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COMMISSION STAFF WORKING DOCUMENT

Accompanying document to the

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF 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}
{SEC(2008) 53}

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1. PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES

On 13 October 2003, the European Parliament and the Council adopted Directive 2003/87/EC of the European Parliament and of the Council establishing a system for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC[1] (the Emissions Trading Directive). It has been amended by Directive 2004/101/EC of the European Parliament and of the Council of 27 October 2004 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms[2]. The European Union Emissions Trading System (EU ETS), became effective as from 1 January 2005.

Recognising the first phase as a learning period[3] and bearing in mind Article 30 of the ET (Emissions Trading) Directive foreseeing the Commission drawing up a report on the application of the ET Directive, the Commission launched a survey among participants and stakeholders of the EU ETS. The survey was conducted between June and September 2005 and involved 517 companies, government bodies, industry associations, market intermediaries and NGOs. Almost 60% of the stakeholders addressed responded. The results of the survey, albeit conducted very soon after the start of the EU ETS, indicated that there are important areas for improvement of the overall design of the system, but did not derive any clear recommendations on where to go. The results of the survey are published and available on the website dedicated to the review of the EU ETS[4].

Article 30 of the ET Directive contains a list of issues for the Commission to consider when drawing up the report on the application of the ET Directive. In responding to Article 30 of the ET Directive, the Commission adopted a Communication[5] (the Review Communication), where it identified growing consensus on the key strategic issues for review, and that, as more experience and evaluation is needed to determine solutions on these issues, it would be premature for the Commission to make legislative proposals at this stage. Therefore, the Commission decided to consult further by means of a separate Working Group on the Review of the EU ETS within the framework of the European Climate Change Programme (ECCP).

In the Review Communication, the Commission also identified the four main topics of the review, namely: (1) scope, (2) robust compliance and enforcement, (3) further harmonisation and increased predictability and (4) linking with emissions trading systems in third countries, and appropriate means to involve developing countries and countries in economic transition. Each of these topics has been dealt with extensively at a dedicated meeting of the above Working Group[6], which, consequently, met four times between March and June 2007. The

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1 OJ L 275, 25.10.2003, p. 32.

2 OJ L 338, 13.11.2004, p. 18.

3 COM(2005) 703, 22.12.2005.

4 http://ec.europa.eu/environment/climat/emission/review_en.htm

5 Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions "Building a global carbon market – Report pursuant to Article 30 of Directive 2003/87/EC" - COM(2006) 676, 13.11.2006.

6 The Group consisted of representatives of all interested Member States, the power sector (conventional and renewable), the energy intensive industry and non-energy ETS sectors, the carbon trading sector, the oil and gas sector as well as cross sector business associations. Non-governmental organisations, representatives of the research Community and other relevant institutions/organisations were also invited and participated actively. A list of participants is available from the EU ETS review website (see footnote 4).

presentations given at these meetings are available from the EU ETS review website[7], the final reports of these meetings reflecting their outcome are annexed to this document (Annex 1). These reports represent a major input to the review of the ET Directive. Furthermore, the Commission services have established a functional mailbox on the EU ETS review website, in order to allow all interested parties to submit their view on the review of the EU ETS to the Commission. Annex 2 contains a summary of these views as well as a list of parties which have submitted their view.

Seven Commission interservice meetings have been held on 28 February, 7 March, 12 April, 8 May, 8 June, 11 July and 31 July 2007, in order to discuss the outcome of the ECCP meetings and the issues to be examined in the framework of this impact assessment. One meeting was exclusively devoted to the work carried out by ENTEC for this impact assessment.

2. IDENTIFICATION OF OVERALL OBJECTIVES, LESSONS LEARNT AND ASSESSMENT CRITERIA

2.1. Overall Objectives

Fighting climate change is one of the most urgent challenges of mankind[8]. The latest IPCC reports[9] provided strong evidence on the likelihood and impact of climate change for overall life on earth highlighting the urgency of effective action. Only a couple of months earlier, Sir Jonathan Stern had published his report[10], in which he confirmed the Commission's stance and pinpointed the costs of action and non-action in combating climate change. His conclusion was simple and clear: the benefits of strong early action considerably outweigh the costs.

The European Commission has taken this message seriously. On 10 January 2007, it adopted a new energy and climate change strategy including the Communication "Limiting Global Climate Change to 2 degrees Celsius"[11]. The Commission's central proposal is that, under a future global agreement, the group of developed countries should cut their emissions of CO2 and other greenhouse gases responsible for warming the planet to 30% below 1990 levels by 2020 and that the EU should take the lead by committing autonomously to reduce its own emissions by at least 20% by 2020. In the longer term, worldwide emissions need to be cut by up to half of 1990 levels by 2050.

The European Council, held on 8-9 March 2007 in Brussels, endorsed these objectives[12]. It also acknowledged the "central role of emission trading in the EU's long-term strategy for reducing greenhouse gas emissions" and underlined

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7 See footnote 4.

8 See for instance EC 2005b.

9 The reports are available from http://www.ipcc.ch/

10 The report is available from http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm

11 COM(2007) 2 final, available from http://eur-lex.europa.eu/LexUriServ/site/en/com/2007/com2007_0002en01.pdf

12 http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/93135.pdf

> that the European Union Emissions Trading System (EU ETS) is and will remain one of the most important instruments for the EU's contribution towards achieving the significant emissions reductions which are necessary to meet the strategic objective of limiting the global average temperature increase to not more than 2 degrees C above pre-industrial levels.

Against this background, ***three overall objectives*** should be aimed at in the framework of the review of the EU ETS:

First overall objective:

Fully exploiting the potential of the EU ETS to contribute to the EU's overall GHG reduction commitments in an economically efficient manner.

The European Council, held on 8-9 March 2007 in Brussels, endorsed

> an EU objective of a 30% reduction in greenhouse gas emissions by 2020 compared to 1990 as its contribution to a global and comprehensive agreement for the period beyond 2012, provided that other developed countries commit themselves to comparable emission reductions and economically more advanced developing countries to contributing adequately according to their responsibilities and respective capabilities.

and that

> until a global and comprehensive post-2012 agreement is concluded, and without prejudice to its position in international climate negotiations, the EU makes a firm independent commitment to achieve at least a 20% reduction of greenhouse gas emissions by 2020 compared to 1990.

In the longer term, the European Council envisages reducing GHG of all developed countries by 60 to 80% by 2050 compared to 1990[13].

Compared to the Kyoto objectives of reducing GHG emissions by 8% from 1990 levels, the new targets are further reaching and underline the need to make use of all instruments available. While the EU ETS should not be considered a panacea to achieve emission reduction targets across all economic sectors of the EU, it offers a huge potential to trigger emission reductions in a number of economic sectors in a cost-effective manner.

Implementing the above emission reduction targets will lead to the necessary gradual restructuring of the European economy towards a less carbon-intensive industry implying the introduction of less carbon intensive products and processes in the medium and longer term. Reinforced research and development efforts should take place in parallel, in order to maintain Europe's industrial base and competence. They are going to prepare the ground for new products and markets that can be expected to evolve as a consequence of a stringent policy to combat climate change.

Since climate change is a global problem, other countries are expected to follow the European path and commit themselves to the necessary GHG reduction targets. Implementing its

[13] see footnote 12.

objectives, Europe will gain first mover advantages on these markets in the middle and the longer term. This can already be observed in some Member States, where the renewable energy industry is acquiring an increasing market share in, for example, the US and China.

Against this background, it should be noted that the basis of Europe's economic welfare is likely to be more and more made up by technological achievements in line with the needs of less-carbon intensive economic activities. They may increasingly determine Europe's competitive position on the global market. For this reason, starting the restructuring now will not only reduce the costs of climate change, but will also ensure Europe's welfare and competitiveness tomorrow.

In the light of these further reaching objectives, the synergies with relevant aspects of other, very important objectives of the European Union should be taken into account:

- Competitiveness and the Lisbon objectives: The Spring 2006 European Council has identified energy and climate change as one of the four priority areas for more growth and jobs[14]. It has been acknowledged that the action against climate change and their costs will bring major opportunities for growth and employment through investment and producing and disseminating new eco-efficient technologies. Fully exploiting the potential of the EU ETS as a cost-effective instrument to tap the potential for emissions reductions while stimulating innovation is fully in line with the Lisbon strategy and its objectives.

- Sustainable development[15]: The needs of the present generation should be met without compromising the ability of future generations to meet their own needs. It represents an overarching objective of the EU set out in the Treaty. A key of objective of the renewed sustainable development strategy of the EU is to promote a prosperous, innovative, knowledge-rich, competitive and eco-efficient economy, which provides high living standards and full and high-quality employment throughout the European Union. In this respect, the polluter-pays-principle is a policy guiding principle. It aims at ensuring that prices reflect the real costs to society of consumption and production activities and that polluters pay for the damage they cause to the environment.

- Cohesion and fairness: In line with the Conclusions of the European Council of March 2007, the national circumstances of Member States should be taken into account in contributing to the climate policy objectives, in order to reflect fairness and transparency.

Second overall objective:

Refining and improving the EU ETS in the light of experience gathered

Experience gathered during the first years of its operation suggests that there is potential to reinforce economic efficiency of the system to the benefit of the European economy. In a number of areas identified in the Review Communication[16] improvements can be achieved by

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14 COM(2006) 816

15 Commission Communication COM(2005) 658, available from http://eur-lex.europa.eu/LexUriServ/site/en/com/2005/com2005_0658en01.pdf As for the renewed strategy of the Council, please refer to http://ec.europa.eu/sustainable/docs/renewed_eu_sds_en.pdf.

16 COM(2006) 676.

taking the experience of the private and public sector over the first years of the EU ETS into account. This would allow fully exploiting the potential of the EU ETS.

Third overall objective:

Contributing to transforming Europe into a low greenhouse-gas-emitting economy and creating the right incentives for forward looking low carbon investment decisions by reinforcing a clear, undistorted and long-term carbon price signal.

In its conclusions of 20 February 2007, the Council emphasised[17]

> that the EU is committed to transforming Europe into a highly energy efficient and low greenhouse-gas-emitting economy

and called on the Commission to

> review Directive 2003/87/EC in good time and bring forward proposals which create the right incentives for forward-looking, low-carbon investment decisions

These stipulations of the Council fully correspond to the objectives identified above. In addition, they highlight the need for a clear, undistorted and long-term carbon price signal as an indispensable feature of the EU ETS.

Such a carbon price signal would help achieving the European Council's 20% renewable target, bring about the necessary incentives for forward-looking, low-carbon investments including CCS and would provide correct incentives for our partners internationally to contribute appropriately to emission reduction. A clear, undistorted and long-term carbon price signal would represent a strong incentive to reward low or no-greenhouse gas emitting technologies conveying price signals along the whole chain of supply and demand from production and generation down to the consumer, as the costs of the allowances will be reflected in the final product offered to consumers. This way, consumers will be made increasingly aware of the costs of emitting greenhouse gases and as a consequence, demand is gradually expected to shift away from more carbon intensive products to less carbon intensive products.

The pressure emerging from a clear, undistorted and long-term carbon price signal to restructure the economy towards a less carbon intensive economy is thought to arrive from two different angles:

- On the supply side, the price of allowances under the EU ETS, will gradually rise with a more and more tightening cap designed to achieve the ambitious, but indispensable emission reduction targets. On condition that the necessary regulatory framework is set right, electricity generators and producers of carbon intensive products will factor in the price of the allowances, which are becoming genuine production costs. In order to minimise this kind of production costs, operators will in the short-term exploit existing potential to realise efficiency gains, as long as it is economic to do so (allowance price). In the medium and longer term, however, they will increasingly turn to less carbon-intensive

[17] see http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/envir/92864.pdf

technologies and investment, as otherwise they face the risk of losing their competitive position on the market and thus market shares.

