230 OJ L 165, 18.6.2013, p. 13.

231 http://ec.europa.eu/clima/policies/g-gas/monitoring/index_en.htm

The Monitoring Mechanism Regulation also requires that the European Commission annually completes a report that assesses the progress of the EU and its Member States towards meeting their commitments under the UNFCCC and the Kyoto Protocol.

The implementing acts and delegated acts to be prepared under the Monitoring Mechanism Regulation would enable the implementation of the Monitoring Mechanism Regulation in several of its provisions, specifying in more detail the structure of the information, reporting formats, and submission procedures. These acts would be adopted in early 2014.

4.9.2. Monitoring and reporting under the EU Emission Trading Scheme

The reform of the EU Emission Trading Scheme (ETS, cf. section 4.2.2) in Phase III has resulted in important changes with regards to domestic institutional arrangements for the monitoring and reporting of GHG emissions under the EU ETS. EU ETS MRV will be required to comply with two new Commission Regulations from the Phase III of the EU ETS onwards, one specific to monitoring and reporting[232] and the other to verification and accreditation.[233] The latter introduces a framework of rules for the accreditation of verifiers to ensure that the verification of operator's or aircraft operator's reports in the framework of the Union's greenhouse gas emission allowance trading scheme is carried out by verifiers that possess the technical competence to perform the entrusted task in an independent and impartial manner and in conformity with the requirements and principles set out in this Regulation. These regulations have direct legal effect in the Member States as there is no need to transpose and implement in national legislation since the provisions apply directly to operators or aircraft operators, verifiers, and accreditation parties. The regulations provide clarity on the roles and responsibilities of all parties (i.e. industrial installations and aircraft operators are required to have an approved monitoring plan) which will strengthen the compliance chain.[234]

With regard to further changes in the framework of the third phase of EU ETS, please refer to section 4.2.2.

4.10. Assessment of the economic and social consequences of response measures

In the EU a wide-ranging impact assessment system accompanying all new policy initiatives has been established[235]. It is based on an integrated approach which analyses

232 OJ L 181, 12.7.2012, p. 30.

233 OJ L 181, 12.7.2012, p. 1.

234 http://ec.europa.eu/clima/policies/ets/monitoring/documentation_en.htm

235 See http://ec.europa.eu/governance/impact/index_en.htm

both benefits and costs, and addresses all significant economic, social and environmental impacts of possible new initiatives. The impact assessment is thus a key element in the development of the European Commission's legislative proposals. The Commission is required to take the impact assessment reports into account when taking decisions, while the impact assessments are also presented and discussed during the scrutiny of legislative proposals from the Council and the Parliament. This approach ensures that potential economic, social and environmental consequences for various stakeholders (within, but also outside of, the European Union) are identified and assessed within the legislative process.

In general, impact assessments are required for all legislative proposals, but also other important Commission initiatives which are likely to have far-reaching impacts. They are prepared for i) legislative proposals which have significant economic, social and environmental impacts, ii) non-legislative initiatives (white papers, action plans, expenditure programmes, negotiating guidelines for international agreements) which define future policies and iii) certain implementing measures (so-called 'comitology' items) and delegated acts which are likely to have significant impacts. Each year, the Secretariat General, involving the Impact Assessment Board and the Commission departments, screen all forthcoming initiatives and decides for which an impact assessment is needed.

Impact assessments follow a set of key steps (see box below). The impact assessment approach ensures that all relevant expertise within the Commission is used, together with inputs from stakeholders. This also enhances the coherence of initiatives across policy areas and makes the impact assessment system accountable and transparent. All impact assessments and all opinions of the Impact Assessment Board on their quality are published online once the Commission has adopted the relevant proposal.

Specific guidelines for the impact assessment have been adopted (European Commission 2009[236]). The guidelines provide in-depth information on when and how to prepare an Impact Assessment, who to involve and how to proceed. The key analytical steps in an Impact Assessment are: i) identifying the problem, ii) defining objectives, iii) developing main policy options, iv) analysing the impacts of the options, v) comparing the options, and vi) outlining policy monitoring and evaluation. As to the assessment of economic, social and environmental consequences, the following key points are to be addressed (see guidelines):

- identify direct and indirect environmental, economic and social impacts and how they occur;

- identify who is affected by these impacts (including those outside the EU) and in what way;

236 SEC(2009) 92. Impact Assessment Guidelines.

- identify whether there are specific impacts that should be examined (fundamental rights, small and medium-sized enterprises, consumers, competition, international, national, regional);

- assess the impacts in qualitative, quantitative and monetary terms or explain in the IA why quantification is not possible or proportionate;

- consider the risks and uncertainties in the policy choices, including expected compliance patterns.

BOX: Key procedural steps for the Commission departments when preparing an impact assessment

1. Planning of impact assessment (IA): Roadmap, integration in the Commission's strategic planning and programming (SPP) cycle and timetable.
2. Work closely with your IA support unit throughout all steps of the IA process.
3. Set up an impact assessment steering group and involve it in all IA work phases.
4. Consult interested parties, collect expertise and analyse the results.
5. Carry out the IA analysis.
6. Present the findings in the IA report.
7. Present the draft IA report together with the executive summary to the Impact Assessment Board (IAB) and take into account the possible time needed to resubmit a revised version.
8. Finalise the IA report in the light of the IAB's recommendations.
9. IA report and IAB opinion(s) go into inter-service consultation alongside the proposal.
10. Submission of IA report, executive summary, IAB opinion(s) and proposal to the College of Commissioners.
11. Transmission of the IA report and the executive summary with the proposal to the other EU institutions.
12. Final IA report and IAB opinion(s) published on dedicated Europa website.
13. In the light of new information or on request from the EP or the Council, the Commission may decide to update the IA report.

(http://ec.europa.eu/governance/impact/ia_key/ia_key_en.htm)

Consulting interested parties is an obligation for every impact assessment and all affected stakeholders should be engaged, using the most appropriate timing, format and tools to reach them. Appropriate consultation tools can be consultative committees, expert groups, open hearings, ad hoc meetings, consultation via the internet, questionnaires, focus groups or seminars/workshops. Existing international policy dialogues are also be used to keep third countries fully informed of forthcoming

initiatives, and as a means of exchanging information, data and results of preparatory studies with partner countries and other external stakeholders.

All key strategies and climate policies have been subject to impact assessments as described above. All impact assessments and all opinions of the Impact Assessment Board are published online[237].

4.11. Estimates of emission reductions and removals from LULUCF

In this section, estimates for emission reductions and removals in the land use, land use change and forestry (LULUCF) sector are given according to accounting rules under the UNFCCC and under the Kyoto Protocol respectively.

4.11.1. LULUCF under the UNFCCC

The CTF Appendix includes CTF Table 1 for the EU-15 and for EU-28 which show emissions/removals from LULUCF.

EU-15: The EU-15 LULUCF sector offsets about 5 % of the total emissions ("without LULUCF") in 2011, with values ranging at Member States level from +1.7 % (contributing to national GHG inventory as a source, in Netherlands) to -57.3 % (as sink, in Sweden) (Table [BR1] Error! ***No text of specified style in document.***-*6*, column a). The most important LULUCF category, Forest Land, in 2011 was a net sink for all MS (column b), offsetting 1.3 % of total emissions in Netherlands, 63.9 % in Sweden, and 7.4 % for the whole EU-15. The most significant contributors to the 5A inventory of the EU-15 are France, Sweden and Finland (column c).

237 For 2013 and other years, see http://ec.europa.eu/governance/impact/ia_carried_out/cia_2013_en.htm

Table [BR1] ***Error! No text of specified style in document.****-6 Sector 5 LULUCF contributions to total national emissions of EU-15 (Gg CO_2 eq) in 2011*

Member State	**Sector 5 over total emission excluding LULUCF**	**Category 5.A over total emissions**	**Member States contribution to EU-15 total for Category 5A**
	(a)	(b)	(c)
Austria	-4.2%	-6.5%	2.0%
Belgium	-1.1%	-3.2%	1.4%
Denmark	-4.7%	-11.4%	2.4%
Finland	-36.7%	-53.7%	13.3%
France	-9.2%	-13.4%	24.1%
Germany	1.0%	-3.6%	12.1%
Greece	-2.2%	-1.8%	0.8%
Ireland	-6.4%	-7.3%	1.6%
Italy	-6.3%	-6.0%	10.9%
Luxembourg	-2.4%	-3.9%	0.2%
Netherlands	1.7%	-1.3%	0.9%
Portugal	-7.6%	-10.9%	2.8%
Spain	-8.3%	-7.2%	9.3%
Sweden	-57.3%	-63.9%	14.5%
United Kingdom	-0.6%	-1.8%	3.7%
EU-15	**-4.8%**	**-7.4%**	**100.0%**

EU-28: The contribution of LULUCF to total emissions also varies for the remaining 13 Member States (see Table [BR1] *Error!* ***No text of specified style in document.****-7*); it ranges from only 1 % (Cyprus) to 149 % (Latvia). EU-15 accounts for almost 80 % of EU-28 removals; Poland has the largest sinks of the remaining 13 Member States accounting for 8.7 % of total EU-28 removals. Overall the LULUCF sector offsets about 6 % of total national GHG emissions in the EU-28.

Table [BR1] ***Error! No text of specified style in document.****-7 Sector 5 LULUCF contributions to total national emissions of EU-28 (Gg CO2 eq) in 2011*

Member State	LULUCF sector	Total national emissions (without LULUCF)	Share of emissions offset by LULUCF sector	Member States contribution to EU-28 total for LULUCF
EU-15	-173 992	3 630 657	-5%	79.3%
Bulgaria	-7 979	66 133	-12%	1.4%
Cyprus	-76	9 154	-1%	0.2%
Croatia	-7 032	28 256	-25%	0.6%
Czech Republic	-7 959	133 496	-6%	2.9%
Estonia	-4 263	20 956	-20%	0.5%
Hungary	-3 787	66 148	-6%	1.4%
Latvia	-17 179	11 494	-149%	0.3%
Lithuania	-10 483	21 612	-49%	0.5%
Malta	-60	3 021	-2%	0.1%
Poland	-21 912	399 390	-5%	8.7%
Romania	-25 305	123 346	-21%	2.7%
Slovakia	-7 467	45 297	-16%	1.0%
Slovenia	-9 619	19 509	-49%	0.4%
EU-28	**-297 115**	**4 578 469**	**-6%**	**100.0%**

4.11.2. LULUCF under the Kyoto Protocol

The EU submission under the KP-LULUCF refers to EU-15 because the EU-15 has a common target for the first commitment period under the Kyoto Protocol. The KP-LULUCF inventory is compiled by adding together the removals and emissions for elected activities from the supplementary KP-LULUCF reporting of each individual EU-15 Member State. It is important to note that KP units are issued and cancelled at MS level. Therefore, all the emissions/removals and any information on KP-LULUCF activities presented here at EU level are shown for information purpose only.

Ten EU-15 Member States have elected forest management, while only three Member States have elected cropland management, two have elected grazing land management; no EU-15 Member State has elected revegetation (*Table [BR1] Error!* ***No text of specified style in document.****-9*). Only two MS have chosen annual accounting. CTF Table 4(a)ii in the CTF Appendix shows the net emissions/removals from activities under 3.3 and 3.4 of the Kyoto Protocol and the related accounting quantities for the years 2008-2011.

CTF Table 4 in the CTF Appendix shows the contribution of KP-LULUCF units towards fulfillment of the Kyoto target. For the calculation of accounting quantities of activities under KP Articles 3.3 and 3.4 (crop management, grazing land management and revegetation) in CP1, averages have been calculated by dividing the sums by four (for the years 2008-2011). For the accounting of forest management activities the forest management cap has to be divided by five as the numbers refer to the whole period of

2008-2012, whereas forest management offsets have to be divided by four. This calculation has been conducted in *Table [BR1] Error!* ***No text of specified style in document.****-8*, explaining the linkage between CTF tables 4 and 4(a)ii.

Table [BR1] ***Error! No text of specified style in document.****-8 Calculation of projected net carbon stock change in CP1*

	Article 3.3		Article 3.4					Average net carbon stock change during 2008-2011		
	Afforestation and Reforestation	Deforestation	Forest Management 3.3 offset	Forest Management Cap	Cropland Management	Grazing Land Management	Revegetation	Article 3.3	Article 3.4	**Total**
	Mt CO_2 eq							Mt CO_2 eq per year		
EU-15	-185.77	117.20	-41.49	-128.73	-32.78	-9.70	NA	-17.14	-46.74	**-63.88**
EU-28	-226.55	133.24	-45.82	-197.94	-32.78	-9.70	4.05	-23.33	-60.65	**-83.98**

The CTF Appendix includes CTF Table 4 and CTF Table 4(a)ii for both EU-15 and EU-28. The reason for this is that the EU-15 has a joint target under the KP's first commitment period, whereas the target under the KP's second commitment period will be related to EU-28[238]. In the CTF Appendix, the EU does not report in CTF Table 4(a)i as this table is only relevant for Parties which are not Parties to the Kyoto Protocol.

Table [BR1] ***Error! No text of specified style in document.****-9 Activities elected under Art. 3.4 and accounting frequency*

EU-15 MS	Art 3.4 elected activities	Accounting frequency
Austria	-	end of CP
Belgium	-	end of CP
Denmark	FM, CM, GM	annual
Finland	FM	end of CP
France	FM	annual
Germany	FM	end of CP
Greece	FM	end of CP
Ireland	-	end of CP
Italy	FM	end of CP
Luxemburg	-	end of CP
Netherlands	-	end of CP
Portugal	FM, CM, GM	end of CP
Spain	FM, CM	end of CP
Sweden	FM	end of CP
UK	FM	end of CP

Note: FM: forest management, CM: cropland management, GM: grazing land management, RV: revegetation, CP: commitment period.

4.12. Use of units from the market-based mechanisms and land use, land-use change and forestry activities

The use of units from market-based mechanisms and land use, land-use change and forest activities (LULUCF) from 2008 to 2012 count towards achievement of the Kyoto Protocol targets for the first commitment period (CP1).

Final data on surrendered units is available only for the EU ETS for these years. Final CP1 compliance actions for sectors which are not covered by the EU ETS will take place when reviewed inventory data will be available for the complete period, in the "true-up" period in 2015. As a result, data on the final use of flexible mechanisms and sinks is not available for the 1st BR.

Table [BR1] Error! ***No text of specified style in document.****-10* shows the annual quantities of units which have been included in the retirement account in the respective

238 As Cyprus and Malta do not have targets under the KP's 1st Commitment Period, no contributions were calculated for these MS.

years for the EU Member States.[239] They sometimes equal the amount of ETS units surrendered in the years before, but there is no obligation to retire those units immediately. Hence, the total retired amount for some Member States is lower than the units surrendered in 2008-2011. In others, the amounts are higher because the respective governments decided to retire units before the end of the "true-up" period. Generally the amount of units already retired is not an indicator for fulfilment of the target of the first commitment period.

239 CTF Table 4b in the CTF Appendix repeats the EU-15 and EU-28 sums shown in Table [BR1] Error! ***No text of specified style in document.-10***

Table [BR1] ***Error! No text of specified style in document.****-10 Annual quantities of units which have been included in the retirement account of EU Member States*

	AAUS			ERUs			RMUs			CERs			tCERs + ICERs			Units from market-based mechanisms under the Convention + other		
	2010	2011	2012	2010	2011	2012	2010	2011	2012	2010	2011	2012	2010	2011	2012	2010	2011	2012
Austria	26 892	84 450	28 671	3	5	34	NO	NO	NO	389	1 193	1 956	NO	NO	NO	NO		
Belgium	45 538	49 458	39 938	4	75	551	NO	NO	NO	635	566	5 680	NO	NO	NO	NO		
Denmark	25 322	24 447	55 297		2	2 283	NO	NO	288	163	823	1 197	NO	NO	NO	NO		
Finland	32 866	39 383	31 402	131	150	633	NO	NO	NO	1 371	1 767	3 048	NO	NO	NO	NO		
France	106 868	110 182	76 854	304	681	3 339	NO	NO	NO	3 967	4 406	24 181	NO	NO	NO	NO		
Germany	854 570	418 523	907 807	671	4 195	33 232	NO	NO	NO	49 721	33 374	41 123	NO	NO	NO	NO		
Greece	63 506	56 267	44 279	21	8	2 710	NO	NO	NO	134	3 650	7 472	NO	NO	NO	NO		
Ireland	16 992	16 231	13 829		395	844	NO	NO	NO	224	730	1 114	NO	NO	NO	NO		
Italy		567 758	170 503		752	4 809	NO	NO	NO		28 578	14 794	NO	NO	NO	NO		
Luxembourg	4 170	2 065	1 810				NO	NO	NO	110	188	242	NO	NO	NO	NO		
Netherlands	204 470	84 411	187 737			895	NO	NO	NO			7 387	NO	NO	NO	NO		
Portugal	26 780	22 566	21 983		320	93	NO	NO	NO	1 528	1 278	2 898	NO	NO	NO	NO		
Spain	110 996	105 878	105 190	44	3 573	6 836	NO	NO	NO	25 886	12 174	20 601	NO	NO	NO	NO		
Sweden	17 083	21 846	18 594		0	19	NO	NO	NO	430	791	1 595	NO	NO	NO	NO		
United Kingdom	0	456 830	204 600	0	1 846	1 339	NO	NO	NO	0	11 034	14 632	NO	NO	NO	NO		
EU-15	1 536 052	2 060 296	1 908 493	1 178	12 003	57 618	0	0	288	84 557	100 552	147 921	0	0	0	NO		
Bulgaria	69 925	30 528	0		704	0	NO	NO	NO		2 296	0	NO	NO	NO	NO		
Croatia	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
Cyprus																		
Czech Republic		219 836	67 795		754	3 085	NO	NO	NO		9 383	3 113	NO	NO	NO	NO		
Estonia	10 115	14 345	15 072			141	NO	NO	NO			17	NO	NO	NO	NO		
Hungary	49 639	21 454	20 459		486	687	NO	NO	NO		1 146	1 357	NO	NO	NO	NO		
Latvia	2 001	3 011	2 848	9	18	22	NO	NO	NO	480	212	54	NO	NO	NO	NO		
Lithuania	3 777	5 563	4 076	462	183	1 165	NO	NO	NO	1 551	648	363	NO	NO	NO	NO		
Malta																		
Poland	379 708	184 382	0	245	1 816	0	NO	NO	NO	14 928	13 912	1	NO	NO	NO	NO		
Romania	45 187	39 011	51 239	328	4 151	0	NO	NO	NO	3 403	4 325	0	NO	NO	NO	NO		
Slovakia	43 588	17 818	21 251		12	104	NO	NO	NO	3 344	4 363	1 018	NO	NO	NO	NO		
Slovenia	7 533	7 626	7 204	170	379	631	NO	NO	NO	368	121	166	NO	NO	NO	NO		
EU-28	2 147 524	2 603 870	2 098 438	2 392	20 507	63 453	0	0	288	108 631	136 958	154 009	0	0	0	NO		

Note: Cyprus and Malta do not have a target under the Kyoto Protocol's 1st Commitment Period
AAU: Assigned Amount Unit; ERU: Emission Reduction Unit; RMU: Removal Unit; CER: Certified Emission Reduction; tCER: Temporary Certified Emission Reduction; lCER: Long-term Certified Emission Reduction

In *Table [BR1]* ***Error! No text of specified style in document.****.11* below, a complete overview of preliminary results about the use of units of Kyoto Mechanisms and sinks to achieve the targets in the first commitment period is shown, based on the results published in the Trends and Projection Report of the EEA[240]. Information on the planned governmental use of flexible mechanisms is displayed by Member States, as it has been reported by questionnaires under the biennial submission from Member States to the European Commission under the EU Monitoring Mechanism Decision[241]. The use of flexible mechanisms surrendered in EU ETS is derived from an extraction from the European Union Transaction Log (EUTL) of July 2013 (see also section 4.2.2.4). The projected use of reductions from sinks under Article 3.3 and 3.4 is the average for the 2008-2011 period, which has been calculated from KP tables submitted to UNFCCC by Member States in 2013[242].

Taking into account approximated emissions for the year 2012[243], ten EU-28 Member States (Austria, Belgium, Denmark, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Slovenia and Spain) will not achieve their KP objective through domestic emissions reductions or limitations alone. If the effect of annual average carbon sinks is taken into account, Ireland and Portugal and Slovenia will reach their KP targets. For the other Member States it will be necessary to make use of the flexible mechanisms.

The combined intended governmental use of flexible mechanisms by EU-15 is expected to represent an increase in the overall EU emission budget by 403 Mt CO_2-equivalent (see*Table [BR1]* ***Error! No text of specified style in document.****.11*). Nine Member States have allocated financial resources with a total amount of €2 351 million for the whole 5-year commitment period[244]. The total use of flexible mechanisms under the EU ETS totals 808 million units for EU-15 in the years 2008-2012. The expected effect of LULUCF in the EU-15 corresponds to a removal of 319 Mt CO_2 for the complete first commitment period.

Of the other EU Member States which have a Kyoto target, eight Member States (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania and Slovakia) have reported their intention to sell a certain amount of Kyoto units to other parties.

The expected effect of LULUCF in the EU-28 corresponds to the average removal of 420 Mt CO_2 for the complete first commitment period.

In total the estimated effect of the use of flexible mechanisms in CP1 (in the EU ETS and governmental) for EU-28 amounts to 1 056 Mt $CO_{2eq,}$ about 4 % of initial AAU.

240 EEA 2013 Trends and Projections Report, http://www.eea.europa.eu/publications/trends-and-projections-2013.

241 Decision no 280/2004/EC.

242 With regard to the calculation of accounting quantities see section 0.

243 EEA 2013: Approximated EU GHG inventory: Proxy GHG estimates for 2012. http://www.eea.europa.eu/publications/approximated-eu-ghg-inventory-2012 .

244 The total budget calculated for EU-15 and EU-28 do not include the expected benefits of AAU sales.

Carbon sink activities of EU-28 are expected to contribute towards an additional emission reduction of 420 Mt CO_{2eq} in CP1.

Table [BR1] ***Error! No text of specified style in document.****.11 Use of flexible mechanisms and sinks in the first commitment period*

Member State	Planned use of Kyoto mechanisms at governemnt level	Type of Kyoto mechanisms for government use	Allocated budget at government level	Intended total use of flexible mechanisms at government level	Actual use of flexible mechanisms (CDM and JI) in ETS	Total use of flexible Mechanisms in CP1	Projected use of reductions from sinks under Art. 3.3 and 3.4
	Yes/No	IET, JI, CDM	€ million	Mt CO_2eq	Mt CO_2eq	Mt CO_2eq	Mt CO_2eq
Austria	Yes	IET, JI, CDM	611.0	80.0	14.0	94.0	6.1
Belgium	Yes	IET, JI, CDM	240.6	29.4	19.1	48.5	-1.1
Bulgaria	Yes	IET, JI	-	-7.0	23.4	16.4	2.7
Croatia	No	-	-	0.0	not app.	0.0	4.9
Cyprus		not applicable			2.6	2.6	not app.
Czech Republic	Yes	-	-	-125.0	38.6	-86.4	6.5
Denmark	Yes	IET, JI, CDM	187.7	12.0	12.5	24.5	8.9
Estonia	Yes	JI, IET	-	-73.6	2.7	-70.9	-2.1
Finland	No	JI, CDM	-	0.0	16.3	16.3	2.9
France	No	-	-	0.0	75.6	75.6	16.1
Germany	No	-	-	0.0	302.2	302.2	49.9
Greece	No	-	-	0.0	27.9	27.9	3.2
Hungary	Yes	-	-	-20.0	9.8	-10.2	11.1
Ireland	Yes	IET, JI, CDM	290.0	9.7	6.6	16.3	17.0
Italy	Yes	IET, JI, CDM	-	10.2	95.5	105.7	83.9
Latvia	Yes	JI, IET	-191.1	-40.4	1.6	-38.7	6.2
Lithuania	Yes	JI	-	-70.7	6.8	-63.9	5.6
Luxembourg	Yes	IET, JI, CDM	150.0	14.0	0.8	14.8	-0.3
Malta		not applicable			1.1	1.1	not app.
Netherlands	Yes	IET, JI, CDM	364.5	46.0	28.6	74.6	-1.8
Poland	Yes	IET, JI	-	0.0	95.6	95.6	42.2
Portugal	Yes	IET, JI, CDM	124.8	8.1	14.7	22.8	49.0
Romania	Yes	IET, JI	-	-13.0	32.2	19.2	15.1
Slovakia	Yes	IET, JI	-	-42.0	10.0	-32.0	1.8
Slovenia	Yes	IET, JI, CDM	80.0	5.0	6.2	11.2	6.6
Spain	Yes	IET, JI, CDM	382.2	194.0	107.1	301.1	56.7
Sweden	No	-	-	0.0	10.1	10.1	10.6
United Kingdom	No	-	-	0.0	77.4	77.4	18.2
EU-15	**Yes**	**IET, JI, CDM**	**2 350.7**	**403.4**	**808.3**	**1 211.7**	**319.4**
EU-28	**Yes**	**IET, JI, CDM**	**2 430.7**	**16.7**	**1 038.9**	**1 055.6**	**419.9**

Note: In the aggregation for EU-28 Malta and Cyprus are not included with regard to the use of flexible mechanisms by government and on the projected use of sinks as they have no individual target under the Kyoto Protocol. Croatia is not included in EU ETS in the period 2008-2012.

Source: EEA 2013 Trends and Projections Report

In the electronic reporting facility provided by the UNFCCC secretariat, the numbers from CTF Table 4b are automatically filled into CTF Table 4 in the CTF Appendix for the reporting on progress, in row "Market-based mechanisms under the Convention".

As discussed above, the reporting on retired units does not explain the projected progress at this stage in time. Taking into account the projected annual contribution of sinks and governmental use of flexible mechanisms[245], the reporting on progress in Table 4 would result in an overview for the reporting on progress as shown in *Table [BR1] Error! **No text of specified style in document.**.12*. The contribution from LULUCF derives from the calculation of the accounting of sinks as shown in *Table [BR1] Error! **No text of specified style in document.**-8*, whereas the use of market-based mechanisms under the convention is calculated as the average of total intended use at governmental level in CP1 from *Table [BR1] **Error! No text of specified style in document.**.11*.

*Table [BR1] **Error! No text of specified style in document.**.12 Report on progress (similar to CTF Table 4)*

		Base Year	2010	2011	2012	Comment
		Mt CO_2 eq				
EU-15						
	Total (without LULUCF)	4 265.52	3 790.22	3 630.66		
	Contribution from LULUCF		-63.88	-63.88	-63.88	Average projected accounting of activites under Article 3.3 and 3.4, see chapter [BR1] 4.11
	Market-based mechanisms under the Convention		80.68	80.68	80.68	Planned average use of flexible meachnisms
	Other market-based mechanisms		0	0	0	
EU-28						
	Total (without LULUCF)	5 791.12	4 733.82	4 578.47		
	Contribution from LULUCF		-83.98	-83.98	-83.98	Average projected accounting of activites under Article 3.3 and 3.4, see chapter [BR1] 4.11
	Market-based mechanisms under the Convention		3.33	3.33	3.33	Planned average use of flexible meachnisms
	Other market-based mechanisms		0	0	0	

245 The use of flexible mechanisms under the EU ETS is not reported in this table as it does not increase the quantity of emission allowances (Kyoto units) within the registry of Parties.

5. PROJECTIONS

5.1. Introduction

This section presents projections of GHG emissions for two scenarios, the "with existing measures scenario" (WEM) and the "with additional measures scenario" (WAM), differentiated by sector and by gas and aggregated to EU-28 level.

Projections are presented for 2015, 2020, 2025 and 2030. All emissions and projections are displayed in CO_2 equivalents and excluding emissions or removals from Land Use, Land Use Change and Forestry (LULUCF).

Projections of emissions related to fuel sold to ships and aircrafts engaged in international transport are not included in the totals reported in this section, unless noted otherwise.

5.1.1. Context

The projections of GHG emissions for EU-28 are based on individual national projections of Member States' submissions to the European Commission under the Decision 208/2004/EC (the Monitoring Mechanism Decision) in 2013.

EEA's European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM) has compiled the national projections and applied QA/QC procedures to ensure consistency of the data reported by MS. This process is described in section 5.6.1.4.

The data used for the EU-28 emission projections conforms with the EEA's and Commission's 2013 reports on progress towards the Kyoto target[246].

- The scenarios which are reported are documented in Section 5.1.2.
- Projections are, unless otherwise noted, reported excluding governmental use of Kyoto mechanisms and without carbon sinks, and excluding emissions from international aviation and marine bunkers.
- Unless otherwise noted, reported emissions refer to the second commitment period (CP2).
- The sector breakdown reported follows the structure of the CTF Tables provided in ***Error! Reference source not found.*** and includes: Energy (without transport), transport, industry/industrial processes, agriculture, waste, other sector[247].

246 The report is available for download from EEA at : http://www.eea.europa.eu/publications/trends-and-projections-2013. The Commission report is available online at: http://ec.europa.eu/clima/policies/g-gas/docs/com_2013_698_en.pdf

247 The Other Sector is reported as the sum of sectors 3 and 7 (solvent and other product use, and other sector).

- The gases which are covered are: CH_4 emissions excluding LULUCF, CO_2 emissions excluding LULUCF, N_2O emissions excluding LULUCF and total F-Gases.

- Figures represent historic GHG emissions up to 2011. Projections are represented starting 2010. Thus, there is an overlap of historic and projected values. Note that if 2010 and 2011 GHG emission trajectories do not match this is due to the fact that projected GHG emissions were aggregated from individual Member State projections, which may not have taken into account the latest inventory values as the base year in the preparation of their projections.

5.1.2. Scenarios

Member State projections are based on different methodologies, and different activities for QA/QC have been applied. With this, the inclusion of polices and measures and the estimation of impacts cannot be completely harmonised. To improve consistency, the Commission had provided Member States with recommendations of what and how EU measures should be taken into account when preparing national projections. In addition not all national projections include WAM scenarios, and for some an adjustment to most the latest available inventory data was necessary (documented in Section 5.6.1.4).

With existing measures scenario (WEM)

The EU 'with existing measures' (WEM) projection represents a business-as-usual scenario aggregated from 28 national WEM projections where only policies and measures that have been adopted or already implemented in the Member State, and as far as covered by national projections, are considered. With regard to EU policy coverage the WEM projection is thus a conservative scenario. All EU-28 Member States that submitted 2013 projections reported WEM projection scenarios. For Member States that did not submit new projections in 2013, the most recent projections data available was used. For emission trends for missing time periods (e.g. if national projections only covered the period up to 2020), or in case of the new Member State, Croatia, for the entire WEM scenario, the EU-28 2013 climate policy "baseline with adopted measures" scenario (EUCLIMIT BAM, see section [BR] 5.4.1 for more details) for this Member State has been used for gap-filling purposes.

With additional measures scenario (WAM)

The 'with additional measures' (WAM) projection represents a scenario where all planned measures are considered to be fully and timely implemented. The GHG emissions projected by the WAM scenario are therefore lower than the WEM projections. Relative to the WEM scenario for which all Member States reported their projections, less Member States reported a 'with additional measures' scenario.

In this case, in order to compile an aggregated data set for the EU-28, the data was gap filled by using WEM projections.

5.1.3. Key parameters and assumptions

The key parameter assumptions of individual Member States are documented in their national projections and, in addition, were aggregated to obtain information relating to the EU-28. The Commission provided Member States with recommended parameter values for the evolution of the EU ETS CO_2 price and for international fuel import prices and provided default values for GDP and population to improve consistency of Member State projections. In national projections these were used to a varying extent. In the case of different national assumptions, Member States were invited to use the recommended values for sensitivity analysis.

For documentation of the EU-28 projection, key parameters have been derived as weighted averages/sums of the values of key parameters as reported by Member States. These are shown for EU-28 in Table [BR1] Error! **No text of specified style in document.**-15 and in **Error! Reference source not found.** (CTF Table 5). The key parameters derived in this way are: GDP, population, international fuel import prices (oil, gas, coal) and EU ETS CO_2 price.

5.2. Projections

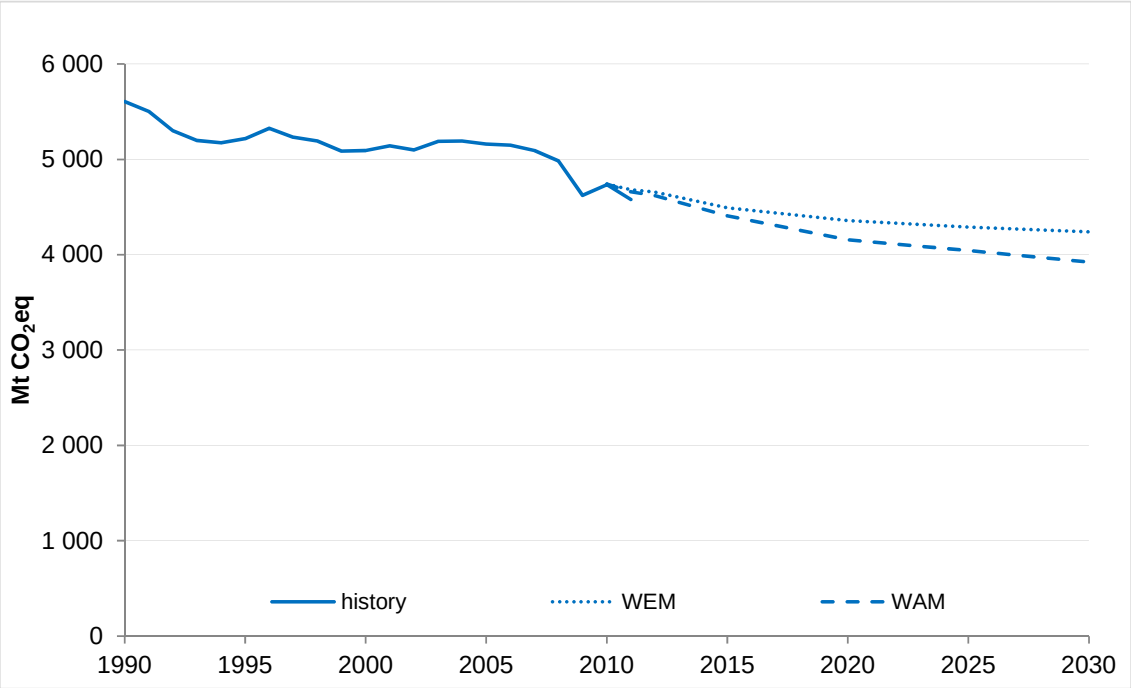
5.2.1. Total aggregate GHG emission projections

Figure [BR1] Error! **No text of specified style in document.**-6 presents total aggregate GHG emissions for EU-28. The figure includes historic values (solid lines) and projected values for both the WEM (dotted line) and WAM scenario (dashed line).

In the **WEM** scenario, total **EU-28** GHG emissions decrease from 5 606 Mt CO_2eq in 1990 to 4 359 Mt CO_2eq in 2020 and 4 239 Mt CO_2eq in 2030.

In the **WAM** scenario they decrease to 4 156 Mt CO_2eq in 2020 and 3 922 Mt CO_2eq in 2030.

Figure [BR1] ***Error! No text of specified style in document.****-6 Total, aggregate, absolute historic and projected GHG emissions for EU-28*



5.2.1.1. Total aggregate GHG emission projections per sector

Figure [BR1] Error! ***No text of specified style in document.****-7* provides a qualitative impression of sector shares on projected total aggregate GHG emissions for EU-28. Detailed numerical data is available in CTF Table 6(a/c) in the CTF Appendix.

