



## **Manual of European Environmental Policy**

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# Overview of EU policy: Climate change

## Development of EU policy

The European Parliament was the first of the EU institutions to recognize that EU policy was needed for climate change. It adopted a Resolution on the subject in 1986 (OJ C255 13.10.86) and it was not until 1988 that the Commission issued the first of its many Communications on the subject, this one called The Greenhouse Effect and the Community ([COM\(88\)656](#)). The fourth Action Programme covering 1987–1992 had been silent on the subject except as a matter for research.

From 1988 policy discussions intensified and in June 1990 the European Council called for early adoption of targets and strategies for limiting emissions of greenhouse gases. A Decision by the Community was precipitated by the Second World Conference on Climate Change held in November 1990. At a joint meeting of the Energy and Environment Councils that preceded the conference, political agreement was reached to stabilize CO<sub>2</sub> emissions in the EU as a whole by 2000 at 1990 levels, on the assumption that other leading countries undertook commitments along similar lines. This political commitment – it was not then embodied in a legally binding EU text – was to influence the negotiations on the [United Nations Framework Convention on Climate Change](#) (UNFCCC) and put the EU in a leading position particularly in relation to the United States. The EU ratified The Convention in December 1993, and, as a whole, went on to meet this stabilization target in 2000.

## The initial EU programme

It took many months after political agreement was reached in 1990 before the Commission was able to present formal proposals to take it forward. Its ideas were finalized just before the UNCED was held at Rio de Janeiro in June 1992 at which The Convention was signed. These ideas were set out in a communication to the Council ([COM\(92\)246](#)) called A Community Strategy to limit carbon dioxide emissions and to improve energy efficiency. The strategy involved the Council adopting four measures:

- A framework Directive on energy efficiency building on the existing [SAVE Programme](#).
- A Decision concerning promotion of renewable energies ([ALTENER Programme](#)).
- A Directive on a combined carbon and energy tax ([COM\(92\)226](#)).

A Decision concerning the so-called ‘monitoring mechanism’ was the first item of EU legislation to be adopted that specifically dealt with [global warming](#). There had of course already been some EU legislation on energy efficiency (see sections on [Intelligent Energy Europe energy labelling](#) and [energy using products](#), and since CFCs are greenhouse gases the EU legislation restricting [ozone depleting substances](#) also contributed to controlling global warming.

The carbon/energy tax proposal was the most contentious of the four measures and was opposed particularly by the British government on the grounds that taxation is a matter that should be the responsibility of the Member States and, in any case, it was not necessary for

reaching its own national target. Some other Member States also had their own reservations. No progress, therefore, was made on the original proposal, which was eventually withdrawn in early 2002. A proposal for a Directive to harmonize fuel tax rates ([COM\(97\)30](#)) was an attempt to avoid the same problems: it was designed to raise the minimum duty rates for petrol and diesel, as set in the Mineral Oils Directive [92/82/EC](#), and expand the coverage of the latter to other energy products. The [Directive](#) was finally agreed, in a much-weakened form, in mid-2003. The inability to reach agreement on a meaningful tax was one of the major contributors to the emergence of [emissions trading](#) at EU level as the main instrument of the Union's climate change policy.

EU policy on climate change also started to work its way into EU energy policy. One resulting change was a repeal in March 1991 of Directive [75/404/EEC](#) that restricted the use of natural gas in power stations. The repeal was affected by Directive [91/148/EEC](#). In some Member States the result was dramatic – notably the huge shift to gas in the United Kingdom and the resulting fall in emissions that helped put it on a path to meeting its burden-sharing target in the first Kyoto commitment period with relative ease.

## Developing the programme

On 1 March 1995, the Commission issued a working paper ([SEC\(95\)288](#)) setting out future options for the Community's climate change strategy. This was to form part of the EU's contribution to the first Conference of the Parties to the UNFCCC, which took place in Berlin in 1995. The areas covered broadly followed those set out in the Green Paper on EU energy policy ([COM\(94\)659](#)) as follows:

- Completing the internal market. It was argued that the internal market might reduce CO<sub>2</sub> emissions by allowing increased efficiency of the supply system. Rapid implementation of the Trans-European Energy Networks was seen as a means of optimizing the use of electricity generation capacity (including low carbon capacity) throughout the EU. The importance of integrated resource planning for electricity and gas was also emphasized.
- Removing barriers to energy efficiency and renewables. Measures cited included the [SAVE II programme](#) and Community support to urban and regional energy management and to [renewable energy systems](#).
- Transport. A range of measures including changing market structures; improving vehicle efficiency; fostering behavioural change; more efficient land use planning and telecommunications was outlined.
- Fiscal instruments. In spite of earlier setbacks, the Commission maintained the basic approach of its CO<sub>2</sub>/energy tax proposals. It encouraged Member States that wished to press ahead with environmental energy taxes to put forward amendments which would increase the flexibility of the proposals as the Council had requested.
- New technologies and RTD. The Community research framework programme, including JOULE and THERMIE, and the specific programme on nuclear energy under the EURATOM Treaty were outlined. It was also noted that specific instruments such as public procurement and subsidies for dissemination and economic demonstration, could accelerate the penetration of new technologies.

The document concluded by noting that the CO<sub>2</sub> emissions of the EU represented about 16 per cent of global emissions, and that exploiting cost-effective options to limit CO<sub>2</sub> emissions within the EU would be essential to set an example for others. It also concluded that cost-effective options could in principle stabilize CO<sub>2</sub> emissions throughout the period 2000–2010, and that there was technical potential to reduce emissions by up to 10 per cent in the year 2010.

The Commission submitted a further report of progress on CO<sub>2</sub> emissions (SEC(95)451, 30.3.1995) to the First Conference of the Parties. As the Community had ratified The Convention, it was required to do this under Article 12.

## Emissions from transport

After protracted delays, the Commission adopted and published a Communication on CO<sub>2</sub> emissions from passenger cars ([COM\(95\)689](#)) in December 1995. Concrete proposals included development of a CO<sub>2</sub> monitoring mechanism for cars, a fuel economy labelling scheme, voluntary agreements with car manufacturers, and the incorporation of CO<sub>2</sub> emissions as an objective of future transport tax reforms. In June 1998, after protracted negotiations, the European car manufacturers' association ACEA offered to cut average new car CO<sub>2</sub> emissions to 140 g/km by the year 2008, which the Council and Commission accepted. A similar agreement was concluded with Japanese and Korean manufacturers. [The monitoring mechanism and fuel economy labelling scheme were also adopted.](#)

A separate Communication ([COM\(98\)204](#)) on transport and CO<sub>2</sub> was also adopted in March 1998. This estimated that without concerted EU action, CO<sub>2</sub> emissions from transport would increase from 26 per cent of the Community's total to nearer 40 per cent by 2010. Emissions from road and air transport would rise particularly quickly and, it was argued, would pose significant problems in meeting the greenhouse gas reduction targets agreed at Kyoto. The Communication set out policies designed to halve the projected growth in CO<sub>2</sub> emissions. Primarily they covered passenger car fuel economy; fair and efficient pricing in transport; developing the internal market in rail transport; and better integration between the various modes of transport.