- On the demand side, consumers will be made increasingly aware of the costs of carbon intensive products, which compared to less carbon intensive products will appear as more expensive and thus less competitive. Consumers' natural desire to turn to cheaper products on homogenous markets will trigger demand for less carbon intensive products, thus reinforcing the trend towards decarbonised production.

A clear and undistorted carbon price signal is necessary to ensure dynamic efficiency, which is needed, in order to establish a constant incentive in terms of innovation and R&D to move towards a less-carbon intensive economy.

This mechanism is already laid down in the overall design of the EU ETS, but may need to be reinforced and more pronounced in the light of the new emission targets. It may, among other things, also affect allocation methods, as some methods might be more promising in this respect than others. So far, the EU ETS mainly focused the identification of least cost abatement measures. As a consequence, companies complied either through making the necessary investments to comply or through buying more allowances. In order to give a clear and undistorted, long-term carbon price signal, and thus to ensure dynamic efficiency, the costs incurred by emitting GHG would need to be reflected too, i.e. from the first tonne emitted. This happened already in a number of sectors of the EU ETS, albeit in a slightly different manner: So far, these costs have been taken into account as opportunity costs and passed on to the consumers, where possible. Conveying a clear, undistorted, long-term carbon price signal as a fundamental prerequisite of ensuring dynamic efficiency in the EU ETS would require these costs to be accounted as genuine production costs[18] rather than opportunity costs.

For those sectors already passing opportunity costs to their customers, the difference in terms of consumer prices would be marginal, if there is any at all[19]. Sectors that do not have the possibility to pass through carbon costs on the grounds of international competition for the supply of the same product may justify the application of transitional measures.

2.2. Lessons learnt and experience gathered

When considering the role of the EU ETS in achieving these objectives, lessons learnt and experience gathered so far have to be taken into account.

The EU ETS is the largest emission trading system in the world. It comprises 27 states under a common framework to reduce GHG emissions in an economically efficient manner and in this respect, is unprecedented in the world. Its first phase from 2005 – 2007 was driven by the wish to create the critical mass for a liquid and well functioning carbon market, which appeared most promising by focusing on CO2 emitting sectors and establishing the necessary infrastructure for trading and MRV. As such, the positive results of the first trading phase were that:

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[18] This is also in line with the polluter-pays-principle.

[19] The actual difference would depend on the level of pass-through and the level of allowance prices. 100% pass through, as it has been the case with some power generators, would – at the same allowance price – make no difference at all.

- the first two compliance cycles have been successfully carried out, thereby establishing overall credibility of the EU ETS based on sound and reliable procedures and infrastructure to monitor, report and verify emissions from the installations under the EU ETS.

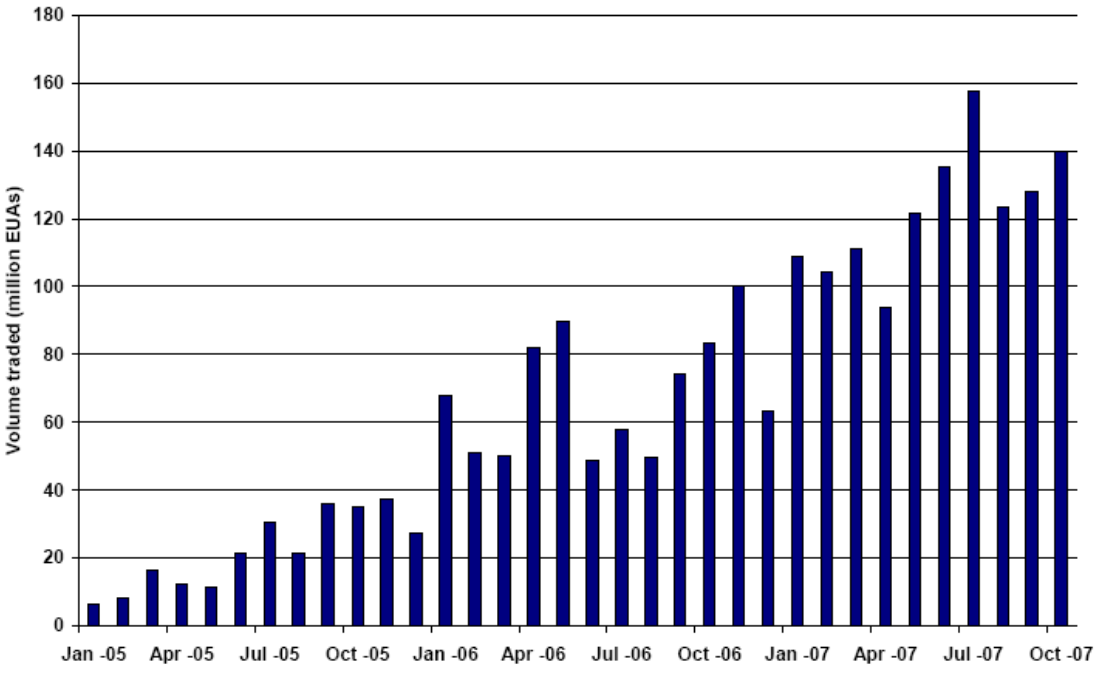
- free trade of allowances across all parties participating in the EU ETS has been achieved and a real market trading allowances has evolved. As can be seen from figure 2.1, traded volumes were steeply rising and exceeded 100 million of allowances traded on a monthly basis almost each month in 2007.

- it allowed very valuable insight in the functioning of carbon markets; without the EU ETS being established in 2005 the EU (authorities and companies) would be much worse off in terms of complying with its Kyoto commitments at least cost;

- due to its size – the EU ETS comprises around 10500 installations from the power and various industrial sectors accounting for approximately 41%[20] of total EU GHG emissions – it offers new opportunities to implement CO2 abatement measures in a cost-effective manner across the EU;

- already in 2006, the EU ETS globally accounted for around 81% of the global carbon market in terms of value and 67% in terms of volume.

Figure 2.1: Monthly volumes traded in the EU ETS



Source: Point Carbon

The first trading period was always intended to be a "learning-by-doing" phase for all parties involved. The problems that occurred provided valuable lessons on how a carbon market functions and have been taken into account to the extent possible in the NAP assessment for

[20] On the basis of 2005 data.

the 2nd trading period. They are also being thoroughly considered for the post-2012 period with a view to identifying appropriate and effective solutions:

- While emissions trading can only exploit its environmental strength and justification, if scarcity on the allowance market is maintained, the lack of verified emission data when setting up the NAPs for the 1st trading period enabled Member States to support their own industry by relying on overoptimistic projections justifying the issuance of more allowances than would be allowed to ensure scarcity on the market. Since this behaviour pattern could be observed in almost all Member States, the environmental effectiveness of the system was put in question – to the detriment of its overall efficiency and thus to the detriment of the overall economy of the EU.

- Lack of a level playing field for operators in the EU ETS resulted in different levels of ambition of the ETS sector in Member States and subsequently different level of ambitions for sectors and installation allocation. As a consequence, distortions of competition between Member States' trading sectors and also within sectors occurred entailing a perception of unfairness.

- Member States have applied widely differing allocation methods entailing among other things fuel specific benchmarks, which have caused a range of distortions and thus did also not comply with the requirement of economic efficiency.

- Furthermore, undue distributional effects to those sectors occurred that were able to pass through the market value of the allowances in the form of opportunity costs thus increasing operating profits for the companies concerned.

- The approval of NAPs turned out to be a long lasting, cumbersome and complex process creating a lot of uncertainty on the market with respect to the overall cap of the EU ETS.

Once such data became available in April 2006, it triggered a halving the allowance price within a couple of days. The swift correction of the market price of allowances demonstrated convincingly that the carbon market is working. The resulting low level of phase I prices indeed was not likely in itself to trigger additional or new abatement measures.

Figure 2.2: Price developments of EU ETS allowances

Source: Point Carbon

In its assessment of the National Allocation Plans for the 2nd trading period, the European Commission developed a robust approach[21] that has been equally applied to all Member States. It was designed to ensure necessary scarcity on the market and to warrant that Member States respect Kyoto targets of the EU and its Member States. On the basis of the experience with NAP I, the Commission had already issued a 2nd guidance document[22] with a view to achieving a more consistent approach on the national allocation plans. Verified emission data provided a reliable basis for the NAP II assessment and showed that the necessary infrastructure requirements for a well functioning carbon market are in place.

Following the approval of 27 Member States NAPs , the overall cap for the 2nd trading period will amount to 2082.68 million tons of CO2. Taking into account the enlarged scope of the EU ETS in the 2nd trading period[23], the EU ETS will deliver emission reductions of 6.5% in the 2nd trading period compared to 2005 verified emissions.

Against this background, the EU ETS is bringing about the environmental benefits it is supposed to.

2.3. Identification of Assessment Criteria

In accordance with the Impact Assessment Guidelines of the European Commission, the options to be assessed will first be screened against the following criteria:

- ***Effectiveness***: the extent to which options can be expected to achieve the objective of the proposal
- ***Efficiency***: the extent to which objectives can be achieved for a given level of resources/at least costs
- ***Consistency***: the extent to which options are likely to limit trade offs across the economic, social and environmental domain

Following the screening, the assessment is mainly based on the following criteria and their respective interpretation:

Environmental effectiveness: Expanding the coverage/scope of the EU ETS would increase its environmental effectiveness provided that the overall cap is not undermined, i.e. there is no carbon leakage. Furthermore, the integrity of the cap is a crucial element of the EU ETS as a cap-and-trade system, since it does not only determine the level of environmental benefit, but also represents the guarantee that the environmental effectiveness of the EU ETS is ensured. For these reasons, the options considered will be assessed whether they contribute to the

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21 COM(2006) 725.

22 COM(2005) 703.

23 On top of the 2122.16 million tons of CO_2 emissions approved by the NAP decisions, another 54.61 million tons of CO_2 emissions from installations that come under the coverage of the system in 2008 to 20121 due to an extended scope applied by the Member States. This does not include new installations entering the EU ETS in sectors already covered in the first trading period. In addition, emissions from installations that the UK opted to exclude temporarily from the EU ETS in 2005 but that will be covered in 2008 to 2012 with an estimated amount of around 30 million tons must be added to the verified emissions, in order to arrive at a comparable scope of the EU ETS in the 1st and 2nd trading period.

integrity of the cap or not and whether the coverage of the EU ETS will be affected. The criteria are also closely linked to the overall objectives set out above. The global dimension of climate change also has to be borne in mind when considering the environmental effectiveness of the different options in question. The need to promote and foster sustainable development is crucial in this respect.

Economic efficiency: The EU ETS is designed as a system that allows meeting a certain emission reduction objective at least cost, i.e. the costs incurred by implementing the objective should not be higher than necessary across the whole EU. Thus, the options considered will be assessed against their ability whether they contribute to achieving the objective in question as well as the overall objectives at least cost. An increased scope of the EU ETS is likely to enhance its economic efficiency, since more sectors/gases/installations would be able to benefit from the flexibility offered by emission trading without compromising the overall environmental objectives. This presupposes a well functioning allowance market including the necessary transparency of the market, which also constitute relevant elements to be borne in mind. In the light of the long term emission reduction objectives indicated by the European Council in March 2007[24], the options should also promote, or at least not hinder, further reaching emission reduction objectives to be achieved in the long term. Incorporating an undistorted, clear and strong carbon price signal reflecting the cost of carbon in the economy is important to ensure least cost measures to be identified. Such a signal would also convey the necessary incentives to establish dynamic efficiency in terms of innovation, research and development. These elements will also have to be considered when assessing the options under consideration.