Figure [BR1] ***Error! No text of specified style in document.****-7 Sector breakdown of projected total aggregate GHG emissions in the EU-28; WEM and WAM scenario*

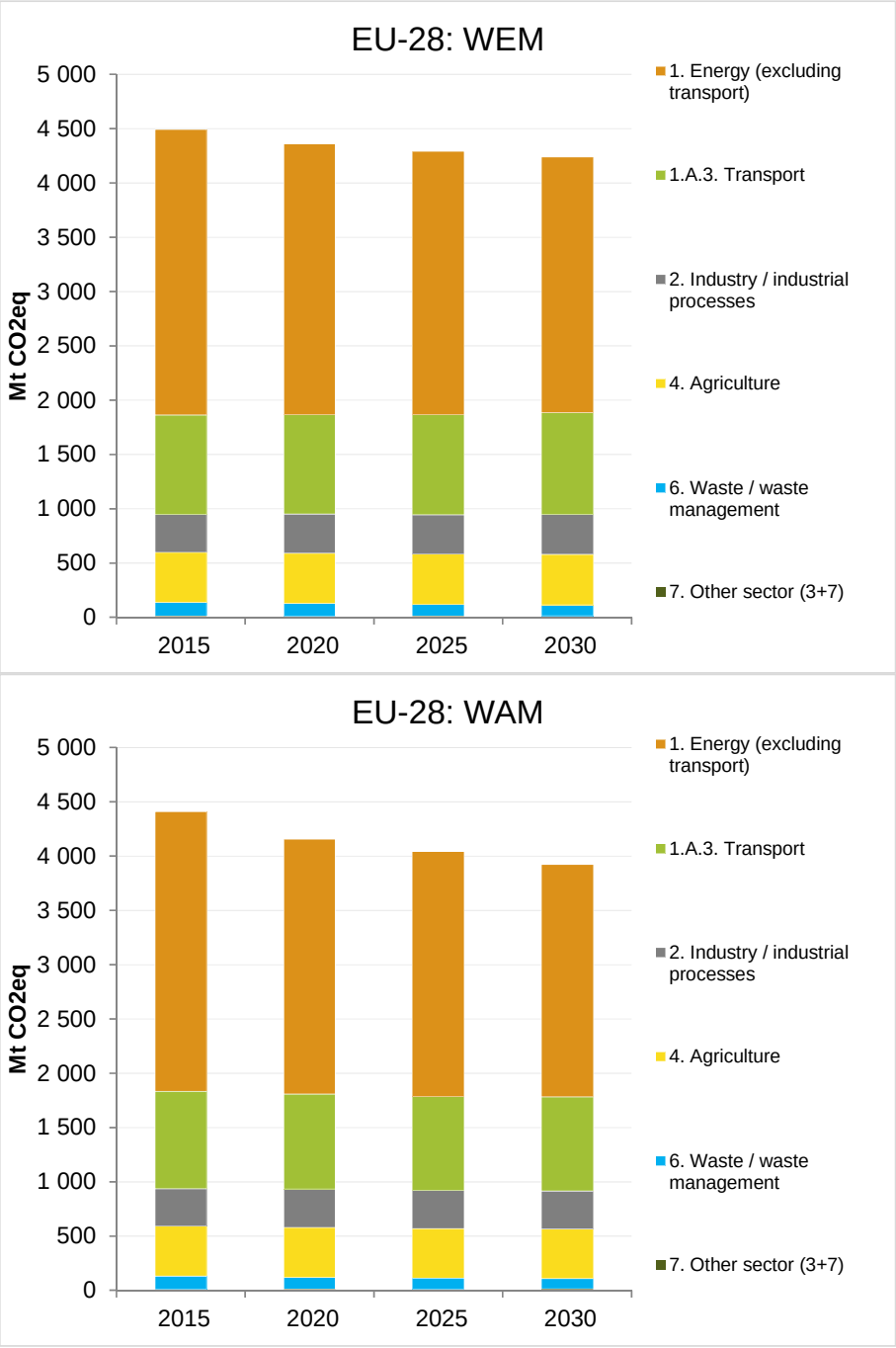


Figure [BR1] Error! ***No text of specified style in document.****-8* provides information on total aggregate GHG emissions on sector level relative to 1990. EU-28 projections are

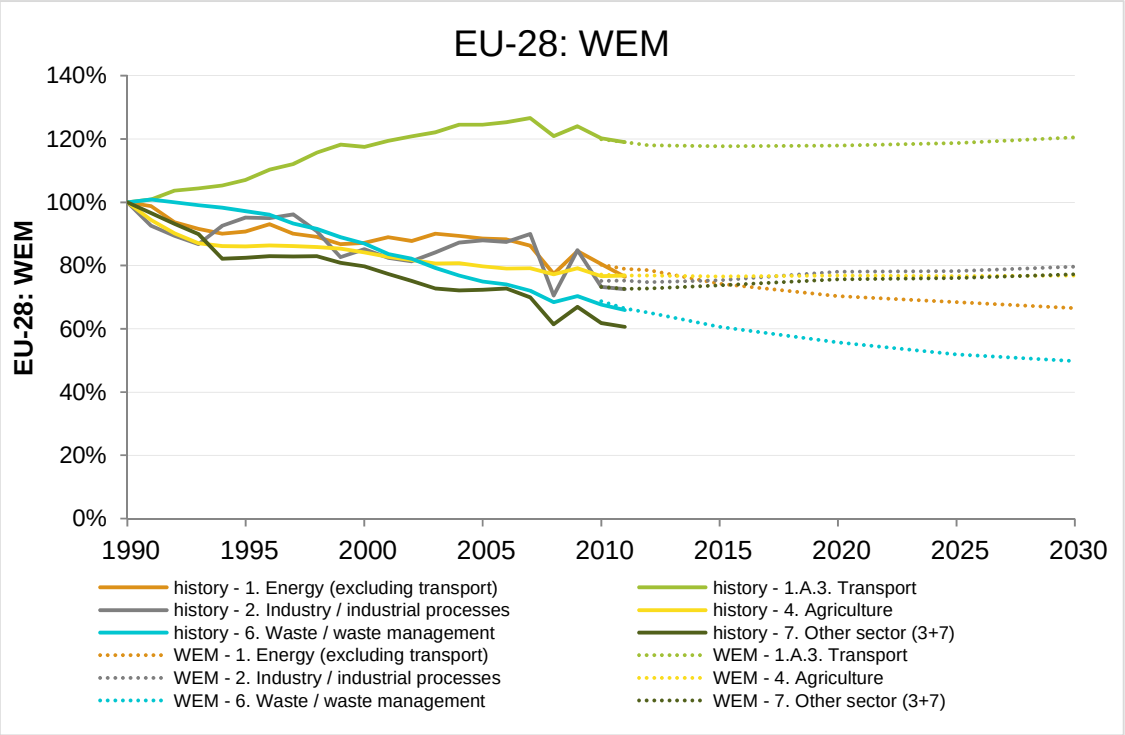
shown for 2010, 2011, 2012, 2015, 2020, 2025 and 2030 excluding carbon sinks and governmental use of Kyoto Mechanisms for each sector.

In the **EU-28 WEM** scenario, total aggregate GHG emissions are projected to be 1 247 Mt CO_2eq (22.2 %) below 1990 levels in **2020** and 1 367 Mt Mt CO_2eq below 1990 levels in **2030**. The contribution of sectors to emission changes again varies strongly: The most significant contribution of absolute GHG emission reductions in the EU-28 from **1990 to 2020** is projected to stem from the energy sector (1 051 Mt CO_2eq), followed by the agricultural sector (140 Mt CO_2eq) and the industrial sector (101 Mt CO_2eq). GHG emissions in the transport sector increase by 139 Mt CO_2eq until 2020. The most significant amount of absolute GHG emission reductions in the EU-28 from **1990 to 2030** is projected to stem from the energy sector (1 186 Mt CO_2eq), followed by the agricultural sector (140 Mt CO_2eq) and the waste sector (102 Mt CO_2eq). GHG emissions in the transport sector increase by 159 Mt CO_2eq.

In the **EU-28 WAM** scenario**,** total aggregate GHG emissions are projected to be 1 450 Mt (25.9 %) below 1990 levels in **2020** and 1 684 Mt below 1990 levels in **2030**. The most significant amount of absolute GHG emission reductions in the EU-28 from **1990 to 2020** is projected to stem from the energy sector (1 194 Mt CO_2eq), followed by the agricultural sector (144 Mt CO_2eq) and the industrial sector (108 Mt CO_2eq). GHG emissions in the transport sector increase by 97 Mt CO_2eq. The most significant amount of absolute GHG emission reductions in the EU-28 from **1990 to 2030** is projected to stem from the energy sector (1 401 Mt CO_2eq), followed by the agricultural sector (148 Mt CO_2eq) and the industrial sector (113 Mt CO_2eq). GHG emissions in the transport sector increase by 89 Mt CO_2eq.

Figure [BR1] Error! ***No text of specified style in document.****-8* and *Figure [BR1] Error!* ***No text of specified style in document.****-9* show the total changes in GHG emissions for WEM and WAM scenarios for the EU-28.

Figure [BR1] ***Error! No text of specified style in document.****-8 EU-28 GHG emissions per sector in the WEM and WAM scenario; relative to 1990*



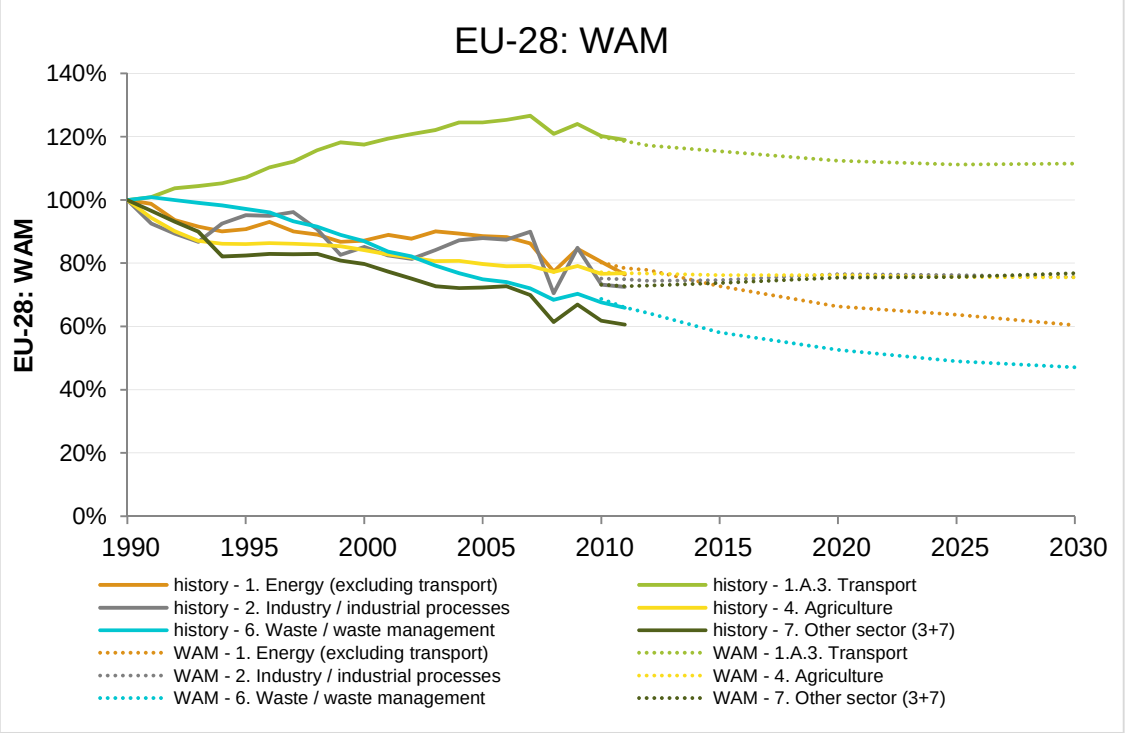
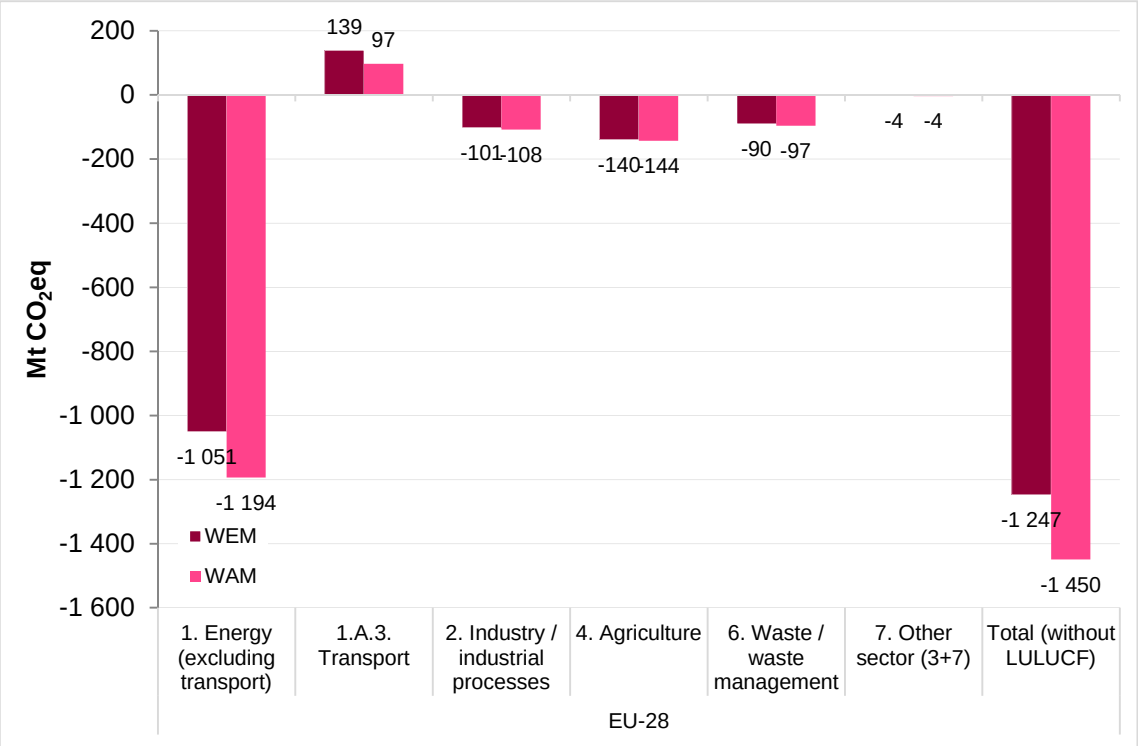


*Figure [BR1] **Error! No text of specified style in document.**-9 Absolute projected GHG emission changes from 1990 and 2020 for EU-28; WEM and WAM scenario*



The common factors which drive historic trends and projections are discussed in more detail in Section 2 of this report and in the national inventory and projection reports of individual Member States. Policies and measures which influence GHG emissions in each sector are discussed in more detail in Section 4 of this report.

5.2.1.2. Total aggregate GHG emission projections per gas

*Figure [BR1] Error! **No text of specified style in document.**-10* below illustrates the expected change in emissions from individual greenhouse gases between 1990 and 2030 under the "with existing measures" and "with additional measures" scenarios.

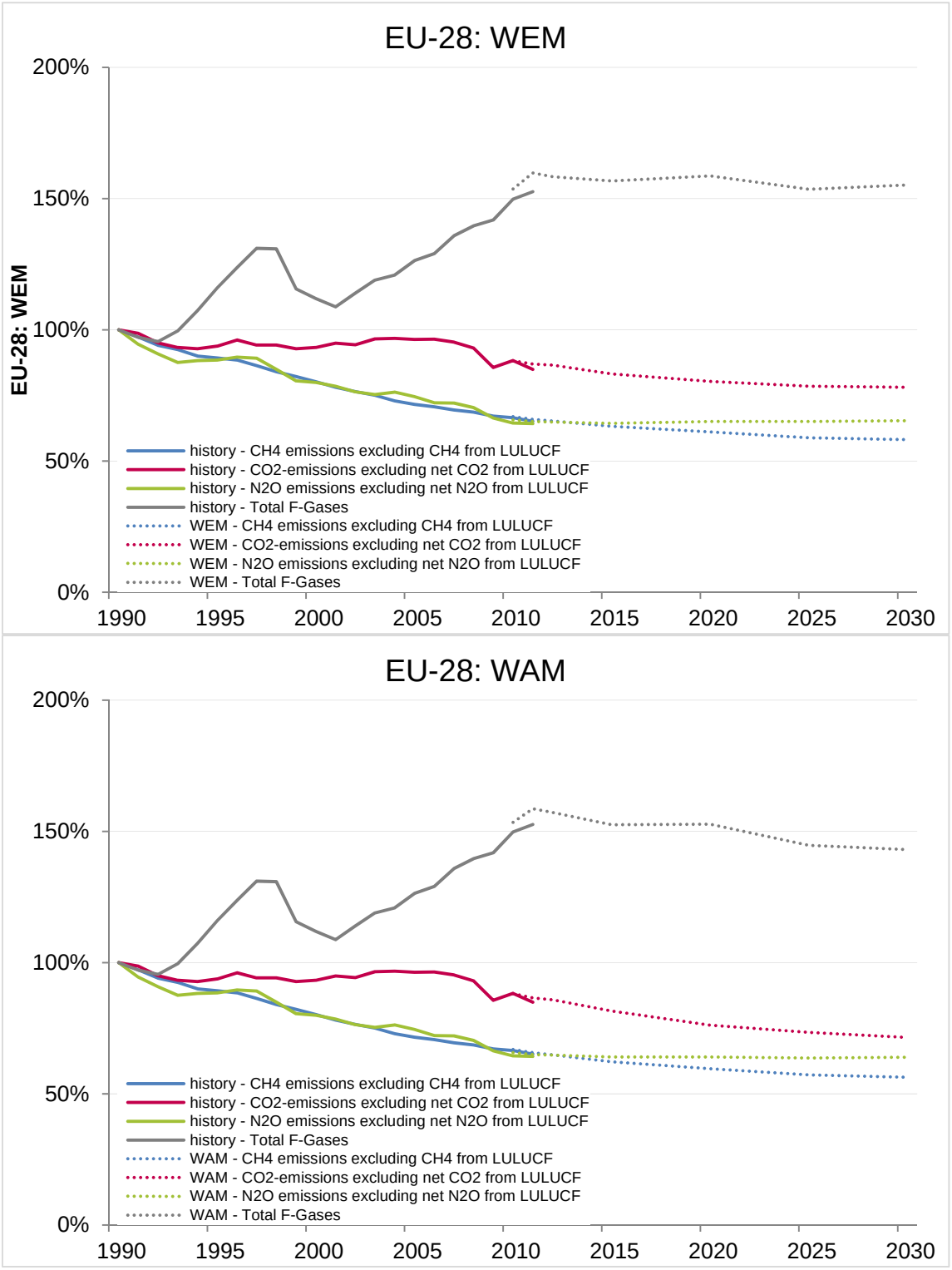
The projected overall reduction GHG emissions (excluding LULUCF) for **1990-2020** under the **WEM** scenario is 1 247 Mt CO_2eq in the EU-28 and 1 367 Mt CO_2eq for **1990-2030**. Reductions in CO_2 emissions are expected to contribute the most to overall emission reductions, the absolute reduction of CO_2 emissions in **1990-2020** under the **WEM** scenario are projected to be 869 Mt CO_2eq in the EU-28. Reductions in CH_4 emissions are projected to amount to 232 Mt CO_2eq. N_2O emissions are projected to be reduced by 182 Mt CO_2eq. F-gases are the only gases projected to increase relative to 1990 levels. However, the absolute contribution of F-gases to overall emissions is less significant: the projected additional F-gas emissions in 2020 compared to 1990 levels are 35 Mt CO_2eq in the EU-28 under the WEM scenario. The absolute reduction of CO_2 emissions in **1990-2030** under the **WEM** scenario is projected to be 972 Mt CO_2eq.

Reductions in CH_4 emissions are 249 Mt CO_2eq. N_2O emissions are projected to be reduced by 180 Mt CO_2eq. F-gases are the only gases projected to increase relative to 1990 levels: the projected additional F-gas emissions in 2020 compared to 1990 levels are 33 Mt CO_2eq in the EU-28 under the WEM scenario.

The projected overall reduction in greenhouse gas emissions (excluding LULUCF) in **1990-2020** under the **WAM** scenario is 1 450 Mt CO_2eq in the EU-28 and 1 684 Mt CO_2eq in **1990-2030**. Reductions in CO_2 emissions are expected to contribute the most: the absolute reduction of CO_2 emissions in **1990-2020** is projected to be 1 054 Mt CO_2eq. Reductions in CH_4 emissions are projected to be 240 Mt CO_2eq. N_2O emissions are projected to decrease by 187 Mt CO_2eq. F-gases are the only gases projected to increase relative to 1990 levels: The projected additional F-gas emissions in 2020 compared to 1990 levels are 32 Mt CO_2eq in the EU-28 considering also additional measures of the WAM scenario. The absolute reduction of CO_2 emissions in **1990-2030** is projected to be 1 262 Mt CO_2eq in the EU-28, reductions in CH_4 emissions are projected to be 260 Mt CO_2eq. N_2O emissions are projected to decrease by 188 Mt CO_2eq. The projected additional F-gas emissions in 2030 compared to 1990 levels are 26 Mt CO_2eq in the EU-28 considering also additional measures of the WAM scenario.

CTF Table 6 in the CTF Appendix contain detailed inventory and projections data, including overall EU-28 projections split by gas and sector for the years 1990, 1995, 2000, 2005, 2010, 2011, 2015, 2020, 2025, 2030.

*Figure [BR1] **Error! No text of specified style in document.**-10 EU-28 GHG emissions per gas relative to 1990; WEM and WAM scenario*



5.2.2. GHG emission projections per UNFCCC sector (level 1) and separately for bunker fuels

5.2.2.1. Energy

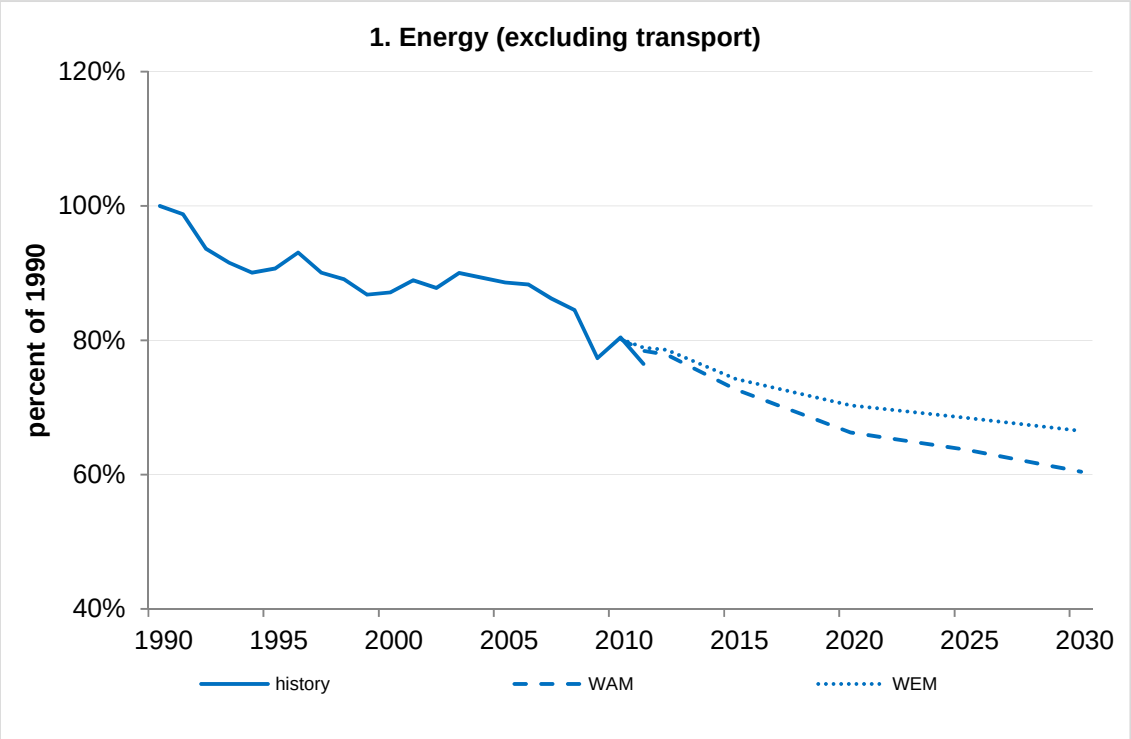
Figure [BR1] Error! ***No text of specified style in document.****-11* shows the GHG emissions and projections from the energy sector excluding transport.

For the EU-28, GHG emissions from the energy sector (excluding transport) have fallen since 1990, mainly due to fuel switching to gas (also reducing CH_4 emissions from coal mining), increased energy and technical efficiency, decreases in fuel combustion in manufacturing industries and construction and restructuring of industry in the new Member States. In part, such reductions have been counteracted by increased housing stock and growth in the services sector, resulting in increased demand for energy services in buildings and homes, and in particular strong growth in demand for electricity to provide these. In addition, recent economic growth in the new Member States has begun to increase demand for energy services. In general, EU-28 GHG emissions from the energy sector show a gradual downward trend from 1990 to the present day, with a short and steep decrease during the economic crisis, after which they increased again to pre-crisis levels and continue with the downward trend also in projections.

Projections for the sector demonstrate Member States' expectations that emissions from the sector will decrease as effects of existing policies and measures, both in the EU-28. The actual magnitude of the decreases in GHG emissions from the energy sector that can be reached up to 2020 and 2030 is also dependent on the successful implementation of planned additional measures.

EU-28 GHG emissions from energy under the **WEM** scenario are projected to decrease to 29.7 % below 1990 levels by 2020, and 33.5 % by 2030, while the decreases would reach 33.7 % below 1990 levels by 2020, and 39.6 % by 2030 if additional policies and measures are also considered (see Figure [BR1] Error! ***No text of specified style in document.****-11*).

Figure [BR1] ***Error! No text of specified style in document.****-11 Projected EU-28 GHG emissions relative to 1990 in the energy sector (excluding transport)*



5.2.2.2. Transport

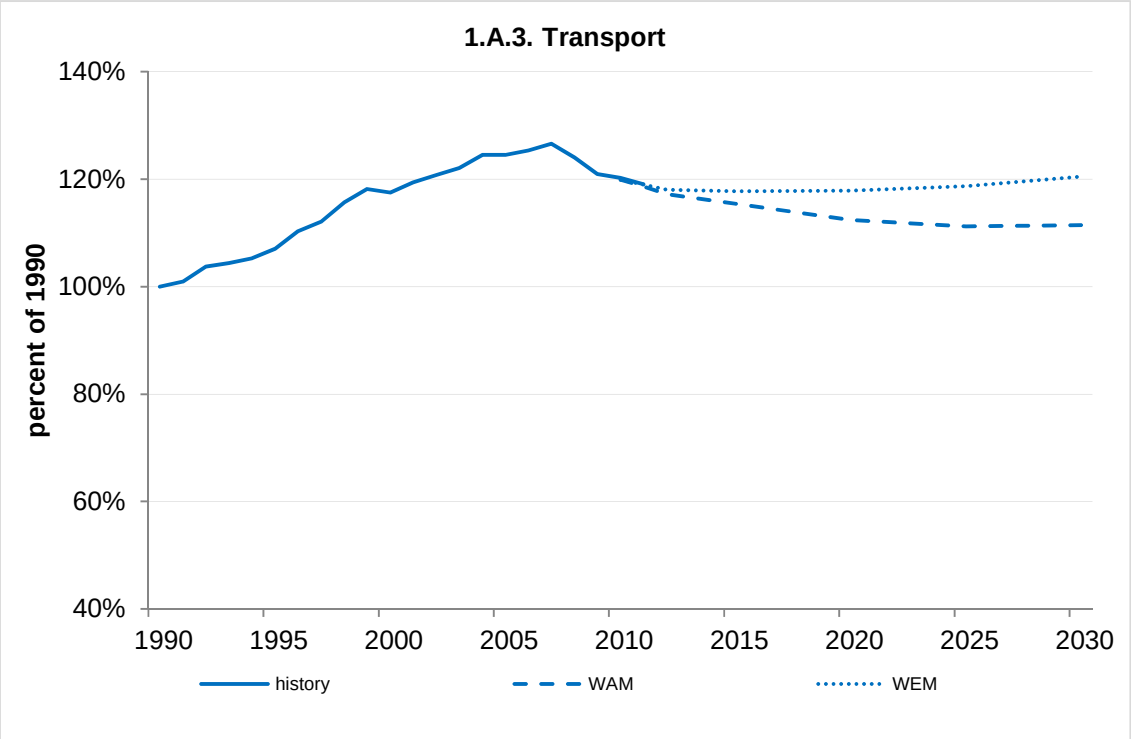
The transport sector caused the largest increase in GHG emissions between 1990 and 2011 (19 % in the EU-28) and is the only sector expected to experience an increase in GHG emissions between 1990 and 2030 under the WEM scenario.

Figure [BR1] Error! ***No text of specified style in document.****-12* below shows projected GHG emissions relative to 1990 in the transport sector for EU-28.

Generally it can be observed that while GHG emissions from transport are above 1990 levels until 2030, the emissions continue to decline, while one can observe a slight upward turn after 2020.

Figure [BR1] Error! ***No text of specified style in document.****-12* shows that under the **WEM** scenario, although the general pattern shows declining GHG emissions after 2007, emissions are expected to reach 17.9 % above 1990 levels by 2020, and 20.5 % above 1990 levels in by 2030, while in the **WAM** scenario additional measures contribute to further decreases so that they are projected to be only 12.4 % above 1990 levels by 2020, and 11.5 % above 1990 levels by 2030.

Figure [BR1] ***Error! No text of specified style in document.****-12 Projected EU-28 GHG emissions relative to 1990 in the transport sector*

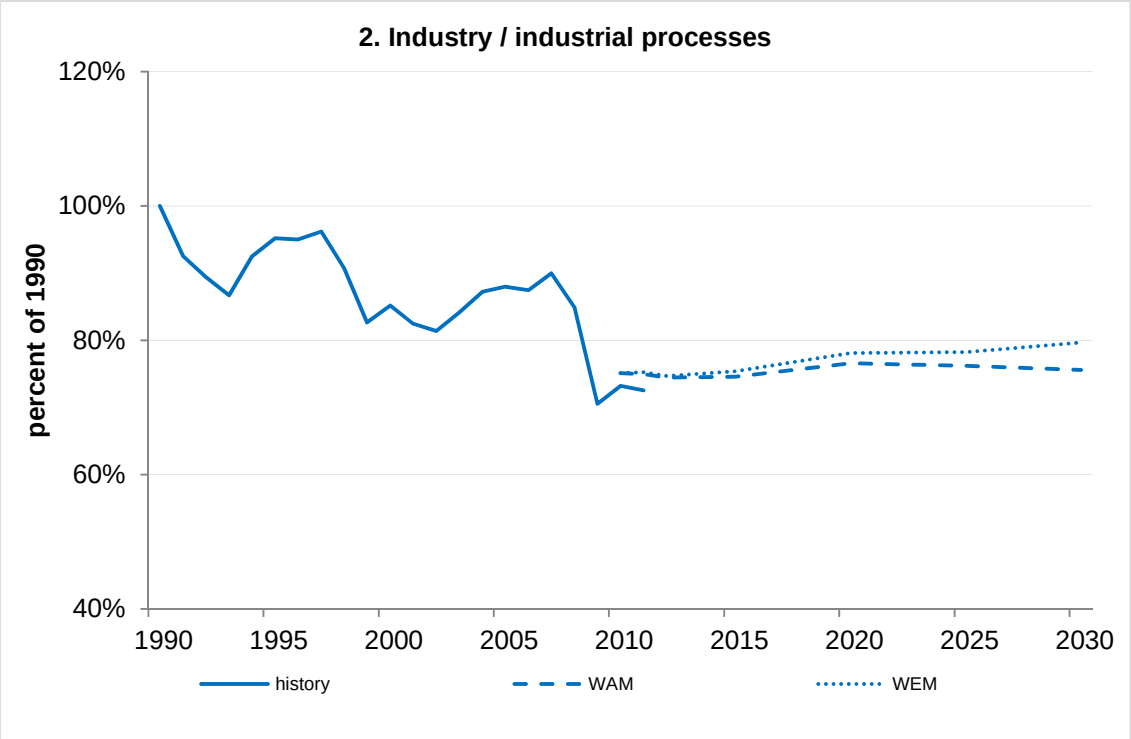


5.2.2.3. Industry/industrial processes

EU-28 GHG emissions from the industry/industrial processes sector have decreased considerably since their peak in 1997. They have sharply declined between 2007 and 2009, then continued slightly upwards and after 2011 a slight upward trend is projected especially in the WEM scenarios. Their fluctuating nature is driven by economic conditions (affecting activity levels) but also by EU and national regulation (affecting efficiency).

Figure [BR1] Error! ***No text of specified style in document.****-13* below shows projected **EU-28** GHG emissions from industrial processes under the **WEM** scenario reach 21.9 % below 1990 levels by 2020, and 20.3 % in 2030. Under the assumption of the implementation of **additional measures**, GHG emissions from industrial processes in the EU-28 could be reduced further to 23.4 % below 1990 levels by 2020 and 24.4 % by 2030.

Figure [BR1] ***Error! No text of specified style in document.****-13 Projected EU-28 GHG emissions relative to 1990 in the industry/industrial processes sector*



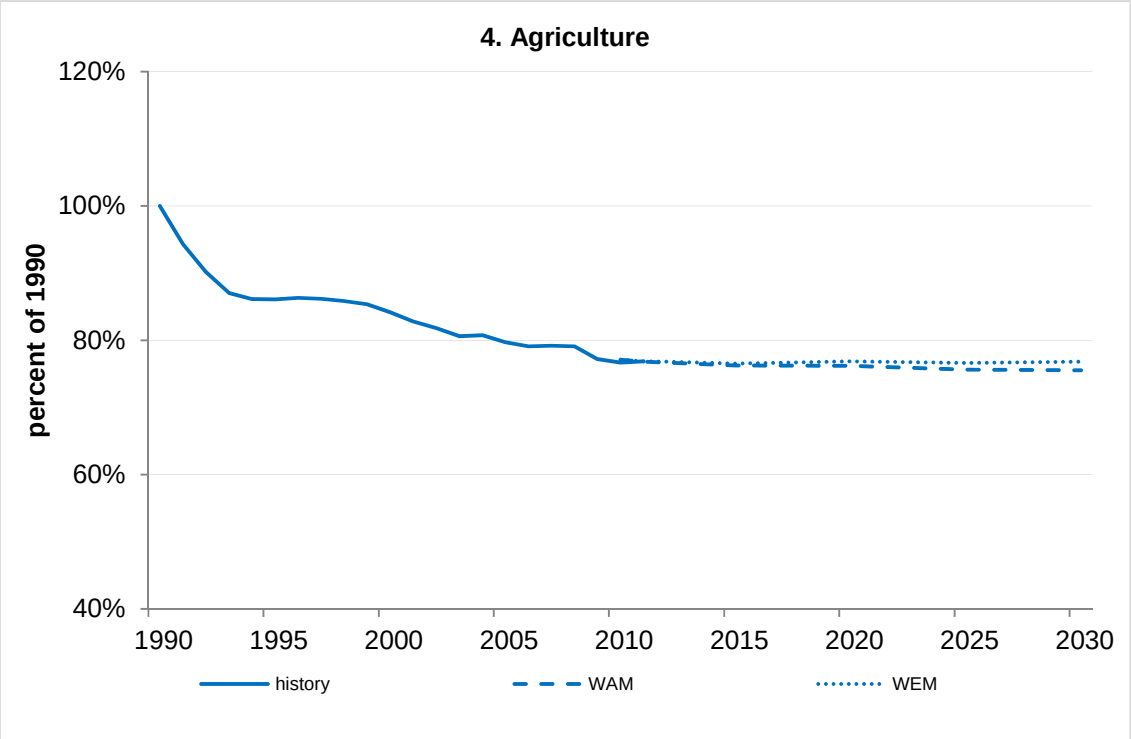
5.2.2.4. Agriculture

EU-28 GHG emissions from the agricultural sector have shown a steady decrease over the past years.

Changes in agricultural policy and farming subsidies as well as increased productivity have driven reduced animal numbers, reduced nitrogen fertiliser production and use and improved manure management resulting in reduced emissions from agricultural soils and livestock.

EU-28 GHG emissions from the agricultural sector are expected to continue decreasing up to 2020 in both WEM and WAM projections but at a slower pace than in previous decades. *Figure [BR1] Error!* ***No text of specified style in document.****-14* shows that for the **EU-28** under the **WEM** scenario, GHG emissions in the agricultural sector are projected to be 23.1 % below 1990 levels by 2020 and 23.2 % below 1990 levels in 2030. Considering **additional policies and measures** would reduce emissions to 23.8 % below 1990 levels in 2020 and 24.4 % below 1990 levels in 2030.

Figure [BR1] ***Error! No text of specified style in document.****-14 Projected EU-28 GHG emissions relative to 1990 in the agriculture sector*



5.2.2.5. Waste

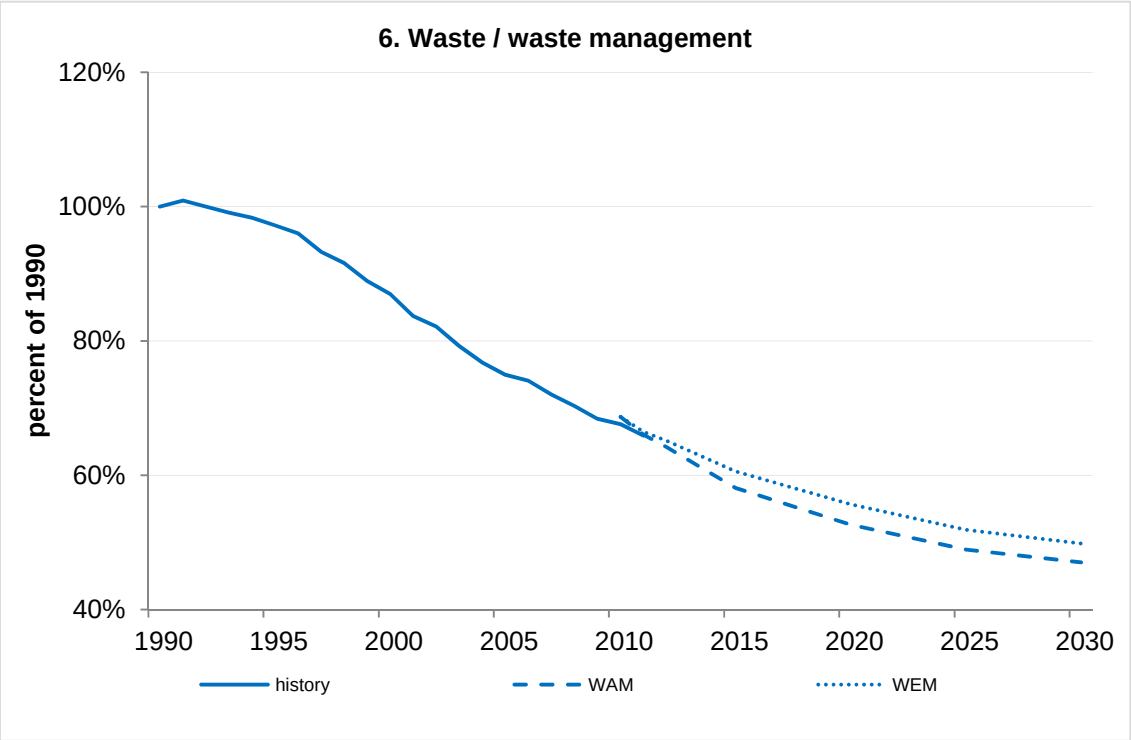
EU-28 GHG emissions from the waste sector have shown a steady and sharp decrease over the past 23 years. EU-28 emissions from the sector are projected to continue to decrease sharply until 2030, while the pace decreases slightly. Planned additional measures of the WAM scenario are projected to have a modest impact on further emission reductions.

Figure [BR1] Error! ***No text of specified style in document.****-15* shows that projected GHG emissions in the waste sector on **EU-28** level under **existing measures** are projected to be 44.3 % below 1990 level in 2020 and 50.2 % below 1990 levels in 2030. Additional measures of the **WAM** scenario would contribute to further decreases of GHG emissions in the waste sector: GHG projected emission levels would be 47.4 % below 1990 levels in 2020 and 52.9 % below 1990 levels in 2030.

Past and future emission decreases can largely be attributed to successful waste legislation, e.g. increased recycling, bans on landfilling, landfill taxes and methane recovery from treated wastewater and landfill. In particular, the Landfill Directive (see Section 4.8.3) has established objectives for the progressive reduction of biodegradable waste to landfill by 25 % within five years of Member State implementation of the

Directive, 50 % within eight years, and by 65 % within fifteen years, compared to 1995 levels.

Figure [BR1] ***Error! No text of specified style in document.****-15 Projected EU-28 GHG emissions relative to 1990 in the waste sector*



5.2.2.6. Other Sector (3+7)

The 'Other sector' is reported as the sum of emissions from Common Reporting Format (CRF) sectors 3 (Solvent and Other Product Use) and 7 (Other).