In 2002, the Commission published two proposals to encourage the use of [biofuels in the transport sector](#).

## The Kyoto Protocol

Strong resistance to extending commitments on greenhouse gases developed in the run-up to the Kyoto conference in [December 1997](#), partly through conflicting priorities between developing countries and the United States. As with the original UNFCCC, therefore, the EU was able to take a leading role in pushing for greenhouse gas reductions beyond the year 2000.

In March 1997, the Environment Council adopted conclusions calling for a 15 per cent reduction by the year 2010 in emissions of CO<sub>2</sub>, methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). This target was supported by the G77 group of developing countries and, as it was conditional upon other industrialized countries making their own contributions, the

Community was able to apply political pressure upon the United States (the largest emitter) and Japan (the hosts of the Summit) to adopt a more positive position.

Nonetheless, negotiations proved extremely difficult. In the event, an overall settlement amounting to a 5.2 per cent reduction by the period 2008–2012 was agreed, with the EU collectively committing itself to the toughest target of an 8 per cent reduction, as against 7 per cent for the United States and 6 per cent for Japan. Targets for developing countries were not included, although the United States pressed for this. The EU for its part conceded to United States demands that an additional three classes of greenhouse gas (hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride) be included in the commitment.

In June 1998 under the United Kingdom's Presidency of the Council, a 'burden-sharing' political agreement was finally reached by the Council as to how the Community is to achieve its collective Kyoto target to reduce greenhouse gas emissions. Agreed reductions were as follows:

<b>Member State</b>	<b>Reduction commitments (per cent)</b>
Belgium	-7.5
Denmark	-21
Germany	-21
Greece	+25
Spain	+15
France	0
Ireland	+13
Italy	-6.5
Luxembourg	-28
Netherlands	-6
Austria	-13
Portugal	+27
Finland	0
Sweden	+4
United Kingdom	-12.5

Thus, Germany, Denmark and Luxembourg committed themselves to very substantial reductions, allowing headroom for continuing increases in emissions in Sweden and the four Cohesion countries. However, this agreement only became a binding commitment once it was included in the Council Decision to ratify the Kyoto Protocol (see below).

Meeting these targets required additional measures at Community level. To reflect this, the Commission published an outline strategy for meeting the target, and responding more generally to the challenges of the Kyoto Protocol, in June 1998. This Communication ([COM\(98\)353](#)) foreshadowed the development of a more concrete and coordinated strategy at Community level in the first half of 1999, after the Member States had submitted their own national plans at the end of 1998.

The second strategy Communication ([COM\(1999\)230](#)) was disappointing, with little substance on policies and measures. However, progress was made with the publication of the European Climate Change Programme (ECCP) the following year (see below). In March

2000, the Commission also published a communication on taxation of aircraft fuel ([COM\(2000\)110](#)).

In the run-up to, and aftermath of, the unsuccessful Sixth Conference of the Parties to the UNFCCC (COP6) in November 2000, the Council reaffirmed the EU's intention to see the Kyoto Protocol ratified and enter into force by 2002. The Community did in the event adopt a Decision to ratify in April 2002, and the EU and its 15 Member States ratified simultaneously the following month ([2002/358/EC](#)). The Commission highlighted the need for a credible implementation strategy to accompany ratification, in particular emphasizing the need for progress on energy taxation.

The ratification Decision included the burden-sharing agreement, which was formally notified to the UNFCCC Secretariat and became binding on Member States once the Protocol entered into force.

## **The European climate change programme and emissions trading**

In March 2000, the Commission published two documents that aimed to take forward EU climate policy. The first of these was a Communication on policies and measures to reduce greenhouse gas emissions, which launched the ECCP ([COM\(2000\)88](#)), while the second was a Green Paper on an EU emissions trading scheme ([COM\(2000\)87](#)).

The ECCP was a Commission programme involving stakeholders from industry, national officials, NGOs and independent experts, to develop proposals on policies and measures to address climate change. Work was initially undertaken in six working groups (WGs), four of which were focussed on policies and measures in the energy consumption, energy supply, transport and industry sectors, while the other two were looking at flexible mechanisms and research.

The report of the ECCP was published in June 2001 and contained a number of proposals for further policies and measures to address climate change in Europe<sup>1</sup>. Together the policies identified by the six original WGs had an estimated cost-effective reduction potential of between 664 and 765 million tonnes of carbon dioxide equivalent (MtCO<sub>2</sub>eq). This is more than twice the estimated reduction of 336MtCO<sub>2</sub>eq, which, according to the [European Environment Agency](#), was required to meet the EU's 8 per cent reduction target under the Kyoto Protocol. Policies producing a further (less cost-effective) potential reduction of 450MtCO<sub>2</sub>eq were also identified.

Over a third of the cost-effective policies were in the energy supply sector, while 40 per cent of the remainder would result from energy efficiency measures related to buildings, products and industrial processes. Potential emissions reductions in the transport sector contributed a further 16 per cent. The policies and measures identified included some that were already under development, for example a [Directive on the energy performance of buildings](#) and the Directive on [combined heat and power](#), which is part of the Action Plan to Improve Energy Efficiency in the European Community ([COM\(2000\)247](#)); the expansion of existing policies to address climate concerns, for example the extension of [EMAS](#) and reform of the Common Agricultural Policy (CAP); and some new proposals, for example a Directive of energy efficient public procurement.

Whereas the first phase of the ECCP took a sectoral approach, the second phase was a more specific process involving technical meetings with stakeholders on individual measures or packages. Measures that could be developed as part of future Community action include an extension of EMAS, an environmental agreement with manufacturers to reduce CO<sub>2</sub> emissions from light commercial vehicles and a framework to incorporate CO<sub>2</sub> considerations into fiscal measures for passenger cars. The list of possible future initiatives also included policies that enhance carbon sequestration. These activities were being coordinated by the ECCP Steering Committee and were the subject of the second ECCP report, which was published in May 2003.

The report outlined the progress in implementing a range of measures, including the 12 highlighted by the first progress report and others not previously linked to the ECCP, as well as the results of the WGs active in the course of 2002, that is the WG on agriculture and the two others relating to agricultural and forestry sinks. It concluded that progress had been good, as many proposals that were outlined by the first ECCP report had been published, or were under development, for example the proposals on [combined heat and power](#), and restrictions on the use of certain [fluorinated gases](#). The one notable exception was the transport sector, where the report acknowledged that the implementation of measures is 'difficult and shows slow progress'. The report also highlighted 'new challenges', including taking forward the so-called 'coalition of the willing' on renewables, which resulted from the Johannesburg World Summit on Sustainable Development (WSSD), the possible integration of climate change into the [Structural and Cohesion Funds](#) post 2006 and the continuing challenge of reducing emissions from transport.

In parallel to the ECCP, the Commission developed an EU [emissions trading scheme](#). A draft proposal had been prepared and was ready to be published in June 2001. It was delayed at first by political wrangling, but subsequent progress was quick. A Directive resulted in October 2003, followed by an amendment and ancillary decisions. The system commenced operation on 1 January 2005.