Administrative costs: For the purpose of the impact assessment, administrative costs are defined as the costs incurred by operators and regulators to establish and maintain the system. Administrative costs may, where appropriate, include transaction costs of operators, but do not include compliance costs incurred by operators under the EU ETS. Compliance costs are incurred where operators have to buy or sell (negative compliance costs) allowances in order to surrender the corresponding amount of allowances in line with their verified emissions. A summary of the administrative cost assessment is available in chapter 8.

Competition and internal market: Where appropriate, the options will also be assessed in terms of their compatibility with a well functioning internal market ensuring competition between market participants without any distortion.

Employment: The renewed Lisbon Strategy is refocused on growth and jobs. The regulatory framework in the EU should contribute to achieving growth and jobs**,** while continuing to take into account the social and environmental objectives and the benefits for citizens and national administrations. The options considered will therefore also be assessed, where appropriate and relevant, against their impact on employment.

If case may be and relevant, other criteria will be applied as well, such as impact on consumers, environmental side effects etc. In some cases, the application of all assessment criteria to the options under consideration does not seem to be applicable. In these cases, the grounds will be briefly explained and the assessment criteria applied will be introduced.

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[24] See footnote 12.

Most of the assessment criteria must be seen in the light of the overall objectives, as set out above: environmental effectiveness and economic efficiency are crucial elements to feature in the options chosen, as they may best guarantee that the EU ETS results in the expected outcome, i.e. achieving a certain reduction of emissions at least cost. Achieving the new emission reduction targets, the need to fully exploit the potential of emissions trading and the stepwise transformation of the EU into a low carbon economy through a revised EU ETS would broadly depend on how much these criteria can be enforced. Bearing in mind the requirements of better regulation, administrative burden at both EU and Member State level should be kept to the minimum required to achieve the overall and specific objectives. Finally, competition and internal market requirements go hand in hand with economic efficiency.

3. SCOPE OF THE DIRECTIVE

3.1. Streamlining the current scope

3.1.1. Identification of Problems

The scope of the EU ETS Directive is defined in Article 2(1):

> "This Directive shall apply to emissions from the activities listed in Annex I and greenhouse gases listed in Annex II."

Annex I lists a number of activities carried out in certain installations including combustion installation and certain industrial plants. In phase I of the EU ETS, different interpretations of combustion installations were used by Member States leading to differences in the coverage of similar installations under the EU ETS. As a result, competitive distortions on the internal market of the EU occurred due to the fact that some Member States have included a certain type of installations, while others had not.

Three different interpretations of the "combustion installations" were applied in the 1st phase:

- a narrow interpretation including only those combustion installations that produce electricity, heat or steam and supply that to third parties
- a medium interpretation including all combustion installations that produce electricity, heat or steam, with the purpose of energy production, including those that are process-integrated, e.g. a steam plant integrated in e.g. chemical industry is included, but certain process furnaces, such as crackers in the petrochemical industry were excluded.
- a broad interpretation including all combustion installations that produce electricity, heat or steam, whether or not their main purpose is not energy production, e.g. the production of ethylene or ammonia (e.g. naphta crackers or ammonia plants).

In its second guidance document (EC 2005a), the Commission made clear that it considered the broad interpretation as the appropriate one to be applied when setting up the NAP for the 2nd trading period. In close cooperation with Member States through the Climate Change

Committee[25], the Commission established a priority list on installations that should be included in the EU ETS in the 2nd trading period, while others were left to the discretion of Member States.

So-called process emissions[26] represent a major issue in this respect, as they have not been consistently included in the EU ETS by all Member States.

Following the agreement in the Climate Change Committee, practically all Member States included the priority list installations in their NAPs. Some Member States apply a broad interpretation as advocated by the Commission, while others applied the medium interpretation plus priority list or stay somewhere between this and the broad interpretation. As a result, the following problems persist:

– competitive distortions accruing from the different interpretation of the notion "combustion installation" continue to exist in the 2nd trading period also highlighting the absence of a level playing field on the internal market;

– incomplete coverage of so-called process emissions, i.e. emissions that do not derive from combustion processes, but represent the major part of emission in some industrial sectors/accruing from both energy production for third parties as well as the supply of energy for a production process with and without using an energy transfer medium; as a consequence, the environmental effectiveness of the system is compromised;

– lack of legal certainty concerning the scope of the Directive.

3.1.2. Identification of Objectives

In the light of the above problems, the following objectives can be identified:

- Ensuring a consistent application of the scope of the Directive across Member States resulting in the elimination of currently existing competitive distortions and creation of a level playing field for all sectors included in the EU ETS.

- This should also bring about full legal certainty on the scope to Member States and entities operating the installations included in the EU ETS.

- Process emissions should be covered as much consistently and completely as possible.

3.1.3. Policy Options and Screening

The current situation concerning the scope of the Directive has been described above. In order to improve it and to achieve the objectives identified, the following options are considered bringing about substantial changes compared to the current situation:

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[25] Committee established by Council Decision 93/389/EEC of 24 June 1993 for a monitoring mechanism of Community CO_2 and other greenhouse gas emissions.

[26] For the sake of clarity, process emissions may be described as emissions emerging from an industrial process, the purpose of which is energy production for the supply of energy to a production process, no matter, whether an energy transfer medium (radiation or heat conduction) is used or not. However, it is important to note that this does not represent an agreed or commonly accepted definition of process emissions, mainly due to the broad meaning of process emissions.

(1) **Option 3.1: Codifying a broad interpretation of combustion installation** by defining more precisely the scope of the Directive. A definition of combustion installation would be introduced implying that all installations combusting fuel are included, irrespective of the purpose of fuel combustion. Energy production for third parties as well as the supply of energy for a production process with and without using an energy transfer medium would be covered. Such an approach would aim to effectively codify the broad combustion interpretation (as has already happened to some degree under Phase II)and would provide for a consistent coverage of process emissions, so that any ambiguity about whether process emissions associated with a 'combustion installation' should be included is removed.

(2) **Option 3.2**: **Activity list:** Defining the scope of the Directive in Annex I by extending the list of all covered activities, including the power sector by means of more precise definitions and moving away from the notion of "combustion installations" with a view to also including process emissions from relevant activities. Activities not explicitly included in this list would therefore be excluded from the system.

(3) **Option 3.3: Economic classification:** Defining the scope of the Directive in Annex I by sectors using a 3 or 4 digit ISIC (International Standard Industrial Classification of all economic activity)[27] or alternative (e.g. CPC) code delivering the same or a similar scope as an approach based on combustion installations.

In accordance with the Impact Assessment Guidelines of the European Commission, screening the proposed options against the criteria[28] of

- Effectiveness: the extent to which options can be expected to achieve the objective of the proposal
- Efficiency: the extent to which objectives can be achieved for a given level of resources/at least costs
- Consistency: the extent to which options are likely to limit trade offs across the economic, social and environmental domain

leads to the following results:

– **Effectiveness**: With respect to a consistent application of the scope of the Directive, option 3.1 would effectively codify the guidance of the Commission for the 2nd period and build upon the work undertaken in the Climate Change Committee. It would provide legal clarity and benefit from the discussions between the Commission and the Member States held in the past with a view to streamlining the scope of the Directive. However, a full and consistent inclusion of process emissions can not be achieved by following this option alone. Option 3.2 has the potential to arrive at a consistent application of the Directive

[27] http://unstats.un.org/unsd/cr/family2.asp?Cl=27

[28] See SEC(2005) 791 available from http://ec.europa.eu/governance/impact/docs/key_docs/sec_2005_0791_en.pdf. These criteria with the meaning indicated will be applied for screening across the whole document.

provided that a common understanding on the activities covered can be ensured. As it is likely that a broad list of activities would need to be agreed, in order to maintain the current environmental effectiveness of the system and avoid ambiguity, a consistent application of the Directive might be more difficult to achieve compared to option 3.1. On the other hand, the issue of process emissions would be solved, since the kind of emissions would not matter anymore. Option 3.3 would be likely to bring some ambiguities partly due to the existing level of disaggregation, which may capture activities currently not foreseen for inclusion in the system, partly due to operators which would fall under several codes. Another serious issue would be the fact that the various international codes (ISIC, CPC) cannot be legally enforced, definitions of categories would be necessary, in order to determine which operator falls under which category. Like option 2, process emissions would automatically be covered.

– **Efficiency**: Achieving the objectives at lowest costs compared to the current situation is best ensured by option 3.1, as it is largely a clarification and partly a continuation of current practice, but with enhanced legal clarity. For this reason, administrative costs for public authorities would not differ much to the current situation. This might be different for option 3.2 and 3.3, which would require some further efforts for all public authorities involved to ensure common understanding of the activity list or the codes respectively.

– **Consistency**: None of the options is likely to have any negative impact on any other Community policies, while options 3.1 and 3.2 might contribute to improving competition on the internal market.

All three options also have to be seen in the light of other outstanding issues in the review of the EU ETS, such as the cost effectiveness for small installations. All three options entail the potential to increase the number of small installations in the system although there are no concrete numbers available due to lack of data. They also would offer the potential to eliminate existing distortions of competition, however, option 3.2 and 3.3 may risk creating new problems.

The following table summarises these considerations:

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
3.1: Codifying broad interpretation	√/0	0	√/0	Retained
3.2: Activity list	√/0	-	√/0	Retained
3.3: Economic classification	-	-	0	Discarded
√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,				

Option 3 is discarded on the grounds that it scores worse compared to options 1 and 2.

3.1.4. Impacts – Comparing the Options

The assessment criteria are applied as set out above, but supplemented by some .

Environmental effectiveness: Both selected options will result in an expansion of the EU ETS, as they will cover more installations than under the current scope. It will increase environmental effectiveness of the system bringing another 40-50 MtCO2 under the EU ETS. Legal clarity of the scope across all Member States, however, seems to be indispensable, in order to ensure an increased and consistent coverage of the system. Again both options provide useful elements in that respect, but none of them would allow a sufficient solution on a stand alone basis: Codifying a broad interpretation through implementation of option 3.1 is

likely to encompass all kind of combustion installations, however, without necessarily capture all process emissions emerging from specific activities. This could result in compromising the environmental effectiveness of the system. In order to provide full legal clarity to Member States, it might also be recommendable to set up a definition of combustion installation that comprises all relevant technical apparatuses the operation of which would result in GHG emissions.

By including a list of activities in Annex I of the Directive (Options 3.2.), process emissions from certain activities could be effectively captured. However, the list of activities to be included is likely to become very long and thus difficult to handle and to implement in practice.

In terms of environmental effectiveness, option 1 might be preferable, because it brings a currently ambiguous situation to an end. It would include more installations in the EU ETS including larger ones, which so far are left to the discretion of Member States[29]. On the other hand, option 3.2 represents a more tailor made approach, as it would exclude everything not explicitly mentioned and thus is likely to result in a large list of activities to be covered to ensure a comparable coverage to option 1. It also means involving a risk that imperfections in coverage under a large list of covered activities could be exploited.