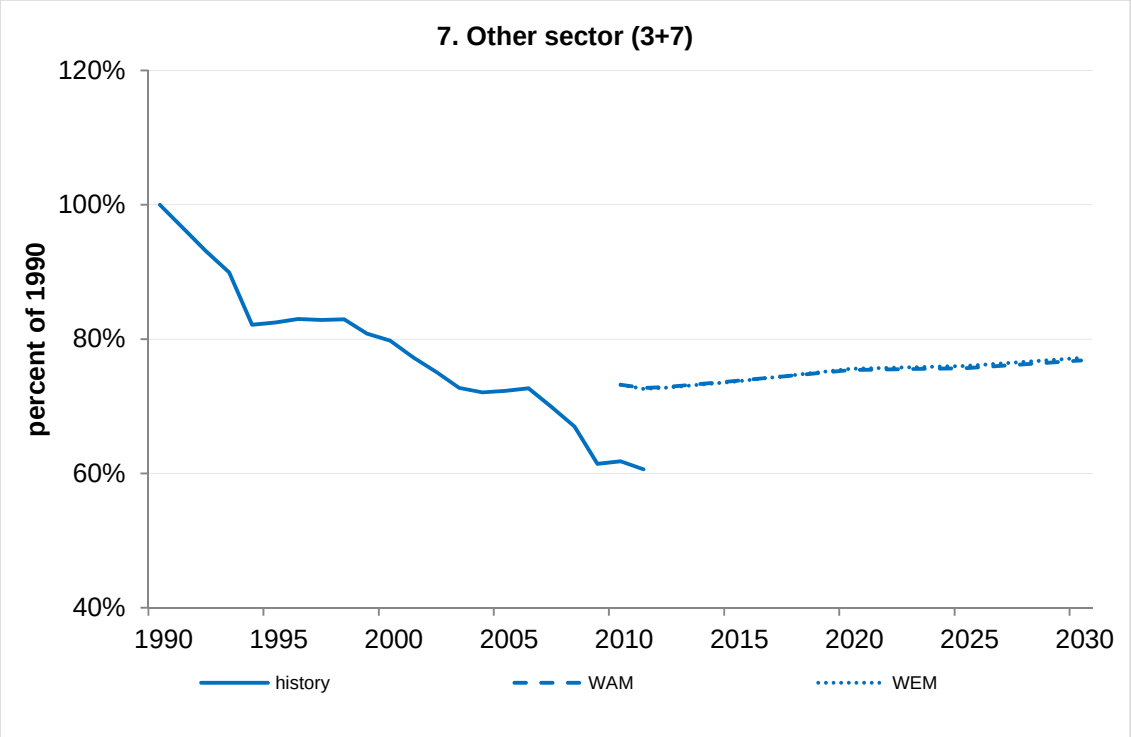
The contribution to the overall emissions from this sector has historically[248] been very small (0.2 % in 2011 for EU-28). EU-28 GHG emissions from 'other' sources have shown a steady and sharp decrease in the past.

Member State projections however indicate a rather stable (slightly increasing) trend after 2015 in both WEM and WAM scenarios.

In **EU-28**, there is very little difference between the **WEM and WAM** projections. The figure shows that emissions are projected to slowly increase, reaching 24.4 % (WEM scenario) and 24.6 (WAM scenario) below 1990 levels by 2020, and 22.8 % (WEM scenario) and 23.2 % (WAM scenario) below 1990 levels in 2030.

248 The inventories list a zero value for the „Other Sector", so historically seen, this only includes „Solvents and Other Product Use".

Figure [BR1] ***Error! No text of specified style in document.****-16 Projected EU-28 GHG emissions relative to 1990 in the other sector (solvent and other product use, other sector)*



5.2.2.7. Aviation and maritime bunker fuels

WEM projections of emissions from international bunker fuels sold to aircrafts have been reported by 26 Member States. WAM projections of emissions from international bunker fuels sold to aircrafts have been reported by 22 Member States. Missing values were gap-filled by WEM values. With this broad coverage nearly all emissions from international aviation are covered in the projections. The same holds for emissions from international bunker fuels sold to ships.

Figure [BR1] Error! ***No text of specified style in document.****-17* shows the projected emissions for the aviation sector for the EU-28 and the WEM (dotted line) and WAM (dashed line) scenario.

The figure shows that the rapid increase which was dampened by the economic crisis is projected to continue up to 2030.

In the **EU-28** under the **WEM** scenario, emissions from international aviation are projected to continue to increase, reaching 98.9 % above 1990 levels by 2020, and 132.4 % above 1990 levels by 2030. Considering also additional measures from the

WAM scenario, this increase is slightly slowed down and is projected to reach 94.3 % above 1990 levels by 2020 and 121.4 % above 1990 levels by 2030.

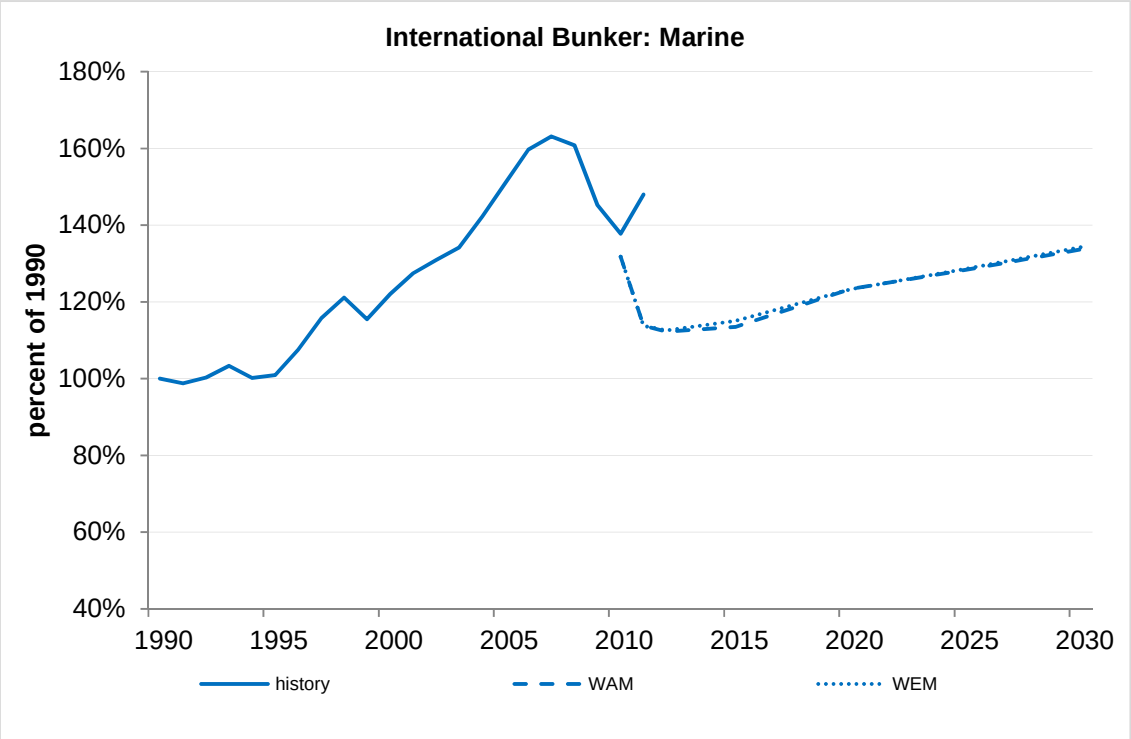
Figure [BR1] ***Error! No text of specified style in document.****-17 Projected EU-28 GHG emissions relative to 1990 in the international bunkers – aviation sector*

Figure [BR1] Error! ***No text of specified style in document.****-18* below shows the projected emissions for the marine sector for the EU-28 and both reported scenarios.

The figure shows that the increase in emissions from the marine sector was broken by the economic crisis but is projected to continue up to 2030, but at a lower level and pace.

In the **EU-28** under the **WEM** scenario, emissions from international marine are projected to continue to increase, reaching 23.3 % above 1990 levels by 2020, and 34.3 % above 1990 levels by 2030. Taking into account additional measures from the **WAM** scenario does not change the projection to a visible magnitude (23.4 % above 1990 levels in 2020 and 33.7 % above 1990 levels in 2030).

Figure [BR1] ***Error! No text of specified style in document.****-18 Projected EU-28 GHG emissions relative to 1990 in the international bunkers – marine sector*



5.2.3. Projections of indirect GHG

A presentation of indirect GHG emission projections is not possible.

5.3. Assessment of aggregate effects of policies and measures

Please refer to Section 5.6.2 for details on the methodology.

The effects of policies and measures in *Figure [BR1] Error!* ***No text of specified style in document.****-19* are shown in total, distinguishing between WEM and WAM scenario. The disaggregation of the total effects of policies and measures into sectors and gases is provided by Table [BR1] Error! **No text of specified style in document.**-13 and Table [BR1] Error! **No text of specified style in document.**-14.

For the aggregate effects of policies and measures in the WEM scenario a bottom-up approach had to be used whereas a top-down approach was used to assess the aggregate effects of policies and measures in the WAM scenario. The effects were disaggregated into sectors in both scenarios, WEM and WAM. However, the sector split differs

between the approaches and the sectoral policy effects in WEM and WAM are therefore not fully comparable.

Figure [BR1] ***Error! No text of specified style in document.****-19 Total effects of policies and measures for EU-28 in Mt CO_2-eq avoided emissions*

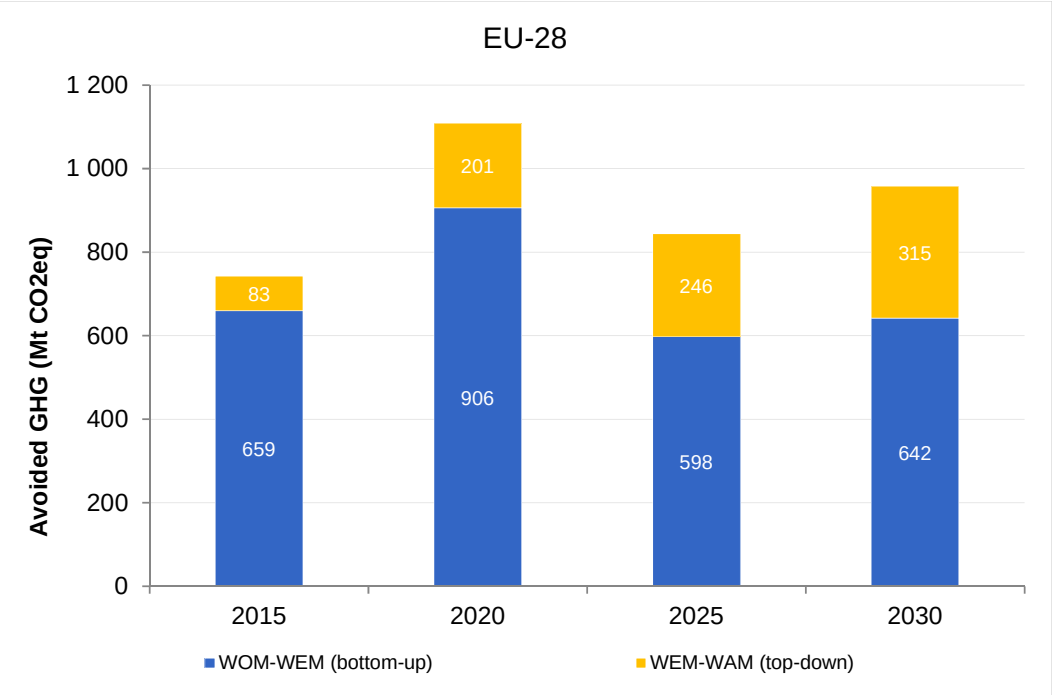


Table [BR1] ***Error! No text of specified style in document.****-13 Total effects of policies and measures EU-28, by sectors Mt CO_2eq avoided GHG emissions*

EU-28	2015	2020	2025	2030
	Mt CO_2 eq.			
WOM-WEM (bottom-up)	**659**	**906**	**598**	**642**
Energy consumption+supply	367	544	379	390
Transport	77	126	85	111
Industrial Processes	15	22	17	18
Agriculture	39	49	30	31
Waste	61	54	7	7
Cross-cutting	100	111	81	85
WEM-WAM (top-down)	**83**	**201**	**246**	**315**
1. Energy (excluding transport)	56	143	168	214
1.A.3. Transport	18	42	58	70
2. Industry / industrial processes	2	6	8	17
4. Agriculture	2	4	6	8
6. Waste / waste management	5	6	6	6
7. Other Sector (3+7)	0	0	0	0
Total effects of policies and measures	**742**	**1107**	**844**	**957**

Table [BR1] ***Error! No text of specified style in document.****-14 Effects of polices and measures as avoided GHG emission by gas for EU-28 Mt CO_2eq avoided GHG emissions*[249]

	2015	2020	2025	2030
EU 28	*Mt CO_2 eq.*			
WOM-WEM (bottom-up)	**761**	**1030**	**655**	**702**
CO_2	579	817	561	597
CH_4	103	106	37	41
N_2O	51	62	26	29
HFC, PFC, SF_6	28	44	31	35
WEM-WAM (top-down)	**84**	**203**	**247**	**317**
CO_2	74	185	225	291
CH_4	6	9	10	11
N_2O	1	6	7	7
HFC, PFC, SF_6	2	4	5	7

249 The sum of effects by gas does not result in total effects, because effects have not been allocated unambiguous by MS.

5.4. Sensitivity Analysis

5.4.1. Introduction

As the EU-28 projection comprises of an aggregation of individual MS projections, a sensitivity analysis for the EU-28 cannot be calculated from these individual projections. An aggregation of sensitivity analyses from individual Member States would not lead to meaningful results as these are based on different assumptions and methodologies, take into account different national circumstances and structures, and vary key parameters and assumptions in a heterogeneous manner.

To provide sensitivity insights for the EU-28, the results of the EU-28 2013 climate policy "baseline with adopted measures" (BAM) projection prepared and consulted with Member State experts in the framework of the EUCLIMIT project[250] on behalf of the European Commission, DG Climate Action are considered instead. The EU-28 EUCLIMIT BAM scenario is based on EU-wide sectoral modelling and focuses on the impacts of existing concrete measures. It includes adopted EU and key national measures in climate, energy and transport related areas up to spring 2012, including the EU level, e.g. the EU Emission Trading Scheme, Eco-design and labelling legislation, the Energy Performance in Buildings directive, the CO_2 and cars and CO_2 and vans regulations, the F-Gas regulation, the Mobile Air Conditioning directive, the Landfill directive and the Nitrate directive. Progress in non-ETS sectors towards the national GHG emission targets set out in the Effort Sharing Decision and the deployment of renewables towards the legally binding national 2020 targets depends on already adopted national policies and measures and concrete EU measures. The EU Energy Efficiency Directive adopted in autumn 2012 is not included insofar as effects on GHG, ETS and non-ETS emissions depend on the way in which transposition into national measures will take place. The EUCLIMIT BAM scenario is hence comparable with a "with existing measures" projection[251].

A comparison of results between the two different approaches is shown in Section 5.4.4. Also some key parameters are differing between aggregated Member State projections and EUCLIMIT results, because EUCLIMIT key parameters are based on data and assumptions available in a consistent way for all Member States, while for the EU-28 projection they are based on a weighted averages of MS projections key parameter values. A comparison of several key parameters is conducted in Section 5.4.3.

In this section the WEM scenario is referred to as "main projection" and the EUCLIMIT BAM scenario as "sensitivity projection".

250 Full project title: Development and application of EU economy-wide climate mitigation modelling capacity. Website: http://www.euclimit.eu.

251 For a detailed description see: European Commission, EU Baseline Scenario 2013. An EU "with existing measures" projection of greenhouse gas, ETS and non-ETS emissions trends to 2020 and beyond.

5.4.2. Member State sensitivities

For information of sensitivity analyses accomplished at Member State level, please refer to the individual Member States' Biennial Reports.

5.4.3. Key parameters main and sensitivity projection

The key parameters and assumptions of the main projection can be found in Table [BR1] Error! **No text of specified style in document.**-15 and in CTF Table 5 in the CTF Appendix.

*Table [BR1] **Error! No text of specified style in document.**-15 Key parameters and assumptions of the main projection*

Parameter	2015	2020	2025	2030
CO2-price (Euro (2010)/tCO2_eq)	12	17	21	27
GDP (Bio. Euro (2005))	13	14	16	17
International coal price (Euro (2010)/boe)	19	20	23	23
International gas price (Euro (2010)/boe)	50	54	58	61
International oil price (Euro (2010)/boe)	86	94	95	101
Population (Mio.)	506	514	518	510

Table [BR1] Error! **No text of specified style in document.**-16 lists key parameters and assumptions underlying the sensitivity projection. It needs to be noted that EU ETS CO_2 price and primary energy demand are endogenous variables in the EUCLIMIT modelling framework and thus model outputs, while in other modelling frameworks these are often provided as external parameters.

Table [BR1] **Error! No text of specified style in document.**-16 Key parameters and assumptions of EU-28 sensitivity projection (EUCLIMIT BAM scenario)

Parameter	2015	2020	2025	2030
CO2-price (Euro (2010)/tCO2_eq)	7	20	35	59
GDP (Bio. Euro (2005))	12	13	15	16
International coal price (Euro (2010)/boe)	22	23	24	24
International gas price (Euro (2010)/boe)	54	62	59	65
International oil price (Euro (2010)/boe)	86	89	89	93
Population (Mio.)	511	517	522	525

Source: EUCLIMIT (GDP deflation to 2005 based on Eurostat price index (nama_gdp_p)

The variation of several key parameters between main and sensitivity are documented below:

- The annual average growth rate between 2015-2030 of GDP in the main projection is 1.87 % p.a. while the sensitivity projection assumes 1.55 % p.a.;

- EU ETS CO_2 prices between 2015 and 2030 develop from €12 (2010)/t CO_2eq to €27 (2010)/t CO_2eq in the main projection and from €7 (2010)/t CO_2eq to €59 (2010)/t CO_2eq in the sensitivity projection;

- The international oil price in the main projection rises from €86 (2010)/boe in 2015 to €101 (2010)/boe in 2030 while in the sensitivity projection it develops from €86 (2010)/boe to € 93 (2010)/boe over the same period.

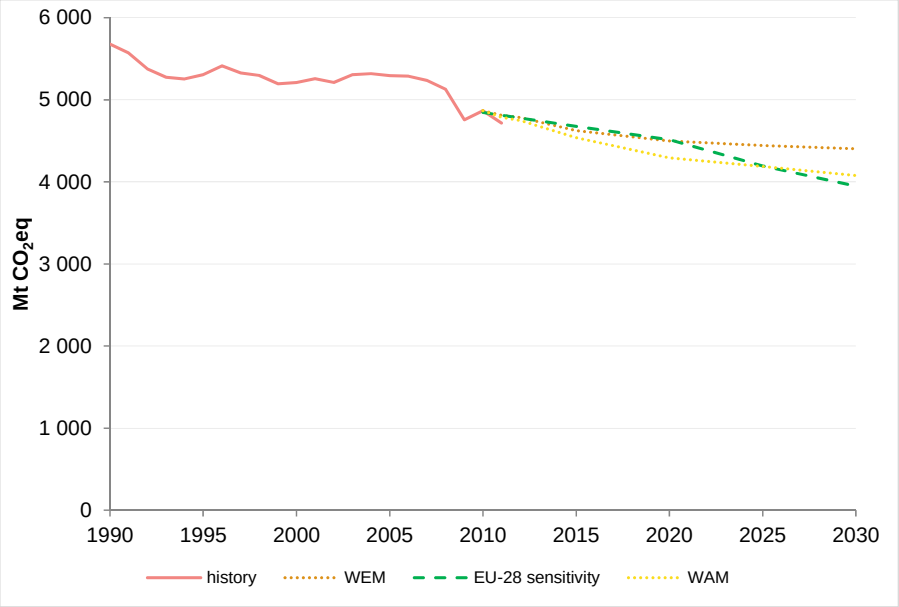
5.4.4. Sensitivity results

Figure [BR1] Error! ***No text of specified style in document.****-20* below includes a comparison of total aggregate GHG emissions on EU-28 level for the main projection (labelled WEM) and the sensitivity projection (labelled EU-28 sensitivity). For illustrative purposes the EU-28 WAM projection is also included in the representation.

The presented trajectories include GHG emissions from international aviation.

A comparison of the EU-28 main projection with the sensitivity projection yields the following main insight: At a variation of the key parameters of the main projection as documented in Section 5.4.3, total projected GHG emissions in the EU-28 sensitivity projection in 2020 are at very similar levels as in the main projection.

*Figure [BR1] **Error! No text of specified style in document.**-20 Total aggregate EU-28 GHG emissions, historic (red solid) and projected WEM (orange dotted), WAM (yellow dotted) and sensitivity projection (green dashed)*



Note: The projections presented by this figure include international aviation. The projected emissions do not include emissions from marine bunkers and LULUCF.

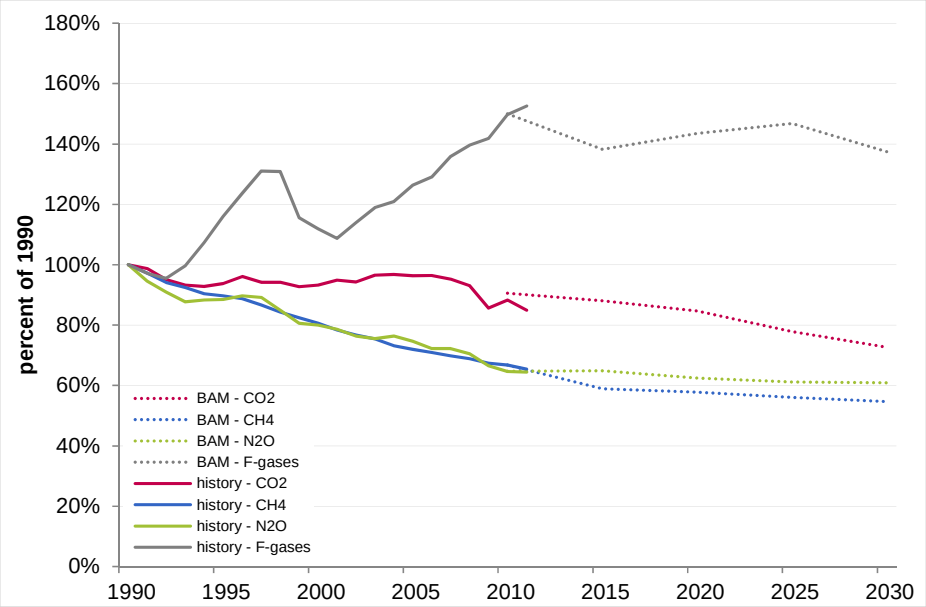
Results after 2020 are of course more uncertain and more dependent on the assumptions made. The sensitivity projection sees a decline in EU GHG emissions at a faster pace as the main WEM projection, yielding results for 2025 and 2030 of a similar order of magnitude as the main WAM projection. This pattern is consistent with the multi-level character of the EU. The EU sensitivity includes EU measures which have been adopted recently, and which might not be fully covered by all national projections, or be covered in a more conservative way. One example is the revised Energy Performance in Buildings Directive which mainly has emission reduction effects from 2020 onwards and on which implementation in national legislation was still ongoing in some countries, so that it might not be included in national WEM but in WAM projections. And the CO_2 and cars regulation includes a decrease of the fleet average to be achieved by all new cars to 95 g/km by 2020, of which the effect on transport emissions will mainly occur after 2020 with the turnover of the car fleet. For those national projections underpinning the main projection that focus on the 2020 time frame and project post 2020 emissions in a simplified way, these post 2020 effects might not be covered. Another reason for the faster decline of the sensitivity projection post-2020 is that it takes fully into account the continuing decrease of the EU ETS cap by a linear factor of 1.74%, reflected in higher CO_2 prices towards the end of the projection period, while Member States chose more conservative assumptions on average, with some of them varying ETS price assumptions between WEM and WAM scenarios. Higher CO_2 prices have also a dampening effect on the projected increase of aviation emissions. Finally, it is recalled that neither main projection nor sensitivity projection includes the recently

adopted EU Energy Efficiency Directive which is expected to induce further GHG emission reductions.

5.4.4.1. Total aggregate GHG emission projections per gas according to sensitivity projection

Figure [BR1] Error! **No text of specified style in document.**-21 below summarises the sensitivity projection per gas relative to 1990 values. The results are generally in line with the EU-28 projection per gas as presented in *Figure [BR1] Error!* ***No text of specified style in document.****-10*. The analogue presentation of GHG emission projections per gas for the WEM (and WAM) scenario is found in section 5.2.1.2. It must be noted that CO_2 emissions presented in Figure [BR1] Error! **No text of specified style in document.**-21 include emissions from international aviation, while the trajectory presented in section 5.2.1.2 does not.

Figure [BR1] **Error! No text of specified style in document.**-21 EU-28 GHG emissions by gas, relative to 1990; sensitivity projection , including international aviation



Source: Calculated from absolute values provided by EUCLIMIT BAM[252]

5.5. Supplementarity

To achieve international greenhouse gas targets, Annex I Parties can use Kyoto Protocol mechanisms. Information on the actual and intended use in the first commitment period is given in section 4.12

252 It should be noted that the EUCLIMIT BAM is calibrated to inventory data as reported by the EU to the UNFCCC in 2012 and energy-related CO2 emissions for 2010 are calculated based on energy balances as reported by Eurostat.

As the chapter on projections only focuses on the development of GHG emissions until 2030, the question of supplementarity cannot be raised for this time horizon as no targets are finally defined and no final decisions are taken with regard to the (supplementary) use of Kyoto mechanisms.

For the EU-28 in the framework of the two most important cross-sector measures (Emission Trading Scheme (ETS) and Effort Sharing Decisions (ESD)) the maximum use of flexible mechanisms is defined as follows:

In the EU - ETS the exact amount per operator for phase 3 (2013 – 2020) is determined in line with the methodology set out in the revised EU ETS Directive (Article 11a(8)) and is further specified in a Regulation on determining international credit entitlements[253].Unused entitlements can be carried over from the second to the third trading period. These, amount to approx. 330 million units[254].

In the ESD, an annual level of Clean Development Mechanism (CDM) and Joint Implementation (JI) mechanism credits is defined per Member State: In general the use of these flexible mechanisms in the 2013-2020 period is limited to 3 % of its 2005 emissions. The Effort Sharing Decision also allows certain Member States that have emission reduction targets, or which are allowed to increase emissions by up to 5 % of 2005 levels, to use an additional 1 % of credits. These credits can come only from CDM projects in least developed countries and small island developing states, and are not bankable or transferable. The Member States concerned are Austria, Finland, Denmark, Italy, Spain, Belgium, Luxembourg, Portugal, Ireland, Slovenia, Cyprus and Sweden.

5.6. Methodology

Information presented in Section 5.2 for the EU-28 is derived through an aggregation of individual Member State information. Detailed descriptions of the methodologies used to generate individual Member State projections, further information on their sensitivity and uncertainty analyses and their key parameters and assumptions are presented in individual Member State National Communications and are not replicated in the EU's National Communication.

The methodology for generating EU-28 projections is described in Section 5.6.1. Changes to the methodology are documented in Section 5.6.1.5

Further, the methodology on determining the total effects of policies and measures and regarding the sensitivity analysis are also outlined in the remainder of this section.

253 Commission regulation on determining international credit entitlements pursuant to Directive 2003/87/EC of the European Parliament and of the Council. (OJ L 299, 9.11.2013, p.32-33)

http://ec.europa.eu/clima/policies/ets/linking/docs/rice_regulation_20131107_en.pdf

254 see EEA 2013 Trends and Projections Report (http://www.eea.europa.eu/publications/trends-and-projections-2013).

5.6.1. Methodology for projections

5.6.1.1. General methodology

The EU-28 projections have been aggregated using Member State's submissions to the European Commission under the MMD in 2013. EEA's European Topic Centre for Air Pollution and Climate Change Mitigation (ETC/ACM) has compiled the national projections and applied quality assessment and quality control (QA/QC) procedures that consist of a number of checks against quality criteria such as completeness, consistency, comparability, accuracy and transparency of reported data. If the quality checks showed that the submission did not follow the quality criteria, the ETC/ACM reviewer was seeking explanation in the accompanying documents submitted by MS. If no explanations could be found, the reviewers contacted MS projection experts to request the clarification needed. If issues remained unresolved or the inaccuracy risk associated with MS projections was deemed too high, the ETC/ACM performed corrective actions on the reported data. A specific corrective action corresponds to each identified quality issue. Such corrective actions are essential to ensure the quality of projections data used in the annual reports of the Commission and the EEA. The EU-15 and EU-28 emission projections conform with the EEA's and European Commission's 2013 reports on progress towards the Kyoto target[255].

5.6.1.2. Models used for sensitivity analysis

A sensitivity analysis in the traditional sense – i.e. ordering by importance the strength and relevance of the input key parameters and assumptions in determining the variation of the model output – is not applicable for a global aggregation of 28 individual Member States projections. Each Member State, however, conducts individual sensitivity analyses. Please refer to the 6th National Communication/1st Biennial Report of the Member States to gain insights into individual sensitivity analyses.

In order to provide a sensitivity analysis on EU-28 level, an alternative method was utilised. The EUCLIMIT service contract provides EU-wide modelling of climate policies for the European Commission based on a consistent set of key parameters and assumptions for individual Member States. Further, as described in Section 5.4 it has produced a scenario (BAM) which, in its definition, comes very close to the WEM scenario as it only includes adopted measures.

The models which have been utilised in EUCLIMIT (Prometheus, GEM-E3, PRIMES, PRIMES TREMOVE, PRIMES Biomass Supply, GAINS, CAPRI, GLOBIOM-G4M) are documented in Section 5.6.3.

Thus, the EU-28 BAM scenario as provided by EUCLIMIT serves as a sensitivity projection to the EU-28 WEM projection presented throughout the report. Please refer to Section 5.6.3 for more details on the sensitivity approach taken.

255 The report is available for download from EEA under : http://www.eea.europa.eu/publications/trends-and-projections-2013. The Commission report is available under: http://ec.europa.eu/clima/policies/g-gas/docs/com_2013_698_en.pdf

5.6.1.3. Key parameters and assumptions

For key parameters and assumptions please refer to Section 5.1.3 and to CTF Table 5 in the CTF Appendix. For key parameters and assumptions of the sensitivity projection, please refer to Section 5.4.3.

5.6.1.4. QA/QC procedure

To acquire best possible consistency of the aggregated projection on EU-28 level, data adjustments and gap-filling were performed by the EEA. These alignments of data resulting from the QA/QC procedures are documented in this section below.

As a further QA/QC procedure the sensitivity projection presented in Section 5.4 is used. In contrast to the EU-28 "with existing measures" projection totalised through individual Member State projections, the EU-28 "baseline scenario" projection (BAM) of EUCLIMIT is derived by a modelling exercise based on one set of key parameters and assumptions.

Reference year calibration

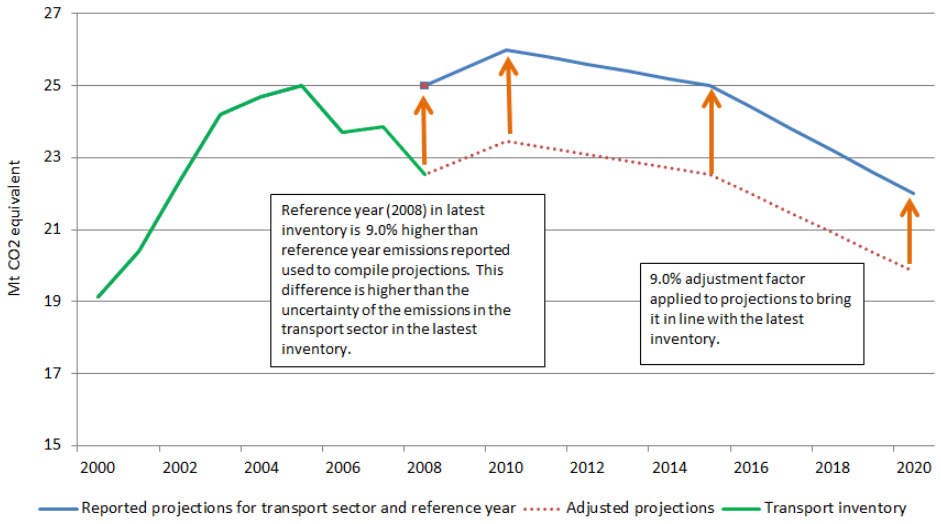
To assure a coherent EU-28 compilation it is of particular importance that the starting year of each projection activity is time-series consistent with the latest available greenhouse gas emissions inventory. In order to correct any inconsistencies between projected emissions reported by Member States and the latest available inventory data, Member States' reference year emissions have been aligned to the respective inventory year of the inventory submission 2013 per MS at a sector level. For projections submitted in 2013, two MS used 2011 (Ireland and Italy), one MS used 2009 (Cyprus), two MS used 2007 (Poland, Sweden) and the remaining 22 MS used 2010 as a reference year.

An adjustment was performed where the deviation between the sector emissions for the reference year and the latest available inventory data for that year was more than the specified sector inventory uncertainty in per cent. The adjustment has been applied for 17 of 27 national projections[256] because a difference higher than specified sector inventory uncertainty was found for at least one of the sectors reported.

An illustrative example of the reference year calibration is given in Figure [BR1] Error! ***No text of specified style in document.***-*22* below.

256 This applies to Austria, Czech Republic, Denmark, Estonia, Finland, France, Germany, the Netherlands, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia, Spain and the United Kingdom.

Figure [BR1] ***Error! No text of specified style in document.****-22 Example of reference year calibration*



Source: EEA

Policies included in the projections scenarios

EU-15 and EU-28 projections presented are aggregated from individual Member States submissions. Projections for the 'with existing measures' and 'with additional measures' scenarios therefore include a variety of measures depending on the status of implementation of EU initiated policies in different Member States and programmes of measures developed independently in individual Member States. Measures included in the EU 'with existing measures' and 'with additional measures' scenarios are therefore not indicated in this chapter.

Gap-filling procedure

Partly or fully gap-filling of MS' projections has been carried out where gaps exist in the projections reported by Member States. The following methods were used to gap-fill:

- Where a 'with additional measures' projection was not provided, the 'with additional measures' projection has been gap-filled with the 'with existing measures' projection to enable an EU level 'with additional measures' projection to be produced. Four of 28 MS[257] did not provide a WAM scenario.

- Where a sector or gas breakdown was available for one scenario and not available for another, the available data from the former have been applied to the national total of the latter.

257 Denmark, Poland, Portugal and the United Kingdom.

- Where total projections were provided but no gas or sector breakdown was provided, the relevant breakdowns in 2013 inventory data have been applied to the projections' national total to generate gas and sector breakdowns. Some sectors were gap-filled for 12 countries of 27.

- Where the years between the mandatory reporting years 2010, 2015 and 2020 was not reported, interpolation was performed. In the submission year 2013, this gap-filling of intermediate years was carried out for 21 of 27 MS.

- Where the years 2025 and/or 2030 were not reported, the years where gap-filled with EUCLIMIT BAM data. Seven countries did not report 2025 and/or 2030 projections.

- Where no scenario was reported or the reported scenario was outdated the entire projection scenario was replaced by EUCLIMIT BAM data. The entire time-series of EUCLIMIT BAM data was used for HR.

- Where an ETS/non-ETS split was not available or only available for some years, the split was gap-filled with EUCLIMIT BAM data. Ten countries did not report an ETS/non-ETS split for all years.

An aggregation of "without measures" projections from national projections was not possible due to the lack of data as the WOM scenario was only reported by 4 of 28 MS.

5.6.1.5. Changes in projection methodologies

Since the projections reported within the 1st Biennial Report need to cover the period up to 2030, but not all Member States provided data up to this point in time, missing data for 2030 has been gap-filled as documented in Section 5.6.1.4

Since Croatia did not submit projections to the EEA, the entire time-series of EUCLIMIT BAM data was used instead.

5.6.2. Methodology for assessing aggregate effects of policies and measures

5.6.2.1. General methodology

The aggregate effects of policies and measures documented in this section have been calculated using two methodological approaches due to the EU projections being an aggregation of individual projections.

The estimated effects of policies and measures from the WEM scenario would ideally be calculated subtracting the emissions from the 'without measures scenario' (WOM) from the WEM scenario. Following this approach, however, was not possible since only four Member States reported a WOM scenario. Thus to estimate the effects of the existing policies and measures, a bottom-up approach was followed (documented in Box 1 below).

For the estimation of the total effect of the measures included in the WAM scenario, a top-down methodology has been applied, subtracting WEM GHG emissions from WAM GHG emissions. This approach is documented in Box 2 below.

Box 1 Bottom-up methodology to determine effects of existing policies and measures.

The bottom-up approach estimates total savings from policies and measures by aggregating the expected savings from individual policies and measures as reported by Member States and aggregated by the EEA in a PaM database. Member States report the savings from their 'existing measures' and 'additional measures' separately, not all impacts of policies and measures are reported and quantified.

On the other hand the bottom-up determination of the effects of policies and measures is likely to be an overestimation, because Member States do include the effects of policies and measures which are not purely national and effects of cross-sectoral policies and measures are taken into account separately. In addition there are generally overlapping effects of policies and measures, which lead to overestimations.

The allocation of effects to sectors and gases could not be conducted in an unambiguous manner, resulting in different sums, depending on the chosen sector and gas.

The effects in the EEA database are categorised into sectors which are not completely compatible with UNFCCC categories: Specifically there is a sector for "Cross sectoral" policies and measures, which leads to an underestimation of effects in other sectors if they are compared to effects with the top-down analysis, based on UNFCCC categories. In addition the allocation of effects to sectors and gases by MS could not always be conducted in a definite manner, which may lead to inconsistencies if effects are summed up.

The effects summed up here draw from the reports of Member States under the MMD while the estimated effects of EU policies and measures documented in section 3, and CTF Table 3 in the CTF Appendix focus only on EU-wide policies. Thus the results are different in nature and cannot be compared.

Box 2 Top-down methodology to determine total effects of additional policies and measures

The estimated effect of additional policies and measures as included in the WAM scenario are calculated by taking the difference between WEM and WAM total GHG emissions:

Effects from additional policies and measures = total WEM GHG emissions – total WAM GHG emissions.