2005 saw the formal launch of a new round of the ECCP, with five WGs convening in the first half of 2006. Topics included a review of the policies developed under the first ECCP, prospects for including aviation in emissions trading, CO<sub>2</sub> capture and storage, reducing automobile emissions, and impacts of and adaptation to climate change. The review of the Emissions Trading Scheme called for by Directive 2003/87/EC itself was begun at the end of 2005, with formal proposals for revisions during the 2008–2012 period issued in November 2006, and a further ECCP process in 2007 preparing revisions for the post-2012 period.

## **Limiting climate change to two degrees and the energy policy for Europe**

The Commission published a set of documents on 10 January 2007, including a climate change policy vision entitled 'Limiting Global Climate Change to 2°C: The way ahead for 2020 and beyond', ([COM\(2007\)2](#)). The proposal called for a range of actions to strengthen climate policy, headed by the proposal that the EU commit to a 20 per cent reduction in emissions by 2020, which would rise to 30 per cent if part of an international agreement under which other countries take appropriate action as well.

At the same time, a set of documents on energy policy were released, underlining the link between climate and energy. ‘An Energy Policy for Europe’ ([COM\(2007\)1](#)) outlines a ten-point Action Plan to advance energy policy in Europe. The accompanying Communications and ancillary documents cover these in more detail and include:

- An energy policy for Europe.
- Renewable energy road map.
- Progress in renewable energy.
- Progress in biofuels.
- Internal market for gas and electricity.
- Gas and electricity infrastructures.
- Nuclear energy.
- Sustainable power generation from fossil fuels.

The headline outcome of the European Council in March 2007 was to support the Commission's proposal for a commitment to a 20 or 30 per cent reduction in emissions, depending on the outcome of international negotiations. In addition, the binding renewable energy target of 20 per cent by 2020 and 10 per cent biofuels in the transport sector by that year were also agreed.

## **The climate and renewable energy package**

The aforementioned Communications and European Council decisions led to official Commission proposals published on 23 January 2008, under the collective title ‘The Climate Action and Renewable Energy Package’ (the CARE package). These proposals were submitted to the Parliament and Council for consideration with the aim of coming to agreement by the end of the year – a goal they met when a first reading agreement was reached in December 2008. The headline outcome of the climate and energy package is a commitment to 20 per cent reductions in greenhouse gas emissions below 1990 levels by 2020 in the EU-27, as well as reaching a level of 20 per cent of energy from renewable sources. The 20 per cent overall cut could be increased to 30 per cent in the event of a suitable new multilateral agreement at the global level. The main elements of the package were the following:

### **Revision of Emissions Trading**

The CARE package significantly alters the EU Emission Trading Scheme (EU ETS), particularly in the way it sets the cap and allocates allowances. A single EU-wide cap is defined by the legislation, with a principle of full auctioning for allocation, starting with power plants in 2013. A transitional free allocation of allowances will apply to certain power plants in new Member States, which will face from 30 per cent auctioning in 2013 increasing to 100 per cent in 2020; auctioning in the manufacturing sector will be phased in gradually – in 2013 the sector will be subject to 20 per cent auctioning, increasing to 70 per cent by 2020, ‘with a view to’ reaching full auctioning in 2027; further, a broad exception is inserted for industrial sectors at risk of carbon leakage which may be eligible to receive up to 100 per cent of their allowances for free from 2013. The Commission is to identify these sectors by December 2009, and by June 2010 it shall report on the carbon leakage implications of any new international agreement and put forward proposals accordingly. Governments agreed to

the principle that ‘at least 50 per cent’ of the proceeds from auctioning ‘should’ be used for climate-related adaptation and mitigation purposes.

Regarding future action, the legislation calls on the Commission to put forward a proposal to include emissions from international maritime transport in the EU reduction commitment from 2013, should the International Maritime Organization fail to agree an appropriate method by December 2011. The text also states that the EU should seek to establish an internationally recognized system for reducing deforestation, increasing afforestation and reforestation, supporting the development of appropriate financing mechanisms within the context of a post-2012 international agreement on climate change.

## **Reducing emissions in non-ETS sectors**

This Decision lays down national reduction targets in the non-ETS sectors. The total reduction is 10 per cent below 2005 levels, with effort divided among Member States according to their GDP: a maximum rise of 20 per cent is allowed for Bulgaria, with a maximum cut of 20 per cent slated for Denmark, Ireland and Luxembourg. Corrective action will apply when a Member State exceeds its annual greenhouse gas emissions limit.

Regarding action, the Decision calls on the Commission to put forward a proposal to include emissions and removals related to land use, land use change and forestry in the EU's reduction commitment should an international agreement not be in place by December 2010. The text also calls on the Commission to propose strengthened or new measures to accelerate energy efficiency improvements by December 2012.

## **Renewable energy**

The new [Renewable Energy Directive](#) aims to ensure that renewable energy makes up at least 20 per cent of the EU's total energy consumption by 2020. Targets were determined in a two-step process: all Member States are to increase the share of renewable energy by 5.5 per cent – any additional increases are determined on the basis of GDP, with an adjustment to reward early movers. The smallest increase in the share of renewables is therefore in Romania, with 5.7 per cent, and the largest in the United Kingdom, with 13.7 per cent.

In addition, the agreement foresees that by 2020 renewable energy – biofuels, electricity and hydrogen produced from renewable sources – will account for at least 10 per cent of the EU's total fuel consumption in all forms of transport. These provisions were quite contentious, with many observers increasingly concerned about promoting biofuels. The agreed text states that the greenhouse gas saving from the use of biofuels should be a 35 per cent reduction initially, rising to 50 per cent from 2017. Second generation biofuels will be double credited towards the target, and renewable electricity consumed by electric cars will be counted at 2.5 times its input. By 2010 the Commission is also to develop a methodology to measure the greenhouse gas emissions caused by indirect land use changes, which pose a significant risk of outweighing greenhouse gas benefits. An evaluation of the implementation of the Directive, scheduled to take place by 2014, will not affect the overall 20 per cent target. The review will assess, though, whether the 10 per cent transport target can be reached.

## Carbon dioxide capture and storage

The adopted [Carbon Capture and Storage Directive](#) ensures that CO<sub>2</sub> capture is regulated under Integrated Pollution Prevention and Control (Directive [2008/1/EC](#)), and both CO<sub>2</sub> capture and pipeline transport are regulated under the [EIA Directive \(85/337/EEC\)](#). The Directive sets out a regulatory regime for the permitting of exploration and storage, and establishes criteria for the selection of storage sites. The requirements on site selection are designed to ensure that only sites with a minimal risk of leakage are chosen. The Directive also covers operation, closure and post-closure obligations, including CO<sub>2</sub> acceptance criteria, monitoring and reporting obligations, inspections, measures in case of irregularities and/or leakage, and provision of a financial security.

The EU ETS will provide the main incentive for carbon dioxide capture and storage (CCS) deployment, since stored CO<sub>2</sub> will be considered as not emitted under the ETS. Furthermore, up to 300 million allowances in the new entrants reserve under the EU ETS will be made available to stimulate the construction and operation of up to 12 commercial demonstration projects to capture and store CO<sub>2</sub>, and for innovative renewable energy demonstration technologies in the EU.