An important consideration is the capability of both options to capture process emissions. Process emissions are not defined in the Directive due to, among other things, the diversity of industrial processes rendering any definition of process emissions very complex, most likely incomplete and subject to legal challenges. For the sake of environmental integrity, however, it does not matter whether emissions are released to the atmosphere as a consequence of combustion for the purpose of generating electricity and/or heat or as a consequence of another chemical process. For this reason, emissions accruing from both combustion and processes are intended to be covered by the Directive.

The current approach of the Directive to deal with emissions from both combustion and processes is based on two pillars and comprises combustion emissions (resulting from combustion activities in all listed activities) and a list of activities that especially exhibit CO2 from processes. This list allows avoiding a definition of process emission, as it does not matter whether emissions from these activities are generated by combustion or processes.

Economic efficiency: This criterion does not seem relevant in this respect.

Administrative costs: It is not possible to accurately indicate the number of new installations captured by the implementation of one of the said options, until Member States have scrutinised the respective sectors. For this reason, it is also not possible to indicate an absolute number of administrative costs incurred by the two options. There is also a wide range of estimated administrative costs for operators varying from €2000 to €15.000 per year and authorities lying between €3.000 and €10.000 per site and year (ENTEC 2007b). However, as an *illustrative indication only*, extrapolating from the UK expansion figures to the total EU number of Phase I installations and verified 2006 emissions could lead to an inclusion of approximately 1500-2000 additional installations and 40-50 $MtCO_2$ under option 1[30]. Based

[29] For a list of likely coverage of sectors/types of installation under a broad interpretation of combustion, refer to ENTEC 2007b.

[30] This assumes that the UK change from the medium interpretation to medium + priority installations also applies at the EU level, because the Phase I installation and emissions data does not (with the exception

on a range of €5000-€25000 per installation per year (covering both operators' and regulators annual costs but excluding one-off costs) this would add administrative costs of very approximately €7.5-50 million / year at EU level compared to the current situation. (ENTEC 2007b).

However, it is expected that the overall level of these administrative costs will decrease due to both the new monitoring and reporting guidelines designed, among other things, to relief the burden of administrative costs to small operators, and due to increased experience acquired from the 1st and 2nd phase[31]. The final costs of the options at stake must also be seen in the light of the solution identified to increase the cost-effectiveness of small operators (see below).

Competition and impacts on consumer: Both options would contribute to creating a level playing field for installations within their specific sector across the internal market. As a consequence, competition on the internal market between competing products will be reinforced by ensuring a more complete coverage of these products and potential market distortions will be eliminated. For instance, gypsum, which is a competitor to cement and lime in the construction industry, is only included in some Member States, but not in all, while the cement and lime industry are participating in the EU ETS throughout the EU. Consumers might therefore benefit from reinforced competition, although the impacts are not expected to be very pronounced.

Impacts on employment, health, innovation and research: Generally, impacts on all these criteria are considered to be very minor due to the relatively small number of companies concerned. Positive effects on innovation and research might be strengthened with more complete sectors facing a carbon price signal.

Table 3.1.4. Summary of the impact of options in relation to relevant problems and objectives

Option	Environmental Effectiveness	Economic Efficiency	Administrative Costs	Competition/ Competitiveness	Employment
3.1: codifying broad interpretation	0/+	0	-	+	0
3.2: activity list	0/+	0	-	+	0

+ positive effect, 0 neutral/no or negligible effect, - negative effect

3.1.5. Compliance of Options with Objectives

In the following, it is evaluated to which extent the options assessed would comply with the objectives defined:

– ***Consistent application of the scope***: Codifying one of the two options is expected to ensure a consistent application of the scope eliminating existing competitive distortions to

of the limited number of MSs already applying the broad interpretation in this phase) cover the priority installations.

[31] Some Member States, such as the Netherlands and Sweden have pointed this out (ENTEC 2007b).

a considerable extent. However, it cannot be excluded that implementing option 3.2 would ensue new inconsistencies and competitive distortions, since the list of activities required might not address the full range of competitive relations on the market.

– ***Full legal certainty on the scope:*** Both options would provide legal clarity for Member States. However, this might be more efficient in the event that option 3.1 is implemented, as its scope and implementation had been extensively discussed in the Climate Change Committee[32]. Option 3.2 might in some cases decrease a Member States' coverage of emissions, if it has already rigorously implemented the broad interpretation of combustion installation, since the option specifically requires the exclusion of any non-mentioned activities. However, given that only few Member States pursued this interpretation under Phase I (of the 15 Member States surveyed under the Ecofys (2006) work the Netherlands, Ireland and Belgium (Wallonia) used the broad interpretation) the effect might be limited.

– ***Consistent and most complete coverage of process emissions***: While option 3.1 would not necessarily capture process emissions to an extent which can be expected from an activity based approach, a new and broader definition of "combustion installation" covering all possible technical apparatus the operation of which would release emissions might offset this drawback to a considerable extent. Emissions not captured by this approach (i.e. using a technical apparatus not included in the definition of "combustion installation") are supposed to be small, but could be addressed through a list of activities supplementing what is covered under option 3.1. The most consistent and most complete coverage of process emissions can therefore be achieved by a combination of option 3.1 and 3.2.

3.2. Cost-effectiveness as regards small installations

3.2.1. Identification of Problems

Currently, there are approximately 10800 installations included in the EU ETS in accordance with

- the capacity thresholds laid down in Annex I of the Directive
- the aggregation clause
- opt-in of Member States

Installations within the EU ETS represent a large range of emitters with annual emissions varying from less than 5000 tCO2 (ca. 3.000 installations) to more than 5.000.000 tCO2 (ca. 70 installations). The contribution of small and large emitters to the overall emissions covered by the EU ETS is very uneven: the largest 7% of installations in the EU ETS represent 60% of total emissions, while the smallest 14% of installations only account for 0.14% (Ecofys 2007a). The disproportionate relation between the number of installations and their contribution to the overall emissions under the EU ETS points to higher transactions costs[33] per ton emitted for small installations. The cost-benefit ratio for including small emitters may therefore appear unbalanced, i.e. the costs are higher compared to the benefits of their

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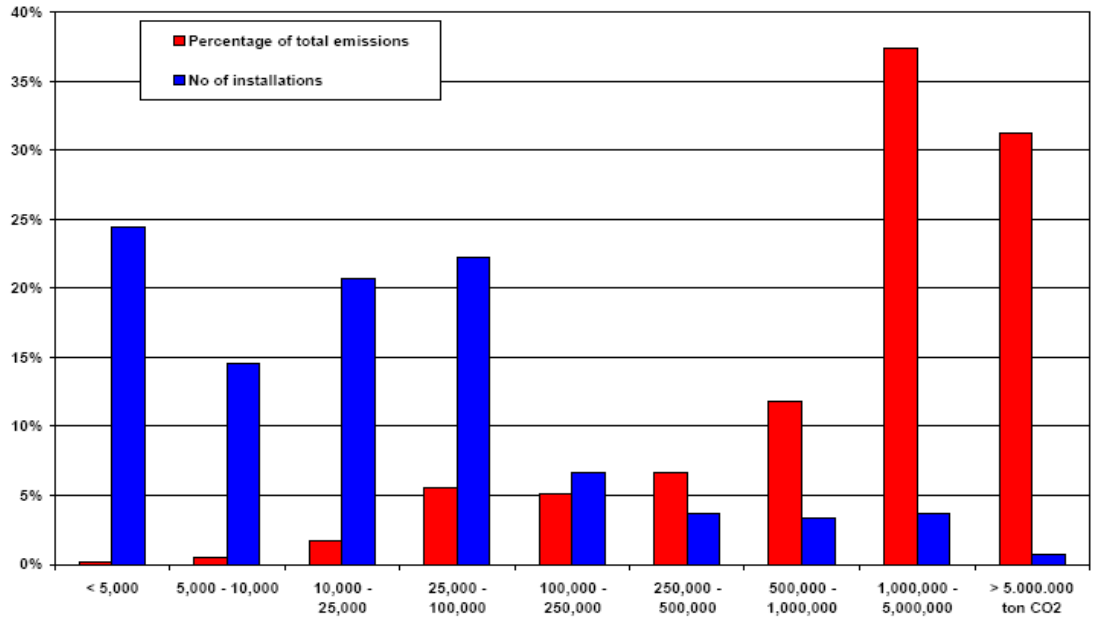
32 See minutes of the Climate Change Committee – 12th Session, 31 May 2006 (not published).

33 In this context, costs of participating in the scheme arising from monitoring, reporting and verification requirements, but not compliance costs (need to buy allowances) are meant.

participation. For this reason, there might be a need to ensure or improve the cost-effectiveness as regards small installations, as indicated by the Commission in its second NAP guidance document (EC 2005a).

An exclusion of small emitters from the EU ETS on the grounds of cost-effectiveness cannot mean, however, that these installations do not need to contribute to the overall emission reduction targets of the EU. It would just mean that there would need to be other more cost-effective measures to ensure the same objective. It is also important to bear in mind that the entry-into-force of the new Monitoring and Reporting Guidelines adopted by the Commission in July 2007[34] (see also below) is likely already to bring about considerable improvements in this respect.

The table below provides an overview of the number of installations and their share in total emissions.



Source: Ecofys 2007a

3.2.2. Identification of Objectives

- Improving cost-effectiveness to small emitters through identification of an appropriate threshold to include/exclude installations in/from the EU ETS. Installations excluded must be subject to alternative, equivalent measures, since all parties have to contribute to emission reductions. The overall issue should also be seen in the context of including new sectors and gases and must not diminish the overall environmental effectiveness and integrity of the EU ETS, i.e. the share of GHG emissions covered by the system.

[34] Commission Decision of 18 July 2007 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council, available from http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32007D0589:EN:NOT

3.2.3. Policy Options and Screening

A number of options have been identified, in order to increase cost-effectiveness of the EU ETS for small emitters[35]:

(4) **Option 3.4: Emissions threshold only:** inclusion of installations based on a minimum threshold for annual emissions or exclusion based on a threshold for maximum emissions. This could be a threshold of 10kt CO_2 or 25ktCO_2 / annum.

(5) **Option 3.5: Production threshold only:** specifying production thresholds instead of capacity thresholds. This option entails the replacement of capacity data with annual production data.

(6) **Option 3.6:** Combination of capacity and emissions threshold: introducing a combination of capacity thresholds and emission thresholds. This option entails keeping the 20 MW capacity threshold whilst additionally adding either a 10 kt CO_2 or 25 kt CO_2/year emissions threshold.

(7) **Option 3.7: MS opt-out:** introducing a specific and conditional opt-out provision for small installations covered by the ETS, where equivalent measures are in place. Under this option MSs would be allowed the flexibility of giving special treatment to small installations provided that they could demonstrate that the installations were subject to 'equivalent environment effort'. The final decision would rest with the EC (role of approving MS proposals), or a supervisory role could be foreseen at Community level. Certain measures will automatically qualify.

(8) **Option 3.8:** Introducing a **change of the aggregation clause**:

– **Option 3.8a: Aggregation capacity threshold:** formalised minimum threshold for the application of the aggregation clause. Under this option only combustion installations with a capacity of over 3 MW each would be counted towards the 20 MW threshold as part of the aggregation rule. This would lead to the removal from the system of sites with a large number of very small sources, the costs of monitoring for which are high compared to annual emissions.