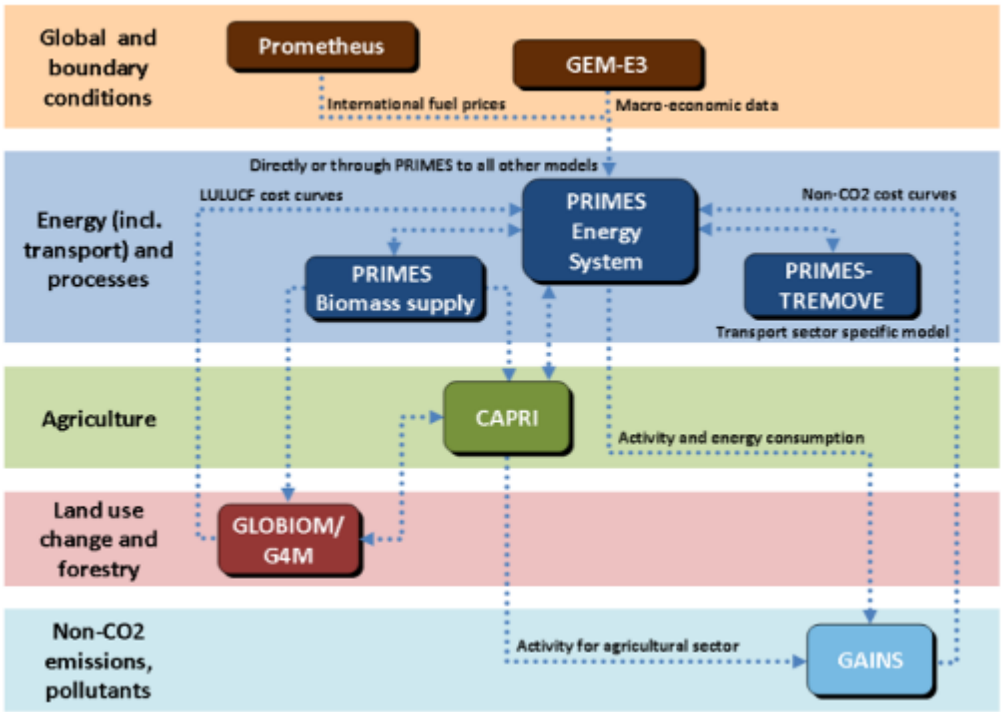
5.6.3. Methodology for sensitivity analysis

Due to the aggregate nature of the EU projection, a sensitivity analysis needs to be achieved by alternative means and the EUCLIMIT BAM scenario, including adopted policies and measures, provided in the EU-28 aggregation, serves as a sensitivity to the main projection presented throughout this 6th National Communication and 1st Biennial Report.

5.6.3.1. General methodology

EUCLIMIT performs model-based scenario quantification supporting the European Commission in undertaking impact assessments and analysing policy options for implementing and further developing the EU climate and energy package and other climate-relevant policies in the EU. For this purpose a suite of mathematical models is linked together in a formally defined way (see *Figure [BR1] Error!* ***No text of specified style in document.****-23* below) to project all greenhouse gas emissions up to the year 2050 in 5-year time steps. Modelling takes place individually for each EU Member State and at the EU-28 aggregate level, the latter is made available for enabling the sensitivity analysis in this 6th National Communication and Biennial Report.

Figure [BR1] ***Error! No text of specified style in document.****-23 EUCLIMIT model interlinkages*



Source: *http://www.euclimit.eu/Default.aspx?Id=2*

The emissions covered by this modelling approach are: CO_2 emissions from energy and processes via the PRIMES model, CH_4, N_2O and the fluorinated greenhouse gases via the GAINS model, GHG from LULUCF via the GLOBIOM-G4M model. Box 3 briefly introduces the models.

Box 3 EUCLIMIT model suite. Source: http://www.euclimit.eu

The models:

Prometheus:

A fully stochastic World energy model used for assessing uncertainties and risks associated with the main energy aggregates including uncertainties associated with economic growth and resource endowment as well as the impact of policy actions (R&D on specific technologies, taxes, standards, subsidies and other supports). The model projects endogenously to the future the world energy prices, supply, demand and emissions for 10 World regions. For the EU BAM modelling world fossil fuel price trajectories generated for the EU Reference scenario 2013[258] serve as import price assumptions for PRIMES.

GEM-E3:

The GEM-E3 (World and Europe) model is an applied general equilibrium model, simultaneously representing World regions and European countries, linked through endogenous bilateral trade flows and environmental flows. The European model is including the EU countries, the Accession Countries and Switzerland. The world model version includes 18 regions among which a grouping of European Union states. GEM-E3 aims at covering the interactions between the economy, the energy system and the environment. It is a comprehensive model of the economy, the productive sectors, consumption, price formation of commodities, labour and capital, investment and dynamic growth. The model is dynamic, recursive over time, driven by accumulation of capital and equipment. The current GEM-E3 version has been updated to the GTAP7 database (base year 2004) and has been updated with the latest Eurostat statistics for the EU Member States. For the EU BAM modelling sectoral value added projections generated for the EU Reference scenario 2013 consistent with exogenous EU GDP and population projections serve as activity assumptions for PRIMES. GDP projections mirror DG ECFIN projections for the short- and medium term and the EPC/DG ECFIN Ageing Report 2012 for the long-run. The population projections are based on EUROSTAT population projection for the period 2010 to 2050.

PRIMES

258 The 2013 EU Reference scenario has been jointly developed during 2012-2013 by the European Commission DG's Energy, DG Climate Action and DG Mobility and Transport to project EU energy, transport and GHG emission trends to 2050 as starting point for assessing further EU policy options. For doing so, it includes also the EU Energy Efficiency Directive and assumes the achievement of the legally binding targets for GHG and RES by 2020.

The PRIMES model simulates the response of energy consumers and the energy supply systems to different pathways of economic development and exogenous constraints and drivers. It is a modelling system that simulates a market equilibrium solution in the European Union and its member states. The model determines the equilibrium by finding the prices of each energy form such that the quantity producers find best to supply match the quantity consumers wish to use. The equilibrium is forwarding looking and includes dynamic relationships for capital accumulation and technology vintages. The model is behavioural formulating agents' decisions according to micro economic theory, but it also represents in an explicit and detailed way the available energy demand and supply technologies and pollution abatement technologies. The system reflects considerations about market competition economics, industry structure, energy /environmental policies and regulation. These are conceived so as to influence market behaviour of energy system agents. The modular structure of PRIMES reflects a distribution of decision making among agents that decide individually about their supply, demand, combined supply and demand, and prices. Then the market integrating part of PRIMES simulates market clearing. PRIMES is a partial equilibrium model simulating the entire energy system both in demand and in supply; it contains a mixed representations of bottom-up and top-down elements. The PRIMES model covers the 27 EU Member States as well as candidate and neighbour states (Norway, Switzerland, Turkey, South East Europe). The timeframe of the model is 2000 to 2050 by five-year periods; the years up to 2005 are calibrated to Eurostat data.

PRIMES TREMOVE

The PRIMES-TREMOVE Transport Model projects the evolution of demand for passengers and freight transport by transport mode and transport mean, based on economic, utility and technology choices of transportation consumers, and projects the derived fuel consumption and emissions of pollutants. Operation costs, investment costs, emission costs, taxes and other public policies, utility and congestion influence the choice of transportation modes and means. The new transportation model is much more detailed than the previous version and its mathematical structure is considerably more enhanced. It is essentially a dynamic system of multi-agent choices under several constraints, which are not necessarily binding simultaneously. Part of the model (e.g. the utility nested tree) was built following the TREMOVE model. Other parts, as for example the component on fuel consumption, follow the COPERT model. The results are consistent with and feed into the general PRIMES model.

PRIMES Biomass Supply

The biomass system model is linked with the PRIMES large scale energy model for Europe and can be either solved as a satellite model through a closed-loop process or as a stand-alone model. The biomass model follows the standards of the PRIMES model: it covers all the EU countries and other associated European countries; it performs dynamic projections to the future from 2000 until 2030 in 5-year time period step; it is calibrated to base years 2000 and 2005 so as to reproduce Eurostat statistics; it computes endogenously the energy and resource balances, the investments, the costs

and prices, and the emission of pollutants. The model represents policy instruments, such as taxes, subsidies, technology progress, emission and other policy constraints, and certificate or allowances markets. For the BAM modelling, it projects biomass supply consistent with the EU bioenergy demand resulting from PRIMES, and generates related inputs for the CAPRI and GLOBIOM-G4M modelling.

GAINS

The GAINS model is an integrated assessment model that brings together information on the sources and impacts of air pollutant and greenhouse gas emissions and their interactions. GAINS is an extension of the earlier RAINS (Regional Air Pollution Information and Simulation) model, which addressed air pollution aspects only. GAINS brings together data on economic development, the structure, control potential and costs of emission sources, the formation and dispersion of pollutants in the atmosphere and an assessment of environmental impacts of pollution. GAINS addresses air pollution impacts on human health from fine particulate matter and ground-level ozone, vegetation damage caused by ground-level ozone, the acidification of terrestrial and aquatic ecosystems and excess nitrogen deposition) of soils, in addition to the mitigation of greenhouse gas emissions. GAINS describes the interrelations between these multiple effects and the range of pollutants (SO_2, NOx, PM, NMVOC, NH_3, CO_2, CH_4, N_2O, F-gases) that contribute to these effects at the European scale. It uses energy related activity data and fuel prices generated by PRIMES and agricultural activity data provided by CAPRI, while generating own activity projections for other sectors, using among others the GDP and population assumptions as described above.

CAPRI

CAPRI is a partial equilibrium economic model which supports decision making related to the Common Agricultural Policy and Environmental policy related to agriculture based on sound scientific quantitative analysis. CAPRI is only viable due to its Pan-European network of researchers which based on an open source approach tender together for projects, develop and maintain the model, apply it for policy impact assessment, write scientific publications and consult clients based on its results. For the BAM modelling, it provides the agricultural activity data per Member State, drawing among others on the EU agricultural market outlooks for the short term and relevant GLOBIOM results for the longer term.

GLOBIOM-G4M

The Global Biosphere Management Model (GLOBIOM) has been developed and is used at the International Institute for Applied Systems Analysis (IIASA). GLOBIOM is a global recursive dynamic partial equilibrium model integrating the agricultural, bioenergy and forestry sectors with the aim to provide policy analysis on global issues concerning land use competition between the major land-based production sectors. It is global in the sense that it encompasses all world regions aggregated in a way that can be altered. GLOBIOM covers 28 (or 50) world regions. Partial denotes that the model does

not include the whole range of economic sectors in a country or region but specialises on agricultural and forestry production as well as bioenergy production. These sectors are, however, modelled in a detailed way accounting for about 20 globally most important crops, a range of livestock production activities, forestry commodities as well as different energy transformation pathways.

For further documentation of EUCLIMIT please refer to http://www.euclimit.eu.

5.6.3.2. Key parameters & assumptions

For key parameters and assumptions of the sensitivity projections please refer to Section [BR] 5.4.3.

6. PROVISION OF FINANCIAL, TECHNOLOGICAL AND CAPACITY BUILDING SUPPORT TO DEVELOPING COUNTRIES

6.1. Introduction

This chapter should be read in conjunction with the chapter on provision of financial support of the 6th National Communication. Together, they present a comprehensive description of the EU's climate support.

This chapter covers the quantitative information for 2011 and 2012, using the required table formats. Data for 2011 and 2012 is therefore not included in the NC chapter.

This chapter also covers all the information related to technology transfer and capacity building. Such information is, therefore, not included in the NC.

The CTF tables with detailed data on the support provided in 2011 and 2012 are included in the CTF Appendix to this report[259].

6.2. General information: the EU's approach to provision of climate finance

The EU collectively continues to be the largest contributor of Official Development Assistance (ODA) and of climate finance flows to developing countries. The European Commission alone has provided ODA for climate change related interventions of more than € 4 billion since 2002.

Finance for development and climate action, both for adaptation and mitigation are intrinsically linked. Unchecked climate change has the potential to undermine all past, current and future efforts to eradicate poverty and achieve the MDGs. Similarly, development is an opportunity for investing in a green, low carbon and climate resilient growth path from the outset.

259 These tables will be submitted to the UNFCCC using the official upload software.

Therefore, mainstreaming of climate concerns into our aid programmes makes good sense both from a development and from a climate angle. We seek to ensure that the funding we provide is policy-coherent, results-oriented and efficiently targeting multiple global policies when relevant and possible. In practice, the EU's support to climate action combines a focus on integration of climate change considerations into the regular EU development aid with targeted initiatives and instruments, such as the Global Climate Change Alliance (GCCA) and specific climate-change "windows" in regional investment facilities that the EU has established since 2007.

It is the responsibility of governments to take the lead in designing and implementing climate policies as a basis for enhanced action and enhanced support. The EU strives to work closely with its partners to strengthen national planning capacities, institutions, planning processes, public financial management and procedures and monitoring systems to create a solid basis for countries to take charge of climate mainstreaming and to enable them to benefit from climate change finance and support from all sources.

There is a limit to what can be achieved with ODA alone. ODA plays an important role in supporting the most vulnerable countries, and it can help leverage climate relevant investment in developing countries. In order to stay within the 2°C target, however, much more needs to be done and additional resources are needed from different funding sources, including domestic sources, the private sector and International Finance Institutions.

Addressing climate change and support sustainable development are key priorities for the EU's external aid. The implementation of climate actions at national and regional level is supported by geographical instruments. These instruments include the European Development Fund (in the ACP countries – Africa, Caribbean and Pacific), the Development Cooperation Instrument (in Asia, Latin America and South Africa), and the European Neighborhood & Partnership Instrument (in the EU's neighbourhood regions). These are complemented by a specific thematic programme (under the development Cooperation Instrument) focusing on environment and sustainable management of natural resources, including energy that addresses global environmental challenges as well as issues of common interest to groups of countries that do not belong to a single region. Further, the EU has established a number of innovative initiatives and facilities such as the Global Climate Change Alliance (GCCA), the Forest Law Enforcement, Governance and Trade (FLEGT), the Global Energy Efficiency and Renewable Energy Fund (GEEREF), the EU water and energy facilities and the Regional Investment Facilities (the so called blending mechanisms).

The EU, together with all the members of the OECD DAC, is increasing its efforts to enhance the capacity to track all its official financial flows, with particular emphasis on climate finance flows. The EU believes that such efforts will result in an enhanced measurement, reporting and verification (MRV) system for climate finance.

6.2.1. Addressing the needs of non-Annex I Parties

The magnitude, complexity and level of threats posed by climate change are understood, by a wide range of countries, as requiring a joint global response. Climate challenges will impact on the life of all humanity, but the biggest challenges will be faced by the poorest that are particularly vulnerable.

Hence, the EU has placed climate change high on the agenda of our external relations; and in particular in our relations with developing countries. Climate change is now regularly discussed in the framework of our Policy Dialogue with Partner countries. National ownership is a key principle for all EU support. Programming of bilateral support normally starts with the national government / actors taking ownership of an inclusive development process. To the extent possible, the EU bases its programming on the partner countries'/regions' own development plans or equivalent, including regional and sector plans, such as National Adaptation Programmes of Action (NAPAs/NAPs) or Nationally Appropriate Mitigation Actions (NAMAs) or – as appropriate – a combination of such documents, depending on the national context.

African countries are key partners in our work. Africa is a complex and diverse grouping, with many Least Developed Countries (LDCs) and it is in this continent that the adaptation challenge is perhaps greatest. EU and African countries share many common views and objectives as regards tackling climate change, and they have the opportunity to form strong alliances to reach global agreement. This EU engagement with Africa is put in practice through, for example, the Africa-EU Strategic Partnership on Climate Change and Environment, which includes a number of key strategic initiatives to jointly address climate change. In addition the EU is occasionally participating to the African Environment Ministries (AMCEN) process.

In 2011 the EU commenced cooperation on Climate Change with the Caribbean Community as a group, providing significant support to the Caribbean Community Climate Change Centre (CCCCC). In the Pacific Region, major high level meetings and several workshops took place, in parallel with increasing support to field actions, in the context of renewed EU-Pacific relations. These efforts are also supported through the Global Climate Change Alliance (GCCA), the EU initiative to step up dialogue and cooperation with developing countries most vulnerable to climate change in particular Least Developed Countries and Small Island Developing States.

GCCA programmes are designed to align with national priorities and support on-going national activities. Many GCCA interventions, including project-based ones directly contribute to the implementation of existing national programmes and strategies. A similar approach is pursued at the regional level. For instance, the GCCA supports the Mekong River Commission's Climate Change and Adaptation Initiative and the implementation of some priorities of the Pacific Islands Framework for Action on Climate Change.

The table below shows how GCCA-supported interventions promote or build on national adaptation strategies.

Table [BR1] **Error! No text of specified style in document.**-17 GCCA programme contributions to existing national programmes or strategies)

GCCA intervention in:	Contributes to:
Belize	Implementation of the National Adaptation Strategy to Address Climate Change in the Water Sector
Burkina Faso	Implementation of the National Rural Sector Plan
Central African Republic	Implementation of the national REDD+ strategy in the south-western region
Ethiopia	Implementation of the Climate Resilient Green Economy strategy, the national Climate Change Adaptation programme, and the Sustainable Land Management programme
Nepal	Mainstreaming of NAPA-prioritised activities through the national framework of Local Adaptation Plans for Action
Papua New Guinea	Implementation of national REDD readiness plan
Uganda	Implementation of the NAPA, operationalisation of two climate-related objectives of the 2010 National Development Plan
Vanuatu	Implementation of measures identified in the NAPA
Bangladesh	Implementation of the Bangladesh Climate Change Strategy and Action Plan
Bhutan	Implementation of the Renewable Natural Resources sector programme/five-year plan
Guyana	Implementation of the National Mangrove Action plan
Rwanda	Implementation of the Strategic Roadmap for Land Tenure Reform and the Strategic Plan for Environment and Natural Resources
Samoa	Implementation of the Water for Life sector plan
Lesotho	Implementation of the environment and climate change priorities of the National Strategic Development Plan
Mauritius	Implementation of the 'Maurice Île Durable' sustainable development strategy
Seychelles	Implementation of the Seychelles National Climate Change Strategy and the Seychelles Sustainable Development Strategy
Solomon Islands	Implementation of some NAPA priorities and the National Disaster Risk Management Plan

Source: Paving the Way for Climate Compatible Development: Experiences from the GCCA

Climate change is also regularly discussed with our partners from Latin America and Asia. The European Commission and the European External Action Service (EEAS) hosted an EU-Asia-Pacific roundtable on 4 June 2012 to discuss the position of the region in the global climate debate and the relevance of EU policies for the region. The roundtable brought together senior officials from EU Member States and from countries in the Asia-Pacific region, experts from selected policy institutes and other invited specialists. Participants discussed global issues and climate politics in view of improving mutual understanding and exploring the scope for advancing cooperation in areas such as industrial policy, research, trade, and development co-operation. Among the specific topics discussed were low emission development strategies, technology transfer,

innovative carbon market mechanisms and improved delivery methods for climate change assistance. The roundtable followed a similar event for Africa held in October 2011.

Climate change is putting at risk years of efforts towards sustainable development. Developing countries are particularly vulnerable because their economies often depend more on climate-sensitive natural resources, and because they possess less resources to adapt to the impacts of climate change. Similarly, the development path chosen has important implications for the capacity of countries and communities to adapt to climate change and for their contribution to greenhouse gas emissions. Thus, climate change, be it related to adaptation or mitigation, is vital to all social and economic development activities.

The EU is therefore putting climate change mainstreaming at the core of its work. It addresses this on two fronts: i) with regard to policies, strategies and practices of EU institutions and Member States and ii) with regard to development processes of our partner countries.

Together with our partner countries, we seek to ensure that EU assistance is systematically integrating climate change considerations, from programming investments in social and physical infrastructure to national sector programmes. We are working to help strengthen countries' institutions and systems to integrate climate change in their development planning processes, from policy-making to budgeting, implementation and monitoring.

6.2.2. Innovating in delivering aid: engaging the private sector in adaptation and mitigation in developing countries

There is an increasing range of ways to collect and pool revenues, use traditional development finance and deliver aid. Engaging the private sector in development financing is another innovative way of mobilizing new funds.

In many developing countries, the expansion of the private sector is a powerful engine of economic growth and the main source of job creation. One of the main challenges for governments in developing countries is to ensure an environment that supports private sector development. This often requires far-reaching economic reforms aimed at improving the investment climate and facilitating access to finance. Accordingly, and as outlined in the EU Agenda for Change, the EU continue to assist partner countries' efforts to improve their business environment with a view to fostering inclusive growth.

EU grants need to be used strategically and effectively to leverage public and private sector financing.

The EU and Member States, together with European and international public financing institutions are actively collaborating though **regional blending mechanisms**, which are expected to be further scaled up in future, in order to use grant funding to leverage financing from other sources. This includes the possibility of making greater use of

guarantee mechanisms, equity investments and other types of innovative financing. In this context, the EU has established with Member States an "EU Platform for External Cooperation and Development" to maximize the impact of resources through enhanced cooperation, coherence, monitoring and development of new innovative financing mechanisms.

A blending mechanism combines grants with additional flows (such as loans and risk capital) to gain financial and qualitative leverage, thereby increasing EU development policy impact.

The following regional blending mechanisms have been established:

- EU-Africa Infrastructure Trust Fund (ITF) - 2007
- Neighbourhood Investment Facility (NIF) - 2008
- Latin America Investment Facility (LAIF) - 2010
- Investment Facility for Central Asia (IFCA) – 2010
- Asia Investment Facility (AIF) – 2012
- Caribbean Investment Facility–2012
- Investment Facility for the Pacific –2012
- Western Balkans Investment Facility 2009

From 2007 to mid 2013, the relevant figures for climate change projects ITF,NIF, LAIF, AIF & IFCA are:

- 96 projects
- €750 million in grants
- Over €10 billion in loans and
- About €20 billion in total project financing.

The types of grant contributions that are made available through the blending mechanisms include: direct grant, technical assistance, interest rate subsidy, risk capital and guarantees.

The EU regional blending facilities have until now mainly supported public investments. The intention is to make growing use of the grants to facilitate private sector participation in investment projects.

The **Global Energy Efficiency and Renewable Energy Fund (GEEREF)** is another innovative financing mechanism**.** It aims to accelerate the transfer, development, use and enforcement of environmentally sound technologies for the world's poorer regions, helping to bring secure, clean and affordable energy to local people.

Structured as a Fund-of-Funds, GEEREF invests in private equity funds that specialise in providing equity finance to small and medium-sized project developers and enterprises (SMEs). GEEREF's beneficiaries are small and medium size (i.e. € 5-10 million) renewable energy and energy efficiency projects and enterprises in developing countries and economies in transition. These projects and enterprises often suffer from lack of capital financing – despite potentially attractive returns.

6.2.3. Methodology for tracking the provision of finance, technology and capacity building support

The approach used by the EU to track its provision of climate finance, technology and capacity building support is based on the OECD DAC system of Rio markers that has been integrated into the EU's own project monitoring and reporting system.

The OECD has developed a comprehensive system for measuring aid in support of climate-related objectives. It is based on detailed project level reporting against carefully defined policy markers. A Rio marker for mitigation was introduced 1998 and in 2010 an additional marker for adaptation was introduced. There are specific guidelines from OECD DAC agreed by DAC members for scoring projects and programmes against these markers. For each Rio marker, projects and programmes are placed in three categories: a) Principal objective, b) significant objective or c) not targeting.

According to the Rio marker methodology an activity is classified as climate change mitigation-related (either marked as 'Principal' or 'Significant') if it "contributes to the objective of stabilisation of greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system by promoting efforts to reduce or limit GHG emissions or to enhance GHG sequestration."

As regards adaptation, an aid activity is marked as relevant if it "intends to reduce the vulnerability of human or natural systems to the impacts of climate change and climate-related risks, by maintaining or increasing adaptive capacity and resilience. This encompasses a range of activities from information and knowledge generation, to capacity development, planning and the implementation of climate change adaptation actions."

The Rio markers are policy makers, and were originally not intended for accurate quantification of flows to support policy goals. Therefore, an activity can have more than one principal or significant policy objective (i.e. it can be marked for several Rio

markers; mitigation, adaptation and other Rio conventions such as Biodiversity and Desertification).

The EU has adopted the following approach to "translate" the Rio marked data into estimated climate finance flows:

- If an activity is marked as principal for mitigation or adaptation, 100% of the support is considered and reported as climate finance;

- If an aid activity is marked as significant for mitigation or adaptation, then only 40% of the support is considered and reported as climate finance.

- To avoid double counting, any activity can only count as 100%, 40% or 0%. If an activity is marked for both mitigation and adaptation, only the highest marking will count when calculating the total climate relevant financial contributing of the activity.

This biennial report covers support that has been committed in 2011 and 2012. A commitment entails that a final decision has been taken on allocation of the funds to a specific project and programme. In general, disbursement follows commitment unless exceptional circumstances arise.

In this biennial report the EU reports only flows that are provided 100% in the form of grants.

The EU is striving to improve the methodology for the tracking of support to climate action, and recognises that there is a need to further refine marking certain types of support to increase accuracy. Further, the EU recognizes that it is still not possible to provide an accurate account of the full technology and capacity building support provided as no comprehensive tracking system for this support is in place.

6.3. Financial Resources

The EU has increased the amount of finance dedicated to mitigation and adaptation and is climate proofing its aid that is not directly climate-related. During the reporting period 2011-2012, the EU delivered USD 1817 / €1 362 million in climate finance. In 2011 and 2012, support provided to mitigation was higher than support provided to adaptation. However, the gap narrowed substantially in 2012. The summary figures are provided in the table below. Detailed country information is provided in the Common Tabular Formats (CTF).

Table [BR1] **Error! No text of specified style in document.**-18 Provision of climate relevant support in 2011 and 2012 (USD 1000)

	2011	2012	Total
Total Support	873 953$	943 114$	1 817 067$

Total Mitigation	677 676$	712 725$	1 390 401$
Total Adaptation	596 205$	710 682$	1 306 888$

Table [BR1] **Error! No text of specified style in document.**-19 - *Provision of climate relevant support in 2011 and 2012 (EUR 1000)*

	2011	2012	Total
Total Support	€ 628 372	€ 733 743	€ 1 362 115
Total Mitigation	€ 487 249	€ 554 500	€ 1 041 749
Total Adaptation	€ 428 672	€ 552 911	€ 981 583

In Table [BR1] Error! **No text of specified style in document.**-18 and *Table [BR1]* Error! **No text of specified style in document.**-19, as per the methodology described above, the figures for mitigation and for adaptation cannot be added.

6.3.1. Provision of financial support through multilateral channels

The EU has not provided core contributions to multilateral organizations, including to the operating entities of the financial mechanism of UNFCCC (the Global Environmental Facility and the Green Climate Fund)[260]. In this regards, table 7a in the CTF Appendix is not filled in.

The EU, however, recognizes that such organizations are particularly suited to facilitate an effective and efficient deployment of support to developing countries, given in particular, their network and experience on the ground.

The EU has supported a number of global programme and Trust Funds managed by multilateral organisations, such as UNDP, UNEP, FAO and the World Bank. The two initiatives described below are examples of such collaboration with multilateral initiatives to pool resources for a more effective, efficient and country driven support. In the EU's statistical system such support is categorised as bilateral support with multiple recipients Thus, in the context of this Biennial Report it will be reported as bilateral support and included in CTF table 7(b).

6.3.1.1. The EU-UNDP Low Emission Capacity Building Programme

The Low Emission Capacity Building Programme (LECBP) was launched in January 2011 as part of a joint collaboration between the European Union (European Commission and Member States) and the United Nations Development

260 The EU's contributions to the UNFCCC and the Kyoto Protocol's budgets are included in the National Communication.

Programme. Since its inception the LECB Programme has grown both in scope and breadth, proudly including 25 participating countries and enhanced technical support through contributions from the European Commission, the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, the Australian Department of Climate Change and Energy Efficiency and AusAID.

The LECBP was based on a 2010 European Commission „scoping study", which focused on 5 pilot countries: Kenya, Indonesia, Mexico, Peru, Thailand, with a view to exploring developing countries' capacity building needs on MRV, NAMAs and LEDS.

This scoping study delivered recommendations for tailor-made capacity building activities in the 5 pilot countries and a toolbox of general recommendations applicable to all developing countries.

This collaborative, country driven programme aims to strengthen technical and institutional capacities at the country level, while at the same time facilitating inclusion and coordination of the public and private sector in national initiatives addressing climate change. It is a six-year programme to strengthen capacities in participating countries in the following ways:

- Develop greenhouse gas (GHG) inventory management systems
- Identify opportunities for Nationally Appropriate Mitigation Actions (NAMA)
- Design systems for measuring, reporting, and verification of proposed actions and means to reduce GHG emissions
- Facilitate the design and adoption of mitigation actions by selected industries in some countries

6.3.1.2. The UN-REDD Programme

The UN-REDD Programme is the United Nations collaborative initiative on Reducing Emissions from Deforestation and forest Degradation (REDD) in developing countries. The Programme was launched in 2008 and builds on the convening role and technical expertise of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP). The UN-REDD Programme supports nationally-led REDD+ processes and promotes the informed and meaningful involvement of all stakeholders, including Indigenous Peoples and other forest-dependent communities, in national and international REDD+ implementation.

The Programme supports national REDD+ readiness efforts in 47 partner countries, spanning Africa, Asia-Pacific and Latin America, in two ways: (i) direct support to the design and implementation of UN-REDD National Programmes; and (ii) complementary support to national REDD+ action through common approaches, analyses, methodologies, tools, data and best practices developed through the UN-

REDD Global Programme. By June 2013, total funding for these two streams of support to countries totalled US$172.4 million, of which over USD13 million have been committed by the European Union.

6.3.2. Provision of financial support through bilateral channels

The principal channel of EU support to climate action in developing countries is provided through the bilateral partnerships and cooperation programmes.

The adaptation challenge is very unevenly distributed among countries and regions depending on their specific exposure, vulnerability and capacity to adapt. Developing countries, and in particular the least developed countries, will face the biggest challenge because poverty and low levels of development are major factors determining vulnerability and capacity to adapt. The EU has taken steps to strengthen its support to adaptation in the field through integration of adaptation considerations into existing and new development assistance programmes and through new areas of work linking adaptation and disaster risk reduction.

The EU also supports countries in their efforts to move towards, more climate resilient and low emission development pathways. It is important that the growth and development challenges faced by developing countries be addressed in an integrated way that avoids locking in inefficient and costly, environmentally damaging, carbon-emitting technologies and infrastructure that will contribute significant emission for many years to come. Moving to a green low-carbon economy constitutes an opportunity for all countries. For example, the 2011 EU Development Policy: an Agenda for Change highlights the provision of sustainable energy as an activity that has a strong multiplying impact on developing countries' economies and, at the same time, contributes to climate change mitigation.

The EU seeks to support combined efforts that builds synergy between mitigation and adaptation. The EU provides substantial support to cross-cutting sectors such as forestry, agriculture, eco-systems based approaches,

In total, the European Union committed USD874 / €628 million in 2011 and USD943 / €734 million in 2012 in bilateral support to climate action in developing countries. Support provided to mitigation and adaptation is shown in *Table [BR1] Error!* **No text of specified style in document.**-18 and *Table [BR1] Error!* **No text of specified style in document.**-19 above. Out of the Total support provided in the two years (USD 1 817 / €1 362 million), USD 1 235 / €924 million were committed in cross-cutting activities (related both to mitigation and to adaptation).

As can be seen in *Table [BR1]* Error! **No text of specified style in document.**-20, the EU has provided most support to cross-cutting projects, i.e. projects impacting two or more relevant sectors, followed by support to the energy and agriculture sectors.

During the reporting period, the EU has placed a particular focus on Africa, where USD 768 / €578 million have been committed. Support to Africa, as a region, was followed to

the provision of support to LDCs (as a group of countries)[261]. Such figures can be seen in

261 Note that these two figures do not overlap."

Table [BR1] Error! **No text of specified style in document.**-21.

For detailed information on the bilateral provision of support by the EU, please see CTF Table 7(b) in the CTF Appendix.

Table [BR1] **Error! No text of specified style in document.**-20 – *Provision of climate relevant support by sector (2011-2012) (EUR and USD 1000)*

	Mitigation															
	Energy		Transport		Industry		Agriculture		Forestry		Water and sanitation		Cross-cutting		Other	
	EUR 1000	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*
2011	€ 40 709	56 620$							€ 9 280	12 907$			€ 35 861	49 876$		
2012	€ 148 138	190 409$	€ 13 600	17 481$			€ 2 702	3 472$			€ 12 200	15 681$			€ 8 000	10 283$
	Adaptation															
	Energy		Transport		Industry		Agriculture		Forestry		Water and sanitation		Cross-cutting		Other	
	EUR 1000	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*
2011			€ 8 990	12 503$			€ 64 079	89 123$			€ 7 800	10 848$	€ 4 600	6 398$	€ 3 200	4 451$
2012							€ 44 940	57 763$			€ 17 962	23 088$	€ 8 000	10 283$	€ 8 132	10 452$
	Cross-cutting															
	Energy		Transport		Industry		Agriculture		Forestry		Water and sanitation		Cross-cutting		Other	
	EUR 1000	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*	*EUR 1000*	*USD 1000*
2011							€ 16 520	22 976$	€ 34 000	47 288$	€ 12 800	17 803$	€ 390 532	543 160$		
2012	€ 3 595	4 621$					€ 56 036	72 026$	€ 79 800	102 571$	€ 69 684	89 568$	€ 242 473	311 662$	€ 18 480	23 753$
TOTAL	€ 192 443	251 650$	€ 22 590	29 984$	€ 0	0$	€ 184 277	245 361$	€ 123 080	162 765$	€ 120 446	156 988$	€ 681 466	921 379$	€ 37 812	48 939$

Table [BR1] **Error! No text of specified style in document.**-21 - *Provision of support by region (2011-2012) (EUR and USD 1000)*

	ACP		Africa		Asia		Caribbean		Eastern Europe and Central Asia		Latin America		Oceania		Unspecified LDCs		Global	
	EUR 1000	USD 1000	EUR 1000	USD 1000	EUR 1000	USD 1000	EUR 1000	USD 1000	EUR 1000	USD 1000	EUR 1000	USD 1000	EUR 1000	USD 1000	EUR 1000	USD 1000	EUR 1000	USD 1000
2011			€ 231 639	322 168$	€ 100 880	140 306$	€ 28 034	38 990$	€ 80 600	112 100$	€ 27 755	38 602$	€ 5 090	7 079$	€ 154 374	214 707$		
2012	€ 27 706	35 611$	€ 346 730	445 668$	€ 88 900	114 267$	€ 42 112	54 129$	€ 42 680	54 859$	€ 82 840	106 478$	€ 26 908	34 586$	€ 14 825	19 055$	€ 61 043	78 461$
TOTAL	€ 27 706	35 611$	€ 578 369	767 836$	€ 189 780	254 573$	€ 70 146	93 119$	€ 123 280	166 959$	€ 110 595	145 080$	€ 31 998	41 665$	€ 169 199	233 762$	€ 61 043	78 461$

Below are some of our most prominent initiatives during the reporting period.

6.3.2.1. Global Climate Change Alliance

The Global Climate Change Alliance (GCCA) is a European Union initiative to strengthen dialogue and cooperation on climate change with developing countries most vulnerable to climate change, in particular LDCs and SIDS. The GCCA comprises 45 programmes in 35 countries and across 8 regions within an envelope of € 290 million.

The first cycle of GCCA regional conferences between the EU, LDCs and SIDS was finalised with the conferences held in Vanuatu and Belize in March 2011. That year, the GCCA pursued a series of workshops on mainstreaming climate change into national planning and budgeting which has trained over 190 government officials from ministries of finance, planning and environment and regional organisations, across the world.

As an example of country level work, the GCCA supports the Cambodia Climate Change Alliance. The programme has already reaped results in the mainstreaming of climate change into overall development strategies. It has supported the creation of an inter-ministerial body for technical advice on climate change and a platform for dialogue on the same topic. GCCA is also enabling Cambodian officials to participate in international negotiations in climate change (through the preparation of position papers, sharing the outcomes of negotiations) and is assisting in-depth analysis to inform policy making. The first call for proposals under GCCA Cambodia produced eight climate change adaptation interventions covering ten provinces and multiple sectors such as agriculture, fisheries, forestry, bio-diversity, urban/coastal infrastructure, disaster risk reduction and community development.

6.3.2.2. The EU Energy Initiative

The EU addresses the current and future energy and development challenges in collaboration with its development partners. The EU Energy Initiative (EUEI) has been a key vehicle for the Commission and Member States to jointly deliver on these commitments. The EUEI celebrated its 10th anniversary in 2012 and is currently preparing a new phase. The new phase will focus on improving its impact and visibility and optimising financial resources as well as suggesting innovative approaches for financing.

An example of a specific EUEI initiative is the Africa- EU Energy Partnership (AEEP). It is a long-term framework for structured political dialogue and co-operation between Africa and the EU on energy issues. The AEEP has several sub-programmes, including the Africa-EU renewable energy cooperation programme. It aims to promote development of the renewable energy market, capacity building, application of feed-in tariffs, technology transfer, mobilisation of financing, and the setting up of renewable energy centres. It serves as an umbrella for renewable energy investments within EU bilateral programmes in support of the 2020 targets for renewable energy agreed

between the EU and Africa. Another sub-programme is the ECOWAS renewable energy and energy efficiency centre (ECREEE) based in Praia, Cape Verde.

6.4. Technology development and transfer

Technology Transfer (TT) in the context of climate change is defined as: "A broad set of processes covering the flows of know-how, experience and equipment for mitigating and adapting to climate change among different stakeholders." More specifically, the transfer and development of technology activities can be hard or soft in nature. These categorisations are defined in the Technology Transfer Framework[262] as:

- "soft" technologies: capacity-building, information networks, training and research.

- "hard" technologies: equipment to control, reduce or prevent anthropogenic emissions of greenhouse gases in the energy, transport, forestry, agriculture, and industry sectors, to enhance removals by sinks, and to facilitate adaptation.

The framework also lists five themes for technology transfer, enabling more precise identification of projects that are of relevance:

1. technology needs and needs assessments
2. technology information
3. enabling environments
4. capacity-building
5. mechanisms for technology transfer.

Since 1999, developing countries have been supported to assess their technology needs through the development of Technology Needs Assessments (TNAs). TNAs are a set of country-driven activities that identify and determine the mitigation and adaptation technology priorities of Parties, particularly developing country Parties. They involve different stakeholders in a consultative process to identify the barriers to technology transfer and measures to address these barriers through sectorial analyses. The purpose of TNAs is to assist in identifying and analysing priority technology needs, which can form the basis for a portfolio of projects and programmes that aim to facilitate the transfer and access of technology. The sectors considered in the TNAs vary according to national circumstances. However, the most commonly selected sectors and subsectors for which technology needs have been identified for mitigation were energy generation and use, industry and transport, and for adaptation, agriculture and fisheries, coastal zones and water resources. TNAs are the first step in understanding the needs in one specific country for new techniques, equipment, knowledge and skills for mitigating greenhouse gas emissions and reducing vulnerability to climate change. Based on a TNA, a national Technology Action Plan can address practical actions necessary to reduce or remove policy, finance, and technology related barriers.