## Adapting to Climate Change

On 29 June 2007 the European Commission adopted a Green Paper entitled ‘Adaptation to climate change – options for EU action’ ([COM\(2007\)354](#)). In doing so, the Commission placed more emphasis on an aspect of climate policy that had long been underemphasized given the focus on mitigation. According to the document, climate change will heavily affect Europe's natural environment and nearly all sections of society and the economy. However, there will be quite large differences in the severity of regional impacts within Europe. Therefore, the Green Paper called for multilevel governance, in order to achieve efficient coordination between measures in Member States, regions and communities. In this context, the role of the EU would be to support adaptation efforts by adjusting relevant policies, filling knowledge gaps and coordinating strategies. The Green Paper focused on four lines of priority actions to be considered:

- Early action to develop adaptation strategies in areas where current knowledge is sufficient, through EU sectoral and other policies and the available Community Funds.
- Integrating global adaptation needs into the EU's external relations and building a new alliance with partners all around the world.
- Filling knowledge gaps on adaptation through Community research and exchange of information, and integrating results into policy and practice.
- Setting up a European Advisory Group on Adaptation to Climate Change to analyse coordinated strategies and actions under the ECCP.

On 1 April 2009 the White Paper on adaptation to climate change ([COM\(2009\)147](#)) was published, along with three working papers on water, coasts and marine issues; agriculture, and health. The White Paper sets out a two-phase framework to increase the EU's resilience to climate change. The first phase, running 2009–2012, is devoted to further research and analysis to lay the groundwork for the implementation of a comprehensive adaptation strategy in the second phase, which is to begin in 2013. The EU sees its role as a facilitator

and coordinator of integrated action. The main changes from the Green Paper were as follows:

- The White Paper no longer states that the CAP should ‘actively discourage unsustainable farming practices’ but instead, more vaguely states that consideration should be given to the CAP as an agent to provide ‘an adequate framework for sustainable production’.
- Greater emphasis is placed on increasing the resilience of social policies, particularly to assess the impacts of climate change and adaptation policies on employment and on the well being of vulnerable social groups.
- The White Paper includes a proposal to update the EU [forest strategy](#) (see section on forestry) to cover climate-related impacts and to assess options for an EU approach to forest protection and forest information systems.
- More emphasis is given to water issues and guidelines are to be developed on adaptation in coastal and marine areas, particularly under the framework of the [Integrated Maritime Policy](#) (see section on maritime policy) and in the reform of the [Common Fisheries Policy](#) (see section on fisheries policy).
- In comparison with the 2007 Green Paper on which the White Paper builds, measures regarding biodiversity have been considerably watered down. The Green Paper emphasized the quality of ecosystems, stating that healthy ecosystems lie at the heart of any adaptation policy and underlined the need for conservation and restoration, as well as interconnectivity between sites. The White Paper focuses only on the connectivity between natural areas to allow for movements in response to climate change, for example through the creation of a ‘permeable landscape’.

## Future climate agreements

Under the terms of the Kyoto Protocol, negotiations on post-2012 international climate policy commitments were to begin in 2005. That did happen, but it was not the orderly review envisioned in the Protocol, but rather just one of a set of processes that emerged to contend with the complex circumstances, not least of which was the non-participation of the world's largest emitter (the United States). In February 2005 the Commission issued a Communication entitled ‘Winning the Battle Against Global Climate Change’ ([COM\(2005\)35](#)) highlighting important considerations for any future agreement. The Environment Council drew Conclusions in December of 2004 and March 2005, which were echoed in the Conclusions from the 2005 Spring Summit. These committed Europe to pursuing climate policies designed to avoid global warming in excess of 2°C, and called for broader participation and a market-based approach in any future framework.

Parties to the UN Climate Convention met in May 2005 for a ‘seminar of governmental experts’ (SOGE), a non-negotiating session agreed at COP10 that was to build confidence for future negotiations. While nothing of particular substance was aired, the tone was more positive than expected. In August 2005 the Danish government invited environment ministers from around the world to convene for a discussion in Greenland and get a first-hand look at the melting ice cap. Meanwhile the United Kingdom, as G8 president in 2005, and president of the Council of the European Union in the second half of 2005, set progress on climate change as a major goal, with the primary goal being successful talks at the 11th Conference of Parties (COP11) to the UNFCCC and first Meeting of Parties to the Kyoto Protocol

(COP/MOP1) in November in Montreal. There was some concern in the run-up to the event as the Prime Minister was quoted as saying that a ‘more sensitive set of mechanisms’ than the current targets and timetables approach was needed in the future, which some interpreted as a rejection of the EU's commitment to Kyoto. In the event, the worries were apparently unfounded, as at Montreal the EU held firm to its demand for the creation of a formal process for the agreement of future Annex I targets (the Ad-hoc WG on further commitments for Annex I Parties, under the Protocol – AWG), as well as a process for exploring additional action under The Convention, which includes participation by those states that are not Parties to the Kyoto Protocol, in particular the United States (the ‘Dialogue on cooperative action’). Other progress included formal adoption of the Marrakesh Accords including the Kyoto Protocol compliance system, and commitments to improving the functioning of the Clean Development Mechanism and Joint Implementation.

One year later in Nairobi the Dialogue held a session on two themes, ‘advancing development goals in a sustainable way’ and ‘realizing the full potential of market-based opportunities’. In talks under the AWG there was no progress as such other than the agreement of a workplan, and a renewed commitment to avoid a gap in commitment periods following 2012. The Protocol's Article 9 requirement to ‘review’ the Protocol was dealt with as a simple status report.

The Portuguese Council Presidency released a position paper of the EU's key positions on climate change on 20 September 2007. The statement reaffirmed the EU commitments agreed in March 2007 and called for all developed countries to reduce their greenhouse gas emissions collectively by 60–80 per cent by 2050 compared to 1990 levels. The statement also listed the essential elements of a post-2012 agreement, including deeper absolute emission reduction commitments by developed countries, ‘fair and effective’ contributions by other countries, efforts to address adaptation and enhance carbon sinks by sustainable forest management and land use practices. The paper came in the context of a year with many climate meetings – G8, UN heads of state, ‘major economies’, and the COP13 meeting in Bali, among others. The EU made clear that it intended to remain engaged in negotiations to create a follow-up to the Kyoto Protocol, which would have to be agreed by 2009–2010 at the very latest to be ratified in time to enter into force as of 2012.

At COP13 in Bali, negotiations were successful in delivering the ‘Bali Action Plan’, a negotiation process to lead to a deal for the post-2012 period to be finalized in Copenhagen in 2009. The negotiating process agreed at Bali included two ‘tracks’, one under the UNFCCC (The Convention track) and one under the Kyoto Protocol (the Protocol track). The tracks were based around the work of the Ad-hoc WG on Long-term Cooperative Action (AWG-LCA) and the Ad-hoc WG on Further Commitments for the Annex I Parties to The Convention (AWG-KP).