– **Option 3.8b: Multiple of aggregation threshold**: Inclusion in the ETS only if application of the aggregation clause sums up to a multiple (e.g. 150%, 200%) of the capacity threshold, but keep all installations in the system if the threshold is reached by a single unit. Under this option, the aggregation rule would apply only if the total capacity of all installations on a single site aggregates to 30 MW or 40 MW. This provision would lead to the exclusion of sites that include a number of small installations adding up to a total of 20 MW. Such installations are likely to have proportionately higher monitoring and verification costs due to the complexity ensuing from large numbers of units per site.

[35] see EC 2005a and Ecofys 2007a.

(9) **Option 3.9 Installation-type exclusions:** adding a list of installations to Annex I that should be excluded from the scope of the Directive. This could be installations such as combustion units of hospitals-, universities and nuclear back-up equipment.

(10) **Option 3.10 Alternative instruments:** under this option measures for small installations alternative to EU ETS inclusion are assessed, and their impacts contrasted with the ETS in general and with the specific options above. The alternatives considered are energy taxation and CO_2 taxation.

Screening the options leads to the following results:

– **Effectiveness**: With the exception of option 3.4 and 3.5, all other options would be effective in that they remove a number of small installations from the scope of the EU ETS. Opposed to this, option 3.4 and 3.5 would cast doubts on their effectiveness: an emission threshold only, as proposed in option 3.4, might also capture installations below 20 MW under certain circumstances (e. g. coal fired combustion with a high load factor), but would exclude installations used only temporary or as back-up or emergency facilities. A production threshold (option 3.5) does not seem to be feasible due to the lack of relevant production figures. Therefore, its effectiveness cannot be decided.

– **Efficiency**: A number of options could be implemented without incurring new costs compared to the current situation (options 3.6 if the current capacity threshold is maintained, options 3.8a and b). The efficiency of option 3.7 would depend on the concrete provisions in Member States and at the EU level to allow the opt-out, while option 3.9 may require some research, in order to establish a complete list of installations to be excluded including their definition (e.g. definition of back-up unit). Option 3.4 is considered less efficient than the current situation, as it would require keeping the current MRV requirements and supplement them with those installations that are below to the emissions threshold. Similarly, option 3.6 would not relieve operators of the excluded installations from monitoring emissions (including verification of reports). Option 3.5 seems technically very difficult, as the definition of production levels targeting specific emission levels would generally be very difficult resulting in increasing costs for both operators and regulators.

– **Consistency**: Most options do not create a problem. Option 3.7, however, would require some Commission scrutiny and either approval or some degree of oversight of opt-out applications, in order to avoid competitive distortions coming up. Option 3.9 may imply some gaming with definitions resulting in unwanted exclusion of installations and thus compromising the environmental effectiveness of the system.

The following table summarises these considerations:

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
3.4: Emission threshold	-	-	√	Discarded
3.5: Production threshold	-	-	√	Discarded
3.6: Combination of capacity and emission	√	0	√	Retained
3.7: Opt-out	√	√	0	Retained
3.8a: Aggregation capacity threshold	√	√	√	Retained
3.8b: Multiple of aggregation threshold	√	√	√	Retained
3.9: Installation type exclusion	√	-	-	Retained
√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,				

Options 3.4 and 3.5 are therefore discarded and will not be further pursued. Since option 3.9 might be effective, it is retained at this stage, although it scores as bad as options 3.4 and 3.5.

3.2.4. Impacts – Comparing the Options

Based on the information available from ENTEC 2007b, the impacts of the different options on various impact areas can be described as follows:

Environmental effectiveness: Option 3.6 with an emission threshold of 10ktCO2/yr would cut down the overall emission coverage by 15MtCO2/yr or 0.75% or, in the event of an emission threshold of 25ktCO2/yr by 50MtCO2/yr or 2.5%. Option 3.8a would lead to less than 1MtCO2 or the exclusion of 0.05%. As for options 3.8b and 3.9, the level of emissions excluded is unknown, but may be higher than under option 3.6, as in particular some moderate or medium sized emitters (40MW limit may lead to emitters in the range of 50-100ktCO2/yr) may be concerned. It is worth noting that a combination of options 3.6 and 3.7 is likely to deliver the best environmental effectiveness: small installations would be excluded on request of Member States (opt-out) provided adequate alternative measures are in place. Such an approach would raise the cost-effectiveness of the EU ETS without compromising its environmental effectiveness.

Economic efficiency: This criterion is not considered relevant.

Administrative costs: under the current situation, there is a large range of administrative costs incurred by operators included in the EU ETS varying from €2.000 to €15.000 per installation and year depending on the size and complexity of the installation concerned. Due to the new MRG and a learning-by-doing effect, administrative costs for small emitters are likely to be at the lower end. Option 3.6 (and also option 3.7 if combined with option 3.6) may reduce the annual overall amount of administrative costs by approximately €8 – 60 million or €13 – 95 million in the case of 10kt or 25kt emission threshold. However, due to the fact that continued monitoring of emissions remains necessary (in order to prove the emission threshold is not reached), part of these savings will be offset. A smaller reduction of costs, possibly in the order of €2 – 12 million, can be expected from option 3.8a, however, these savings would be net, because further monitoring would not be required. While the overall amount of cost reductions emerging from the other options are unknown, since the number of small installations excluded would be unknown, the savings per installation are likely to be higher than under option 3.6.Costs incurred by regulators under the current system vary from €3.000 to €10.000 per installation and year. Option 3.6 would bring about the highest reduction of these costs, in the order of approximately €12.6 – 40 million and €20 – 60 million respectively. The same observations as above would apply to the regulatory costs.
Impact on competitiveness, competition and internal market: transaction costs per ton of CO2 are considerably higher for small installations than for their larger counterparts. In the form of administrative costs they amount to €0.5 – 3/tCO2 for small and medium sized emitters dropping to less than €0.01/tCO2 for the largest emitters. This means that in an extreme case, a small emitter incurs 300 times higher administrative or transaction costs per ton of CO2 than the large emitters. While such an extreme case is not likely to have any effect in reality, because the emitters concerned may not be in the same sector, it points to potential distortions of competition between different operators in a given sector. On condition that an alternative system would require equivalent environmental efforts from the operators excluded, option 3.6 would result in an improvement compared to the current situation, as competitiveness of small operators might be strengthened without resulting in competitive

distortions on the internal market. This would also go for option 3.8a, albeit to a smaller extent, and 3.8b. No impact on competitiveness and the internal market is likely to accrue from option 3.9, because many sites excluded might be in the public sector. Option 3.7 may lead to competitive distortions between ETS and non-ETS installations, unless the Commission is put in the position to assess the impacts on the basis of information provided by Member States. **Employment**: The sector most concerned might be the verification business. Impacts for other sectors are negligible.

Table 3.1.4. Summary of the impact of options in relation to relevant problems and objectives

Option	Environmental Effectiveness	Economic Efficiency	Administrative Costs	Competition/ Competitiveness	Employment
3.6:Combination of capacity and emission	+	0	0/+	+	0
3.7: Opt-out	+	0	+	-/0	0
3.8a: Aggregation capacity threshold	+	0	+	+	0
3.8b: Multiple of aggregation threshold	+	0	+	0/+	0
3.9: installation type exclusion	0/+	0	+	0	0

+ positive effect, 0 neutral/no or negligible effect, - negative effect

3.2.5. Alternative Instruments

In the light of the EU's climate change policy in general and the emission reduction targets in particular, all emitters of GHG irrespective of their size have to contribute to these policy objectives. Usually, operators often referred to as small emitters can be characterised as compliance companies in the sense that they strive for compliance within the EU ETS, but do not have the potential to fully exploit commercial opportunities emerging from emissions trading. While their administrative costs per ton of emission are thought to be disproportionately high compared to larger emitters, there may be alternative instruments available which might be more cost-effective for small emitters than is emissions trading. For this reason, a qualitative analysis of alternative measures is presented in the following. Two instruments, a CO2 tax and an energy tax, have been included in this analysis. Their impacts on the assessment criteria are briefly compared with the respective impacts to be observed in the EU ETS:

– **Cost-effectiveness of emissions reduction**: in theory, a CO2 tax could be as cost-effective as the ETS in terms of emissions reductions. In practice, however, it is difficult to determine the appropriate tax level to achieve the desired reduction of emissions. An

energy tax will not lead to cost-effective emission reductions, since it is not directly based on the level of emissions produced but rather energy consumed.

- **Administrative costs to emitters** are expected to decrease significantly in the event of both CO2 tax and energy tax, although in the case of the former, costs from monitoring emissions will not disappear.

- **Production costs to emitters (emissions trading with little auctioning):** In theory, a CO2 tax could be set to provide an equivalent impact, but it is difficult to implement due to fluctuating ETS allowance price and level of free allocation. Compared to the EU ETS, a CO2 tax would impact on production costs from the first ton emitted, possibly reinforcing incentives to reduce emissions, while under emission trading with free allocation this might not necessarily be the case in practice. A CO2 tax, however, would provide more certainty to the emitting companies. Setting an impact equivalent to the ETS, but based on an energy tax might be even more difficult, since an energy tax is not differentiated by carbon intensity.

- **Innovation and research**: A CO2 tax potentially provides greater long term price certainty and dynamic efficiency, unless the ETS cap is tightened over time. While an energy tax is similar to a CO2 tax in this respect, the lack of carbon differentiation reduces incentives to innovate.

- **Budget effects on public authorities**: A CO2 tax, and to a smaller extent also an energy tax, would lead to revenue increases for the state budget, as long as allowances are allocated for free under the ETS. Auctioning would provide similar impacts.

- **Administrative costs of public authorities**: Regulator's costs could decrease in particular with an energy tax due to simplified monitoring and verification requirements. This is, however, unlikely to be the case with a CO2 tax. Provided equivalent tax systems are already in place, implementation costs would only increase slightly.

- **Functioning of the internal market**: Harmonisation of CO2 and energy taxes at EU level may be problematic. Non-harmonised tax rates may lead to competitive distortions between Member States and also between ETS and non-ETS installations.

- Direct and indirect employment effects may be marginal to negligible in all cases.

3.2.6. Compliance of Options with Objectives

On the basis of the above analysis, a combination of options 3.6, 3.7 and 3.8a score best and would comply most with the objective to increase cost-effectiveness to small emitters. They would bring about considerable overall reductions of administrative costs to both operators and regulators and would, on condition that exclusion of small operators is made conditional to the existence of alternative measures in Member States, lead to an improvement of the competitiveness of small operators without distorting competition or the well functioning of the internal market.

In order to decide which emission threshold should be applied, the following considerations should be taken into account:

- Excluding installations from the scope of the system means by definition reducing its environmental effectiveness.

- This would only be justifiable, if operators excluded would be subject to equivalent measures undertaken at national level ensuring that they contribute their appropriate share to the overall reduction efforts of the EU.

- As set out above, the objective is to increase cost-effectiveness to small emitters through identification of an appropriate threshold. Since small emitters are usually compliance companies, i.e. they do not trade allowances, but ensure that the number of allowances surrendered complies with their emissions, cost-effectiveness is mainly a matter of administrative costs[36].

- Consequently, the threshold should be chosen, in order to allow the maximum gain in terms of reduction of administrative costs for each ton excluded from the system.

Against this background, table 3.2.6 demonstrates that choosing a threshold of 10.000 tonnes brings about the best relative ratio between a "ton lost vs. reduction of administrative costs".