262 Technology Transfer Framework: http://unfccc.int/ttclear/jsp/Framework.jsp

At the UN climate conference in Cancun in December 2010, the Convention Parties agreed to implement a new Technology Mechanism. The core task of the new Technology Mechanism is facilitating international technology cooperation to accelerate action at different stages of the technology cycle, including research and development, demonstration, deployment, diffusion and transfer. The Convention's Technology Mechanism consists of the Technology Executive Committee (TEC) and the Climate Technology Centre and Network (CTC-N), both fully operational since early 2013. The TEC will provide an overview of technological needs and analysis of policy and technical issues related to the development and transfer of technology for mitigation and adaptation. Driven by the needs and acting on requests from developing countries the CTC-N will provide capacity building and technical assistance for research, development, demonstration, deployment and diffusion of new and existing technologies on climate mitigation and adaptation. The CTC-N will have a coordinating role, engaging existing institutions from public, private, academic, research and business communities. Requests by developing countries for assistance will be channelled through national focal points (Designated National Entities) and in full coordination with national technology needs and strategies. The CTC-N addresses the fragmentation of information related to climate technology by establishing a support structure of organisations with outstanding technical and regional competencies.

The Technology Mechanism is fully operational since early 2013 and stimulates the transfer of technologies to developing countries through North-South, South–South and triangular technology cooperation. The CTC-N addresses the need of low-income countries to access information on mitigation and adaptation technologies through its demand driven system and training offers.

The European Commission and several EU Member States support the implementation of the CTC-N. The centre is located in Copenhagen, Denmark.

6.4.1. EU Funded Technology Transfer Initiatives and Programmes

All development aid cooperation projects in the field of climate change, and described in the previous section, involve technology transfer activities as defined by the technology transfer framework. It is in most case impossible, within a given programme, to get a breakdown of the technology transfer activities and related financial resources.

In addition to these, there are a number of other climate change activities involving technology transfer funded by the EU, most notably in the area of research. The following section provides an overview of such programmes. For detailed information on some of the projects, please consult section 8.4.6 in the EU's sixth National Communication for concrete examples addressing research and development of mitigation and adaptation technologies.

6.4.1.1. EU Framework Programmes

The 7th Framework Programme for research and technological development (FP7) remained during 2007-2013 the most important EU financial mechanism to support research on climate change and the development of energy technologies, including cooperation with non-EU countries, with resources for research in support to TT and capacity building with third countries. Many specific FP instruments are developed to promote and support international cooperation including on climate change technologies.

The main component of FP7, which ran between 2007 and 2013, was the €32.4 billion "Cooperation" programme, which was divided into research themes, one of which is called "Environment (including climate change)": with a total budget of €1.89 billion, which was the cornerstone of environmental research in Europe and also expanded to developing countries, as a number of projects under FP7 awere specifically targeted at these countries. Furthermore, the mitigation of greenhouse gas emissions was a priority of projects across FP7, i.e. on energy, transport or food production.

6.4.1.2. Strategic Energy Technology Plan

The Strategic Energy Technology (SET) Plan provides a blueprint for Europe to develop a world-class portfolio of affordable, clean, efficient and low emission energy technologies. It puts forward a vision of Europe investing and working collectively to develop and facilitate a global market take-up of such technologies, with European industry leading the way. SET Plan also includes a substantial international cooperation dimension with industrialised, emerging and developing countries that should create new opportunities for cooperation between the EU and international partners.

6.4.1.3. Near-zero Emissions Power Generation Technology through Carbon Dioxide Capture and Storage

The EU and China committed to cooperate on Carbon Dioxide Capture and Storage (CCS) in the framework of the "Near-zero Emissions Power Generation Technology through Carbon Dioxide Capture and Storage" programme (NZEC). This cooperation aims at demonstrating the CCS technology in China to enable deployment from 2020.

The first phase of NZEC was completed between 2006 and 2009. Four research and development projects financed by the European Commission and UK involving Chinese and European academic organizations, companies and government bodies made significant progress in identifying options and constraints for CCS in China. At the 2009 Summit, China and EU jointly agreed to finalise the feasibility (phase II) of a demonstration plant, and a Memorandum of Understanding was signed between the European Commission and the Ministry of Science and Technology (MOST). Implementation is on-going. In 2010 Norway joined the initiative. A call for proposals has been launched in 2013 to select the project and conduct pre-feasibility studies to be finalised in 2014.

6.5. Capacity building

Capacity development is at the heart of the EU development assistance, in line with the provisions of the Paris Declaration on Aid Effectiveness and the Accra Agenda for Action. EU's development activities in the field of climate change are based on, and emphasize the importance of, the principles of national ownership, stakeholder participation, country-driven demand, cooperation between donors and across programmes, and impact assessment and monitoring (when appropriate). Due to the fact that almost all development activities undertaken by the EU and its member-states include a capacity-building component(s) or activities and given the high number and volume of development programmes supported, it is impossible to estimate and single out the full extent of financial support provided by the EU explicitly for the purposes of capacity-building. Since EU support is partner country-driven, only information from partner countries, for example through National Communications, is the best way to get a picture of capacity building support and activities and their effectiveness.

The EU supports a wide range of climate-related capacity development actions at the national level. This includes strengthening local institutional capacity for:

- Adaptation to the negative effects of climate change through: enhancing national institutions' and stakeholders' capabilities to analyse and predict the impact of climate change; support for the development and implementation of national plans, policies and measures; creating an environment for active dissemination of information, raising of public awareness and exchange of best practices.

- Mitigation of greenhouse gases via: assistance in the preparation of baseline scenarios, cost-benefit analysis, GHG-inventories on national and sectoral level; enhancing capabilities to monitor, report and verify GHG-data; supporting local institutions and the private sector with the development and implementation of low-carbon strategies and nationally appropriate mitigation actions.

- Climate financing by: creating capacities, which enable access to existing bilateral, multilateral and private capital financing options for diverse projects in the area of climate change adaptation and mitigation.

- Integration (mainstreaming) of climate change into national policies, strategies and plans in all relevant sectors as well as into country systems (planning, budgeting, reporting, procurement, etc.)

- Support to the participation in the international climate change negotiation process through assisting the preparation of national communications, consulting national focal points, creating an environment for exchange, coordination and debate on climate political goals and strategies.

The common tabular formats adopted at COP-18 included a table on capacity building activities (CTF Table 9), which should be filled in to the extent possible. While, as mentioned above, it is not yet possible for the EU to report on such activities in the format provided, the EU still wishes to provide the following examples of capacity building activities. Most of these activities have been supported by the EU and one or more of its Member States.

6.5.1. Capacity building for mitigation

6.5.1.1. Low Emission Capacity-Building Programme

Name of the initiative: Low Emission Capacity-Building Programme: A global initiative to support NAMA, LEDS and MRV

Recipient country: 25 developing countries

Support provided by: the EU, Germany and Australia

Description of the activity

This global initiative aims at supporting developing and emerging countries in their national climate change mitigation efforts, low emission development strategies and enhanced measuring, reporting and verification systems. The methodology follows a country-driven and multi-stakeholder approach, with includes the participation of both the public and the private sectors. It is based on focused capacity-building activities addressing collection of relevant data, identification of key actions in selected sectors, design of measuring, reporting and verification (MRV) systems, linkages with outcomes and processes of National Communications.

One of the countries in which the Low Emission Capacity-Building Programme (LECB) programme works is Argentina. In this country, the LECB efforts are contributing to strengthen the capacity of the Secretariat of the Environment and Sustainable Development to lead the process of policy dialogue and formulation to support mitigation strategies in the petrochemical and fertiliser industry. Such a process is indeed a complex task requiring coordination at several levels of government with the participation of a wide spectrum of stakeholders.

The following three specific objectives were agreed upon:

- support knowledge generation and transfer allowing a positioning of Climate Change in the design of development policies and strategies;
- develop capacities by promoting sector-based dialogue and synergies in existing plans, programs and policies; and
- design and implement an advocacy and communications plan on Climate Change to better position the subject into the political agenda.

The project thus supports the public and private sector to formalize a joint strategy towards the reduction of greenhouse gases. This joint work conducted with all stakeholders in a given sector allows building capacities on both sides on the same basis, thereby facilitating a common understanding of the challenges and of the solutions that can be implemented. The idea is to start working in the petrochemical and fertilizer industry and then replicate the experience in other industrial sectors in Argentina. These sectors were selected because 1) there was an agreement to move forward on these issues by private companies, 2) the significant incidence on the total emissions of the country (especially ammonia and urea) and 3) the demonstration effect it will have on a wide range of private actors.

6.5.2. Capacity building for adaptation

6.5.2.1. Chololo Eco-village

Name of the initiative: Chololo Eco-village: an integrated approach to adaptation and resilience

Recipient country: Tanzania

Support provided by: European Union (Global Climate Change Alliance)

Description of the activity

Chololo village, located in one of the drought prone regions of Tanzania, is made up of vulnerable and deprived farming families, using rain fed agriculture, subsistence farming, communal grazing, and thus dependent on natural resources for livelihood.

Seeking to strengthen capacity of vulnerable rural communities to adapt to climate change, the pilot project aimed at transforming Chololo into a thriving eco-village – a model of good practice in climate change adaptation and mitigation. It worked closely with all villagers to identify, test, evaluate and share innovative adaptation technologies and approaches; to support the village community to adopt and implement land use plans and natural resource management practices; to empower women to act at the forefront of the transformation, with increased authority and reduced workload and to increase household food security and income, and improve livelihoods.

What has been achieved so far? 400 farmers and their families now have improved food security thanks to the introduction of drought resistant, high-yielding, early-maturing seeds and supply of improved cattle and cocks. The village water supply system was restored, roof catchment for rainwater installed at the village school and a sub-surface dam and a sand dam, to capture water in the nearby river, were constructed. In addition, 133 villagers were trained on afforestation and nursery management, and planted 14 500 tree seedlings and 3 000 trees. As regards energy efficiency, 10 domestic biogas plants were constructed and are now functioning, 60 energy saving cooking stoves are used by families.

Several high-ranking officials from the Government, as well as the media, visited the village which raised the awareness of many communities in the country, leading to wide-ranging efforts to scale-up and replicate the initiative.

6.5.2.2. QESPIKUNA

Name of the initiative: QESPIKUNA: Capacity building of local authorities and civil society actors for the integration of DRM in the sustainable development planning

Recipient country: Peru

Support provided by: European Union

Description of the activity

Peru is one of the most bio-diverse countries, with the most productive sea, one of the largest portions of the Amazon forest, and the Andean glaciers representing 70 % of the ice surface in the tropics. Many rural communities live in difficult conditions in sometimes harsh environmental conditions: they are highly vulnerable to and badly affected by the effects of climate change.

In order to reduce this vulnerability, "QESPIKUNA", an action supported by the NGO Practical Action together with local communities, has prioritized work in three regions of the Peruvian Andes to strengthen the capacities of local authorities and civil society for the integration of the Disaster Risk Management (DRM) in local sustainable development planning. The project seeks to disseminate and apply political and economic tools to allow appropriate social development planning and greater coordination and transparency among the institutions involved, prioritizing the use of Information and Communication Technologies (ICT).

6.5.2.3. Improving livelihoods and food security in rural Uganda

Name of the initiative: Improving livelihoods and food security in rural Uganda

Recipient country: Uganda

Support provided by: European Union and Ireland

Description of the activity

Climate change poses a significant threat to Uganda because of its predicted effect on agriculture, food security and soil and water resources. The project is tackling this threat by focusing on the sustainable improvement of livelihoods and food security for the rural population. The aim is to strengthen the resilience of the rural population and the agricultural production systems in the central part of the cattle corridor, and to build the capacities of communities, commercial farmers and the Government of Uganda to cope with climate change. Ireland has provided € 11 million for the project through the EU's Global Climate Change Alliance.

The project has three key components: strengthening knowledge and capacities for climate change adaptation; creating better access for livestock to water; and improving the

resilience of agricultural production systems in the cattle corridor. The project will run from 2012 to 2016.

Good progress has been made in consultation and engagement with partners including local governments, ministries and other development partners. This has provided the opportunity to assess the potential for using existing structures and implementation modalities for the project, as well as assessing complementarities and alignment with existing projects and programmes.

Following the conclusion of the Memorandum of Understanding between the FAO and the Government of Uganda in August 2012, the project has moved from inception to launch. The definition of all the key actions has been finalized, a monitoring and evaluation system has been established and major procurement of technical assistance and other core services has been undertaken. Experience shows the need to work closely with farmer groups and the private sector, which are the key drivers of agriculture and forestry in Uganda. In the water sector, there is a need to address the lack of community involvement which can be a cause of failure due to lack of ownership of infrastructure and poor operation and maintenance.

6.5.2.4. Peri-urban water and sanitation programme

Name of the initiative: Peri-urban water and sanitation programme (PASAP)

Recipient country: Peru

Support provided by: European Union, Sweden

Description of the activity

Together with Sweden, the EU supports strengthened institutional capacity building for climate change adaptation in Bolivia through support to the Bolivian government, Ministry of Water and Environment, to implement the sector programme PASAP which is based on the national plan for basic sanitation. The overall objective of PASAP is to improve the livelihoods of people living in poverty in peri-urban areas focusing on sustainable management of water resources and promoting water and sanitation systems that are resilient to climate change. Indicators for climate change adaptation have been developed in order to ensure that climate-resilient water and sanitation systems are implemented, e.g. in terms of more efficient water use, installing low-consumption appliances, and treating waste water. The support from EU and Sweden for the overall intervention is 28 million Euro, of which the capacity building component amounts to 2 million Euro.

6.5.3. Capacity building for climate finance

6.5.3.1. Cambodia Climate Change Alliance

Name of the initiative: Cambodia Climate Change Alliance

Recipient country: Cambodia

Support provided by: European Union, Sweden and Denmark

Description of the activity

The EU is, together with Sweden, Danida and UNDP, supporting national capacity development and institutional strengthening in Cambodia through the Cambodia Climate Change Alliance (CCCA). The CCCA's overall objective is to strengthen the capacity of the National Climate Change Committee (NCCC) to fulfil its mandate to address climate change. The support is strategically important to build climate change adaptation capacity and in order to make the government better prepared to receive and manage climate change funds. The capacity building and institutional strengthening activities include, inter alia: i) the establishment of a climate fund and a fund secretariat which are integrated in the Climate Change Department within the Ministry of Environment; ii) establishment of an inter-ministerial technical team specialised on climate issues has been established to provide support to the National Committee on Climate Change; iii) the establishment of a knowledge and information platform; and iv) strengthening capacity of government officials to actively manage climate change issues and participate in national and international climate change dialogue. The total budget is 10 million USD.

6.5.4. Capacity building for mainstreaming and integration

6.5.4.1. Mainstreaming of climate change into national systems and policies

Name of the initiative: Mainstreaming of climate change into national systems and policies

Recipient country: Mozambique

Support provided by: European Union, Denmark and Ireland

Description of the activity

Aiming at supporting the government of Mozambique's efforts in tackling the adverse effects of climate change, with a special focus on the most vulnerable communities in the rural areas of the country, this program seeks to increase the capacity of the Government to adequately mainstream climate change and climate-proofing initiatives into its poverty alleviation and development strategies. It benefits from support of the Global Climate Change Alliance (GCCA), Ireland and Denmark.

The main expected results and activities are structured around 3 pillars, two of which have a strong capacity-building component.

The first pillar aims at strengthening institutional capacity and technical expertise of key government institutions. It does so by supporting local staff to review relevant sector development strategies to integrate environmental and climate change themes. These reviews are set against the most recent legal and policy frameworks. Other courses of action include strengthening the environmental monitoring system to adequately measure sector performance; promoting good governance practices; improving compliance with relevant legal and regulatory framework; and providing a clear reference for enhanced coordination

and linkages between all government and non-state actors, at central, provincial and district level.

Information sharing and awareness campaigns form the backbone of the second pillar. Specific tailor-made capacity-building actions take the form of on-the-job training courses aimed at improving responsiveness to climate change amongst key development agents at all levels from central to local level.

Finally, the third pillar focuses on implementation of the national response to climate change (Environment Strategy for Sustainable Development, National Adaptation Programme of Action), which is supported by putting into practice a number of pilot projects, mainly in the agrarian and agroforestry sectors and sharing the lessons learnt, including through farm-to-farm exchanges.

6.5.4.2. Nepal Climate Change Support Programme

Name of the initiative: Nepal Climate Change Support Programme- Building Climate Resilience in Nepal: Integrating climate change into poverty reduction and other development strategies

Recipient country: Nepal

Support provided by: European Union, United Kingdom and Cyprus

Description of the activity

The European Union (Global Climate Change Alliance), in partnership with the UK and Cyprus, is supporting the Nepal Climate Change Support Programme (NCCSP), which focuses on building community resilience to climate change. Local communities will use a simple national adaptation framework to plan and prioritize adaptation activities. The UK support will help fund these activities to ensure the needs of the poorest and most climate vulnerable people in Nepal are addressed first.

The project also aims to enable the Government of Nepal (GoN) to adopt climate change policies and implement actions that increase benefits and sustainability of public as well as public private development efforts in a longer term. It does so by building capacity of GoN to develop, cost, budget and implement evidence-based policy and measures aimed at mainstreaming climate change in key development sectors (agriculture, forestry, water and energy), including through public-private partnerships.

An interesting feature of the program is that it also seeks to strengthen technical and institutional capacity of Village Development Committees (VDCs) and District Development Committees (DDCs) in mid- and far-west regions (14 districts), to increase their capacity in integrating climate change into key local and district policies, government institutions and budget processes.

The initiative will support GoN to implement NAPA prioritized activities through the national framework of Local Adaptation Plans for Action (LAPA), which provides effective

delivery of adaptation services to the most climate vulnerable communities. The programme will also establish and/or strengthen mechanisms of sharing in adaptation interventions among different stakeholders at the district and national levels. The project is expected to have important cross-cutting impacts and aspects, such as women's empowerment, inclusion of the poor and disadvantaged groups, enhancement of good governance, mainstreaming of climate change in local planning, as well as look into ecosystem and livelihood perspective working at VDC level.

By 2015, the NCCSP programme will assist 3 million people from the poorest and most vulnerable groups (over half of them women and girls). The UK has provided 3 million pounds in Fast Start Finance to the NCCSP, the EU € 8 million and Cyprus € 0.6 million.

7. LIST OF ABBREVIATIONS

AAU	Assigned Amount Unit
AEA	Annual Emission Allowances
AMESD	African Monitoring of Environment for Sustainable Development
Art	Article
BAM	baseline scenario of EUCLIMIT
boe	Barrel of oil equivalent
BR	Biennial report
BR1	1st Biennial report
BRICS	Brazil, Russia, India, China and South Africa
CAP	Common Agricultural Policy
CB	Capacity building
CCC	Climate Change Committee (under the Monitoring Mechanism Decision)
CCCA	Cambodia Climate Change Alliance
CCPMs	Common and Coordinated Policies and Measures
CCS	Carbon Capture and storage
CDM	Clean Development Mechanism
CEOS	Committee on Earth Observation Satellites
CER	Certified Emission Reduction
CIF	Climate Investment Funds
CION	European Commission
CITL	Community Independent Transaction Log
CM	Cropland Management
CM SAF	Satellite Application Facility on Climate Monitoring
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2eq	Carbon dioxide equivalents

COP	Conference of Parties
COSME	Programme for the Competitiveness of enterprises and SMEs
COSPAR	Committee on Space Research
CP	Commitment Period
CPA	Classification of products by activity in the European Union
CRF	Common Reporting Format
CTF	Common Tabular Format
DCs	Developing countries
DDC	District Development Committee
DG	Directorate-General
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EAP	Environment Action Programme
ECMWF	European Centre for Medium range Weather Forecasting
ECV	Essential Climate Variable
EDCTP	European and Developing Countries Clinical Trials Partnership
EEA	European Environment Agency
EEAS	European External Action Service
Eionet	European Environment Information and Observation Network
EIT	Economy in transition
EMU	Economic and Monetary Union
EO	Earth Observation
EP	European Parliament
ERA	European Research Area
ERA-NET	European Research Area Net
ERC	European Research Council
ERDF	European Regional Development Fund
ERT	Expert Review Team
ERU	Emission Reduction Unit
ESA	European Space Agency
ESD	Effort Sharing Decision
ESF	European Social Fund
ESSP	Earth System Science Partnership
ETAP	EU Environmental Technologies Action Plan
ETC/ACM	European Topic Centre on Air Pollution and Climate Change Mitigation
ETS	Emission trading scheme
EU ETS	The European Union's emission trading scheme
EU	European Union
EUCLIMIT	Development and application of EU economy-wide climate mitigation modelling capacity (project)

EU-15	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom
EU-27	EU-15 plus Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia,
EU-28	EU-27 plus Croatia
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
EUR	Euro
EURATOM	European Atomic Energy Community
FACCE-JPI	Joint Programming Initiative Agriculture, Food Security and Climate Change
FCDR	Fundamental Climate Data Records
FlexMechs	Flexible Mechanisms under the Kyoto Protocol
FM	Forest Management
FP	Framework Programme
FP6	6th Framework Programme
FP7	7th Framework Programme
FSF	Fast Start Financing
GCOS	Global Climate Observing System
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems
GFCS	Global Framework for Climate Services
GHG	Greenhouse Gases
GIS	Geographical Information Systems
GM	Grazing Land Management
GVA	Gross Value Added
GWP	Global Warming Potential
HFCs	Hydrofluorocarbons
IA	Impact Assessment
IAB	Impact Assessment Board
ICPC	International Cooperation Partner Countries
ICSU	International Council for Science
IDR	In Depth Review
IET	International Emissions Trading
IOCCG	International Ocean Colour Coordinating Group
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental panel on climate change
JI	Joint Implementation
JPI	Joint Programming Initiative
JRC	Joint Research Centre

koe	Kilograms of Oil Equivalents
KP	Kyoto Protocol
LBA	Legally-Binding Agreement
lCER	Long-term Certified Emission Reduction
LDCF	Least Developed Countries Fund
LDCs	Least developed countries
LECB	Low Emission Capacity-Building Programme
LEDS	Low-Emission Development Strategies
LULUCF	Land use, land use Change and Forestry
MESA	Monitoring of Environment and Security in Africa
MISR	Multi-angle Imaging SpectroRadiometer
MMD	Monitoring Mechanism Decision
MMR	Monitoring Mechanism Regulation
MRV	Monitoring, Reporting and Verification
MS	EU Member State
MSG	Meteosat Second Generation
Mt	Megatonnes
Mtoe	Megatonnes of oil equivalent
N_2O	Nitrous Oxide
NACE	Statistical classification of economic activities in the European Union
NAMA	Nationally Appropriate Mitigation Action
NAP	National Adaptation Plan
NAS	National Adaptation Strategy
NASA	National Aeronautics and Space Administration
NC	National Communication
NC4	4th National Communication
NC5	5th National Communication
NC6	6th National Communication
NCCC	National Climate Change Committee
NCCSP	Nepal Climate Change Support Programme
NEC	National Emissions Ceiling
NER	New Entrant Reserve
NF3	Nitrogen Trifluoride
NIR	National Inventory Report
NMVOC	Non-methane volatile organic compounds
NREAP	National Renewable Energy Action Plan
NOx	Nitrogen oxides
ODA	Official Development Assistance
PaMs	Policies and measures
PASAP	Peri-urban water and sanitation programme

PFCs	Perfluorocarbons
QELRC	quantified emission limitation and reduction commitment
RMU	Removal Unit
RSO	Research and Systematic Observation
RV	Revegetation
SAF	Satellite Application Facility
SANSA	South African National Space Agency
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SCCF	Special Climate Change Fund
SDS	Sustainable Development Strategy
SEF	Standard Electronic Format for reporting Kyoto Protocol units
SF_6	Sulphur Hexafluoride
SICA	Specific International Cooperation Actions
SME	Small and Medium-sized Enterprises
SO_2	Sulphur Dioxide
SPP	Strategic Planning and Programming
tCER	Temporary Certified Emission Reduction
TFEU	Treaty on the Functioning of the European Union
toe	Tonnes of Oil Equivalents
TT	Technology transfer
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations framework convention on climate change
USD	United States of America Dollars
VDC	Village Development Committee
VE	Verified emissions
WAM	With additional measures scenario
WCRP	World Climate Research Programme
WEM	With existing measures scenario
WG I	Working Group I under the CCC
WG II	Working Group II under the CCC
WOM	Without measures scenario

8. APPENDIX: CTF FOR EU 1ST BIENNIAL REPORT

Overview on CTF tables provided with the first EU Biennial Report:

CTF Table 1 (EU-28): Emission trends

CTF Table 1 (EU-15): Emission trends

CTF Table 2 (EU-28):	Description of quantified economy-wide emission reduction target
CTF Table 3 (EU-28):	Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects
CTF Table 4 (EU-28):	Reporting on progress
CTF Table 4(a)II (EU-28):	Progress in achievement of the quantified economy-wide emission reduction targets – further information on mitigation actions relevant to the counting of emissions and removals from the land use, land-use change and forestry sector in relation to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
CTF Table 4(b) (EU-28):	Reporting on progress
CTF Table 4 (EU-15):	Reporting on progress
CTF Table 4(a)II (EU-15):	Progress in achievement of the quantified economy-wide emission reduction targets – further information on mitigation actions relevant to the counting of emissions and removals from the land use, land-use change and forestry sector in relation to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
CTF Table 4(b) (EU-15):	Reporting on progress
CTF Table 5 (EU-28):	Summary of key variables and assumptions used in the projections analysis
CTF Table 6(a)/(c) (EU-28):	Information on updated greenhouse gas projections under a 'with measures' scenario and under a 'with additional measures' scenario
CTF Table 7 (EU-28):	Provision of public financial support: summary information
CTF Table 7(b) (EU-28):	Provision of public financial support: contribution through bilateral, regional and other channels

8.1. CTF Table 1 (EU-28): Emission trends

8.1.1. CTF Table 1 (EU-28): Emission trends: summary

GREENHOUSE GAS EMISSIONS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	CO_2 equivalent (Gg)																					
CO_2 emissions including net CO_2 from LULUCF	4 159 772	4 059 355	3 907 259	3 834 990	3 812 968	3 859 488	3 955 960	3 873 724	3 870 231	3 790 888	3 834 014	3 875 017	3 903 625	4 025 666	4 010 262	3 978 538	3 959 546	3 944 256	3 805 984	3 462 426	3 607 925	3 458 944
CO_2 emissions excluding net CO_2 from LULUCF	4 430 302	4 373 120	4 210 575	4 131 621	4 111 840	4 155 793	4 256 619	4 174 494	4 172 165	4 107 753	4 131 745	4 203 658	4 177 413	4 277 389	4 287 706	4 269 224	4 273 988	4 220 994	4 124 952	3 792 439	3 912 211	3 764 300
CH_4	599 346	582 985	563 848	554 091	541 545	537 452	532 101	519 344	505 443	494 124	483 077	469 649	459 965	452 032	438 737	431 122	425 431	418 678	412 705	403 753	400 313	392 169
N_2O	525 561	496 900	477 772	460 769	464 288	464 977	471 302	468 799	446 447	423 715	420 445	413 134	401 623	396 767	401 199	392 375	379 729	379 530	370 393	349 717	339 842	338 577
HFCs	27 882	27 537	29 447	31 880	36 039	40 426	45 761	52 796	54 214	47 681	47 142	46 846	49 574	54 878	57 111	61 686	64 537	69 319	72 745	75 989	80 181	81 761
PFCs	21 304	19 470	15 763	14 890	14 303	14 028	13 496	12 527	11 871	11 560	9 876	8 904	10 389	8 635	7 327	6 129	5 497	5 083	4 376	2 844	3 329	3 602
SF_6	10 958	11 396	12 216	13 147	14 231	15 332	15 136	13 509	12 622	10 284	10 282	9 629	8 553	8 001	8 274	8 192	7 575	7 318	6 868	6 471	6 559	6 429
Total (including net CO_2 from LULUCF)	**5 344 823**	**5 197 644**	**5 006 304**	**4 909 767**	**4 883 374**	**4 931 703**	**5 033 755**	**4 940 699**	**4 900 827**	**4 778 252**	**4 804 835**	**4 823 179**	**4 833 730**	**4 945 979**	**4 922 910**	**4 878 042**	**4 842 315**	**4 824 184**	**4 673 071**	**4 301 200**	**4 438 149**	**4 281 481**
Total (excluding net CO_2 from LULUCF)	**5 615 353**	**5 511 409**	**5 309 621**	**5 206 398**	**5 182 246**	**5 228 007**	**5 334 414**	**5 241 469**	**5 202 762**	**5 095 118**	**5 102 566**	**5 151 820**	**5 107 518**	**5 197 702**	**5 200 354**	**5 168 727**	**5 156 757**	**5 100 923**	**4 992 039**	**4 631 213**	**4 742 434**	**4 586 837**
Total (without LULUCF)	**5 606 118**	**5 502 415**	**5 300 837**	**5 197 649**	**5 171 502**	**5 217 746**	**5 324 172**	**5 231 717**	**5 192 796**	**5 086 012**	**5 092 807**	**5 142 950**	**5 098 801**	**5 187 898**	**5 191 779**	**5 159 660**	**5 147 924**	**5 091 633**	**4 983 739**	**4 622 743**	**4 733 944**	**4 578 597**

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2
	CO_2 equivalent (Gg)																					
1. Energy	4 319 605	4 283 306	4 123 808	4 054 034	4 009 684	4 045 929	4 154 190	4 062 632	4 054 521	3 993 696	4 000 242	4 078 342	4 048 881	4 138 318	4 132 251	4 106 849	4 102 932	4 039 130	3 959 346	3 680 648	3 784 411	3 634
2. Industrial Processes	461 477	427 085	412 545	400 235	426 956	439 424	438 508	444 021	418 825	381 456	393 099	380 585	375 469	388 397	402 633	406 017	403 715	415 233	391 719	325 652	337 860	334
3. Solvent and Other Product Use	16 855	16 274	15 696	15 161	13 846	13 904	13 989	13 969	13 980	13 622	13 442	13 033	12 660	12 264	12 152	12 188	12 254	11 788	11 287	10 356	10 415	10
4. Agriculture	604 008	569 741	544 575	525 841	520 252	520 030	521 420	520 665	518 477	515 661	508 448	500 085	494 081	487 087	487 939	481 543	477 833	478 424	477 855	466 382	463 189	464
5. Land-Use, Land-Use Change and Forestry	-261 295	-304 770	-294 533	-287 881	-288 128	-286 042	-290 416	-291 018	-291 969	-307 760	-287 972	-319 772	-265 071	-241 919	-268 869	-281 618	-305 609	-267 449	-310 668	-321 543	-295 796	-297
6. Waste	204 173	206 009	204 212	202 378	200 764	198 459	196 065	190 431	186 993	181 577	177 575	170 905	167 711	161 832	156 804	153 063	151 189	147 059	143 533	139 704	138 069	134
7. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Abbreviation: LULUCF = land use, land-use change and forestry.

[a] The column “Base year” should be filled in only by those Parties with economies in transition that use a base year different from 1990 in accordance with the relevant decisions of the Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

[b] Includes net CO_2, CH_4 and N_2O from LULUCF.

8.1.2. CTF Table 1 (EU-28): Emission trends: CO_2

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2
	(Gg)																				
1. Energy	**4 129 772**	**4 100 979**	**3 949 194**	**3 880 523**	**3 845 056**	**3 881 713**	**3 990 875**	**3 903 826**	**3 904 266**	**3 847 999**	**3 860 265**	**3 942 566**	**3 916 728**	**4 007 442**	**4 006 515**	**3 984 776**	**3 984 049**	**3 924 483**	**3 845 365**	**3 572 082**	**3 673**
A. Fuel Combustion (Sectoral Approach)	4 104 312	4 076 671	3 924 309	3 855 426	3 820 399	3 854 666	3 963 450	3 876 626	3 879 598	3 823 865	3 835 383	3 918 350	3 891 987	3 982 061	3 982 118	3 959 408	3 958 175	3 899 277	3 821 524	3 549 395	3 650
1. Energy Industries	1 663 267	1 639 784	1 561 449	1 501 054	1 505 870	1 508 534	1 539 451	1 491 033	1 508 968	1 469 307	1 497 585	1 535 312	1 554 581	1 606 267	1 592 145	1 579 665	1 589 978	1 598 771	1 523 270	1 398 668	1 421
2. Manufacturing Industries and Construction	850 702	805 500	761 071	741 731	741 365	753 194	742 817	741 998	713 677	692 255	701 744	680 525	661 063	672 666	671 428	665 233	665 681	659 500	631 175	532 943	571
3. Transport	765 675	772 928	794 386	798 963	804 950	817 681	842 098	855 374	882 395	902 712	899 893	915 024	926 680	936 896	956 301	956 831	963 794	973 460	954 061	930 526	925
4. Other Sectors	796 900	835 425	788 556	796 851	752 236	759 614	824 869	774 751	760 843	746 968	724 151	776 619	739 040	755 164	750 445	745 563	727 498	655 922	702 177	677 377	723
5. Other	27 768	23 034	18 847	16 828	15 979	15 643	14 214	13 470	13 714	12 622	12 010	10 869	10 621	11 068	11 798	12 116	11 225	11 623	10 842	9 882	9
B. Fugitive Emissions from Fuels	25 460	24 308	24 885	25 097	24 657	27 047	27 426	27 200	24 668	24 134	24 882	24 215	24 742	25 381	24 397	25 367	25 874	25 206	23 840	22 687	23
1. Solid Fuels	4 474	3 213	3 207	2 884	1 668	2 642	2 664	3 748	1 973	2 915	3 643	2 969	3 190	3 762	3 590	3 041	3 362	3 120	2 888	2 055	3
2. Oil and Natural Gas	20 986	21 095	21 678	22 213	22 988	24 405	24 762	23 453	22 695	21 219	21 239	21 247	21 552	21 619	20 807	22 326	22 511	22 086	20 953	20 632	19
2. Industrial Processes	**283 869**	**255 982**	**245 834**	**236 207**	**253 364**	**261 017**	**252 736**	**258 125**	**255 335**	**247 609**	**259 406**	**249 325**	**248 783**	**258 183**	**269 480**	**272 506**	**277 760**	**285 163**	**268 613**	**210 310**	**227**
A. Mineral Products	150 233	136 947	132 385	126 546	134 946	140 010	135 586	138 741	140 915	141 042	143 570	141 132	141 072	142 465	148 777	148 770	152 834	158 038	147 619	117 850	120
B. Chemical Industry	44 010	41 213	38 982	37 558	40 306	43 698	43 816	41 854	40 836	40 638	44 042	41 838	40 704	42 752	43 491	45 016	42 745	45 340	43 812	38 305	41
C. Metal Production	88 274	76 519	73 018	70 783	76 729	75 831	71 984	76 053	71 890	64 497	70 051	64 685	65 412	71 516	75 619	76 681	80 387	80 009	75 479	52 518	64
D. Other Production	87	63	68	64	43	36	63	62	56	66	62	56	46	60	55	48	33	43	52	49	
E. Production of Halocarbons and SF_6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F. Consumption of Halocarbons and SF_6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
G. Other	1 265	1 238	1 381	1 256	1 340	1 442	1 286	1 414	1 639	1 367	1 681	1 614	1 550	1 391	1 537	1 990	1 761	1 734	1 651	1 588	1
3. Solvent and Other Product Use	**11 786**	**11 291**	**10 658**	**10 159**	**8 911**	**8 940**	**8 931**	**9 002**	**9 072**	**8 891**	**8 823**	**8 521**	**8 441**	**8 278**	**8 290**	**8 314**	**8 314**	**7 975**	**7 600**	**6 817**	**7**
4. Agriculture	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
A. Enteric Fermentation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2
	(Gg)																				
B. Manure Management	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
C. Rice Cultivation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
D. Agricultural Soils	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
E. Prescribed Burning of Savannas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F. Field Burning of Agricultural Residues	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
G. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5. Land-Use, Land-Use Change and Forestry	**-270 530**	**-313 765**	**-303 317**	**-296 631**	**-298 873**	**-296 304**	**-300 659**	**-300 770**	**-301 935**	**-316 866**	**-297 731**	**-328 641**	**-273 788**	**-251 723**	**-277 444**	**-290 685**	**-314 442**	**-276 738**	**-318 968**	**-330 013**	**-304**
A. Forest Land	-390 799	-432 439	-421 849	-417 675	-420 692	-416 684	-417 862	-414 941	-418 267	-429 336	-404 553	-435 001	-382 192	-366 397	-383 572	-393 277	-415 190	-384 364	-424 303	-430 977	-401
B. Cropland	86 456	83 232	85 467	83 696	85 077	88 179	84 197	82 778	80 748	81 501	78 144	77 360	82 128	88 072	79 257	76 055	73 614	75 471	73 898	72 755	74
C. Grassland	2 879	2 447	-677	1 643	-114	-4 104	-3 400	-2 842	-724	-4 235	-6 743	-8 023	-10 519	-11 023	-12 200	-12 830	-12 829	-7 277	-10 912	-11 643	-13
D. Wetlands	5 466	5 595	5 568	5 462	5 647	5 681	5 684	5 585	5 506	5 990	6 275	6 691	5 815	6 209	6 269	6 336	6 195	6 184	5 476	5 958	5
E. Settlements	28 088	28 995	29 390	29 742	31 171	30 719	30 735	31 248	31 882	33 524	32 894	33 266	33 707	34 230	35 838	37 168	38 549	38 678	39 989	38 982	38
F. Other Land	2 447	1 875	1 765	2 657	2 392	2 865	3 746	3 070	4 423	2 281	2 220	1 446	1 533	1 947	1 075	-115	-300	-676	326	-1 013	-2
G. Other	-5 067	-3 469	-2 980	-2 156	-2 352	-2 960	-3 758	-5 669	-5 503	-6 591	-5 968	-4 380	-4 261	-4 760	-4 111	-4 022	-4 480	-4 754	-3 444	-4 075	-6
6. Waste	**4 875**	**4 868**	**4 889**	**4 732**	**4 509**	**4 122**	**4 077**	**3 541**	**3 492**	**3 254**	**3 250**	**3 246**	**3 460**	**3 486**	**3 421**	**3 628**	**3 865**	**3 374**	**3 375**	**3 229**	**3**
A. Solid Waste Disposal on Land	227	268	308	299	244	104	83	60	58	54	38	36	27	27	26	25	14	12	10	5	
B. Waste-water Handling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
C. Waste Incineration	4 630	4 581	4 562	4 415	4 247	3 997	3 974	3 462	3 415	3 180	3 193	3 192	3 415	3 440	3 377	3 585	3 832	3 342	3 344	3 203	3
D. Other	18	19	20	18	18	20	20	19	18	19	19	19	18	20	18	18	19	19	21	21	
7. Other	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
Total CO_2 Emissions including net CO_2 from LULUCF	**4 159 772**	**4 059 355**	**3 907 259**	**3 834 990**	**3 812 968**	**3 859 488**	**3 955 960**	**3 873 724**	**3 870 231**	**3 790 888**	**3 834 014**	**3 875 017**	**3 903 625**	**4 025 666**	**4 010 262**	**3 978 538**	**3 959 546**	**3 944 256**	**3 805 984**	**3 462 426**	**3 607**
Total CO_2 Emissions excluding net CO_2 from LULUCF	**4 430 302**	**4 373 120**	**4 210 575**	**4 131 621**	**4 111 840**	**4 155 793**	**4 256 619**	**4 174 494**	**4 172 165**	**4 107 753**	**4 131 745**	**4 203 658**	**4 177 413**	**4 277 389**	**4 287 706**	**4 269 224**	**4 273 988**	**4 220 994**	**4 124 952**	**3 792 439**	**3 912**
Memo Items:																					
International Bunkers	**178 662**	**175 925**	**183 156**	**190 728**	**190 417**	**196 005**	**207 225**	**220 577**	**233 541**	**235 483**	**248 740**	**253 157**	**254 378**	**262 427**	**280 065**	**296 537**	**311 630**	**319 118**	**318 097**	**290 468**	**282**
Aviation	69 556	68 260	73 910	78 184	81 397	86 194	90 091	94 231	101 719	109 381	115 493	113 926	111 271	115 770	124 614	131 432	137 179	141 610	142 603	131 845	131
Marine	109 106	107 665	109 246	112 545	109 020	109 811	117 134	126 346	131 822	126 101	133 247	139 231	143 107	146 657	155 451	165 105	174 451	177 508	175 494	158 623	150
Multilateral Operations	**1**	**2**	**2**	**2**	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**4**	**2**	**2**	**3**	**4**	**4**	**4**	**4**	
CO_2 Emissions from Biomass	**177 810**	**187 975**	**188 910**	**206 023**	**206 952**	**215 470**	**228 581**	**241 299**	**243 067**	**249 110**	**249 990**	**259 691**	**264 591**	**288 906**	**306 343**	**323 189**	**343 494**	**362 615**	**394 890**	**411 240**	**460**