In Bali, developing countries agreed for the first time to consider taking ‘measurable, reportable and verifiable’ mitigation actions, in exchange for being supported by technology and finance from developed countries. Meanwhile, developed countries would consider taking ‘commitments or actions’, which could include emission targets – with the EU and others managing to convince the United States to sign on. Other main discussion points included establishment of an Adaptation Fund Board to manage the Adaptation Fund, and a first step toward recognizing Reduced Emissions from Deforestation and Degradation in Developing Countries (REDD).

Under an increased pace of negotiation to prepare for the Copenhagen COP in 2009, intersessional UN meetings were held in Bangkok, Bonn and Accra prior to the Poznan COP in December 2008. These made progress on aspects of the Bali action plan, though nothing of particularly tangible consequence.

COP14 in Poznan was marked by few significant achievements, but neither were there roadblocks to Copenhagen. Parties to The Convention discussed mitigation actions in the developing world – to what degree they are linked directly to developed country funding, whether they are reviewed for their adequacy, or merely the subject of voluntary action. Most developing countries also objected to the idea of gradations of mitigation commitment among them, for example including a means of graduating into targets. Adaptation was the subject of an ongoing debate around the methodology for establishing what the needs are, how adaptation should be achieved, how to generate the finance and how to manage it. The discussions of technology focused largely on institutional issues – whether a new or an existing framework should be used. Some countries proposed planning committees and other UN bodies to help direct that funding.

Among Kyoto Parties, discussion of cuts in Annex I countries of 25–40 per cent by 2020 emerged again as in Bali, but a compromise was reached to avoid making a direct link between the general range and specific country commitments. Also important was a broad understanding that the nature of commitments should be target related – in the form of quantified emissions limits and reduction objectives (QELROs). The Adaptation Fund was among the more important of these other issues – agreements have been reached that permit it to begin functioning in 2009.

The main result of the discussions was establishment of work programmes leading to Copenhagen, and the mandate given to the chairmen to compile draft negotiating texts. This process will be completed iteratively through the first half of 2009, responding to submissions by Parties and intersessional meetings.

The United Nations Climate Change Conference in Copenhagen took place from 7 to 19 December 2009. It marked the culmination of the two-year negotiating process under the Bali roadmap. The main purpose of the WG sessions in the run-up to Copenhagen was to develop negotiating texts which could then be finalized and adopted at COP15. However, by the end of 2010 there was still insufficient agreement on many key areas to give much hope for an agreement to be concluded at Copenhagen. This related both to the content and to the form of an agreement. On the Protocol track, there was a stalemate, with developing countries urging Annex I parties to commit to ambitious reduction targets in line with the science and developed countries stressing the need for the involvement of the United States and major developing countries. On The Convention track, the negotiating text had become very long and complex, reflecting the various proposals by UNFCCC parties and an unwieldy number of brackets indicating areas of disagreement<sup>2</sup>. Instead, an alternative text, the ‘Copenhagen Accord’, was negotiated by 25–30 countries during the last two days of COP15 and submitted to the COP for formal adoption. At the closing plenary of COP15 there was disagreement both on the content of the Accord and the way it had been developed. As a consequence, Parties to The Convention could not agree formally to adopt it. They did however agree to adopt a Decision which would ‘take note’ of the Accord, and to establish a procedure which would allow those countries willing to do so to register their support for the Accord and their emission reduction targets by 31 January 2010<sup>3</sup>. It was also agreed to extend the mandates of the AWG-LCA and the AWG-KP for another year to COP16COP/MOP6.

Work on the negotiation texts thus continued in the two Ad-hoc WGs during 2010. Concerns were expressed during and after COP15 about the way in which the Copenhagen Accord was developed and agreed. Some raised questions about the role of the UN in future climate governance and others raised concerns about the future role of the EU at the centre of international climate negotiations.

The substance of the Copenhagen Accord did reflect some of the substance of the two negotiating tracks. Annex I Parties to The Convention were required to submit their quantified economy-wide emission targets for 2020 and as per Appendix 1 of the Accord by 31 January 2010. The text was a little more ambiguous when it came to the nationally appropriate mitigation actions of developing country Parties. The EU formalized its support for the Copenhagen Accord on 28 January. Its stance did not change from its negotiating position for the COP15: an emission reduction target of 20 per cent (of 1990 levels) by 2020, with a conditional pledge of 30 per cent reductions (again, on 1990 levels) by 2020 provided that other developed countries committed themselves to comparable emission reductions and economically more advanced developing countries to contributing adequately according to their responsibilities and respective capabilities.

COP16 and COP/MOP6 were held in Cancún, Mexico in December 2010. The core of the Cancún Agreements was laid down in two parallel decisions, one on the outcome of the AWG-LCA adopted by the COP, and another on the results of the AWG-KP, adopted by the COP/MOP. The COP decision addressed all issues within the mandate of the AWG-LCA, as laid down by decision 1/CP.13 (the Bali Action Plan), aimed at ‘enabling the full, effective and sustained implementation of the Convention through long-term co-operative action now, up to and beyond 2012’. However, it stopped far short of exhausting that mandate and deferred resolution of many contentious issues to 2011 or even later. Nevertheless, it represented a significant step forward from where the UNFCCC process stood after Copenhagen, by providing for immediate action on some issues and giving political guidance for the further development of a more comprehensive and detailed agreement later.

By contrast, the decision on the outcome of the AWG-KP was much shorter, as the negotiations on the second commitment period of the Kyoto Protocol could not be concluded. As a result, the AWG-KP was given a mandate to continue its work based on the latest version of the negotiating text in order to complete it by forwarding proposals for adoption by the COP/MOP ‘as early as possible and in time to ensure that there is no gap between the first and second commitment periods’. The COP/MOP took note of the proposals for emission reductions beyond 2012 made by industrialised countries in the wake of the Copenhagen Accord, while urging those Parties ‘to raise the level of ambition of the emission reductions to be achieved by them individually or jointly’. However, the future fate of the Kyoto Protocol remained uncertain, especially in view of the fact that both Japan and Russia formally announced in Cancún that they had no intention of subscribing to further commitments under the Protocol, but were instead seeking to replace it by a new agreement, under which all major emitters, including non-Annex I Parties such as China and India, would have obligations to limit their emissions of greenhouse gases. Effectively, Japan and Russia had joined the camp of the United States in rejecting the Kyoto approach. This leaves the EU increasingly isolated in its continued support for a rules-based regime based on the existing Kyoto architecture.

Some progress was made through the adoption of revised rules on forest management accounting rules as part of the Protocol’s implementing provisions on land use, land-use

change and forestry (LULUCF), as well as through modest improvements in the Kyoto flexibility mechanisms (JI and CDM). But, even if an amendment to the Protocol should be adopted at the next COP/MOP, a gap between the first and second commitment periods is virtually inevitable as it is unlikely that a sufficient number of Parties would be able to ratify the amendment in time for its entry into force before the expiry of the first commitment period on 31 December 2012.