Table 3.2.6: Comparison of a 10.000 and 25.000 tonnes threshold for optional exclusion of small installations with respect to the reduction of administrative costs

No	Subject	10.000 tonnes/yr	25.000 tonnes/yr
1	Number of installations	4200	6300
2	Emissions excluded from the EU ETS*	15 mio t	50 mio t
3	Emissions excluded from the EU ETS in % of NAP II allocation	0.7	2.4
4	Administrative costs on average**		
	- per regulator/yr	€ 6500	
	- per operator/yr	€ 8500	
5	Total administrative costs on average per installation/yr	€ 15000	
6	Overall reduction of administrative costs***	€ 63 mio	€ 94.5 mio
7	**Reduction of administrative costs per tonne excluded****	**€ 4.2**	**€ 1.89**

Legend and explanations:

* estimates from ENTEC 2007b

** average of administrative costs for operators ranging between € 2000 and € 15.000 and for regulators ranging between € 3000 and € 10.000

*** [5]*[1]

****[6]/[2]

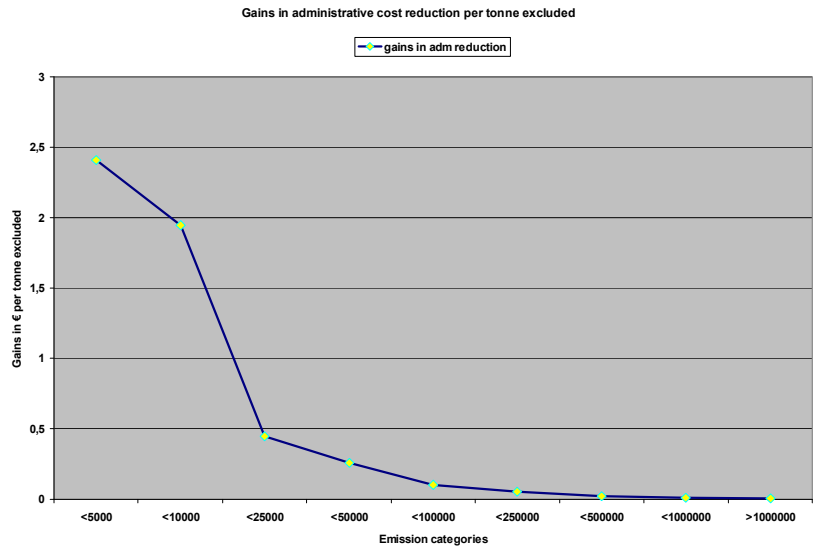
36 This is in contrast to the issue of compliance costs, which would matter in the case of a command-and-control approach.

Source: ENTEC 2007b, PWC

As can be seen from row 7 in table 3.2.6, the reduction of administrative costs per tonne excluded amounts to €4.2 in the case of a 10.000 tonnes threshold, while the corresponding figure for a threshold of 25.000 tonnes would only be €1.89. This means that in the former case the gain or economisation of administrative costs is 222% higher per tonne than in the latter. Against this background, the variant with 10.000 tonnes looks much more promising in terms of striking the right balance between reducing the scope of the EU ETS and improving the cost-effectiveness of small installations.

This result is not surprising, as is demonstrated by figure X below. The graph, which is based on figures from the European Environment Agency and using the same administrative cost indications and method as above, confirms that indeed an emission threshold of 10.000 tonnes scores much better than that of 25.000 tonnes.

Figure 3.2.6: Gains in administrative cost reduction per tonne excluded



Source: EEA 2006a and own calculations

For any of the other options, compliance with the objective could only be assumed to a lesser extent, if at all:

– Option 3.8b could potentially lead to a quite high level of emissions excluded from the system and would not comply with the overall objective to fully exploit the potential of the EU ETS to contribute to the EU's overall GHG reduction commitments in an economically efficient manner.

– This would also hold for option 3.9.

The issue should also be considered in the context and in connection with options accruing from section 3.1 and 3.3. An overview is provided in section 3.4.

With respect to alternative instruments, a CO2 tax might be preferable to the EU ETS in the case of small emitters excluded from the EU ETS.

3.3. Inclusion of new sectors and gases

3.3.1. Identification of Problems

The first trading period of the EU ETS from 2005 – 2007 was very much designed as a learning-by-doing phase. It focussed on creating the critical mass for a liquid trading market and establishing the necessary monitoring, reporting and verification infrastructure. For this reason, the Directive focussed, like all successful applications of cap-and-trade systems in various environmental domains have done, mainly on large stationary sources and only on CO2 emitters, while in principle it covers all greenhouse gases (see Annex II of the Directive).

Based on available NAP II decisions and relevant GHG monitoring reports submitted to the UNFCCC[37], the EU ETS covers a share of 37% of total GHG emissions of the European Union. This means that the balance of GHG emissions is subject to no measures or measures, which are most likely, less cost-effective. Expanding its coverage by inclusion of new sectors and gases would have two effects:

- it would enhance the environmental effectiveness of the system, since it would cover a larger share of total EU GHG emissions;
- it would introduce new and additional abatement opportunities to the system, thereby offering a higher abatement potential and lower abatement costs[38], which may ultimately lead to lower allowance prices. It would thus render the system more efficient.

The question of whether new sectors and gases can be included would depend on whether certain criteria can be met. This would first and above all apply to criteria assessing the monitoring, reporting and verification (MRV) requirements, as the implementation of robust MRV must be considered a "conditio sine qua non" for the inclusion of new sectors and gases. Otherwise, the environmental integrity of the EU ETS would be jeopardised.

Experience gathered so far has enabled the Commission to revise the initial monitoring and reporting guidelines (MRG) with a view to both improving the monitoring, reporting and

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[37] See Annual European Community greenhouse gas inventory 1990-2005 and inventory report 2007, available from http://reports.eea.europa.eu/technical_report_2007_7/en and "Climate Change: Commissioner Dimas welcomes 2005 reduction in EU greenhouse gas emissions and calls for further action", Press release IP/07/835, available from http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/835&format=HTML&aged=0&language=EN&guiLanguage=fr as well as press release on the Commission Decision on the Danish NAP, available from http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1274&format=HTML&aged=0&language=EN&guiLanguage=en

[38] It has been suggested that compliance costs could potentially be reduced by up to 30-40% through the inclusion of new sectors and gases provided, however, that certain conditions including accurate monitoring, reporting and verification issues are met (see Final Report of the 1st meeting of the ECCP working group on emissions trading on the review of the EU ETS on the scope of the Directive, http://ec.europa.eu/environment/climat/emission/pdf/report_1st_meeting.pdf).

verification process and making the rules clearer and more cost-effective[39]. The new rules may also lay the ground to include new CO2 emitting sectors.

Some Member States have announced their intention to make use of Article 24 of the EU ETS Directive with a view to opting in N2O. The Commission is currently elaborating the necessary MRG for N2O, which enables a Community-wide inclusion of N2O and might be used as an example for the inclusion of other sectors and gases.

When deciding on the inclusion of new sectors and gases, the objective of contributing to transforming Europe into a low greenhouse-gas-emitting economy entailing the need for reinforcing a clear, undistorted and long-term carbon price signal has to be taken into account. While the potential and costs of abatement may also play a role in this respect, its non-availability must not constitute a reason not to include a given sector within the EU ETS. Otherwise, emergence of a non-distorted carbon price signal may be slowed down and thus jeopardise dynamic efficiency, which is an indispensable requirement to achieve the above mentioned objective. In this context, it is worth recalling the reference of the Presidency conclusions of the European Council in June 2007 to emission reduction targets by 2050.[40]

In the event that inclusion of a sector in the EU ETS should raise serious problems with respect to international competitiveness of this sector, measures related to other elements of the EU ETS are thought to remedy these problems.

In the light of the above, there is reason to believe that further efficiency gains for the system as a whole could be achieved by the inclusion of new sectors and gases.

3.3.2. Identification of Objectives

- Enhancing the environmental effectiveness of the EU ETS by including new sectors in the EU ETS either emitting CO2 or other GHG, which would also help to reduce the climate change impacts of these sectors. The role of a clear, un-distorted, long-term carbon price signal, however, has to be taken into account as well as the fact that the availability of reduction potential should not play a role in the longer run, as there are already sectors included in the EU ETS with a limited reduction potential. A harmonised approach across Europe including robust MRV rules, clear legal definitions, recognizing technology and the international dimension (i.e. international competitiveness and the ability to pass or not pass through costs) should also be taken into account. However, the matter of international competitiveness as such should not constitute a reason not to include a sector, as long as alternative means are available to address the issue.

- Reduce existing intra-EU competitive distortions between competing products/sectors

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[39] The revised MRG have been adopted by the Commission and will already be applied in the 2nd trading period.

[40] "The European Council recalls its conclusions of March 2007 on an integrated climate and energy policy. It welcomes the important signal sent by the G8 Summit at Heiligendamm. The clear reference to at least halving emissions by 2050, the commitment to the UNFCCC process (UN Framework Convention on Climate Change) and to achieving a comprehensive post-2012 agreement by 2009 provide an encouraging basis for the upcoming UNFCCC negotiations which should be launched in Bali in December 2007." Presidency Conclusions of the Brussels European Council, 10/11 June 2007, paragraph 40.

Criteria designed to reach these objectives are considered to represent the criteria to be used when deciding on inclusion of new sectors and gases, as requested by the Council[41].

3.3.3. Policy Options and Screening

3.3.3.1. Criteria for inclusion of new sectors and gases

In line with the requirements to ensure effectiveness, efficiency and consistency of the policy options, the following criteria will be applied in the screening process:

- ***Significance of the source***
    - The share of the source in EU GHG emissions. However, it is important to note that this criterion does not necessarily preclude smaller sources, if their inclusion would comply with the overall objectives of the review, in particular the need to reinforce an undistorted carbon price signal. Furthermore, it would need proof if it was technically feasible to bring them into the system as the most cost-effective way to achieve emissions reductions relative to alternative measures outside of ETS;
    - The trend of the sector/GHG in the EU25[42], because fast growing sources of emissions mean that they will be more significant in later years if not adequately controlled.
- ***Feasibility to monitor the emissions***
    - Achievable level of uncertainty (low <10%, medium 10-20%, high >20%), which is important for the environmental effectiveness of the system as well as the functioning of the allowance market in relation to the number of allowances needed for compliance. This is best achieved where similarly robust levels of accuracy are available across all participating installations.
    - Data collection: above if it is not possible to easily collect information on emissions this could undermine the environmental effectiveness of the system as well as the functioning of the allowance market.
    - Installation boundaries: where it is difficult to define them, it is not clear what emissions are covered by the system, potentially impacting upon its environmental integrity.
- ***Proportionality of transaction costs***
    - Number and size of emitters: smaller more complex emitters can be subject to disproportionate administrative burden under the ETS and hence reducing emissions from sectors, which contain a large number of them, may be more cost-effectively achieved via alternative measures outside of the ETS. This issue, however, has already been addressed under section 3.3.2.

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41 see http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/envir/92864.pdf

42 Data for EU-27, i.e. including Romania and Bulgária, are not available.

- Complexity of MRV requirements: Where complexity is high this will entail higher administrative costs and hence emissions reductions may be achieved in a more cost-effective via alternative measures.

– ***Interaction with existing policies and regulation***

- Existing regulation: If the source is subject to sufficient emissions reductions under alternative measures then there is little need to bring it within the scope of EU ETS as they could entail a double burden.

- Competition: If there is competition with sectors already covered, there is a desire to bring the sector into the system to reduce competitive distortions between those who are currently subject to a carbon price within the system and those outside who are not.