8.1.3. CTF Table 1 (EU-28): Emission trends: CH_4

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	(Gg)																					
Total CH_4 Emissions	**28 540**	**27 761**	**26 850**	**26 385**	**25 788**	**25 593**	**25 338**	**24 731**	**24 069**	**23 530**	**23 004**	**22 364**	**21 903**	**21 525**	**20 892**	**20 530**	**20 259**	**19 937**	**19 653**	**19 226**	**19 063**	**18 675**
1. Energy	**7 409**	**7 046**	**6 704**	**6 640**	**6 175**	**6 145**	**6 028**	**5 803**	**5 368**	**5 197**	**5 013**	**4 810**	**4 661**	**4 569**	**4 321**	**4 176**	**4 024**	**3 824**	**3 816**	**3 642**	**3 699**	**3 612**
A. Fuel Combustion (Sectoral Approach)	1 211	1 211	1 142	1 149	1 056	1 048	1 095	1 040	981	953	884	875	829	855	865	864	873	868	902	888	963	902

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	(Gg)																					
1. Energy Industries	55	56	55	57	58	65	71	71	73	73	71	72	74	93	100	106	113	124	133	134	148	148
2. Manufacturing Industries and Construction	78	74	72	71	72	75	76	78	78	78	81	81	81	87	91	92	92	89	86	72	80	82
3. Transport	245	235	233	224	217	208	201	190	181	171	153	144	133	124	115	108	100	92	83	77	71	66
4. Other Sectors	820	834	776	792	705	697	745	700	647	629	577	574	537	548	556	554	565	561	598	603	661	603
5. Other	13	10	6	5	3	3	3	2	2	2	2	3	3	3	3	3	3	3	3	2	2	3
B. Fugitive Emissions from Fuels	6 198	5 836	5 562	5 490	5 119	5 097	4 933	4 763	4 387	4 244	4 129	3 935	3 832	3 714	3 456	3 312	3 151	2 956	2 914	2 754	2 737	2 710
1. Solid Fuels	3 506	3 342	3 161	3 068	2 719	2 788	2 668	2 591	2 281	2 232	2 117	1 920	1 818	1 701	1 504	1 359	1 270	1 122	1 078	957	932	936
2. Oil and Natural Gas	2 693	2 494	2 401	2 422	2 399	2 309	2 265	2 172	2 106	2 012	2 013	2 015	2 013	2 013	1 952	1 953	1 881	1 834	1 836	1 797	1 805	1 774
2. Industrial Processes	**64**	**60**	**59**	**59**	**64**	**66**	**64**	**64**	**59**	**55**	**58**	**57**	**55**	**61**	**62**	**64**	**63**	**63**	**58**	**48**	**52**	**52**
A. Mineral Products	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1
B. Chemical Industry	44	43	43	43	47	47	46	46	43	40	42	42	40	45	46	45	43	43	41	36	40	39
C. Metal Production	16	13	12	12	14	14	14	14	13	12	12	12	11	12	13	15	16	16	14	8	9	10
D. Other Production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E. Production of Halocarbons and SF_6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F. Consumption of Halocarbons and SF_6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G. Other	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3. Solvent and Other Product Use	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4. Agriculture	**11 991**	**11 499**	**11 025**	**10 703**	**10 535**	**10 477**	**10 467**	**10 338**	**10 282**	**10 203**	**10 033**	**9 945**	**9 810**	**9 756**	**9 647**	**9 599**	**9 593**	**9 632**	**9 567**	**9 489**	**9 347**	**9 216**
A. Enteric Fermentation	9 277	8 870	8 492	8 257	8 134	8 086	8 074	7 959	7 902	7 841	7 705	7 602	7 453	7 392	7 292	7 260	7 227	7 264	7 245	7 178	7 077	7 000
B. Manure Management	2 554	2 475	2 389	2 312	2 259	2 252	2 247	2 228	2 240	2 228	2 200	2 212	2 227	2 224	2 206	2 202	2 226	2 229	2 189	2 160	2 116	2 057
C. Rice Cultivation	114	108	104	101	108	106	114	114	108	104	99	99	105	108	117	112	111	113	105	120	124	127
D. Agricultural Soils	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E. Prescribed Burning of Savannas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F. Field Burning of Agricultural Residues	46	46	39	33	33	33	32	37	32	30	29	32	26	32	32	25	28	25	28	30	30	31
G. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5. Land-Use, Land-Use Change and Forestry	**222**	**216**	**209**	**208**	**304**	**290**	**280**	**269**	**275**	**243**	**269**	**237**	**233**	**275**	**230**	**251**	**242**	**256**	**217**	**223**	**227**	**214**

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	(Gg)																					
A. Forest Land	78	76	71	65	77	65	57	60	68	55	78	56	58	93	54	80	71	63	44	49	57	46
B. Cropland	7	8	7	7	7	7	7	6	7	7	7	7	6	9	8	7	7	7	7	7	8	7
C. Grassland	29	25	24	29	28	15	17	19	27	15	21	16	12	19	16	14	14	36	16	18	14	13
D. Wetlands	105	105	105	105	105	106	106	106	106	106	106	106	106	107	107	107	107	108	108	108	109	110
E. Settlements	2	2	2	2	2	2	2	2	2	3	2	3	3	3	3	3	3	3	3	3	3	3
F. Other Land	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G. Other	0	0	0	0	85	95	90	75	65	58	55	50	48	45	42	40	39	38	38	37	37	36
6. Waste	**8 854**	**8 939**	**8 854**	**8 776**	**8 709**	**8 616**	**8 499**	**8 257**	**8 085**	**7 831**	**7 631**	**7 316**	**7 145**	**6 864**	**6 632**	**6 440**	**6 336**	**6 162**	**5 995**	**5 824**	**5 736**	**5 581**
A. Solid Waste Disposal on Land	7 694	7 819	7 768	7 707	7 644	7 549	7 449	7 220	7 052	6 816	6 699	6 417	6 241	5 938	5 704	5 545	5 442	5 283	5 141	5 005	4 901	4 732
B. Waste-water Handling	1 132	1 088	1 052	1 034	1 027	1 025	1 003	992	988	968	881	848	846	869	873	839	835	819	795	762	777	789
C. Waste Incineration	9	10	9	9	7	7	7	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4
D. Other	19	22	25	27	31	35	40	41	41	44	47	47	54	54	52	53	55	56	55	53	54	56
7. Other	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Memo Items:																						
International Bunkers	**5**	**5**	**5**	**5**	**5**	**5**	**6**	**6**	**13**	**6**	**6**	**7**	**7**	**7**	**7**	**8**	**10**	**22**	**14**	**9**	**9**	**9**
Aviation	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	2	2	2	2	1	1	1
Marine	4	4	4	4	4	4	4	4	11	5	5	5	5	6	6	6	9	21	12	8	8	8
Multilateral Operations	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

8.1.4. CTF Table 1 (EU-28): Emission trends: N_2O

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	(Gg)																					
Total N_2O Emissions	**1 695**	**1 603**	**1 541**	**1 486**	**1 498**	**1 500**	**1 520**	**1 512**	**1 440**	**1 367**	**1 356**	**1 333**	**1 296**	**1 280**	**1 294**	**1 266**	**1 225**	**1 224**	**1 195**	**1 128**	**1 096**	**1 092**
1. Energy	**110**	**111**	**109**	**110**	**113**	**113**	**118**	**119**	**121**	**118**	**112**	**112**	**111**	**113**	**113**	**111**	**111**	**111**	**109**	**103**	**106**	**105**
A. Fuel Combustion (Sectoral Approach)	110	110	109	110	112	113	118	119	121	118	112	112	110	112	113	111	111	110	109	103	106	104
1. Energy Industries	35	35	34	33	33	29	30	28	29	28	28	29	30	31	31	31	32	32	31	30	31	31
2. Manufacturing Industries and Construction	24	23	23	22	22	22	22	22	22	21	21	21	21	21	21	22	22	22	21	18	19	19
3. Transport	24	25	26	28	32	37	40	43	45	44	37	36	35	34	34	32	32	32	32	30	30	30
4. Other Sectors	24	25	24	25	24	24	25	24	23	23	23	24	23	24	24	24	24	23	24	23	24	23
5. Other	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	1	2	1	1	1	1	1

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	(Gg)																					
B. Fugitive Emissions from Fuels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1. Solid Fuels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2. Oil and Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2. Industrial Processes	**375**	**359**	**349**	**332**	**347**	**346**	**355**	**341**	**269**	**204**	**210**	**209**	**184**	**185**	**191**	**181**	**152**	**152**	**122**	**94**	**60**	**45**
A. Mineral Products	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B. Chemical Industry	374	359	348	332	347	346	355	341	269	203	210	208	184	185	190	181	151	151	122	93	60	45
C. Metal Production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D. Other Production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E. Production of Halocarbons and SF_6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F. Consumption of Halocarbons and SF_6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3. Solvent and Other Product Use	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**15**	**15**	**15**	**14**	**13**	**12**	**12**	**13**	**12**	**12**	**11**	**11**	**10**
4. Agriculture	**1 136**	**1 059**	**1 010**	**971**	**965**	**968**	**973**	**979**	**976**	**972**	**961**	**940**	**929**	**910**	**920**	**903**	**892**	**891**	**893**	**862**	**861**	**874**
A. Enteric Fermentation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B. Manure Management	136	131	124	118	115	115	113	113	112	110	107	106	105	103	101	101	99	100	99	97	96	94
C. Rice Cultivation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D. Agricultural Soils	999	927	885	852	848	852	859	866	863	862	853	833	824	807	819	802	792	790	794	764	765	779
E. Prescribed Burning of Savannas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F. Field Burning of Agricultural Residues	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1
G. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5. Land-Use, Land-Use Change and Forestry	**15**	**14**	**14**	**14**	**14**	**13**	**14**	**13**	**14**	**13**	**13**	**13**	**12**	**13**	**12**	**12**	**12**	**13**	**12**	**12**	**12**	**12**
A. Forest Land	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
B. Cropland	12	12	11	11	11	11	11	11	11	11	10	10	10	10	10	10	10	10	10	10	9	9
C. Grassland	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
D. Wetlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E. Settlements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F. Other Land	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6. Waste	**43**	**43**	**43**	**43**	**43**	**43**	**44**	**44**	**44**	**45**	**45**	**45**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**	**46**
A. Solid Waste Disposal on Land	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B. Waste-water Handling	42	42	42	41	41	41	41	41	42	42	42	42	42	42	42	42	42	42	42	41	42	41
C. Waste Incineration	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
D. Other	0	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3	3	4	4	4	4
7. Other	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Memo Items:																						
International Bunkers	**5**	**5**	**6**	**6**	**6**	**7**	**7**	**6**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**8**	**10**	**9**	**8**	**8**	**8**
Aviation	2	2	2	2	2	3	3	3	3	3	3	3	3	3	4	4	4	4	5	4	4	4
Marine	3	3	4	4	4	4	4	3	4	3	3	3	3	3	3	3	4	5	4	4	4	4

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	(Gg)																					
Multilateral Operations	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

8.1.5. CTF Table 1 (EU-28): Emission trends: HFCs, PFCs and SF_6

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	CO_2 equivalent (Gg)																					
Emissions of HFCs	**27 882**	**27 537**	**29 447**	**31 880**	**36 039**	**40 426**	**45 761**	**52 796**	**54 214**	**47 681**	**47 142**	**46 846**	**49 574**	**54 878**	**57 111**	**61 686**	**64 537**	**69 319**	**72 745**	**75 989**	**80 181**	**81 761**
Emissions of PFCs	**21 304**	**19 470**	**15 763**	**14 890**	**14 303**	**14 028**	**13 496**	**12 527**	**11 871**	**11 560**	**9 876**	**8 904**	**10 389**	**8 635**	**7 327**	**6 129**	**5 497**	**5 083**	**4 376**	**2 844**	**3 329**	**3 602**
Emissions of SF_6	**10 958**	**11 396**	**12 216**	**13 147**	**14 231**	**15 332**	**15 136**	**13 509**	**12 622**	**10 284**	**10 282**	**9 629**	**8 553**	**8 001**	**8 274**	**8 192**	**7 575**	**7 318**	**6 868**	**6 471**	**6 559**	**6 429**

8.2. CTF Table 1 (EU-15): Emission trends

8.2.1. CTF Table 1 (EU-15): Emission trends: summary

GREENHOUSE GAS EMISSIONS	BY	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	CO_2 equivalent (Gg)																						
CO_2 emissions including net CO_2 from LULUCF	3 223 990	3 223 990	3 216 370	3 149 449	3 098 707	3 092 816	3 127 504	3 188 117	3 132 061	3 187 750	3 147 439	3 189 022	3 223 773	3 257 436	3 347 883	3 340 335	3 318 820	3 281 952	3 249 186	3 143 196	2 875 806	2 979 914	2 823 473
CO_2 emissions excluding net CO_2 from LULUCF	3 367 101	3 367 101	3 391 490	3 315 827	3 259 052	3 261 695	3 297 510	3 372 483	3 318 057	3 367 625	3 344 235	3 372 961	3 434 560	3 426 687	3 493 595	3 502 867	3 484 095	3 467 476	3 408 379	3 331 501	3 067 035	3 155 308	3 002 815
CH_4	437 846	437 846	434 068	426 997	423 313	413 852	410 365	405 672	394 752	385 604	376 516	369 034	357 171	347 149	338 016	326 974	319 572	313 264	308 412	303 879	298 333	295 750	289 256
N_2O	399 887	399 887	394 617	387 704	374 645	378 719	379 101	385 268	383 337	363 743	342 703	339 170	330 305	321 052	315 834	316 888	307 624	295 456	293 847	285 949	275 481	266 026	263 657
HFCs	41 368	27 882	27 537	29 428	31 859	35 976	39 992	45 077	51 649	52 756	45 831	44 952	43 710	45 730	50 025	51 154	54 418	55 866	58 818	62 768	66 040	69 311	70 746
PFCs	15 680	17 329	15 960	13 804	12 948	12 283	11 718	11 288	10 289	9 645	9 479	8 093	7 357	9 146	7 846	6 632	5 490	5 067	4 738	4 120	2 715	3 193	3 461
SF_6	13 861	10 768	11 191	12 013	12 910	13 950	15 012	14 811	13 130	12 315	9 923	9 867	9 155	8 228	7 617	7 782	7 721	7 135	6 828	6 421	6 081	6 184	6 073
Total (including net CO_2 from LULUCF)	**4 132 632**	**4 117 702**	**4 099 744**	**4 019 395**	**3 954 381**	**3 947 597**	**3 983 693**	**4 050 232**	**3 985 217**	**4 011 813**	**3 931 891**	**3 960 139**	**3 971 472**	**3 988 741**	**4 067 221**	**4 049 765**	**4 013 645**	**3 958 742**	**3 921 830**	**3 806 332**	**3 524 456**	**3 620 378**	**3 456 665**
Total (excluding net CO_2 from LULUCF)	**4 275 743**	**4 260 813**	**4 274 864**	**4 185 773**	**4 114 727**	**4 116 475**	**4 153 698**	**4 234 598**	**4 171 213**	**4 191 688**	**4 128 687**	**4 144 078**	**4 182 259**	**4 157 991**	**4 212 933**	**4 212 296**	**4 178 920**	**4 144 266**	**4 081 023**	**3 994 637**	**3 715 685**	**3 795 772**	**3 636 007**
Total (without LULUCF)	**4 269 434**	**4 254 504**	**4 268 722**	**4 180 145**	**4 108 992**	**4 108 710**	**4 146 316**	**4 227 322**	**4 164 403**	**4 184 702**	**4 122 541**	**4 137 544**	**4 176 335**	**4 152 190**	**4 206 200**	**4 206 622**	**4 172 776**	**4 138 444**	**4 074 904**	**3 989 311**	**3 710 157**	**3 790 225**	**3 630 657**

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	BY	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	CO2 equivalent (Gg)																						

1. Energy	3 282 202	3 282 202	3 315 360	3 243 702	3 191 000	3 175 319	3 206 153	3 286 100	3 223 205	3 268 243	3 243 233	3 259 170	3 324 404	3 314 175	3 372 420	3 370 568	3 348 234	3 328 965	3 265 306	3 199 675	2 971 834	3 047 527	2 897 729
2. Industrial Processes	368 132	353 202	342 935	333 313	325 091	343 323	350 331	349 906	356 162	335 721	305 433	309 929	299 667	296 879	305 204	312 769	311 069	303 309	307 892	292 496	254 056	260 581	253 234
3. Solvent and Other Product Use	13 212	13 212	12 860	12 611	12 234	11 691	11 749	11 790	11 826	11 841	11 526	11 254	10 840	10 449	9 953	9 700	9 667	9 733	9 336	8 790	8 098	8 205	7 969
4. Agriculture	433 868	433 868	423 554	418 027	410 116	409 654	412 156	416 285	416 241	416 192	415 604	413 446	404 148	397 580	391 851	391 781	385 133	380 099	379 781	379 023	370 387	369 491	369 785
5. Land-Use, Land-Use Change and Forestry	-136 802	-136 802	-168 978	-160 749	-154 611	-161 113	-162 623	-177 091	-179 185	-172 890	-190 649	-177 405	-204 864	-163 449	-138 979	-156 858	-159 131	-179 703	-153 074	-182 978	-185 700	-169 847	-173 992
6. Waste	172 019	172 019	174 012	172 491	170 552	168 723	165 928	163 241	156 968	152 705	146 745	143 744	137 277	133 107	126 771	121 805	118 674	116 338	112 588	109 327	105 781	104 420	101 941
7. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Abbreviation: LULUCF = land use, land-use change and forestry. BY: base year

[a] The column “Base year” should be filled in only by those Parties with economies in transition that use a base year different from 1990 in accordance with the relevant decisions of the Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

[b] Includes net CO_2, CH_4 and N_2O from LULUCF.

8.2.2. CTF Table 1 (EU-15): Emission trends: CO_2

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	BY	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	20
	(Gg)																				
1. Energy	**3 156 875**	**3 156 875**	**3 190 657**	**3 122 375**	**3 071 199**	**3 064 837**	**3 097 155**	**3 178 821**	**3 119 175**	**3 168 185**	**3 146 198**	**3 167 401**	**3 236 554**	**3 228 815**	**3 288 978**	**3 290 969**	**3 272 434**	**3 256 041**	**3 194 465**	**3 129 276**	**2 904 5**
A. Fuel Combustion (Sectoral Approach)	3 136 785	3 136 785	3 170 557	3 101 797	3 050 376	3 043 307	3 074 338	3 155 329	3 096 921	3 146 879	3 126 414	3 147 752	3 216 941	3 209 147	3 269 086	3 271 531	3 252 499	3 235 965	3 174 608	3 110 262	2 885 9
1. Energy Industries	1 156 756	1 156 756	1 159 237	1 121 557	1 075 483	1 085 923	1 095 685	1 111 869	1 077 567	1 113 028	1 092 802	1 124 228	1 151 553	1 182 864	1 215 467	1 212 093	1 204 963	1 208 370	1 210 773	1 148 924	1 051 5
2. Manufacturing Industries and Construction	635 063	635 063	616 767	593 863	571 390	582 595	584 493	570 441	583 977	574 081	568 476	572 663	557 643	543 523	555 211	554 258	554 824	556 436	550 458	528 615	446 2
3. Transport	685 397	685 397	699 970	724 460	731 403	735 750	744 997	761 580	771 044	794 832	814 283	815 549	825 722	835 813	839 272	851 370	845 139	845 198	846 133	822 085	802 0
4. Other Sectors	638 235	638 235	677 273	646 805	658 314	625 698	636 727	700 282	653 551	654 668	641 059	626 360	674 185	638 958	650 633	645 383	639 275	617 499	558 858	603 123	578 6
5. Other	21 334	21 334	17 311	15 111	13 786	13 340	12 436	11 157	10 781	10 270	9 794	8 951	7 837	7 990	8 504	8 427	8 298	8 461	8 387	7 516	7 4
B. Fugitive Emissions from Fuels	20 090	20 090	20 100	20 578	20 823	21 530	22 817	23 492	22 254	21 306	19 783	19 649	19 613	19 668	19 892	19 438	19 935	20 076	19 856	19 014	18 5
1. Solid Fuels	1 301	1 301	992	922	832	762	775	1 049	997	685	590	560	548	569	661	762	808	835	615	994	7
2. Oil and Natural Gas	18 789	18 789	19 108	19 656	19 991	20 769	22 042	22 443	21 258	20 621	19 193	19 090	19 065	19 099	19 231	18 676	19 127	19 241	19 241	18 019	17 8
2. Industrial Processes	**197 064**	**197 064**	**187 926**	**180 817**	**175 728**	**185 481**	**189 311**	**182 730**	**188 367**	**188 985**	**187 890**	**195 692**	**188 379**	**188 187**	**195 107**	**202 490**	**202 117**	**201 946**	**204 779**	**193 472**	**154 4**
A. Mineral Products	112 504	112 504	106 846	105 213	101 483	107 039	110 808	106 736	109 576	112 007	113 134	115 574	113 877	114 536	116 075	119 713	118 971	120 386	122 408	113 049	91 3
B. Chemical Industry	30 407	30 407	29 367	28 293	27 778	29 027	30 805	30 894	30 897	31 841	31 663	33 070	31 368	31 896	31 971	32 170	33 146	31 743	33 384	32 067	29 2
C. Metal Production	53 794	53 794	51 284	46 853	46 075	49 029	47 353	44 722	47 543	44 781	42 727	46 656	42 751	41 372	46 683	50 223	49 576	49 425	48 640	47 970	33 5
D. Other Production	77	77	54	59	55	34	27	53	53	46	56	53	48	37	51	45	38	22	31	36	
E. Production of Halocarbons and SF_6																					
F. Consumption of Halocarbons and SF_6																					
G. Other	282	282	375	400	338	352	318	325	299	310	310	338	334	346	328	339	385	370	316	350	3
3. Solvent and Other Product Use	**8 845**	**8 845**	**8 559**	**8 257**	**7 922**	**7 419**	**7 494**	**7 436**	**7 545**	**7 626**	**7 468**	**7 317**	**7 060**	**6 930**	**6 736**	**6 706**	**6 704**	**6 654**	**6 380**	**5 982**	**5 3**
4. Agriculture	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
A. Enteric Fermentation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	BY	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	20
	(Gg)																				
B. Manure Management	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
C. Rice Cultivation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
D. Agricultural Soils	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
E. Prescribed Burning of Savannas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F. Field Burning of Agricultural Residues	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
G. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5. Land-Use, Land-Use Change and Forestry	**-143 111**	**-143 111**	**-175 120**	**-166 378**	**-160 346**	**-168 878**	**-170 006**	**-184 366**	**-185 996**	**-179 875**	**-196 795**	**-183 939**	**-210 787**	**-169 251**	**-145 712**	**-162 532**	**-165 275**	**-185 524**	**-159 193**	**-188 305**	**-191 2**
A. Forest Land	-252 638	-252 638	-284 359	-278 817	-272 429	-279 313	-279 941	-293 108	-293 583	-288 469	-304 484	-288 040	-313 709	-271 397	-248 182	-263 845	-265 711	-281 947	-259 532	-282 712	-285 0
B. Cropland	78 455	78 455	78 473	81 592	79 047	78 314	80 036	78 331	77 737	77 370	78 568	75 633	75 120	75 684	75 832	73 635	72 984	69 638	69 758	69 691	68 8
C. Grassland	6 025	6 025	4 218	3 828	5 447	3 694	-71	651	1 404	2 041	-1 061	-787	-4 038	-4 763	-4 193	-5 048	-5 756	-6 324	-1 286	-7 435	-7 6
D. Wetlands	2 426	2 426	2 341	2 515	2 439	2 616	2 595	2 573	2 528	2 434	2 755	2 880	3 147	2 595	2 812	2 873	3 051	2 885	2 850	2 030	2 2
E. Settlements	25 885	25 885	26 182	26 496	27 032	27 467	27 993	28 475	28 659	29 250	30 708	29 287	30 235	30 567	30 776	32 195	33 061	33 980	34 432	35 370	34 6
F. Other Land	1 657	1 657	1 340	1 032	712	600	1 857	1 802	1 365	990	940	577	452	-129	-435	-584	-1 244	-1 681	-2 059	-2 899	-2 6
G. Other	-4 921	-4 921	-3 316	-3 023	-2 594	-2 256	-2 475	-3 091	-4 106	-3 491	-4 222	-3 489	-1 995	-1 808	-2 323	-1 757	-1 660	-2 075	-3 356	-2 348	-1 5
6. Waste	**4 316**	**4 316**	**4 348**	**4 378**	**4 204**	**3 958**	**3 550**	**3 496**	**2 969**	**2 828**	**2 679**	**2 551**	**2 567**	**2 755**	**2 774**	**2 702**	**2 841**	**2 835**	**2 755**	**2 771**	**2 6**
A. Solid Waste Disposal on Land	227	227	268	308	299	244	104	83	60	58	54	38	36	27	27	26	25	14	12	10	
B. Waste-water Handling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
C. Waste Incineration	4 071	4 071	4 062	4 051	3 886	3 696	3 426	3 392	2 890	2 752	2 606	2 495	2 513	2 710	2 728	2 658	2 798	2 802	2 723	2 740	2 6
D. Other	18	18	19	20	18	18	20	20	19	18	19	19	19	18	20	18	18	19	19	21	
7. Other	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
Total CO_2 Emissions including net CO_2 from LULUCF	**3 223 990**	**3 223 990**	**3 216 370**	**3 149 449**	**3 098 707**	**3 092 816**	**3 127 504**	**3 188 117**	**3 132 061**	**3 187 750**	**3 147 439**	**3 189 022**	**3 223 773**	**3 257 436**	**3 347 883**	**3 340 335**	**3 318 820**	**3 281 952**	**3 249 186**	**3 143 196**	**2 875 8**
Total CO_2 Emissions excluding net CO_2 from LULUCF	**3 367 101**	**3 367 101**	**3 391 490**	**3 315 827**	**3 259 052**	**3 261 695**	**3 297 510**	**3 372 483**	**3 318 057**	**3 367 625**	**3 344 235**	**3 372 961**	**3 434 560**	**3 426 687**	**3 493 595**	**3 502 867**	**3 484 095**	**3 467 476**	**3 408 379**	**3 331 501**	**3 067 0**
Memo Items:																					
International Bunkers	**168 930**	**168 930**	**167 731**	**174 049**	**181 984**	**181 703**	**187 530**	**199 343**	**213 422**	**226 386**	**227 917**	**240 677**	**243 255**	**244 549**	**251 448**	**268 814**	**283 094**	**299 859**	**304 987**	**303 963**	**276 0**
Aviation	64 253	64 253	63 625	69 036	73 210	76 579	81 076	85 629	89 827	97 299	105 091	111 082	109 448	106 920	110 851	119 411	125 837	131 145	135 337	135 720	125 7
Marine	104 678	104 678	104 107	105 013	108 774	105 124	106 454	113 714	123 595	129 087	122 826	129 594	133 807	137 629	140 597	149 403	157 257	168 714	169 650	168 243	150 3
Multilateral Operations	**1**	**1**	**2**	**2**	**2**	**2**	**2**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**2**	**1**	**3**	**4**	**3**	**4**	
CO_2 Emissions from Biomass	**154 075**	**154 075**	**164 298**	**164 352**	**167 973**	**167 772**	**171 102**	**177 415**	**185 862**	**188 258**	**196 003**	**196 320**	**206 779**	**209 202**	**228 652**	**241 565**	**254 498**	**274 090**	**290 683**	**313 336**	**327 2**

BY: base year

8.2.3. CTF Table 1 (EU-15): Emission trends: CH_4

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	BY	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	(Gg)																						
Total CH_4 Emissions	**20 850**	**20 850**	**20 670**	**20 333**	**20 158**	**19 707**	**19 541**	**19 318**	**18 798**	**18 362**	**17 929**	**17 573**	**17 008**	**16 531**	**16 096**	**15 570**	**15 218**	**14 917**	**14 686**	**14 470**	**14 206**	**14 083**	**13 774**
1. Energy	**4 546**	**4 546**	**4 501**	**4 354**	**4 282**	**3 797**	**3 729**	**3 591**	**3 423**	**3 200**	**3 100**	**2 936**	**2 749**	**2 648**	**2 538**	**2 356**	**2 204**	**2 069**	**1 976**	**1 982**	**1 910**	**1 934**	**1 862**
A. Fuel Combustion (Sectoral Approach)	893	893	891	842	816	753	742	763	723	705	686	643	633	594	611	612	600	593	600	620	604	647	610
1. Energy Industries	47	47	48	48	50	51	58	64	64	67	67	65	66	68	87	93	99	106	116	125	126	139	138

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	BY	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	(Gg)																						
2. Manufacturing Industries and Construction	61	61	59	58	56	59	60	61	64	66	67	70	70	70	76	80	82	81	78	75	62	69	71
3. Transport	223	223	215	215	206	198	189	181	170	163	152	137	128	118	108	100	91	83	76	68	62	57	53
4. Other Sectors	551	551	560	516	499	443	433	455	424	409	398	370	368	337	339	338	327	321	330	351	353	381	347
5. Other	12	12	8	5	4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B. Fugitive Emissions from Fuels	3 653	3 653	3 610	3 512	3 467	3 045	2 987	2 828	2 699	2 495	2 414	2 293	2 117	2 054	1 927	1 744	1 604	1 476	1 375	1 362	1 306	1 287	1 252
1. Solid Fuels	2 195	2 195	2 145	2 001	1 952	1 579	1 639	1 514	1 461	1 271	1 262	1 157	994	953	838	690	564	500	423	401	341	322	316
2. Oil and Natural Gas	1 458	1 458	1 465	1 511	1 515	1 466	1 348	1 313	1 238	1 224	1 152	1 136	1 123	1 101	1 089	1 054	1 040	976	952	961	965	965	936
2. Industrial Processes	**39**	**39**	**38**	**39**	**38**	**41**	**39**	**38**	**37**	**35**	**35**	**34**	**34**	**34**	**36**	**36**	**37**	**36**	**37**	**34**	**29**	**33**	**30**
A. Mineral Products	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1
B. Chemical Industry	30	30	30	31	30	32	30	30	29	27	26	26	26	26	28	27	26	24	25	22	22	24	22
C. Metal Production	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	8	8	9	8	4	5	5
D. Other Production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E. Production of Halocarbons and SF_6																							0
F. Consumption of Halocarbons and SF_6																							0
G. Other	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3. Solvent and Other Product Use	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4. Agriculture	**8 667**	**8 667**	**8 446**	**8 348**	**8 323**	**8 337**	**8 367**	**8 427**	**8 361**	**8 351**	**8 332**	**8 267**	**8 219**	**8 058**	**7 992**	**7 920**	**7 858**	**7 817**	**7 846**	**7 816**	**7 780**	**7 704**	**7 584**
A. Enteric Fermentation	6 743	6 743	6 560	6 462	6 430	6 431	6 447	6 487	6 407	6 382	6 371	6 309	6 247	6 102	6 038	5 967	5 919	5 875	5 895	5 885	5 847	5 803	5 726
B. Manure Management	1 781	1 781	1 747	1 752	1 769	1 773	1 790	1 803	1 813	1 837	1 834	1 836	1 850	1 833	1 822	1 816	1 812	1 812	1 819	1 808	1 795	1 759	1 714
C. Rice Cultivation	105	105	102	100	98	107	104	111	112	106	102	97	97	102	106	114	109	108	109	101	115	118	121
D. Agricultural Soils	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E. Prescribed Burning of Savannas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F. Field Burning of Agricultural Residues	38	38	37	33	26	25	24	26	28	26	24	24	24	20	27	23	18	21	22	21	23	23	23
G. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5. Land-Use, Land-Use Change and Forestry	**108**	**108**	**106**	**87**	**92**	**189**	**177**	**163**	**153**	**158**	**127**	**144**	**121**	**118**	**154**	**115**	**135**	**124**	**132**	**99**	**107**	**109**	**100**
A. Forest Land	68	68	69	52	52	65	56	45	48	55	42	56	43	47	77	44	69	58	44	32	38	45	38
B. Cropland	7	7	8	7	7	7	7	7	6	7	7	6	6	6	9	7	7	7	7	7	7	8	7
C. Grassland	29	29	24	24	28	27	14	17	19	26	14	21	15	11	18	16	13	13	36	16	18	14	13
D. Wetlands		2	2	2	2	2	2	2	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3
E. Settlements		2	2	2	2	2	2	2	2	2	3	2	3	3	3	3	3	3	3	3	3	3	3
F. Other Land	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G. Other	0	0	0	0	0	85	95	90	75	65	58	55	50	48	45	42	40	39	38	38	37	37	36
6. Waste	**7 489**	**7 489**	**7 579**	**7 505**	**7 422**	**7 344**	**7 230**	**7 098**	**6 824**	**6 618**	**6 336**	**6 192**	**5 885**	**5 674**	**5 376**	**5 143**	**4 984**	**4 872**	**4 696**	**4 540**	**4 380**	**4 304**	**4 198**
A. Solid Waste Disposal on Land	6 797	6 797	6 900	6 833	6 756	6 676	6 563	6 445	6 185	5 981	5 711	5 584	5 300	5 087	4 787	4 546	4 386	4 275	4 114	3 977	3 842	3 750	3 634
B. Waste-water Handling	664	664	647	638	631	629	624	607	595	593	578	557	535	535	537	545	546	545	528	510	487	502	513
C. Waste Incineration	9	9	10	9	9	7	7	7	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4
D. Other	19	19	22	25	26	31	35	39	41	41	43	47	47	48	48	48	48	49	51	49	47	48	48
7. Other	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	BY	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	(Gg)																						
Memo Items:																							
International Bunkers	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**7**	**7**	**7**	**7**	**6**	**6**	**6**
Aviation	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Marine	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	5	5	5
Multilateral Operations	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

BY: base year

8.2.4. CTF Table 1 (EU-15): Emission trends: N_2O

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	BY	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	(Gg)																						
Total N_2O Emissions	**1 290**	**1 290**	**1 273**	**1 251**	**1 209**	**1 222**	**1 223**	**1 243**	**1 237**	**1 173**	**1 105**	**1 094**	**1 066**	**1 036**	**1 019**	**1 022**	**992**	**953**	**948**	**922**	**889**	**858**	**851**
1. Energy	**96**	**96**	**97**	**96**	**96**	**99**	**99**	**103**	**104**	**106**	**103**	**97**	**97**	**96**	**97**	**97**	**95**	**95**	**95**	**93**	**88**	**90**	**88**
A. Fuel Combustion (Sectoral Approach)	96	96	97	96	96	99	99	102	103	106	103	97	97	96	97	97	95	95	94	92	87	90	88
1. Energy Industries	29	29	30	29	27	28	24	24	23	24	23	24	24	25	26	26	26	26	27	26	25	26	25
2. Manufacturing Industries and Construction	22	22	22	21	20	20	20	20	20	20	20	20	20	20	20	20	20	20	21	20	17	18	18
3. Transport	21	21	22	23	25	29	32	35	38	40	38	32	30	29	29	28	26	26	26	25	24	24	24
4. Other Sectors	21	21	22	21	21	20	20	21	20	20	20	20	21	20	21	21	21	20	20	20	20	21	20
5. Other	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
B. Fugitive Emissions from Fuels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1. Solid Fuels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2. Oil and Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2. Industrial Processes	**320**	**320**	**321**	**311**	**293**	**306**	**302**	**307**	**297**	**230**	**166**	**163**	**162**	**145**	**141**	**142**	**131**	**105**	**103**	**81**	**78**	**43**	**29**
A. Mineral Products	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B. Chemical Industry	320	320	321	311	293	305	301	307	296	230	166	163	162	144	141	141	130	105	103	80	78	43	28
C. Metal Production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D. Other Production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E. Production of Halocarbons and SF_6																							0
F. Consumption of Halocarbons and SF_6																							0
G. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3. Solvent and Other Product Use	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**13**	**13**	**12**	**11**	**10**	**10**	**10**	**10**	**10**	**9**	**9**	**8**	**8**
4. Agriculture	**812**	**812**	**794**	**783**	**759**	**757**	**763**	**772**	**776**	**777**	**776**	**774**	**747**	**737**	**723**	**727**	**710**	**697**	**694**	**693**	**668**	**670**	**679**
A. Enteric Fermentation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B. Manure Management	76	76	74	73	73	72	73	73	73	72	72	71	71	69	67	66	66	64	65	65	64	64	63
C. Rice Cultivation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D. Agricultural Soils	736	736	719	709	686	684	690	699	703	704	704	703	676	668	655	660	644	632	628	628	603	606	616
E. Prescribed Burning of Savannas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F. Field Burning of Agricultural Residues	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	BY	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	(Gg)																						
G. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5. Land-Use, Land-Use Change and Forestry	**13**	**13**	**13**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**10**	**11**	**10**	**11**	**11**	**10**
A. Forest Land	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B. Cropland	11	11	11	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	9	9	9	9	9
C. Grassland	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
D. Wetlands		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E. Settlements		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F. Other Land	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6. Waste	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**34**	**35**	**35**	**36**	**36**	**36**	**36**	**36**	**36**	**36**	**36**	**36**	**36**	**36**	**36**
A. Solid Waste Disposal on Land	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B. Waste-water Handling	32	32	33	33	32	32	32	32	32	33	33	33	33	33	33	33	33	32	32	33	32	32	32
C. Waste Incineration	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
D. Other	0	0	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	3	3	3	3
7. Other	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Memo Items:																							
International Bunkers	**4**	**4**	**4**	**5**	**5**	**5**	**6**	**6**	**6**	**6**	**6**	**7**	**6**	**6**	**6**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**
Aviation	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4
Marine	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Multilateral Operations	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

BY: base year

8.2.5. CTF Table 1 (EU-15): Emission trends: HFCs, PFCs and SF_6

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	BY	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	CO_2 equivalent (Gg)																						
Emissions of HFCs	**41 368**	**27 882**	**27 537**	**29 428**	**31 859**	**35 976**	**39 992**	**45 077**	**51 649**	**52 756**	**45 831**	**44 952**	**43 710**	**45 730**	**50 025**	**51 154**	**54 418**	**55 866**	**58 818**	**62 768**	**66 040**	**69 311**	**70 746**
Emissions of PFCs	**15 680**	**17 329**	**15 960**	**13 804**	**12 948**	**12 283**	**11 718**	**11 288**	**10 289**	**9 645**	**9 479**	**8 093**	**7 357**	**9 146**	**7 846**	**6 632**	**5 490**	**5 067**	**4 738**	**4 120**	**2 715**	**3 193**	**3 461**
Emissions of SF_6	**13 861**	**10 768**	**11 191**	**12 013**	**12 910**	**13 950**	**15 012**	**14 811**	**13 130**	**12 315**	**9 923**	**9 867**	**9 155**	**8 228**	**7 617**	**7 782**	**7 721**	**7 135**	**6 828**	**6 421**	**6 081**	**6 184**	**6 073**

BY: base year

8.3. CTF Table 2 (EU-28): Description of quantified economy-wide emission reduction target

[a] *Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.*

Note: Tables 2(a), 2(b), 2(c), 2(d), 2(e) and 2(f), as defined in UNFCCC decision 19/CP.18 were merged into a single Table 2 in the electronic reporting facility provided by the UNFCCC Secretariat

Emission reduction target: base year and target		
		Comments
Base year/ base period	1990	
Emission reductions target (% of base year/base period)	20.00%	Legally binding target trajectories for the period 2013-2020 are enshrined in both the EU-ETS Directive (Directive 2003/87/EC and respective amendments) and the Effort Sharing Decision (Decision No 406/2009/EC). These legally binding trajectories not only result in a 20% GHG reduction in 2020 compared to 1990 but also define the EU's annual target pathway to reduce EU GHG emissions from 2013 to 2020. The Effort Sharing Decision sets annual national emission targets for all Member States for the period 2013-2020 for those sectors not covered by the EU emissions trading system (ETS), expressed as percentage changes from 2005 levels. In March 2013, the Commission formally adopted the national annual limits throughout the period for each Member State. By 2020, the national targets will collectively deliver a reduction of around 10% in total EU emissions from the sectors covered compared with 2005 levels. The emission reduction to be achieved from the sectors covered by the EU ETS will be 21% below 2005 emission levels.
Emission reductions target (% of 1990) [b]	20.00%	
Period for reaching target	2020	

Gases and sectors covered. GWP values.				
Gases covered	**Covered**	**Base Year**	**GWP[c] reference source**	**Comments**
CO_2	Yes	1990	4nd AR	as adopted in UNFCCC reporting guidelines for national GHG inventories of Annex I Parties and as adopted under the EU Monitoring Mechanism Regulation
CH_4	Yes	1990	4nd AR	as adopted in UNFCCC reporting guidelines for national GHG inventories of Annex I Parties and as adopted under the EU Monitoring Mechanism Regulation
N_2O	Yes	1990	4nd AR	as adopted in UNFCCC reporting guidelines for national GHG inventories of Annex I Parties and as adopted under the EU Monitoring Mechanism Regulation
HFCs	Yes	1990	4nd AR	as adopted in UNFCCC reporting guidelines for national GHG inventories of Annex I Parties and as adopted under the EU Monitoring Mechanism Regulation
PFCs	Yes	1990	4nd AR	as adopted in UNFCCC reporting guidelines for national GHG inventories of Annex I Parties and as adopted under the EU Monitoring Mechanism Regulation
SF_6	Yes	1990	4nd AR	as adopted in UNFCCC reporting guidelines for national GHG inventories of Annex I Parties and as adopted under the EU Monitoring Mechanism Regulation
NF_3	Yes	1995/2000	4nd AR	as adopted in UNFCCC reporting guidelines for national GHG inventories of Annex I Parties and as adopted under the EU Monitoring Mechanism Regulation. Base year not yet determined.
Other gases (specify) [d]				

Sectors covered [e]	**Covered**	**Comments**
Energy	Yes	
Transport[f]	Yes	
Industrial processes[g]	Yes	
Agriculture	Yes	
LULUCF	No	
Waste	Yes	
Other sectors (specify) [h]		
Aviation	Yes	Aviation in the scope of the EU-ETS: CO_2 emissions from all flights falling within the aviation activities listed in Annex I of the EU ETS Directive which depart from an aerodrome situated in the territory of a Member State and those which arrive in such an aerodrome from a third country, excluding small commercial emitters.