In its decision, the COP for the first time formally ‘recognizes that deep cuts in global greenhouse gas emissions are required according to science (...) with a view to reducing global greenhouse gas emissions so as to hold the increase in global average temperature below 2°C above preindustrial levels’, while providing for a review in 2015 which may lead to ‘strengthening the long-term global goal on the basis of the best available scientific knowledge, including in relation to a global average temperature rise of 1.5°C’, a major demand of the small island states and African countries. However, the COP could not agree on a quantified ‘global goal for substantially reducing global emissions by 2050’, nor on a concrete timeframe for global peaking of greenhouse gas emissions, as the EU and others had hoped, and further consideration of these matters was deferred to COP17 in Durban.

The COP decision merely ‘takes note’ of the mitigation commitments or actions pledged by developed and developing countries under the Copenhagen Accord. It established a process to develop modalities for measuring, reporting and verification (MRV) of these actions and commitments, and the associated MRV of support to developing countries to implement their ‘voluntary’ actions.

These rather weak general provisions on mitigation and MRV in general were supplemented by somewhat more detailed provisions on reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD+), but, in this area too, many of the detailed modalities, including for financing such measures, still need to be further elaborated. Other sections of the COP decision deal with enhanced action on adaptation (through the establishment of the ‘Cancún Adaptation Framework’ including a permanent Adaptation Committee under the UNFCCC), finance (providing for the establishment of a new ‘Green Climate Fund’, which should be operational within one year), technology (through the creation of a Technology Mechanism comprising a Technology Executive Committee and a Climate Technology Centre and Network), and capacity building. These provisions responded to major demands from the developing countries, but further negotiations and action will be required to make them fully operational.

The stakes of the Durban climate conference in December 2011 were high, as the future of the multilateral climate change regime under the United Nations once again was uncertain, with the impending end of the Kyoto Protocol’s first commitment period looming even larger than the previous year’s conference in Cancun. The preparatory talks in Panama City in October made some incremental progress on technical issues, but had left the fundamental political and legal questions about the future content and form of the UN climate regime.

In addition to the formal COP meeting and its equivalent under the Kyoto Protocol (CMP), the conference included the fourth part of the 16th session of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) and the fourth part of the 14th session of the Ad Hoc Working Group on Long-term Cooperative

Action under the Convention (AWG-LCA), as well as regular sessions of the Subsidiary Bodies to the COP (SBI and SBSTA).

The AWG-KP continued to focus its work on trying to secure agreement on a second commitment period under the Kyoto Protocol, still operating on the basis of its original mandate as defined by CMP-1 in Montreal six years previously. Since the first commitment period ends on 31 December 2012, and any formal amendment to the Kyoto Protocol laying down the terms of the second commitment period would still need to go through a ratification procedure following its adoption by the CMP, a legal gap between the end of the first and entry into force of the second commitment period had in fact already become inevitable even before Durban.

In Durban, the CMP made progress towards finalisation of the Kyoto Protocol negotiations by agreeing on a new set of accounting rules for land-use, land-use change and forestry (LULUCF) activities and other technical aspects of the rules for a second commitment period, but stopped short of actually adopting a formal amendment to the Protocol laying down the quantified emission limitation or reduction commitments that would have to be complied with by Annex I Parties to the Protocol during the second commitment period. A set of “proposed amendments” were annexed to the Durban decision, but the actual commitment figures were left blank, and Parties were invited to convert their pledges initially made in Copenhagen (and reiterated in Cancun) into actual commitments and communicate these figures by 1 May 2012 for consideration at the next meeting of the AWG-KP.

Another contentious issue whose resolution was deferred once more was that of how to deal with the surplus Kyoto credits that will be held by a number of Parties, including many EU Member States, at the expiry of the first commitment period. The AWG-KP was tasked with assessing the implications of the carry-over of this surplus to the second commitment period on the aggregate scale of emission reductions and formulating recommendations for dealing with the issue to the next CMP.

The talks in Durban made it clear that, if the CMP next year finally succeeds in adopting an amendment to the Kyoto Protocol laying down in legally binding form the requirements of the second commitment period, only very few Parties outside the EU will actually be bound by a quantified emission limitation or reduction commitments after 2012. Leaving aside Croatia and Iceland, which were discussing EU membership, only Australia, Belarus, Kazakhstan, Liechtenstein, Monaco, New Zealand, Norway, Switzerland and Ukraine would have such commitments. Canada, Japan and the Russian Federation, which have obligations under the first commitment period, officially put on record that they do not intend to participate in the second.

The Durban conference also decided to launch a new negotiation process in a separate forum known as the ‘Ad Hoc Working Group on the Durban Platform for Enhanced Action’ that could lead, in a few years, to the adoption of a new global agreement under the UNFCCC involving all the Parties to the Framework Convention. This was the EU’s major demand in return for the continuation of the Kyoto Protocol. The mandate of the new AWG is ‘to develop a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties’. This carefully crafted language suggests that the new agreement will be legally binding under international law, though its exact form remains to be agreed. The substance of the future agreement, too, was only vaguely defined at this stage. The COP decision refers to the Parties’ intention to ‘accelerate the reduction of global

greenhouse gas emissions’ and ‘strengthen the multilateral, rules-based regime under the Convention’, and further mentions that the issues to be covered will include mitigation, adaptation, finance, technology development and transfer, transparency of action, and support and capacity-building, but the extent to which the future new agreement will actually include specific commitments to control emissions by both developed and developing countries remains to be decided. There shall at any rate be a ‘workplan on enhancing mitigation ambition’ under which Parties will discuss how to ‘close the ambition gap with a view to ensuring the highest possible mitigation efforts by all Parties’.

Negotiations under this new mandate are due to start ‘as a matter of urgency in the first half of 2012’ but no specific date for the start of the talks was agreed in Durban. The new agreement should be adopted no later than 2015, but would only have to be implemented from 2020. This makes it highly unlikely that a peaking of global emissions can be achieved before this date.

The AWG-LCA continued its work on all the issues under the Bali Action Plan, especially with a view to implementing and operationalizing the agreements reached in Cancun in 2010 on such issues as adaptation, finance, technology, capacity building, review of the global long-term goal, and monitoring, reporting and verification. This resulted in the adoption of a series of decisions by the COP.

The main results achieved in Durban concern the operationalization of the new institutions whose establishment was agreed in Cancun: the Adaptation Committee, the Standing Committee on finance, the Climate Technology Centre and Network and Technology Executive Committee and, last but not least, the Green Climate Fund.

This Fund is intended to function as the main vehicle to mobilise the US\$100 billion a year of new climate funding from public and private sources by 2020 to address the needs of developing countries, as pledged by industrialised countries in the Copenhagen Accord. The instrument establishing the Fund, elaborated by a group of international financial experts in accordance with the political guidance given in Cancun, was formally endorsed by the COP in Durban. While the institutional questions have thus been resolved, no progress was made on the equally controversial question of how to raise the volume of finance that was promised, and to share the burden between the public and private sector and between individual donor countries.

The next COP/MOP (and other associated meetings), will be hosted by Qatar in Doha from 26 November to 7 December 2012.