– ***Compliance costs***

- Abatement availability: in general, if would be preferred to include sectors with a large amount of remaining abatement potential as the mechanism under the ETS provides a cost-effective way of unlocking this. However, sectors with small remaining potential should not be precluded purely because of this due to the desire to provide a clear long-term carbon price across as much of the EU economy as possible.

The level of abatement costs may not strictly represent a criterion for exclusion or inclusion, but may be considered more for information on the likely response of the sector (e.g. net buyer or seller) within the system: Given that sectors are still assumed to be subject to alternative emissions reduction measures outside of ETS and that abatement costs only help determine the carbon price within the system itself (with all participants exposed to the same marginal price of CO_2) the level of abatement costs should not be an essential criterion on the inclusion or exclusion of a given sector.

3.3.3.2. Options to include CO2 sectors not yet included in the EU ETS and result of screening

Annex 5 provides a table indicating the results of the screening exercise against the criteria mentioned above. Consequently, the following sectors emitting CO2 are considered further for inclusion in the EU ETS:

– **Petrochemicals** and **other chemicals:** Some CO_2 emissions are already included via combustion installations and the explicit types of activity mentioned in the Phase II NAP guidance[43]. However, due to the complexity of the sector further examination surrounding a more formal inclusion under Annex I is warranted.

– **Ammonia production:** This is technically part of the chemicals sector, but because of its reasonably clear installation boundary and high level of process emissions, this 'sector' is examined separately in terms of the potential for a more formal inclusion under Annex I.

[43] Of relevance are petrochemical crackers and carbon black production

– **Aluminium production:** Direct CO_2 emissions associated with primary aluminium production are only covered via combustion installations if auto-generation is used. However, this is only estimated to be around 3% of the sector's energy consumption in the EU, primarily because production uses electricity rather than heat and steam and there is no inherent benefit to having electricity generation on-site as opposed to importing it from a dedicated producer. Process emissions of both CO_2 and PFCs (the latter of which are not effectively impacted on by the F-gas regulation) from primary aluminium production are significant and would need to be formally included in Annex I of the Directive.

There are some sectors, which are already covered to some degree or which will be covered automatically in a move to a broad interpretation of combustion – and for which more explicit coverage is not needed within Annex I:

– **Food and drink (CO_2)** This sector generally contains a large number of small sources, some of which are brought into the system via the definition of combustion installation, if they are above the 20MW threshold. In addition, the move to a broad interpretation of combustion will bring in a greater number of types of installation in this sector, again provided that the thresholds are met. Given the negligible process emissions and the fact that most significant sources are captured via combustion installations in Annex I of the Directive this sector is not considered further.

– **Production of rockwool and oil/gas flaring –** are already included in the EU ETS, as they were explicitly required by the additional NAP 2 guidance. They would be covered by a broad interpretation of combustion installation.

– **Gyspum (CO_2)** This sector has already been included by some MSs in Phase II and is automatically covered by the move to a broad interpretation of combustion installation (where the relevant thresholds are met). Given the negligible process emissions there is no need to bring this sector in more explicitly under annex I.

A CO2 emitting sector not yet covered and not deemed suitable for inclusion at this stage is:

– **Waste incineration (CO_2)**: This sector is already covered by both the Waste Incineration Directive and IPPC as there is a need for careful control of other pollutants from waste incineration. In addition, MRV requirements are likely to be complex due to the high variability in the composition of the waste stream.

3.3.3.3. Options to include other GHG emissions

Annex 6 provides a table indicating the results of the screening exercise against the criteria mentioned above. Consequently, the following sectors emitting other GHG are considered further for inclusion in the EU ETS:

– **Nitric acid and adipic acid production** (N2O) as it is a non-CO2 greenhouse gas the sector would need to be formally included as a separate Annex I activity under the Directive. Following an opt-in request furthermore the inclusion of N_2O from the production of glyoxalic acid and glyoxal should be considered.

The following sectors are not deemed suitable for inclusion:

– **Natural gas distribution (CH_4):** High levels of uncertainty and difficulties in defining the installation mean there are technical issues with bringing this sector into the system. In addition, the choice of abatement options is limited, and so other direct regulatory measures may be more appropriate.

– **Semiconductors (PFCs):** The F-Gas Regulation (842/2006) already tightly covers the use of PFCs in the semiconductor industry, and it is also subject to a worldwide voluntary agreement. Hence inclusion under ETS would impose a double burden.

– **Magnesium foundries (SF_6):** Under the F-Gas Regulation (842/2006), the use of sulphur hexafluoride (above 850kg per year) in magnesium foundries will be prohibited from 1 January 2008. Hence it is already tightly covered by existing regulation and inclusion under ETS would impose a double burden.

Coalmine methane (CH4) is already effectively captured by the EU ETS where it is used as a fuel in combustion installations (>20 MW). The remaining emissions are more appropriately considered as domestic offset projects and hence are examined in chapter 6.

3.3.4. Impacts on sectors through inclusion in EU ETS

3.3.4.1. Some general remarks

The following analysis is carried out sector by sector due to specificities of sectors. It is also based on the assumption that the screening process (see above) has proven the overall feasibility of including the sector from a technical point of view (i.e. possibility of MRV, reasonable complexity etc).

Against this background, specific features of the various sectors will be looked at with a view to determining the impacts possibly accruing from their inclusion in the EU ETS. The assessment criteria applied are environmental effectiveness, economic efficiency, administrative costs, competition and competitiveness and employment. Potential impacts on competitiveness of the sectors concerned may depend on the degree of allocating allowances for free and on the effectiveness of other measures to address potential competitiveness concerns. This as well as other aspects related to the matter of competitiveness are discussed in more detail in section 5.6. For this reason, and in order to avoid duplication, only some specific aspects are mentioned in this section, while general considerations are presented in chapter 5.

3.3.4.2. CO2 emissions from petrochemicals production and other chemicals

General remarks: This paper refers to the "chemical sector"[44] when a broader view is needed than only petrochemicals. However, as this chapter explains, it is possible to focus mainly on petrochemicals. Most chemical processes need significant energy input (at least for starting the reaction) and as a consequence, combustion installations can be found in most chemical production plants. However, respective considerations are already addressed in chapter 3.1. In the current chapter only chemicals are considered where significant process emissions occur and which therefore would not necessarily be covered under the activity "combustion installation". As a result of a first screening, relevant[45] chemicals productions can be summarized under the heading "petrochemicals", as the only other chemicals sector coming out of the screening is ammonia synthesis, which is treated separately (see chapter 3.3.4.3.). In order to roughly define the petrochemicals sector, it is useful to classify organic chemical sectors into

- upstream mineral oil refineries
- mid-stream petrochemical processes, which can be divided into a narrow petrochemical sector and a wider petrochemical sector and
- downstream other chemicals, often referred to as "large volume organic chemicals" (LVOC)

Annex 7 contains an illustration of this division of the chemicals sector. Of the named sectors, mineral oil refineries are not further discussed, as they are already covered by the current scope of the directive (through Annex I). Furthermore, carbon black production and emissions from crackers are covered for inclusion in the ETS by the NAP II guidance. All other combustion installations in the chemicals sector with a capacity of 20 MW and more are already included in the EU ETS or at least will be under the broad scope (see chapter 3.1.). A

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44 This is only a very small part of all chemical industry regarding the number of substances produced, but still the major part regarding CO_2 emissions. Several (not completely precise) definitions of chemical sub-sectors exist, which often distinguish partly the input, the output, certain production processes or the scale of the production. E.g. the BREF documents are classified into LVOC (large scale organic chemistry, which is roughly comparable in coverage to "petrochemicals"), OFC (organic fine chemicals, which also include pharmaceuticals, biocides, dyes and pigments as well as explosives), LVIC (large volume inorganic chemicals, two documents: AAF (ammonia, acids and fertilizers), S (solids and others)) and SIC (speciality inorganic chemicals), Polymers (with some overlap to petrochemicals), Chlor-alkali manufacturing industry. Refineries are usually considered not to be chemical industry, but still petrochemical processes (especially cracking) are found there. Note that most of the activities under IPPC can be considered to a certain extent to be chemical processes, but by common understanding they are treated separately, e.g. all metals production and mineral industries.

45 Because of its sheer diversity (several thousands of chemicals are produced at industrial scale), it is not useful to focus on single substances (with the exception of some large volume chemicals), but on (groups of) processes which are commonly used in the chemical industry. By this approach it becomes obvious that all processes using carbon in some form as input can be preliminarily included in the screening. Either carbon is used in its carbonate form, or as hydrocarbon. As relevant large scale processes of the first group of inputs is already covered by the ETS under the heading "mineral industry", all chemical processes which use hydrocarbons would be possible to include in this analysis. Hydrocarbon chemistry is generally called "organic chemistry", with the exception of ammonia production, as the latter is no hydrocarbon and consequently an inorganic chemical.

broad interpretation of combustion would also add a number of further activities to the scope of the EU ETS[46]

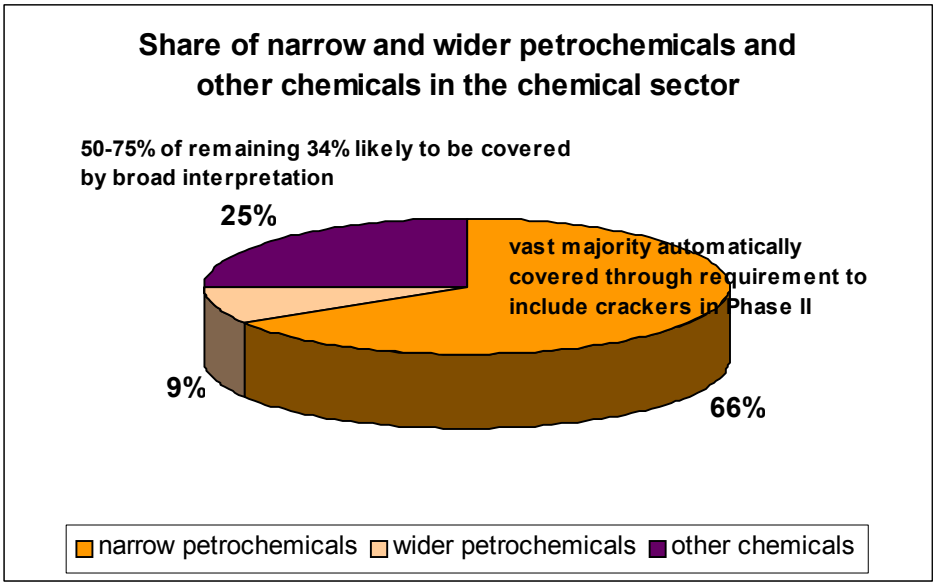
Table 3.3.4.2.A

	Share	MtCO2
narrow petrochemicals	66%	87
wider petrochemicals	9%	12
other chemicals	25%	33
total	100%	132

Source: ENTEC 2007b

Environmental effectiveness: Due to the complexity of the chemical processes concerned in combination with a lack of data, it is not possible to accurately indicate the emissions that would be captured by including the chemical sector in the EU ETS on top of a consistent application of a broad interpretation of combustion installation. The following figure is based on information provided by ENTEC 2007b.