Role of LULUCF sector		
		Comments
LULUCF in base year level and target	Excluded	
Contribution of LULUCF is calculated using		

Possible scale of contributions of market-based mechanisms under the Convention (estimated kt CO_2 eq)

		Comments
CERs		The exact number of units that can be used during the period 2013-2020 can only be determined following the availability of final data concerning the use of these units during the period 2008-2012 and relevant greenhouse gas emissions data. The use of these units under the ETS Directive and the Effort Sharing Decision is subject to the limits specified above which do not separate between CERs and ERUs, but include additional criteria for the use of CERs.
ERUs		The exact number of units that can be used during the period 2013-2020 can only be determined following the availability of final data concerning the use of these units during the period 2008-2012 and relevant greenhouse gas emissions data. The use of these units under the ETS Directive and the Effort Sharing Decision is subject to the limits specified above which do not separate between CERs and ERUs, but include additional criteria for the use of ERUs.
AAUs[i]		AAUs for the period 2013-2020 have not yet been determined. The EU expects to achieve its 20% target for the period 2013-2020 with the implementation of the ETS Directive and the ESD Decision in the non-ETS sectors which do not allow the use of AAUs from non-EU Parties.
Carry-over units[j]		The exact number of carry-over units for the EU and its Member States from the first commitment period that can be used for compliance during the period 2013-2020 can only be determined after the true-up period of the first commitment period. In the second commitment period the use of such units in the PPSR account depend on the extent by which emissions during the second commitment period exceed the assigned amount for that commitment period, which can only be determined at the end of the second commitment period. At CMP.9 the EU made a declaration when adopting the Doha amendment of the Kyoto Protocol that the European Union legislation on Climate-Energy Package for the implementation of its emission reduction objectives for the period 2013-2020 does not allow the use of surplus AAUs carried over from the first commitment period to meet these objectives.
Other mechanism units under the Convention (specify)[k]		There are general provisions in place in the EU legislation that allow for the use of such units provided that the necessary legal arrangements for the creation of such units have been put in place in the EU which is not the case at the point in time of the provision of this report.
Possible scale of contributions of other market-based mechanisms (estimated kt CO_2 eq)		None
Any other information:[l]		In December 2009, the European Council reiterated the conditional offer of the EU to move to a 30% reduction by 2020 compared to 1990 levels as part of a global and comprehensive agreement for the period beyond 2012, provided that other developed countries commit themselves to comparable emission reductions and that developing countries contribute adequately according to their responsibilities and respective capabilities.

Abbreviations: LULUCF = land use, land-use change and forestry.

Abbreviations: GWP = global warming potential

Abbreviations: AAU = assigned amount unit, CER = certified emission reduction, ERU = emission reduction unit.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Optional

[c] Please specify the reference for the GWP: Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) or the Fourth Assessment Report of the IPCC.

[d] Specify other gases

[e] More than one selection will be allowed. If Parties use sectors other than those indicated above, the explanation of how these sectors relate to the sectors defined by the IPCC should be provided.

[f] Transport is reported as a subsector of the energy sector.

[g] Industrial processes refer to the industrial processes and solvent and other product use sectors.

[h] Specify other sectors

[i] AAUs issued to or purchased by a Party.

[j] Units carried over from the first to the second commitment periods of the Kyoto Protocol, as described in decision 13/CMP.1 and consistent with decision XX/CMP.8.

[k] As indicated in paragraph 5(e) of the guidelines contained in annex I of decision 2/CP.17 .

[1] This information could include information on the domestic legal status of the target or the total assigned amount of emission units for the period for reaching a target. Some of this information is presented in the narrative part of the biennial report.

8.4. CTF Table 3 (EU-28): Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
Directive 2009/29/EC and 2003/87/EC EU-Emission trading system	Cross sectoral	CO_2, N_2O,PFC	Cost-efficient reduction of emissions	regulatory	implemented	Putting a marked price to carbon and giving a financial value to each tonne of emissions saved	2005	CION/MS	NE	NE	NE	NE	NE	For 2020 the mitigation impact is estimated at 21% compared to 2005 levels. Source for the complete first and second trading period: Directives 2009/29/EC and 2003/87/EC; see chapter [BR1] 4.2.2
Effort Sharing Decision	Cross sectoral	CO_2,CH_4 N_2O,HFC, PFC, SF_2	GHG emissions reduction in sectors not included in the EU ETS.	regulatory	emission targets were adopted by EC in March 2013	Binding GHG emissions targets for MS for the years 2013-2020 for sectors not included in the EU ETS	Yet missing	MS need to implement national measures and policies to limit emissions from sectors covered here	NE	NE	NE	NE	NE	For 2020 the mitigation impact is estimated at 10 % compared to 2005 levels; see chapter [BR1] 4.2.3 emission targets were adopted by EC in March 2013
CCS Directive	Cross sectoral	CO_2	geological storage of CO_2	regulatory	adopted	Establishes a legal framework for the environmentally safe geological storage of CO_2	2009	MS	NE	NE	NE	NE	NE	see chapter [BR1] 4.2.4

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
Taxation of Energy Products and Electricity	Cross sectoral	CO_2, CH_4, N_2O	set minimum levels of taxation of energy products to reduce GHG emissions	regulatory	implemented, revision in adoption process	The Directive covers all taxes on energy consumption, except for VAT and provides for common taxation rules and common minimum levels of taxation	2003	MS	NE	NE	NE	NE	NE	see chapter [BR1] 4.2.5 revision in adoption process
Research and Innovation in Climate and Energy	Other (Cross sectoral)	Other (Not directly affected)	Research and Systematic Observation through involvement of multiple actors and multiple instruments, tools and programmes. New EU research and development programme (Horizon 2020) for 2014-2020. contains objective of reaching 35% climate related expenditures.	Research	Implemented	Includes research programmes and activities, such as • EU Framework Programmes (FP) for Research and Technological Development • LIFE+ (EU's funding instrument for the environment) • Competitiveness and Innovation Framework Programme • International Development Cooperation • Contribution to and/or financial	NA	CION/EP, MS and others	NE	NE	NE	NE	NE	Targeted towards research and observation, see chapter [BR1] 4.2.6

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
						support for major international institutions, research initiatives and programmes								
Structural and Cohesion Funds	Cross sectoral	Not directly affected	Funds are financial instruments of European Union cohesion policy, to narrow the development disparities among regions and Member States	financial instrument	implemented	Funds are used to co-finance regional development related measures between 2007 and 2013	2007	EC/MS	NE	NE	Not directly affected	NE	NE	Not directly affected; see chapter [BR1] 4.2.7
National Emissions Ceilings Directive	Cross sectoral	Atmospheric pollutants: SO_2, NOx, VOC, NH3, O3.	Meet specified interim environmental and health objectives for acidification, eutrophication and ground-level ozone pollution in 2010	regulatory	implemented, revision underway	Directives sets sets upper limits for each Member State for the total emissions in 2010 of four atmospheric pollutants	2001	EC/MS	NE	NE	NE	NE	NE	revision underway see chapter [BR1] 4.2.8
Renewable Energy Roadmap / Directive 2009/28/EC on the promotion of the use of energy from renewable sources	Energy, transport	CO_2	20 % share of renewable sources in EU total gross final energy consumption in 2020 (electricity, heat and transport	regulatory	implemented	The Directive promotes the increase of renewables in the energy supply sector, such as the transport sector and it supports	2010	MS	NE	NE	750000	NE	NE	Estimated impact range: 600-900 Mt (2020), Source: Citizens' Summary of 23 January 2008 see chapter [BR1] 4.3.2 and

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
						cooperation between Member States.								4.3.3
Biomass Action Plan	Energy	CO_2	Increase use of biomass for electricity and heat production and transport	regulatory	published	Sets out Community actions to increase the demand for biomass, improve supply, overcome technical barriers and develop research.	2005	MS	148000	NE	NE	NE	NE	Impact includes reductions in the transport sector, SEC(2005) 1573 see chapter [BR1] 4.3.4
Directive 2004/8/EC on the promotion of cogeneration based on a useful heat demand in the internal energy market	Energy	CO_2	Promotion and development of high efficiency cogeneration of heat and power	Regulatory	Implemented	It requires Member States to carry out analyses of their potential for high efficiency cogeneration and to evaluate progress towards increasing the share of this technology	2006 (end date: 04.06. 2014)	MS	33000	NE	NE	NE	NE	Estimated impact range: 24000-42000 kt (2010) Source: COM(2004) 366 final see chapter [BR1] 4.3.5
Directive 2006/32/EC on energy end-use efficiency and energy services	Energy, industry	CO_2	Remove barriers to promote energy efficiency and to achieve energy savings in energy consumption	Regulatory	Implemented	Member States are required to set themselves indicative national targets of at least 9 % of energy savings for the year 2016 based on the average final energy	2008 (end date: 04.06. 2014)	MS	NE	NE	NE	NE	NE	impact not estimated see chapter [BR1] 4.3.6

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
						consumption of the last available five years.								
Directive 2010/31/EU on the energy performance of buildings	Energy	CO_2	Improve the energy performance of new buildings and of existing buildings	Regulatory	Implemented	The Directive obliges Member States to set minimum standards for the energy performance of new buildings and existing buildings that are subject to major renovation work.	2012	MS	NE	NE	185000	NE	NE	Estimated impact range: 160000-210000kt (2020), Source: SEC(2008) 2864 see chapter [BR1] 4.3.7
Energy Efficiency Plan 2011 COM(2011) 109 final	Energy, transport	CO_2	Reduction of primary energy consumption by 20% in 2020	Regulatory	Adopted	Member States have to set indicative national targets and develop energy efficiency programmes.	2011	MS	NE	NE	740000	NE	NE	SEC(2011) 277 final see chapter [BR1] 4.3.8
Directive 2012/27/EU on energy efficiency	Energy, industry	CO_2	Reduction of barriers in the energy market and avoiding market failure, increase of energy efficiency at all stages of the energy chain	Regulatory	Adopted	The Directive establishes a common framework of measures for the promotion of energy efficiency and supports the Energy Efficiency Plan 2011.	2014	MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.3.9

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
Directive 2009/72/EC concerning common rules for the internal market in electricity	Energy	CO_2	Develop a competitive, secure and sustainable electricity market.	Regulatory	Implemented	The Directive introduces common rules for the generation, transmission, distribution and supply of electricity. It lays down universal service obligations and consumer rights, and clarifies competition requirements.	2011	MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.3.10
Directive 2009/125/EC establishing a framework for the setting of eco-design requirements for energy-related products	Energy	CO_2	Reduce energy consumption	regulatory	implemented	This is the framework Directive for eco-design requirements and one of the major cornerstones of the Community Strategy on Integrated Product Policy, together with the Energy Labelling Directive.	2009	CION/MS	NE	NE	NE	NE	NE	Impact estimated separately for each product category (see related eco-design regulations below) see chapter [BR1] 4.3.11
Directive 2010/30/EU on the indication by labelling and standard product information of	Energy	CO_2	Help consumers to identify energy-saving products	regulatory	implemented	The Directive is part of the Community Strategy for Integrated Product Policy	2010	CION/MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.3.12

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
the consumption of energy and other resources by energy-related products						and introduces energy labels to sign energy-related products. The ranking scale ranges from A(+++) most efficient to G least efficient.								
Eco-design requirements for glandless standalone circulators and glandless circulators integrated in products (COM REG (EC) 641/2009)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for glandless standalone circulators and circulator integrated products, including the requirement for Energy labelling (see Reg. (EC) 622/2012)	2009	CION/MS/ industry	NE	NE	12000	NE	NE	SEC(2009) 1016 final see chapter [BR1] 4.3.11
Eco-design requirements for fluorescent lamps without integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps (COM REG (EC) 245/2009 amended by COM REG (EU) 347/2010)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for fluorescent lamps, high discharge lamps, ballasts and luminaires able to operate such lamps, including the requirement for Energy labelling. (see Reg. (EU) 874/2012)	2009	CION/MS/industry	NE	15300	NE	NE	NE	SEC(2009) 324 see chapter [BR1] 4.3.11

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
Eco-design requirements for non-directional household lamps, amendment is replacing functionality requirements for lamps excluding compact fluorescent lamps and LED lamps (COM REG (EC) 244/2009 amended by COM REG (EC) 859/2009)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for non-directional household lamps, including the requirement for Energy labelling (see Reg. (EU) 874/2012).	2009	CION/MS/industry	NE	NE	15400	NE	NE	SEC(2009) 327 see chapter [BR1] 4.3.11
Eco-design requirements for household refrigerating appliances (COM REG (EC) 643/2009)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for household refrigerating appliances, including the requirement for Energy labelling (see Reg. (EU) 1060/2010).	2009	CION/MS/industry	NE	NE	2000	6000	NE	SEC(2009) 1020 final see chapter [BR1] 4.3.11
Eco-design requirements for televisions (COM REG (EC) 642/2009)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for televisions, including the requirement for Energy labelling (see Reg. (EU) 1062/2010	2009	CION/MS/industry	NE	NE	165000	NE	NE	SEC(2009) 1011 final see chapter [BR1] 4.3.11
Eco-design requirements for	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum	2009	CION/MS/industry	NE	NE	64000	94000	NE	SEC(2009) 1013 final

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
electric motors (COM REG (EC) 640/2009)						standards for electric motors; Energy labelling has not been introduced.								see chapter [BR1] 4.3.11
Eco-design requirements for no-load condition electric power consumption and average active efficiency of external power supplies (COM REG (EC) 278/2009)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for no-load condition electric power consumption and average active efficiency of external power supplies; Energy labelling has not been introduced.	2009	CION/MS/industry	NE	NE	36000	NE	NE	SEC(2009) 434 see chapter [BR1] 4.3.11
Eco-design requirements for simple set-top boxes (COM REG (EC) 107/2009)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for simple set-top boxes; Energy labelling has not been introduced.	2009	CION/MS/industry	NE	NE	17000	NE	NE	SEC(2009) 114 final see chapter [BR1] 4.3.11
Eco-design requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment (COM REG (EC) 1275/2008)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for standby and off mode electric power consumption of electrical and electronic household and office equipment; Energy labelling	2009	CION/MS/industry	NE	NE	14000	NE	NE	SEC(2008) 3071 see chapter [BR1] 4.3.11

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
						has not been introduced.								
Eco-design requirements for household tumble driers (COM REG (EU) 932/2012)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for household tumble driers, including the requirement for Energy labelling (see Reg. (EU) 392/2012)	2012	CION/MS/industry	NE	400	1500	2900	38000	Impact assessment draft 2012 see chapter [BR1] 4.3.11
Eco-design requirements for water pumps (COM REG (EU) 547/2012)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for water pumps; Energy labelling has not been introduced.	2012	CION/MS/industry	NE	NE	NE	NE	NE	Impact assessment shows ranges between 1200 and 2100 kt in 2020, Source: SWD(2012) 178 final see chapter [BR1] 4.3.11
Eco-design requirements for air conditioners and comfort fans (COM REG (EU) 206/2012)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for air conditioners and comfort fans, including the requirement for Energy labelling (see Reg. (EU) 626/2011)	2012	CION/MS/industry	NE	17000	3800	5500	6000	SWD(2012) 35 final see chapter [BR1] 4.3.11
Eco-design requirements for industrial fans (COM REG (EU) 327/2011)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for industrial fans; Energy labelling has not been	2011	CION/MS/industry	NE	9600	24800	41600	NE	SEC(2011) 384 final see chapter [BR1] 4.3.11

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
						introduced.								
Eco-design requirements for household dishwashers (COM REG (EU) 1016/2010)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for household dishwashers, including the requirement for Energy labelling (see Reg. (EU) 1059/2010)	2010	CION/MS/industry	NE	NE	500	1800	NE	SEC(2010) 1356 final see chapter [BR1] 4.3.11
Eco-design requirements for household washing machines (COM REG (EU) 1015/2010)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for household washing machines, including the requirement for Energy labelling (see Reg. (EU) 1061/2010)	2010	CION/MS/industry	NE	NE	800	NE	NE	SEC(2010) 1354 see chapter [BR1] 4.3.11
Eco-design requirements for directional lamps, light emitting diode lamps and related equipment (COM REG (EU) 1194/2012)	Energy	CO_2	Reduce energy consumption	regulatory	implemented	The Regulation sets minimum standards for directional lamps, light emitting diode lamps and related equipment, including the requirement for Energy labelling (see Reg. (EU) 874/2012)	2013	CION/MS/industry	NE	NE	9500	10300	NE	SWD(2012) 0419 see chapter [BR1] 4.3.11
Voluntary eco-design scheme	Energy	CO_2	Reduce energy consumption	voluntary	implemented	Voluntary agreement on	2010	CION/MS/industry	NE	NE	NE	NE	NE	Cumulative impact 2020:

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
for complex set-top boxes						energy consumption targets for set-top boxes without Energy labelling.								21000kt, SWD(2012) 391 final see chapter [BR1] 4.3.11
Voluntary eco design scheme for imaging equipment	Energy	CO_2	Reduce energy consumption	voluntary	implemented	Voluntary agreement on energy consumption targets for imaging equipment without Energy labelling.	2011	CION/MS/industry	NE	NE	10200	NE	NE	SWD(2013) 15 final see chapter [BR1] 4.3.11
Draft for eco-design requirements for space heaters and combination heaters	Energy	CO_2	Reduce energy consumption	regulatory	planned	The draft Regulation aims to set minimum standards for space heaters and combination heaters.	NA	CION/MS/industry	NE	NE	110000	NE	NE	Impact assessment draft 2013 see chapter [BR1] 4.3.12
Green Public Procurement	Energy	CO_2	Increase the share of efficient and environmentally friendly technologies, products, services in the public sector	Voluntary	Implemented	Provision of guidelines and criteria for GPP in public authorities	2004	MS	35000	NE	NE	NE	NE	Estimated impact range: 25000-45000kt (2010) Source: Second ECCP Progress Report (EU 15 only) see chapter [BR1] 4.3.13
Energy Star Programme	Energy	CO_2	promotion of less energy consuming office appliances	Voluntary	Implemented	The label shall help consumers to identify low energy consumption	2002	MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.3.14

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
						products.								
Motor Challenge Programme	Industry	CO_2	Improve the energy efficiency of their electric Motor Driven Systems	Voluntary	Implemented	Companies receive aid, advice and technical assistance to undertake specific measures to reduce energy consumption.	2003	Companies	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.3.15
Strategic Energy Technology Plan (COM(2007) 723)	Energy	CO_2	Support introduction of low carbon technologies	Planning/Strategy	Implemented	The plan comprises measures relating to planning, implementation, resources and international cooperation in the field of energy technology	2007	CION	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.3.16
Intelligent Energy — Europe II Programme	Energy, transport	CO_2	Improve energy efficiency	Economic	Implemented	It is a funding instrument and provides grants and tenders in the four areas of: energy efficiency and rational use, new and renewable energy sources, energy in transport and integrated initiatives.	2007 (start of funding period)	CION (funding: MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.3.17

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
Covenant of Mayors	Energy	CO_2	Support and coordinate climate action on local level	Voluntary	Implemented	In order to translate their political commitment into specific measures and projects, Covenant signatories undertake to prepare and submit a Sustainable Energy Action Plan (SEAP).	2008	Local governments	NE	NE	420000	NE	NE	Impact compared to base year 1990. Source: Five-year assessment by JRC see chapter [BR1] 4.3.18

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
CO_2 from cars (Regulation 443/2009)	Transport	CO_2	130 grams of CO_2 per kilometre (g/km) by 2015 and 95g/km by 2020.	Regulatory	Implemented	The Regulation is setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles	2009	MS	NE	NE	24900		43600	SWD(2012) 213 final Part II see chapter [BR1] 4.4.3
CO_2 from vans (Regulation 510/2011)	Transport	CO_2	175 grams of CO_2 per kilometre (g/km) by 2017 and 147g/km by 2020.	Regulatory	Implemented	The Regulation is similar to the one for new cars and sets CO_2emission targets for new vans sold on the EU market.	2011	MS	NE	NE	1900	NE	5300	Personal communication, I. Saleniece, DG Climate Action, European Commission, 31/5/2013 see chapter [BR1] 4.4.4
Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport	Transport	CO_2	Indicative target for biofuels and other renewable energy used in road transport: 5.75 % by 2010	Regulatory	Expired	The Directive was repealed on 31.12.2011 by the Renewable Energy Directive (see section 4.3.3), which sets mandatory targets.	2004 (end date: 31.12.2011)	MS	37500	NE	NE	NE	NE	Estimated impact range: 35000-40000kt, Sourced Second ECCP Progress Report (EU 15 only) see chapter [BR1] 4.4.5
Directive 2009/28/EC on the promotion of the use of energy	Transport	CO_2	By 2020, the share of renewable energy shall	Regulatory	Implemented	The Directive sets a number of sustainability criteria that	2010	MS	NE	NE	NE	NE	NE	(impact not estimated for transport sector)

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
from renewable sources (Transport sector)			amount to 10 % of fuels consumed in the transport sector			must be met for biofuels and bioliquids to count towards the target, including a minimum threshold of GHG savings for biofuels								see chapter [BR1] 4.4.5
Directive 2009/30/EC on the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions	Transport	CO_2	Reduce the greenhouse gas intensity of fuels used in road transport by 6% in 2020	Regulatory	Implemented	The reduction shall be obtained through the use of biofuels, alternative fuels or reductions in flaring and venting. The Directive applies to all petrol, diesel and biofuels used in road transport, as well as to gas oil used in non-road-mobile machinery.	2010	MS	NE	NE	55000	NE	NE	Personal communication, I. Saleniece, DG Climate Action, European Commission, 6/6/2013 see chapter [BR1] 4.4.6
Proposal for the amendment of the Fuel Quality Directive and the Renewable Energy Directive	Transport	CO_2	reduce GHG emissions from indirect land-use change	Regulatory	Planned	It is planned that both the Fuel Quality Directive and the transport-related section of the RES Directive will be amended because GHG	NA	MS	NE	NE	48000	NE	NE	SWD(2012) 343 final This figure only includes emission reductions in the transport sector see chapter [BR1] 4.4.7

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
						emissions related to indirect land use changes (ILUC) are not taken into account under the current legislation.								
Euro 5 and 6 Standards Regulation (EC) No 692/2008	Transport	Indirect GHG, CO_2	Limitation of emissions of CO, non-methane hydrocarbons, total hydrocarbons, NOx and PM	Regulatory	Implemented/adopted	The Regulation applies to all passenger vehicles, vans, and commercial vehicles intended for the transport of passengers or goods weighing less than 2,610 kg.	2009 (Euro 5), 2014 (Euro 6)	Industry	NE	NE	2000	NE	NE	SEC(2005) 1745 see chapter [BR1] 4.4.8
Euro VI Standard for heavy duty vehicles (buses and trucks) Regulation (EC) No 595/2009	Transport	Indirect GHG	reduce harmful exhaust emissions, including ozone precursors, NOx, hydrocarbons, PM	Regulatory	Adopted	The Regulation provides harmonized technical rules for trucks, lorries and buses (vehicles over 2,610 kg) for type approval and standards for the durability of pollution control devices.	2013	Industry	NE	NE	NE	NE	NE	SEC(2007) 1718 see chapter [BR1] 4.4.9
General Safety Regulation (EC/661/2009) and Tyre	Transport	CO_2	Enhance safety of motor vehicles, increase fuel	Regulatory	Implemented	The regulation integrates environmental and safety	2000	Industry	NE	NE	2750	NE	NE	Estimated impact range: 1500-5000 kt, Source:

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
Labelling and Minimum Rolling Resistance (EC1222/2009)			efficiency of motor vehicles and tyres, reduce noise emissions of tyres			requirements for type approval of vehicles and tyres. It applies to vehicles of passenger transport (category M), transportation of goods (category N) and trailers (category O).								SEC(2008)2860 see chapter [BR1] 4.4.10
Infrastructure charging for heavy goods vehicles (1999/62//EC, amended by 2006/38/EC and 2011/76/EU)	Transport	CO_2	better functioning of the internal market and reduction of congestion, noise and air pollution	regulatory	Partly implemented	The Directive stipulates rules how and to what extent the cost of constructing, operating and developing infrastructure can be borne (through tolls and vignettes) by road users.	1999	MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.4.11
Clean Power for Transport package including the deployment of alternative fuel infrastructure COM(2013) 18 final	Transport	CO_2	Reduce CO_2 emissions through shift of fuel type	Planning/Strategy	adopted	The Communication lays out a comprehensive European alternative fuels strategy for the long-term substitution of oil as energy source in all modes of transport and a proposal for a Directive on the	2013	MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.4.12

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
						deployment of alternative fuels infrastructure.								
Clean vehicles Directive (2009/33/EC)	Transport	CO_2	Reduce CO_2 emissions through procurement of green vehicles	regulatory	implemented	The Directive requires that energy and environmental impacts linked to the operation of vehicles over their whole lifetime, including CO_2 emissions, are taken into account in public procurement decisions.	2010	MS	NE	1900	NE	NE	NE	Impact estimated for year 2017, Impact assessment report see chapter [BR1] 4.4.13

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
White Paper: Roadmap to a Single European Transport Area COM(2011) 144 final	Trans-port	CO_2	Create a competitive and efficient internal EU transport system, cut transport emissions by 60% by 2050	Strategy	adopted	The 2011 White Paper, which forms an integral part of the "Resource Efficiency" initiative of the Commission, defines a long-term strategy to achieve a competitive and resource efficient transport system.	2011	CION	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.4.14
Integrating maritime transport emissions in the EU's greenhouse gas reduction policies COM(2013) 479 final	Trans-port	CO_2	Include GHG emissions from maritime transport in the EU's emission reduction policy	Strategy	adopted	The strategy proposes an MRV system, reduction targets and further measures, including market-based instruments	2013	CION	NE	NE	NE	NE	4400	SWD(2013) 237 final/2 see chapter [BR1] 4.4.15
F-gas Regulation 2006/842/EC	Industrial Processes	HFCs, PFCs, SF_6	Reduce consumption and use of F-gases	Regulatory	Implemented	The Regulation has been supplemented by ten implementing acts or "Commission Regulations", which stipulate reporting format, form of labels, standard leaking	2006	CION, MS	NE	27000	33000	NE	NE	Consultancy report see chapter [BR1] 4.5.2

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
						checking requirements, training of companies and personnel, etc.								
Proposed revision of the F-gas regulation	Industrial processes	HFCs, PFCs, SF_6	Reduce consumption and use of F-gases	Regulatory	planned	The new proposal anticipates bold steps to limit the use of F-gases in new equipment, which includes a limitation of the total amount of HFCs sold in the EU.	2014	CION, MS	NE	NE	NE	NE	72000	SWD(2012) 363 see chapter [BR1] 4.5.3
European Directive on mobile air-conditioning systems (MACs) (2006/40/EC)	Industrial Processes	HFCs	Reduce use and consumption of F-gases	Regulatory	Implemented	The Directive lays down the requirements for the EC type approval or national type-approval of vehicles as regards emissions from, and the safe functioning of, air-conditioning systems.	2006	CION, MS, industry	NE	3000	13000	NE	NE	COM (2011) 581 final see chapter [BR1] 4.5.4

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
Industrial Emissions Directive (2010/75/EU)	Industrial processes	All gases	Reduction of harmful industrial emissions across the EU	Regulatory	Implemented	The Directive is a recast of existing legislation aiming at achieving benefits to the environment and human health by reducing polluting emissions as well as waste from industrial and agricultural installations in particular through Best Available Techniques (BAT).	2011	CION, MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.5.5
Common Agricultural Policy	Agriculture	CO_2, CH_4, N_2O	Ensure sustainable agriculture	Regulatory, economic information	implemented	The CAP is based on two pillars: the first one focuses on direct income support for farmers and measures aimed at better functioning of markets, the second pillar supporting rural development based on a programming approach.	1962	CION/MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.6.2

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
Rural Development Policy	Agriculture	CO_2, CH_4, N_2O	Preserve, enhance ecosystems dependent on agriculture and forest; Resource efficiency, low carbon and climate resilient agriculture	regulatory, economic	RDPs 2007-2013 under implementation; RDPs 2014-2020 to be adopted.	The EU's rural development policy (RDP) addresses the multiple roles of farming in society and, in particular, challenges faced in its wider rural context.	current legal framework: 2007 -13, new legal framework 2014-20	CION/MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.6.3
Thematic Soil Strategy (COM(2006) 231)/ Soil Framework Directive	Agriculture, LULUCF	CO_2	protect soil as carbon pool	information, education, research, regulatory	Strategy adopted, Directive planned	The proposed Directive aims at establishing a common strategy for the protection and sustainable use of soil based on the principles of integration of soil concerns into other policies.	2006, Directive being negotiated	CION/MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.6.4
Nitrates Directive (91/676/EEC)	Agriculture	N_2O	prevent water pollution	regulatory	implemented	The Directive contains actions and measures to be elaborated by the Member States, such as monitoring of waters, identification of nitrates vulnerable zones (NZV), establishment of Codes of Good Agricultural	1991	CION/MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.6.5

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
						Practices (CGAP) and implementation of actions plans.								
EU Forest Strategy/EU Forest Action Plan (SEC(2006) 748)	LULUCF	CO_2	Sustainable forest management	Planning	adopted	The Forest Action Plan includes several key actions referring to climate change mitigation: promotion of forest biomass for energy generation, EU compliance with UNFCCC and Kyoto obligations, protection of EU forests.	1998/2006	CION/MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.7.1
Forestry measure within the Rural Development Policy	LULUCF, Agriculture	CO_2	Sustainable forest management	economic	implemented	Forestry is an integral part of rural development; support for sustainable and climate-friendly land use should encompass forest area development and sustainable management of forests.	2007, reformed in 2013	CION/MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.7.2
LULUCF accounting	LULUCF, Agriculture	CO_2, (CH_4, N_2O)	Robust accounting of LULUCF activities across	regulatory	Adopted	Provides the basis for a formal inclusion of the LULUCF	2013 (as together with start of second commitment	CION (DG Clima)	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.7.3

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
			Europe			sector and ensures a harmonized legal framework allowing the collection of reliable data by robust accounting and reporting in a standardized way.	period)							
Waste Framework Directive (2008/98/EC)	Waste, Energy, Industry	CH_4, CO_2	Promote prevention and recycling of waste	regulatory	implemented	The Directive is a legal framework for the management of waste to cope with the challenge of decoupling economic growth from waste generation and promoting strict hierarchy of intervention for waste prevention and management. It has been amended in 2006 and 2008.	1975	CION/MS	NE	NE	40100	NE	NE	Consultancy report see chapter [BR1] 4.8.2
Landfill Directive (1999/31/EC)	Waste, Energy	CH_4	prevent or reduce as far as possible negative effects on the environment	regulatory	implemented	The Landfill Directive defines the different categories of waste	1999	CION/MS	48000	NE	44000	NE	NE	2010 impact compared to 1995 levels, 2020 impact compared to 2008 levels (if

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
			resulting from landfilling			(municipal waste, hazardous waste, non-hazardous waste and inert waste) and applies to all landfills, defined as waste disposal sites for the deposit of waste onto or into land.								all MS fully meet the targets: 62000kt in 2020), Source: EEA report see chapter [BR1] 4.8.3
Waste Incineration (2000/76/EC)	Waste, Industry, Energy	CO_2, CH_4	avoid or minimize polluting emission due waste (co)-incineration	regulatory	Implemented	The objective of the Directive is to prevent or to limit negative effects on the environment from the incineration and co-incineration of waste, in particular pollution by emissions into air, soil, surface water and groundwater, and the resulting risks to human health.	2000	CION/MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.8.4
EU policies targeting waste streams	Waste, Industry, energy	CO_2, CH_4, F-gases	Saving of resources	regulatory	implemented	These policy group targets different waste streams to promote recycling, re-use and waste	Different for each directive, first in 1994	CION/MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.8.5

Name of mitigation action [a]	Sectors affected [b]	GHGs affected	Objective and/or activity affected	Type of instrument [c]	Status of implementation [d]	Brief description [e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact [f] (not cumulative, in kt CO_2 eq)					Comment
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]	
						recovery.								
Management of biodegradable waste (COM/2008/0811 final)	Waste, Energy	CO_2, CH_4	Make us of bio-waste as energy or material source	NA	planned	The CION published a Green Paper on the Management of biodegradable waste to use the potential of bio-waste. Currently the MS follow different strategies to manage their bio-waste. A binding target is under discussion.	NA	CION/MS	NE	NE	NE	NE	NE	Reduction potential ranges between 1500 and 6000 kt CO_2eq in 2020, depending on the target. Source: Feasibility assessment see chapter [BR1] 4.8.6
Urban Waste Water Treatment Directive (91/271/EEC)	Waste	N_2O, CH_4	protect the environment from the adverse effects of urban & industrial waste water discharges	regulatory	implemented	The Directive concerns the collection, treatment and discharge of urban waste water and the treatment and discharge of waste water from certain industrial sectors.	1991	EC/MS	NE	NE	NE	NE	NE	(impact not estimated) see chapter [BR1] 4.8.7

Abbreviations: GHG = greenhouse gas; LULUCF = land use, land-use change and forestry.; NE: not estimated

[a] Parties should use an asterisk (*) to indicate that a mitigation action is included in the 'with measures' projection.

On aggregated EU-level, detailed information on the inclusion of EU-wide PaMs in the 'with measures' projection is not available as this may differ between the 28 Member

States. Such detailed information can be sought in the Member states' own Biennial Reports.

[b] To the extent possible, the following sectors should be used: energy, transport, industry/industrial processes, agriculture, forestry/LULUCF, waste management/waste, other sectors, cross-cutting, as appropriate.