## Future directions

On the 27 May 2010 the Commission published an important Communication analysing the options for moving beyond the existing 20 per cent greenhouse gas reduction commitment and the risk of carbon leakage. The Communication made it very clear that the choice to move to 30 per cent or not, will be a political one. The Communication ([COM\(2010\)265/3](#)) and its two accompanying Commission staff working documents ([SEC\(2010\)650/2](#)) presented an analysis of the implications of both the 20 per cent and the 30 per cent targets as seen from a 2010 perspective. In accordance with the requirements of the [Emission Trading Directive](#), it also reported on the risks of carbon leakage. Finally the Communication pronounced on whether ‘the conditions’ for a move to a 30 per cent target had been met.

According to the Commission, by early 2010, the cost of meeting the 2007 20 per cent target – now inscribed in the legislation contained in the Climate Action and Renewable Energy (CARE) package – had dropped from €70 billion to €48 billion per annum (by 2020). This was attributed to the interplay of three factors: lower economic growth reducing the stringency of the 20 per cent target; a drop in energy demand due to a rise in oil prices; and a lower carbon price due to allowances not used during the economic recession being carried over into future trading periods.

The original cost of €70 billion per annum by 2020 estimated for the CARE package in 2008 would have taken the EU more than half way from 20 per cent to 30 per cent. The difference in 2010 between the two options is €33 billion per annum in 2020. In relation to the original anticipated cost of the CARE package, the additional cost would however be €11 billion. The Communication pointed out that the value of improvements in air quality could potentially match this, as well as bringing benefits in terms of energy security.

The Commission also reflected on where the additional savings could come from. Inside the EU-Emission Trading Scheme (ETS), contributions could come from the electricity and industrial sectors (e.g. refineries); in the effort sharing sectors, households and services, mainly from heating; in the agricultural sector, there may be potential for reducing methane and nitrous oxide emissions from intensive farming. Geographically, the potential for moving from 20 per cent to 30 per cent was seen to be proportionally higher in the poorer Member States. The cost-effective split between efforts in the ETS and the non-ETS sectors remained largely the same as for the 20 per cent target moving from 21 per cent to 34 per cent over 2005 emissions for the EU-ETS sectors, and from 10 per cent to 16 per cent in the effort sharing sectors. In terms of policy measures, the Communication suggested that moving from 20 per cent to 30 per cent would entail a combination of the tightening existing policies, and the introduction of new ones. Five broad headings of options are outlined: options inside the EU ETS; technological options; carbon taxes; using EU policies to drive reductions; and using the leverage of international credits.

An earlier draft of the Communication had emphasised the technical feasibility and the economic affordability of a move to 30 per cent, as well as the role of strong targets as a force for modernising the European economy, capitalising on an early lead in green technologies, and protecting against the loss of competitive advantage as the global economy transforms to low carbon. The published Communication emphasised that ‘the conditions’ for moving to 30 per cent are not met, and that both business and governments are constrained in their access to funds and therefore in their capacity to invest in the necessary economic transformation. Moreover, the Commission distanced itself from the political choice that has to be made,

declaring on the very first page that ‘the purpose of this Communication is not to decide now to move to a 30 per cent target’. It is rather ‘to facilitate a more informed debate about the implications of different levels of ambition’.

Initial reactions to the draft version were mixed, with France and Germany publicly speaking out against a possible 30 per cent target in May 2010. However, by July 2010 France, Germany and the UK were publicly calling for a move to a 30 per cent target, simultaneously publishing articles in national newspapers penned by their respective national climate ministers: Chris Huhne (UK), Norbert Röttgen (Germany) and Jean-Louis Borloo (France).

In October 2010 the Council invited the Commission further to elaborate options for moving to a 30 per cent reduction and to conduct analyses on the consequences at Member State level. This was the purpose of a Staff Working Document released 1 February 2012 ([COM\(2012\)5](#)), which built on the May 2010 Communication, using the same three scenarios:

- Baseline scenario: trends and policy measures implemented as of spring 2009. Projections based on this scenario suggest that EU GHG emissions would stay at 14 per cent below 1990 levels in 2020;
- Reference scenario: full implementation of the Climate and Energy Package. This includes the achievement of the 20 per cent renewable energy target and 20 per cent GHG emissions reductions compared to 2020; and
- 30 per cent reduction commitment scenario: 25 per cent GHG reduction through domestic measures, with the remaining 5 per cent to be met through the use of international emission reduction credits.

The option of 30 per cent domestic savings and 0 per cent through the use of international emission reduction credits does not appear to have been examined.

The May 2010 Communication had shown that reaching the 20 per cent GHG emissions reduction target and the 20 per cent renewables target for 2020 had lower costs in absolute terms than originally forecasted. These had fallen from an estimated €70 billion per annum by 2020 to an estimated €48 billion per annum by 2020. In its February 2012 Staff Working Document, the Commission emphasised that the new Member State analysis showed that the cost effective implementation of the package would cost considerably less than originally envisaged for all Member States, and that these cost reductions would be greater in lower income Member States.

Unlocking the emission reductions will require upfront investments. The additional EU wide cost-effective potential for making additional savings tends to be located in lower income Member States. These have, by definition, less available resources to invest, a fact exacerbated by the current financial and economic climate. In the Staff Working Document, the Commission outlined two mechanisms that have the potential to balance out these differences between Member States.

Firstly, the point was made that moving to a 30 per cent target through reducing the number of allowances auctioned in the Emission Trading Scheme (ETS) (through set-aside) would contribute to higher auctioning revenues. According to the Commission, the carbon price would increase more than the reduction in the amount of auctioned allowances. The Commission was also careful to highlight, that the existing distribution key for auctioned

allowanced in the ETS Directive would strengthen the redistributive effect in favour of lower income Member States.

The Commission also considered the question of who would be giving up their allowances in the context of a more stringent target. It was suggested that this could be skewed towards the higher income Member States. According to the analysis, the transfers related to the redistribution of auctioning rights to lower income Member States would amount to €5.4 billion in 2020. This would apparently not reduce the net-value of revenues of higher income Member States. While the overall price of allowances would, *ceteris paribus*, rise, providing a generalised increased incentive for making emission reductions, there would be an additional incentive on higher income Member States due to the reduction in the actual number of allowances.

Secondly, the Commission considered the transfer mechanism in the Effort Sharing Decision. Moving to a 30 per cent target would also require greater emission reduction efforts in the non-ETS sectors. This would increase the demand for transfers of national emissions allocations between Member States considerably and increase the value of such transfers. This could provide a revenue stream for those Member State governments with targets that, comparatively, require less effort. This effect would be enhanced if such governments introduce 'smart policies' (such as reduction of fuel subsidies, efficiency improvements and carbon pricing). Such policies are doubly desirable in that not only could they facilitate a revenue stream through the transfer of national emissions allocations (due to emission reductions), they could also in themselves generate revenues. Both streams of revenue could be recycled to spur employment, innovation, growth and job creation. Moving to 30 per cent was in other words not just a win-win, but a win-win-win-win.

The Commission concluded that 'there seem to be potential mechanisms which, individual or in combination, could ensure an equitable distribution of costs and benefits between EU Member States if the political decisions were taken to set a new GHG emission target for 2020 going beyond the current reduction'. This cautious conclusion was not very far from the conclusions drawn in a report by IEEP and the Öko Institut published June 2011, exploring a wider range of options.<sup>4</sup> This concluded that there was a range of potentially interesting options, that none of these were simple, and all of them required further exploration of their desirability and feasibility.

In March 2011, a revised strategic vision for EU carbon emissions was set out in the Commission's 'Roadmap for moving to a competitive low carbon economy in 2050' (published on 8 March 2011) ([COM\(2011\)112](#)). The roadmap is positioned as a deliverable under the Europe 2020 Resource Efficiency Flagship, published in January 2011 ([COM\(2011\)21](#)). The Communication sets out milestones to achieve 80 per cent reduction in domestic EU greenhouse gas emissions by 2050, providing, in the process, a strong case for a 25 per cent reduction by 2020, and allocating a central role to the Energy Efficiency Plan 2011 published on 11 March 2011 ([COM\(2011\)109](#)) in achieving this. The Energy Efficiency Plan, resulted in a legislative proposal for a new Directive on energy efficiency which would be repealing Directives 2004/8/EC and 2006/32/EC ([COM\(2011\)370](#)) (See [Sectoral Policies: Energy](#) for more detail).

The Roadmap contains four central sections: on the milestones to 2050, on the sectoral implications, on the investment needs and how to address these, and on the international dimensions. The overarching objective, framing the Communication, is the 80-95 per cent

reduction over 1990 by 2050, reconfirmed by the European Council in February 2011, as necessary for staying below 2C°. It is observed that these reduction requirements will ‘largely need to be met internally.’ On the basis of ‘an extensive modelling analysis’ the most cost-effective pathway to an 80 per cent reduction in 2050 is identified as passing through 25 per cent in 2020, 40 per cent in 2030 and 60 per cent in 2040. The annual emission reduction would be roughly 1 per cent in the first decade to 2020, 1.5 per cent in the second decade to 2030, and 2 per cent in the last two decades to 2050. This increasing rate of improvement is justified on the grounds that over time, a ‘wider set of cost-effective technologies [will become] available.’

The Communication states that while the EU is on target to meet the other two objectives of the climate and energy package (20 per cent GHG reduction and 20 per cent renewables by 2020), the third objective, 20 per cent improvement in energy efficiency, is not on target. In fact, with current policies, only half of that objective would be achieved. However, if the EU delivers on its current policies, including the 20 per cent renewables and the 20 per cent per cent energy efficiency objectives, then the EU will in fact overshoot the third target, on GHG emission reductions and achieve 25 per cent by 2020.

The Communication sets out an overview of the pathway for key sectors, indicating the percentage reductions that would have to be achieved over 1990 per key sector by 2030 and 2050 respectively. Sectoral dialogues will be initiated and sector specific policy initiatives and roadmaps (e.g. 2050 Energy Roadmap; White Paper on transport) will be developed.

The *power sector* is attributed a major role in decarbonising Europe by 2050. This has two dimensions. Firstly, the electricity sector should itself decarbonise and is expected to make 93-99 per cent cuts by 2050 by including the share of “low carbon technologies” from around 45 per cent today to nearly 100 per cent in 2050. Secondly, there is a ‘fuel switching’ dimension, where this lower carbon electricity partially replaces fossil fuels in end-uses such as transport and heating. This will only work if the first dimension is assured. More detail will be forthcoming in the Energy 2050 Roadmap expected towards the end of 2011. The emissions of the power sector are regulated through the ETS. The Communication highlights the importance of ensuring that the carbon price is both sufficient, and sufficiently stable, to enable to transition of the sector. The Commission also considers that there is insufficient incentive for network operators to make the required investments in grids to accommodate the change, and for this reason, “future work would consider how the policy framework can foster these investments at EU, national and local level and incentivise demand-side management.”

The *transport sector* savings could be some 54-67 per cent (including CO<sub>2</sub> from aviation, but excluding maritime emissions). The Communication notes that until 2025, the main driver for reversing the trend of increasing greenhouse gas emissions from transport is likely to remain improved fuel efficiency. In combination with additional measures such as pricing schemes, infrastructure charging, intelligent city planning and improving public transport, emissions from road, rail and inland waterways could be brought to below 1990 levels in 2030.

The discussion on the *built environment* focuses mainly on buildings themselves. The Communication suggests that 88-91 per cent reduction could be achieved from the residential and services sector. A number of existing initiatives are referenced (Energy Performance of Buildings Directive; the inclusion of energy efficiency standards in public procurement for relevant public buildings and services). The Communication highlights the need to focus on

the refurbishment of the existing building stock, and to identify how this can be financed. The Commission suggests that over the next decade “investments in energy-saving building components and equipment will need to be increased by up to €200 billion.” The need to decrease the carbon footprint of energy supplied to buildings is also highlighted with various options noted.

The Commission's analysis shows that GHG emissions in the *industrial sector* could be reduced by 83-87 per cent by 2050. The application of more advanced resource and energy efficient industrial processes and equipment, increased recycling, as well as abatement technologies for non-CO<sub>2</sub> emissions (e.g. nitrous oxide and methane), could make a major contribution by allowing energy intensive sectors to reduce emissions by half or more. In addition to the application of more advanced industrial processes and equipment, the Commission expects that carbon capture and storage would also need to be deployed on a broad scale after 2035, notably for industrial emissions (e.g. in the cement and steel sector). It is estimated that this would entail an annual investment of more than € 10 billion.

The Commission's analysis shows that by 2050 the *agriculture sector* can reduce non-CO<sub>2</sub> emissions by between 42 and 49 per cent compared to 1990. It raises the expectation that the Common Agricultural Policy legislative proposals for 2013, as well as a forthcoming Bio-economy Communication, will address a number of mitigation options from better land-use. The following measures are particularly highlighted in this context: further sustainable efficiency gains, efficient fertiliser use, bio-gasification of organic manure, improved manure management, better fodder, local diversification and commercialisation of production and improved livestock productivity, as well as maximising the benefits of extensive farming. In addition, the Communication highlights the value of improved agricultural and forestry practices to increase the capacity of the sector to preserve and sequester carbon in soils and forests, suggesting e.g. targeted measures to maintain grasslands, restore wetlands and peat lands, low- or zero-tillage, to reduce erosion and allow for the development of forests. The Commission expects the rate of emission reductions in the agricultural sector to slow down after 2030, in part due to increased agricultural production due to a growing global population. It also notes, that by 2050, agriculture will represent one third of the by then remaining EU emissions.

The investment needs to achieve the necessary emission reductions are estimated to be, on average, around €270 annually over the next 40 years. This would represent an additional investment of 1.5 per cent of EU GDP on top of the existing investment levels of 19 per cent of GDP in 2009. In April 2011 the Transport White Paper ([COM\(2011\)144](#)) was published and in May 2011 a consultation on an [energy 2050 roadmap](#) was launched. Both of these are discussed in more detail in the respective sectoral policy sections on [transport](#) and [energy](#), as is the Commission's December 2011 communication on the EnergyRoadmap 2050.

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