[c] To the extent possible, the following types of instrument should be used: economic, fiscal, voluntary agreement, regulatory, information, education, research, other.

[d] To the extent possible, the following descriptive terms should be used to report on the status of implementation: implemented, adopted, planned.

[e] Additional information may be provided on the cost of the mitigation actions and the relevant timescale.

[f] Optional year or years deemed relevant by the Party.

Abbreviations for implementing entities: CION: European Commission; EP: European Parliament; MS: Member States

8.5. CTF Table 4 (EU-28): Reporting on progress

	Unit	Base Year	2010	2011	2012	Comment
Total (without LULUCF)	kt CO_2 eq	5.791.121.99	4.733.815.65	4.578.468.64		
Contribution from LULUCF [c]	kt CO_2 eq		-83.976.59	-83.976.59	-83.976.59	Average projected accounting of activites under Article 3.3 and 3.4. see chapter [BR1] 4.11
Market-based mechanisms under the Convention	number of units		2.258.546.746.00	2.761.334.892.00	2.315.900.565.00	see chapter[BR1] 4.12
	kt CO_2 eq		2.258.546.75	2.761.334.89	2.315.900.57	see chapter[BR1] 4.12
Other market-based mechanisms	number of units					
	kt CO_2 eq					

Abbreviation: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] For the base year, information reported on the emission reduction target shall include the following: (a) total GHG emissions, excluding emissions and removals from the LULUCF sector; (b) emissions and/or removals from the LULUCF sector based on the accounting approach applied taking into consideration any relevant decisions of the Conference of the Parties and the activities and/or land that will be accounted for; (c) total GHG emissions, including emissions and removals from the LULUCF sector. For each reported year, information reported on progress made towards the emission reduction targets shall include, in addition to the information noted in paragraphs 9(a–c) of the UNFCCC biennial reporting guidelines for developed country Parties, information on the use of units from market-based mechanisms.

[c] Information in this column should be consistent with the information reported in table 4(a)I or 4(a)II, as appropriate. The Parties for which all relevant information on the LULUCF contribution is reported in table 1 of this common tabular format can refer to table 1.

8.5.1. CTF Table 4(a)II (EU-28): Progress in achievement of the quantified economy-wide emission reduction targets – further information on mitigation actions relevant to the counting of emissions and removals from the land use, land-use change and forestry sector in relation to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

GREENHOUSE GAS SOURCE AND SINK ACTIVITIES	Base year[d]	Net emissions/removals[e]					Accounting Parameters[h]	Accounting Quantity[i]
		2008	2009	2010	2011	Total[g]		
	(kt CO_2 eq)							
A. Article 3.3 activities								
A.1. Afforestation and Reforestation								-226 548.74
A.1.1. Units of land not harvested since the beginning of the commitment period[j]		-53 133.24	-56 592.49	-58 302.70	-58 230.82	-226 259.26		-226 259.26
A.1.2. Units of land harvested since the beginning of the commitment period[j]								-289.48
A.2. Deforestation		36 890.01	34 260.82	31 416.02	30 677.71	133 244.56		133 244.56
B. Article 3.4 activities								
B.1. Forest Management (if elected)		-337 739.62	-337 540.41	-307 270.05	-314 865.87	-1 297 415.94		-243 755.87
3.3 offset[k]							44 521.75	-45 816.80
FM cap[l]							197 939.08	-197 939.08
B.2. Cropland Management (if elected)	9 600.26	1 981.30	1 330.31	1 480.18	827.46	5 619.26	38 401.02	-32 781.76
B.3. Grazing Land Management (if elected)	2 218.92	-0.67	-130.96	-267.13	-430.03	-828.80	8 875.69	-9 704.49
B.4. Revegetation (if elected)	-1 274.97	-238.94	-253.57	-268.28	-286.95	-1 047.75	-5 099.88	4 052.13

Note: 1 kt CO_2 eq equals 1 Gg CO_2 eq.

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Developed country Parties with a quantified economy-wide emission reduction target as communicated to the secretariat and contained in document FCCC/SB/2011/INF.1/Rev.1 or any update to that document, that are Parties to the Kyoto Protocol, may use table 4(a)II for reporting of accounting quantities if LULUCF is contributing to the attainment of that target.

[c] Parties can include references to the relevant parts of the national inventory report, where accounting methodologies regarding LULUCF are further described in the documentation box or in the biennial reports.

[d] Net emissions and removals in the Party's base year, as established by decision 9/CP.2.

[e] All values are reported in the information table on accounting for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, of the CRF for the relevant inventory year as reported in the current submission and are automatically entered in this table.

[f] Additional columns for relevant years should be added, if applicable.

[g] Cumulative net emissions and removals for all years of the commitment period reported in the current submission.

[h] The values in the cells "3.3 offset" and "Forest management cap" are absolute values.

[i] The accounting quantity is the total quantity of units to be added to or subtracted from a Party's assigned amount for a particular activity in accordance with the provisions of Article 7, paragraph 4, of the Kyoto Protocol.

[j] In accordance with paragraph 4 of the annex to decision 16/CMP.1, debits resulting from harvesting during the first commitment period following afforestation and reforestation since 1990 shall not be greater than the credits accounted for on that unit of land.

[k] In accordance with paragraph 10 of the annex to decision 16/CMP.1, for the first commitment period a Party included in Annex I that incurs a net source of emissions under the provisions of Article 3 paragraph 3, may account for anthropogenic greenhouse gas emissions by sources and removals by sinks in areas under forest management under Article 3, paragraph 4, up to a level that is equal to the net source of emissions under the provisions of Article 3, paragraph 3, but not greater than 9.0 megatonnes of carbon times five, if the total anthropogenic greenhouse gas emissions by sources and removals by sinks in the managed forest since 1990 is equal to, or larger than, the net source of emissions incurred under Article 3, paragraph 3.

[l] In accordance with paragraph 11 of the annex to decision 16/CMP.1, for the first commitment period of the Kyoto Protocol only, additions to and subtractions from the assigned amount of a Party resulting from Forest management under Article 3, paragraph 4, after the application of paragraph 10 of the annex to decision 16/CMP.1 and resulting from forest management project activities undertaken under Article 6, shall not exceed the value inscribed in the appendix of the annex to decision 16/CMP.1, times five.

8.5.2. CTF Table 4(b) (EU-28): Reporting on progress

	Quantity of units	kt CO_2 eq	Comments
2011			
Kyoto Protocol Units [d]			
AAUs	2.603.870.003.00	2.603.870.00	
ERUs	20.506.866.00	20.506.87	
CERs	136.958.023.00	136.958.02	
tCERs	NO	NO	
lCERs	NO	NO	
Units from market-based mechanisms under the Convention [d, e]			
Units from other market-based mechanisms [d, e]			
Total			
2012			
Kyoto Protocol Units [d]			
AAUs	2.098.437.856.00	2.098.437.86	
ERUs	63.453.240.00	63.453.24	
CERs	154.009.469.00	154.009.47	
tCERs	NO	NO	
lCERs	NO	NO	
Units from market-based mechanisms under the Convention [d, e]			
Units from other market-based mechanisms [d, e]			
Total			In addition. 288 245 RMUs (= 288.25 kt CO_2 eq) were retired in 2012.

Abbreviations: AAUs = assigned amount units, CERs = certified emission reductions, ERUs = emission reduction units, lCERs = long-term certified emission reductions, tCERs = temporary certified emission reductions.

Note: 2011 is the latest reporting year.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] For each reported year, information reported on progress made towards the emission reduction target shall include, in addition to the information noted in paragraphs 9(a-c) of the reporting guidelines, on the use of units from market-based mechanisms.

[c] Parties may include this information, as appropriate and if relevant to their target.

[d] Units surrendered by that Party for that year that have not been previously surrendered by that or any other Party.

[e] Additional rows for each market-based mechanism should be added, if applicable

8.6. CTF Table 4 (EU-15): Reporting on progress

	Unit	Base Year	2010	2011	2012	Comment
Total (without LULUCF)	kt CO_2 eq	4.265.517.72	3.790.224.66	3.630.657.22		
Contribution from LULUCF [c]	kt CO_2 eq		-63.882.35	-63.882.35	-63.882.35	Average projected accounting of activites under Article 3.3 and 3.4. see chapter [BR1] 4.11
Market-based mechanisms under the Convention	number of units		1.621.787.612.00	2.172.851.039.00	2.114.032.058.00	see chapter[BR1] 4.12
	kt CO_2 eq		1.621.787.61	2.172.851.05	2.114.032.05	see chapter[BR1] 4.12
Other market-based mechanisms	number of units					
	kt CO_2 eq					

Abbreviation: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] For the base year, information reported on the emission reduction target shall include the following: (a) total GHG emissions, excluding emissions and removals from the LULUCF sector; (b) emissions and/or removals from the LULUCF sector based on the accounting approach applied taking into consideration any relevant decisions of the Conference of the Parties and the activities and/or land that will be accounted for; (c) total GHG emissions, including emissions and removals from the LULUCF sector. For each reported year, information reported on progress made towards the emission reduction targets shall include, in addition to the information noted in paragraphs 9(a–c) of the UNFCCC biennial reporting guidelines for developed country Parties, information on the use of units from market-based mechanisms.

[c] Information in this column should be consistent with the information reported in table 4(a)I or 4(a)II, as appropriate. The Parties for which all relevant information on the LULUCF contribution is reported in table 1 of this common tabular format can refer to table 1.

8.6.1. CTF Table 4(a)II (EU-15): Progress in achievement of the quantified economy-wide emission reduction targets – further information on mitigation actions relevant to the counting of emissions and removals from the land use, land-use change and forestry sector in relation to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

GREENHOUSE GAS SOURCE AND SINK ACTIVITIES	Base year[d]	Net emissions/removals[e]					Accounting Parameters[h]	Accounting Quantity[i]
		2008	2009	2010	2011	Total[g]		
	(kt CO_2 eq)							
A. Article 3.3 activities								
A.1. Afforestation and Reforestation								-185 767.46
A.1.1. Units of land not harvested since the beginning of the commitment period[j]		-43 924.61	-46 786.57	-47 840.99	-47 215.28	-185 767.46		-185 767.46
A.1.2. Units of land harvested since the beginning of the commitment period[j]								0.00
A.2. Deforestation		31 457.68	30 447.20	27 834.81	27 456.75	117 196.44		117 196.44
B. Article 3.4 activities								
B.1. Forest Management (if elected)		-233 029.29	-228 901.50	-205 081.67	-215 247.36	-882 259.83		-170 225.14
3.3 offset[k]							41 494.39	-41 494.39
FM cap[l]							128 730.74	-128 730.74
B.2. Cropland Management (if elected)	9 600.26	1 981.30	1 330.31	1 480.18	827.46	5 619.26	38 401.02	-32 781.76
B.3. Grazing Land Management (if elected)	2 218.92	-0.67	-130.96	-267.13	-430.03	-828.80	8 875.69	-9 704.49
B.4. Revegetation (if elected)	NA	NA	NA	NA	NA	NA	NA	NA

Note: 1 kt CO_2 eq equals 1 Gg CO_2 eq.

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Developed country Parties with a quantified economy-wide emission reduction target as communicated to the secretariat and contained in document FCCC/SB/2011/INF.1/Rev.1 or any update to that document, that are Parties to the Kyoto Protocol, may use table 4(a)II for reporting of accounting quantities if LULUCF is contributing to the attainment of that target.

[c] Parties can include references to the relevant parts of the national inventory report, where accounting methodologies regarding LULUCF are further described in the documentation box or in the biennial reports.

[d] Net emissions and removals in the Party's base year, as established by decision 9/CP.2.

[e] All values are reported in the information table on accounting for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, of the CRF for the relevant inventory year as reported in the current submission and are automatically entered in this table.

[f] Additional columns for relevant years should be added, if applicable.

[g] Cumulative net emissions and removals for all years of the commitment period reported in the current submission.

[h] The values in the cells "3.3 offset" and "Forest management cap" are absolute values.

[i] The accounting quantity is the total quantity of units to be added to or subtracted from a Party's assigned amount for a particular activity in accordance with the provisions of Article 7, paragraph 4, of the Kyoto Protocol.

[j] In accordance with paragraph 4 of the annex to decision 16/CMP.1, debits resulting from harvesting during the first commitment period following afforestation and reforestation since 1990 shall not be greater than the credits accounted for on that unit of land.

[k] In accordance with paragraph 10 of the annex to decision 16/CMP.1, for the first commitment period a Party included in Annex I that incurs a net source of emissions under the provisions of Article 3 paragraph 3, may account for anthropogenic greenhouse gas emissions by sources and removals by sinks in areas under forest management under Article 3, paragraph 4, up to a level that is equal to the net source of emissions under the provisions of Article 3, paragraph 3, but not greater than 9.0 megatonnes of carbon times five, if the total anthropogenic greenhouse gas emissions by sources and removals by sinks in the managed forest since 1990 is equal to, or larger than, the net source of emissions incurred under Article 3, paragraph 3.

[l] In accordance with paragraph 11 of the annex to decision 16/CMP.1, for the first commitment period of the Kyoto Protocol only, additions to and subtractions from the assigned amount of a Party resulting from Forest management under Article 3, paragraph 4, after the application of paragraph 10 of the annex to decision 16/CMP.1 and resulting from forest management project activities undertaken under Article 6, shall not exceed the value inscribed in the appendix of the annex to decision 16/CMP.1, times five.

8.6.2. CTF Table 4(b) (EU-15): Reporting on progress

	Quantity of units	kt CO_2 eq	Comments
2011			
Kyoto Protocol Units [d]			
AAUs	2.060.295.747.00	2.060.295.75	
ERUs	12.003.006.00	12.003.01	
CERs	100.552.286.00	100.552.29	
tCERs	NO	NO	
lCERs	NO	NO	
Units from market-based mechanisms under the Convention [d, e]			
Units from other market-based mechanisms [d, e]			
Total			
2012			
Kyoto Protocol Units [d]			
AAUs	1.908.493.342.00	1.908.493.34	
ERUs	57.617.782.00	57.617.78	
CERs	147.920.934.00	147.920.93	
tCERs	NO	NO	
lCERs	NO	NO	
Units from market-based mechanisms under the Convention [d, e]			
Units from other market-based mechanisms [d, e]			
Total			In addition. 288 245 RMUs (= 288.25 kt CO_2 eq) were retired in 2012.

Abbreviations: AAUs = assigned amount units, CERs = certified emission reductions, ERUs = emission reduction units, lCERs = long-term certified emission reductions, tCERs = temporary certified emission reductions.

Note: 2011 is the latest reporting year.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] For each reported year, information reported on progress made towards the emission reduction target shall include, in addition to the information noted in paragraphs 9(a-c) of the reporting guidelines, on the use of units from market-based mechanisms.

[c] Parties may include this information, as appropriate and if relevant to their target.

[d] Units surrendered by that Party for that year that have not been previously surrendered by that or any other Party.

[e] Additional rows for each market-based mechanism should be added, if applicable

8.7. CTF Table 5 (EU-28): Summary of key variables and assumptions used in the projections analysis

Parameter	2015	2020	2025	2030
CO2-price (Euro (2010)/tCO2_eq)	12	17	21	27
GDP (Bio. Euro (2005))	13	14	16	17
International coal price (Euro (2010)/boe)	19	20	23	23
International gas price (Euro (2010)/boe)	50	54	58	61
International oil price (Euro (2010)/boe)	86	94	95	101
Population (Mio.)	506	514	518	510

Abbreviation: boe: barrel of oil equivalent

8.8. CTF Table 6(a)/(c) (EU-28): Information on updated greenhouse gas projections under a 'with measures' scenario and under a 'with additional measures' scenario

Sector/Gas	1990	1995	2000	2005	2010	2011	2015	2020	2025	2030
historic emissions (Gg CO2eq)										
1. Energy (excluding transport)	3 541 260	3 212 558	3 085 544	3 137 803	2 848 549	2 708 285				
1.A.3. Transport	778 344	833 370	914 698	969 045	935 862	926 442				
2. Industry / industrial processes	461 477	439 424	393 099	406 017	337 860	334 685				
4. Agriculture	604 008	520 030	508 448	481 543	463 189	464 418				
6. Waste / waste management	204 173	198 459	177 575	153 063	138 069	134 553				
7. Other sector (3+7)	16 855	13 904	13 442	12 188	10 415	10 215				
CH4 emissions excluding CH4 from LULUCF	594 692	531 372	477 428	425 851	395 550	387 667				
CO2-emissions excluding net CO2 from LULUCF	4 430 302	4 155 793	4 131 745	4 269 224	3 912 211	3 764 300				
N2O emissions excluding net N2O from LULUCF	520 980	460 796	416 334	388 578	336 115	334 839				
Total F-Gases	60 144	69 786	67 300	76 007	90 068	91 792				
Memo Item: International Bunker: Marine	*110 112*	*111 159*	*134 416*	*166 308*	*151 693*	*163 007*				
Memo Item: International Bunker: Aviation	*70 242*	*87 027*	*116 607*	*132 706*	*133 091*	*136 618*				
'with measures' scenario (WEM) (Gg CO2eq)										
1. Energy (excluding transport)					2 840 827	2 794 356	2 630 111	2 490 519	2 423 795	2 354 773
1.A.3. Transport					933 275	926 348	916 294	917 399	923 865	937 767
2. Industry / industrial processes					346 648	347 209	347 871	360 357	361 116	367 624
4. Agriculture					465 734	464 270	462 331	464 373	462 910	463 951
6. Waste / waste management					140 252	135 673	123 657	113 709	105 896	101 718
7. Other sector (3+7)					12 339	12 238	12 422	12 744	12 813	13 016
CH4 emissions excluding CH4 from LULUCF					397 984	391 950	375 926	363 186	350 057	346 120
CO2-emissions excluding net CO2 from LULUCF					3 906 391	3 853 181	3 687 433	3 561 272	3 478 999	3 458 596
N2O emissions excluding net N2O from LULUCF					342 310	338 837	335 120	339 257	338 896	340 862
Total F-Gases					92 389	96 089	94 254	95 436	92 379	93 319
Memo Item: International Bunker: Marine					*145 124*	*125 243*	*126 748*	*135 796*	*141 606*	*147 892*
Memo Item: International Bunker: Aviation					*127 986*	*129 963*	*129 916*	*139 734*	*151 078*	*163 235*
'with additional measures' scenario (WAM) (Gg CO2eq)										
1. Energy (excluding transport)					2 840 821	2 778 261	2 574 427	2 347 301	2 256 017	2 140 274
1.A.3. Transport					933 275	923 180	898 308	875 065	865 627	867 612
2. Industry / industrial processes					346 648	346 011	344 314	353 324	351 715	348 920
4. Agriculture					465 735	464 034	460 653	460 389	456 783	456 405
6. Waste / waste management					140 252	134 811	118 677	107 441	99 949	96 071
7. Other sector (3+7)					12 339	12 258	12 434	12 710	12 756	12 953
CH4 emissions excluding CH4 from LULUCF					397 982	390 751	370 145	354 605	340 103	334 816
CO2-emissions excluding net CO2 from LULUCF					3 906 391	3 833 698	3 613 283	3 376 322	3 253 904	3 168 076
N2O emissions excluding net N2O from LULUCF					342 307	338 653	333 784	333 533	331 836	333 423
Total F-Gases					92 287	95 438	91 761	91 884	87 007	86 036
Memo Item: International Bunker: Marine					*145 124*	*125 356*	*125 026*	*135 854*	*141 331*	*147 217*
Memo Item: International Bunker: Aviation					*127 986*	*128 901*	*128 427*	*136 485*	*145 940*	*155 516*

Abbreviations: WEM: With existing measures scenario; WAM: With additional measures scenario

Note: Historic GHG emissions are presented up to 2011. Projections are represented starting 2010. Thus, there is an overlap of historic and projected values. Note that if 2010 and 2011 GHG emission trajectories do not match this is due to the fact that projected GHG emissions were aggregated from individual Member State projections, which may not have taken into account the latest inventory values as the base year in the preparation of their projections.

8.9. CTF Table 7 (EU-28): Provision of public financial support: summary information

Allocation channels	European euro - EUR					USD [b]				
		Climate-specific [d]					Climate-specific [d]			
	Core/general [c]	Mitigation	Adaptation	Cross-cutting [e]	Other	Core/general [c]	Mitigation	Adaptation	Cross-cutting [e]	Other
2011										
Total contributions through multilateral channels										
Multilateral climate change funds [g]										
Other multilateral climate change funds [h]										
Multilateral financial institutions, including regional development banks										
Specialized United Nations bodies										
Total contributions through bilateral, regional and other channels		85,850,681.00	88,669,476.00	453,851,867.00			119,402,895.00	123,323,333.00	631,226,518.00	
Total		85,850,681.00	88,669,476.00	453,851,867.00			119,402,895.00	123,323,333.00	631,226,518.00	
2012										
Total contributions through multilateral channels										
Multilateral climate change funds [g]										
Other multilateral climate change funds [h]										
Multilateral financial institutions, including regional development banks										
Specialized United Nations bodies										
Total contributions through bilateral, regional and other channels		184,639,734.00	79,034,455.00	470,068,362.00			237,326,137.00	101,586,703.00	604,200,977.00	
Total		184,639,734.00	79,034,455.00	470,068,362.00			237,326,137.00	101,586,703.00	604,200,977.00	

Abbreviation: USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2011 and 2012, where 2014 is the reporting year.

[b] Parties should provide an explanation on methodology used for currency exchange for the information provided in table 7, 7(a) and 7(b) in the box below.

[c] This refers to support to multilateral institutions that Parties cannot specify as climate-specific.

[d] Parties should explain in their biennial reports how they define funds as being climate-specific.

[e] This refers to funding for activities which are cross-cutting across mitigation and adaptation.

[g] Multilateral climate change funds listed in paragraph 17(a) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

[h] Other multilateral climate change funds as referred in paragraph 17(b) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

8.9.1. CTF Table 7(b) (EU-28): Provision of public financial support: contribution through bilateral, regional and other channels in 2011

Note: For some countries, more than one entry can be found. This means that more than one type of support (mitigation, adaptation or cross cutting) has been provided.

Recipient country/ region/project/programme[b]	*Total amount*		*Status*[c]	*Funding source*	*Financial instrument*	*Type of support*	*Sector*[d]	*Additional Information*[e]
	Climate-specific/							
	EUR	*USD*	*Provided, Committed, Pledged*	*ODA OOF Other*[g]	*Grant; Concessional loan; Non-concessional loan; Equity; Other*[g]	*Mitigation Adaptation Cross-cutting*[h] *Other*[g]	*Energy Transport Industry Agriculture Forestry Water and sanitation Cross-cutting Other*[g]	
Bangladesh	20 000 000	27 816 412	*Committed*	*ODA*	*Grant*	*Cross-cutting*	*Cross-cutting*	
Benin	8 000 000	11 126 565	*Committed*	*ODA*	*Grant*	*Cross-cutting*	*Water and Sanitation*	Flood prevention and control
Bhutan	3 600 000	5 006 954	*Committed*	*ODA*	*Grant*	*Cross-cutting*	*Agriculture*	
Burkina Faso	2 000 000	2 781 641	*Committed*	*ODA*	*Grant*	*Cross-cutting*	*Agriculture*	
Burkina Faso	1 200 000	1 668 985	*Committed*	*ODA*	*Grant*	*Adaptation*	*Other*	
Central African Republic	2 680 000	3 727 399	*Committed*	*ODA*	*Grant*	*Mitigation*	*Forestry*	
China	10 000 000	13 908 206	*Committed*	*ODA*	*Grant*	*Cross-cutting*	*Cross-cutting*	
China	2 000 000	2 781 641	*Committed*	*ODA*	*Grant*	*Adaptation*	*Other*	
Ivory Coast	3 120 000	4 339 360	*Committed*	*ODA*	*Grant*	*Cross-cutting*	*Agriculture*	
Cook Islands	600 000	834 492	*Committed*	*ODA*	*Grant*	*Adaptation*	*Cross-cuting*	
Cuba	7 000 000	9 735 744	*Committed*	*ODA*	*Grant*	*Cross-cutting*	*Agriculture*	
Democratic Republic of the Congo	14 000 000	19 471 488	*Committed*	*ODA*	*Grant*	*Cross-cutting*	*Forestry*	
Djibouti	4 800 000	6 675 939	*Committed*	*ODA*	*Grant*	*Mitigation*	*Energy*	
Egypt	1 250 953	1 739 851	*Committed*	*ODA*	*Grant*	*Mitigation*	*Energy*	
Egypt	8 000 000	11 126 565	*Committed*	*ODA*	*Grant*	*Adaptation*	*Transport*	*Urban Development*
Egypt	10 749 047	14 949 996	*Committed*	*ODA*	*Grant*	*Mitigation*	*Energy*	

Recipient country/ region/project/programme[b]	Total amount		Status[c]	Funding source	Financial instrument	Type of support	Sector[d]	Additional Information[e]
	Climate-specific/							
	EUR	USD	Provided, Committed, Pledged	ODA OOF Other[g]	Grant; Concessional loan; Non-concessional loan; Equity; Other[g]	Mitigation Adaptation Cross-cutting [h] Other[g]	Energy Transport Industry Agriculture Forestry Water and sanitation Cross-cutting Other[g]	
Gabon	4 800 000	6 675 939	Committed	ODA	Grant	Adaptation	Water and Sanitation	
Gambia	3 860 000	5 368 567	Committed	ODA	Grant	Cross-cutting	Cross-cutting	
Grenada	1 000 000	1 390 821	Committed	ODA	Grant	Mitigation	Energy	
Guatemala	800 000	1 112 656	Committed	ODA	Grant	Cross-cutting	Agriculture	
Guyana	736 739	1 024 672	Committed	ODA	Grant	Mitigation	Energy	
Guyana	1 120 000	1 557 719	Committed	ODA	Grant	Adaptation	Agriculture	
Guyana	6 880 000	9 568 846	Committed	ODA	Grant	Adaptation	Agriculture	
Haiti	7 480 000	10 403 338	Committed	ODA	Grant	Mitigation	Cross-cutting	
Indonesia	15 000 000	20 862 309	Committed	ODA	Grant	Cross-cutting	Forestry	
Jamaica	12 381 200	17 220 028	Committed	ODA	Grant	Mitigation	Cross-cutting	
Jamaica	172 742	240 253	Committed	ODA	Grant	Mitigation	Energy	
Jordan	14 000 000	19 471 488	Committed	ODA	Grant	Mitigation	Energy	
Laos	5 000 000	6 954 103	Committed	ODA	Grant	Cross-cutting	Forestry	
Lebanon	3 200 000	4 450 626	Committed	ODA	Grant	Cross-cutting	Cross-cutting	
Malawi	4 634 400	6 445 619	Committed	ODA	Grant	Adaptation	Agriculture	
Mozambique	1 966 800	2 735 466	Committed	ODA	Grant	Adaptation	Agriculture	
Mozambique	5 000 000	6 954 103	Committed	ODA	Grant	Cross-cutting	Cross-cutting	
Nicaragua	2 140 000	2 976 356	Committed	ODA	Grant	Cross-cutting	Cross-cutting	
Niger	6 000 000	8 344 924	Committed	ODA	Grant	Adaptation	Agriculture	
Sierra Leone	6 600 000	9 179 416	Committed	ODA	Grant	Mitigation	Forestry	
Solomon Islands	990 000	1 376 912	Committed	ODA	Grant	Adaptation	Transport	Road Infrastructure
Swaziland	4 800 000	6 675 939	Committed	ODA	Grant	Cross-cutting	Water and Sanitation	
South Sudan	16 800 000	23 365 786	Committed	ODA	Grant	Adaptation	Agriculture	Food Security
Sudan	9 200 000	12 795 549	Committed	ODA	Grant	Adaptation	Agriculture	Food Security
Suriname	78 276	108 868	Committed	ODA	Grant	Adaptation	Agriculture	Water
Tajikistan	6 400 000	8 901 252	Committed	ODA	Grant	Adaptation	Agriculture	
Tanzania	4 000 000	5 563 282	Committed	ODA	Grant	Adaptation	Cross-cuting	

Recipient country/ region/project/programme[b]	Total amount		Status[c]	Funding source	Financial instrument	Type of support	Sector[d]	Additional Information[e]
	Climate-specific/							
	EUR	USD	Provided, Committed, Pledged	ODA OOF Other[g]	Grant; Concessional loan; Non-concessional loan; Equity; Other[g]	Mitigation Adaptation Cross-cutting[h] Other[g]	Energy Transport Industry Agriculture Forestry Water and sanitation Cross-cutting Other[g]	
Uganda	11 000 000	15 299 026	Committed	ODA	Grant	Adaptation	Agriculture	
Uganda	1 380 300	1 919 750	Committed	ODA	Grant	Mitigation	Energy	
Uganda	6 619 700	9 206 815	Committed	ODA	Grant	Mitigation	Energy	
Uzbekistan	4 000 000	5 563 282	Committed	ODA	Grant	Cross-cutting	Cross-cutting	Rural Development
Vietnam	1 200 000	1 668 985	Committed	ODA	Grant	Cross-cutting	Cross-cutting	
Western Samoa	3 000 000	4 172 462	Committed	ODA	Grant	Adaptation	Water and Sanitation	
Regional Africa	71 977 736	100 108 117	Committed	ODA	Grant	Cross-cutting	Cross-cutting	Several projects
Regional Asia	44 080 000	61 307 371	Committed	ODA	Grant	Cross-cutting	Cross-cutting	Several projects
Regional Latin America	16 000 000	22 253 129	Committed	ODA	Grant	Mitigation	Cross-cutting	
Unspecified LDCs	154 374 131	214 706 719	Committed	ODA	Grant	Cross-cutting	Cross-cutting	Several projects
Regional Eastern Europe and Central Asia	70 200 000	97 635 605	Committed	ODA	Grant	Cross-cutting	Cross-cutting	Several projects
Regional Oceania	500 000	695 410	Committed	ODA	Grant	Cross-cutting	Cross-cutting	Several projects

Abbreviations: ODA = official development assistance, OOF = other official flows; USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2011 and 2012, where 2014 is the reporting year.

[b] Parties should report, to the extent possible, on details contained in this table.

[c] Parties should explain, in their biennial reports, the methodologies used to specify the funds as provided, committed and/or pledged. Parties will provide the information for as many status categories as appropriate in the following order of priority: provided, committed, pledged.

[d] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under "Other".

[e] Parties should report, as appropriate, on project details and the implementing agency.

[f] Parties should explain in their biennial reports how they define funds as being climate-specific.

[g] Please specify.

[h] Cross-cutting type of support refers to funding for activities which are cross-cutting across mitigation and adaptation.

8.9.2. CTF Table 7(b) (EU-28): Provision of public financial support: contribution through bilateral, regional and other channels in 2011

Note: For some countries, more than one entry can be found. This means that more than one type of support (mitigation, adaptation or cross cutting) has been provided.

Recipient country/ region/project/programme[b]	Total amount		Status[c]	Funding source	Financial instrument	Type of support	Sector[d]	Additional Information[e]
	Climate-specific/							
	EUR	USD	Provided, Committed Pledged	ODA OOF Other[g]	Grant; Concessional loan; Non-concessional loan; Equity; Other[g]	Mitigation Adaptation Cross-cutting [h] Other[g]	Energy, Transport, Industry Agriculture Forestry Water and sanitation Cross-cutting Other [g]	
Afghanistan	24 000 000	30 848 329	Committed	ODA	Grant	Cross Cutting	Agriculture	
Algeria	13 600 000	17 480 720	Committed	ODA	Grant	Cross Cutting	Cross cutting	
Algeria	6 000 000	7 712 082	Committed	ODA	Grant	Adaptation	Other	
Bangladesh	12 100 000	15 552 699	Committed	ODA	Grant	Adaptation	Agriculture	
Belize	240 000	308 483	Committed	ODA	Grant	Adaptation	Other	
Bolivia	8 800 000	11 311 054	Committed	ODA	Grant	Adaptation	Water and Sanitation	
Burundi	6 400 000	8 226 221	Committed	ODA	Grant	Mitigation	Energy	
Burkina Faso	8 000 000	10 282 776	Committed	ODA	Grant	Cross Cutting	Forestry	
Cambodia	8 000 000	10 282 776	Committed	ODA	Grant	Adaptation	Agriculture	
Central African Republic	4 000 000	5 141 388	Committed	ODA	Grant	Cross Cutting	Forestry	
Chad	2 000 000	2 570 694	Committed	ODA	Grant	Cross Cutting	Other	
Chad	2 000 000	2 570 694	Committed	ODA	Grant	Mitigation	Other	
Congo (Brazzaville)	13 600 000	17 480 720	Committed	ODA	Grant	Mitigation	Transport	
Djibouti	40 500 000	52 056 555	Committed	ODA	Grant	Cross Cutting	Water and Sanitation	
Dominica	6 108 000	7 850 900	Committed	ODA	Grant	Cross Cutting	Other	
East Timor	4 000 000	5 141 388	Committed	ODA	Grant	Adaptation	Cross cutting	
Egypt	12 000 000	15 424 165	Committed	ODA	Grant	Mitigation	Energy	
Egypt	4 000 000	5 141 388	Committed	ODA	Grant	Cross Cutting	Cross cutting	
Gambia	1 900 000	2 442 159	Committed	ODA	Grant	Cross Cutting	Cross cutting	
Ghana	2 896 000	3 722 365	Committed	ODA	Grant	Cross Cutting	Agriculture	
Honduras	18 800 000	24 164 524	Committed	ODA	Grant	Cross Cutting	Forestry	
Jamaica	1 892 000	2 431 877	Committed	ODA	Grant	Adaptation	Other	
Kenya	2 701 600	3 472 494	Committed	ODA	Grant	Mitigation	Agriculture	
Kiribati	1 922 455	2 471 022	Committed	ODA	Grant	Adaptation	Water and Sanitation	
Lebanon	4 800 000	6 169 666	Committed	ODA	Grant	Cross Cutting	Cross cutting	

Recipient country/ region/project/programme[b]	*Total amount*		*Status*[c]	*Funding source*	*Financial instrument*	*Type of support*	*Sector*[d]	*Additional Information*[e]
	Climate-specific/		*Provided, Committed Pledged*	*ODA OOF Other*[g]	*Grant; Concessional loan; Non-concessional loan; Equity; Other*[g]	*Mitigation Adaptation Cross-cutting* [h] *Other*[g]	*Energy, Transport, Industry Agriculture Forestry Water and sanitation Cross-cutting Other* [g]	
	EUR	*USD*						
Lesotho	4 000 000	5 141 388	*Committed*	*ODA*	*Grant*	*Adaptation*	*Cross cutting*	
Liberia	2 000 000	2 570 694	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Other*	
Madagascar	13 600 000	17 480 720	*Committed*	*ODA*	*Grant*	*Adaptation*	*Agriculture*	
Malawi	4 000 000	5 141 388	*Committed*	*ODA*	*Grant*	*Adaptation*	*Agriculture*	
Malaysia	4 000 000	5 141 388	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Forestry*	REDD+ readiness
Morocco	37 000 000	47 557 841	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Forestry*	
Mozambique	2 000 000	2 570 694	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Other*	
Nicaragua	8 000 000	10 282 776	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Forestry*	
Palestine	5 780 000	7 429 306	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Water and Sanitation*	
Papua New Guinea	6 000 000	7 712 082	*Committed*	*ODA*	*Grant*	*Mitigation*	*Other*	
Philippines	2 400 000	3 084 833	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Other*	
Saint Lucia	4 140 000	5 321 337	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Agriculture*	
Saint Vincent and the Grenadines	3 972 000	5 105 398	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Other*	
Somalia	25 000 000	32 133 676	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Agriculture*	
Swaziland	2 800 000	3 598 972	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Water and Sanitation*	
Sudan	2 800 000	3 598 972	*Committed*	*ODA*	*Grant*	*Adaptation*	*Agriculture*	
Tanzania	20 604 000	26 483 290	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Water and Sanitation*	
Tonga	2 595 200	3 335 733	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Energy*	
Tuvalu	950 000	1 221 080	*Committed*	*ODA*	*Grant*	*Mitigation*	*Energy*	Also on Water and Sanitation
Uganda	12 200 000	15 681 234	*Committed*	*ODA*	*Grant*	*Mitigation*	*Water and Sanitation*	
Vanuatu	1 000 000	1 285 347	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Energy*	
Western Samoa	7 240 000	9 305 913	*Committed*	*ODA*	*Grant*	*Adaptation*	*Water and Sanitation*	
Zambia	4 440 000	5 706 941	*Committed*	*ODA*	*Grant*	*Adaptation*	*Agriculture*	
Regional ACP	27 705 562	35 611 262	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Cross cutting*	Transport Sector
Regional Africa	86 108 134	110 678 835	*Committed*	*ODA*	*Grant*	*Mitigation*	*Energy*	Including NIF
Regional Asia	34 400 000	44 215 938	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Cross cutting*	Including FLEGT Asia (Forestry) and SWITCH Asia
Regional Caribbean	26 000 000	33 419 023	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Cross cutting*	
Regional Latin America	47 000 000	60 411 311	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Cross cutting*	Including LAIF
Unspecified LDCs	14 824 984	19 055 249	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Cross cutting*	
Regional Eastern Europe and	42 680 000	54 858 612	*Committed*	*ODA*	*Grant*	*Mitigation*	*Energy*	Including IFCA

Recipient country/ region/project/programme[b]	*Total amount*		*Status*[c]	*Funding source*	*Financial instrument*	*Type of support*	*Sector*[d]	*Additional Information*[e]
	Climate-specific/		*Provided, Committed Pledged*	*ODA OOF Other*[g]	*Grant; Concessional loan; Non-concessional loan; Equity; Other*[g]	*Mitigation Adaptation Cross-cutting* [h] *Other*[g]	*Energy, Transport, Industry Agriculture Forestry Water and sanitation Cross-cutting Other* [g]	
	EUR	*USD*						
Central Asia								
Regional Oceania	7 200 000	9 254 499	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Cross cutting*	
Global	61 042 616	78 460 946	*Committed*	*ODA*	*Grant*	*Cross Cutting*	*Cross cutting*	Including 2012 AAP Part I; Sustainable Energy for All; CEPF and PMR;

Abbreviations: ODA = official development assistance, OOF = other official flows; USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2011 and 2012, where 2014 is the reporting year.

[b] Parties should report, to the extent possible, on details contained in this table.

[c] Parties should explain, in their biennial reports, the methodologies used to specify the funds as provided, committed and/or pledged. Parties will provide the information for as many status categories as appropriate in the following order of priority: provided, committed, pledged.

[d] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under "Other".

[e] Parties should report, as appropriate, on project details and the implementing agency.

[f] Parties should explain in their biennial reports how they define funds as being climate-specific.

[g] Please specify.

[h] Cross-cutting type of support refers to funding for activities which are cross-cutting across mitigation and adaptation.