Figure 3.3.4.2.A



Source: ENTEC 2007b

Although the figures must be strongly caveated due to the fact that they are based on UK data extrapolated to the EU, the figure shows that the bulk of emissions from the chemical sector would already be covered through the inclusion of crackers in Phase II and under a broad interpretation of combustion installation. Only 9-17% of total emissions from the chemical sector amounting to approximately 11 – 22 MtCO2 might not be included, but would mainly consist of small emitters with less than 20 MW rated thermal capacity. However, for the sake of legal clarity, it would nevertheless be useful to include the chemicals sector in Annex I of

46 ENTEC 2007b.

the Directive. In order to target the large emitters, this inclusion should preferably aim at petrochemical production processes, as a broad definition of combustion installations would cover the rest of the chemical industry, while ensuring through the 20MW threshold that the smallest emitters stay outside the ETS.

Economic efficiency: Reduction or abatement potential might amount to 20% of the sector's total emission, however at relatively high cost as many lower cost abatement measures have already been taken to help reduce energy costs.

Competition and competitiveness: While the inclusion of petrochemical crackers within Phase II has helped to sort out some competitive distortions on the internal market, including the chemical sector more widely would also help reduce competitive distortions with installations producing similar materials on sites already covered by the EU ETS (e.g. petrochemical installations inside refineries).

With respect to the competitive situation with non-EU competitors, modelling[47] suggests that whilst there may be some impact on the chemical sector, it is not likely to be too significant at an aggregate level. This is in line with another study, which looked at the chemical sector in one Member State[48] and according to which the impact of inclusion of the chemicals sector in the EU ETS on operator profitability and competitiveness appears relatively limited[49].

Administrative costs: Since petrochemical installations tend to be large and are already extensively monitored (IPPC and LCP Directive), the overall administrative burden accruing from inclusion in the EU ETS should not be disproportionate. Consistent coverage of the sector may even remove some regulatory complication.

While monitoring and reporting requirements of the sector may create some additional burden to public authorities, the overall approach to be applied in this respect will not be different from the approaches used in other ETS sectors.

Employment: So far, there is no evidence that negative employment effects would occur which can be attributed to the inclusion of the chemicals sector in the EU ETS.

3.3.4.3. Ammonia

Environmental effectiveness: The estimated share of emissions released from the production of ammonia amounts to approximately 2.25% of GHG emissions covered by the EU ETS in phase II. It roughly corresponds to 45 Mt CO2 and is split between emissions from combustion (appr. 15 MtCO2) and process emissions (30 MtCO2). It is worth noting that a broad interpretation of combustion installation, as discussed in section 3.1 would include the combustion share of ammonia related emissions, but not necessarily the process emissions. Increasing the environmental effectiveness of the EU ETS, but also because there are considerable possibilities to shift parts of the energy input (and thus the emissions) between the combustion part and the reaction part of the installation, the regulatory clarity and the

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47 Using the GEM-E3 model, see LETS Update: Sustainability Appraisal Report, cited in ENTEC 2007b and available from http://e3mlab.ntua.gr/reports/LetsUpdate_Report.pdf, where also a short description of the GEM-E3 model and the results of the modelling can be found.

48 Potential Expansion of the EU ETS in the UK to the Petrochemicals Sector, report by Defra by NERA and ENTEC UK Ltd, 2005.

49 Further details see ENTEC 2007b.

avoidance of possible "cheating" (i.e. optimize the combustion/process shift after allocation and consider it emission reduction) demands the inclusion of the whole emissions.

Economic efficiency: The results of the screening exercise (see Annex 5) showed that emissions from ammonia production would be well suited for inclusion in the EU ETS: low uncertainty in terms of monitoring the emissions, good data collection possibilities, clearly defined installation boundaries (only in the case of full inclusion instead of combustion only), good abilities to identify the operators and easy verification possibilities are promising in this respect. In addition, the small number of companies, which all operate large plants, low complexity of MRV matters also support this finding as does the medium to high abatement potential.

The main abatement techniques for ammonia production are related to process changes. 23% of the CO2 emissions in ammonia production can be reduced across both combustion and process emissions[50]. Total abatement costs are referred to as "reasonable".

Administrative costs: Costs for operators in terms of MRG would not be excessive due to the relatively low complexity of the process and the high level of existing regulation. There are generally large plants with about 76% of production based in Germany, Netherlands, France, Belgium and the UK. Costs for public authorities are considered to be similar to other sectors with large and less complex installations, i.e. relatively low.

Competition and competitiveness: In the Netherlands, ammonia producers were initially included, but have been opted out, as other EU-based competitors were not included in the system. Inclusion at EU level would therefore be beneficial for the functioning of the internal market and remove currently existing competitive distortions emerging from an inconsistent interpretation of combustion in Member States.

With respect to the competitive situation in comparison with non-EU competitors, it has to be noted that there are competitive advantages of non-EU competitors located in Russia and the Middle-East due to access to cheaper natural gas. Imports of ammonia from outside the EU rose from 12% in 2005 to 17% in 2006 (ENTEC 2007b). High gas prices have caused several ammonia plants in the EU to shut down. However, in the longer term, increasing demand from Asia may alleviate the competitive pressure on European producers. Also costs of logistics (handling and transportation of the product for imports from outside the EU) play already an important role[51] and may, in the longer term, partially offset competitive advantages of non-EU producers[52]. Against this background, it cannot be fully excluded that, in the short term, EU ammonia producers may have to cope with increasing competitive pressure from non-EU producers, if included in the EU ETS. In the longer term, however, additional pressure accruing from inclusion in the EU ETS may decrease, thus providing a more level-playing field like competition between EU and non-EU producers.

Employment: Bearing in mind competitive advantages of external production sites (cheap energy prices, almost no transportation costs for energy) and continuing demand from emerging economies in Asia, negative effects on employment cannot be fully excluded in the

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50 ENTEC 2007b.

51 According to ENTEC 2007b, the cost of logistics may represent over 20% of the price paid by farmers for European manufactured fertilisers and substantially more when the product is imported from other sources produced outside the EU.

52 In particular, if transportation costs may also contain an appropriate carbon component.

future, however, can most likely not be attributed to the carbon constraint accruing from the EU ETS, but to a whole bunch of considerations, among which the EU ETS may figure, but not very prominently.

3.3.4.4. Aluminium (CO2 and PFC emissions)

Aluminium contains a number of desired properties and is therefore widely used in transportation, packaging and the construction industries, as it combines light weight with high strength. Carbon fibres and other composite materials are increasingly used to substitute for aluminium in certain applications. There is primary and secondary aluminium production, which are different in many respects: all direct CO2 and PFC emissions from aluminium come from primary production, while secondary aluminium production only accounts for 6% of indirect CO2 emissions and does not entail any PFC emissions. In addition, primary aluminium production is carried out in a small number of large installations, while there are many more smaller installations producing secondary aluminium.

Since the production of primary aluminium requires a large amount of electricity[53], aluminium production is already affected by the EU ETS through indirect price effects, although usually aluminium producers enjoy long-term electricity supply contracts, which may alleviate the overall price effects on aluminium. However, this would depend on the respective provisions of the contract concerned.

Environmental effectiveness: Including the aluminium sector in the EU ETS would increase its scope and thus its environmental effectiveness. Low uncertainty in terms of monitoring the emissions, good data collection possibilities, clearly defined installation boundaries and a limited number of large installations provide sufficient evidence that emissions can be adequately monitored, reported and verified and thus safeguard the environmental integrity and effectiveness of the system. Furthermore, the limited number of installations and their relatively large amount of emissions compared to the average emissions of EU ETS installations also advocate including the aluminium sector in the EU ETS.

The overall share of aluminium production in EU GHG emissions corresponds to 0.4% or 8 MtCO2 plus another 0.2% or 4 MtCO2eq in the form of PFC on the basis of EU ETS Phase II allocations. These figures represent direct emissions in the form of process emissions[54]. Based on these figures, average annual emissions of primary aluminium installations would amount to 0.5 MtCO2, which is 219% of the average emission of all installations under the EU ETS.

A specific feature of the aluminium sector emerges from the fact that it does not only emit CO2, but also PFC, which is a very powerful GHG with a global warming potential of approximately 6500[55]. Since the emission of PFC points to flaws in the production process, there is a general incentive for the aluminium industry to avoid creating PFC emissions. According to the European Aluminium Association (EAA), the abatement potential for PFC is greater than for CO2. For this reason, EAA advocates including PFC, too, if CO2 from the aluminium industry is to be included.

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53 According to McKinsey 2006, but also other sources, one tonne primary aluminium requires 15 MWh of electricity.

54 The share of indirect emissions through the consumption of electricity is on average higher. It accounts for 55% of total average emissions per ton aluminium produced.

55 This means that 1 kg of PFC corresponds to 6500 kg of CO_2 in terms of global warming potential.

Economic efficiency: Including the aluminium sector would contribute to the overall economic efficiency of the system, as it broadens the scope of the system. Due to the relatively low abatement potential in the aluminium sector estimated at 7.5% and resulting in relatively high abatement costs, the sector is expected to be a net buyer on the allowance market. In 2008, 90% of aluminium plants will be BAT plants following significant reductions in the past years. However, new abatement technologies are under development, but are not thought to be commercially available before ten years from now[56]. Including the sector in the EU ETS could promote research and development of less carbon intensive technologies. Most of the direct emissions from aluminium production are process emissions, which cannot be avoided. Exceptions to this rule are PFC emissions (see above).

Due to the specific features of the production process, aluminium is thought to be exposed to indirect effects accruing from rising electricity prices. Bearing in mind the huge amount of electricity used to produce one tonne of aluminium, this seems comprehensible. It also means that, albeit not yet included in the EU ETS, the aluminium sector had to cope with these effects in the past. Rising demand for the product underpinned by constantly growing prices from $1800 (2005) to $2800 (2007) per tonne on the global aluminium market have certainly helped the European aluminium industry in this respect.

A specific feature of the aluminium sector emerges from the fact that it does not only emit CO2, but also PFC, which is a very powerful GHG with a global warming potential of approximately 6500[57]. Since the emission of PFC points to flaws in the production process, there is a general incentive for the aluminium industry to avoid creating PFC emissions. This objective, however, has not been reached yet. According to the European Aluminium Association (EAA), the abatement potential for PFC is greater than for CO2. For this reason, EAA advocates including PFC, too, if CO2 from the aluminium industry is to be included.

Administrative costs to the operators are considered to be medium, since the sector (primary aluminium) consists of large installations with clear boundaries. The process is complex, but highly controlled. Due to the small number of installations, the impact on public authorities is not likely to be significant, at least concerning the primary production. Secondary aluminium production concerns a larger number of smaller plants, which may lead to slightly increased costs of regulation relative to primary aluminium.

Operators may face some one-off administrative costs when setting up the necessary monitoring and reporting facilities. However, due to the relatively large emission quantities, the average costs per ton emitted are expected to be very low and would further decrease over time due to efficiency gains, which can reasonably be expected.

Competition and competitiveness: On the EU internal market, aluminium competes with several other materials (such as steel) in transportation, the construction sector and as packaging material. As most of these competing materials are already included in the system, full inclusion of the aluminium sector could reduce the existing distortion of competition as this would better reflect the full carbon costs of competing products. For reasons of consistency it is better to include both primary and secondary aluminium, although the latter is composed of a larger number of smaller plants. Secondary Aluminium would already be

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[56] The use of inert anode cells replaces carbon anodes thus eliminating emissions of PFC and CO2 from electrolysis process (ENTEC 2007b).

[57] This means that 1 kg of PFC corresponds to 6500 kg of CO_2 in terms of global warming potential.

covered by broad combustion definition. Inclusion of primary Aluminium (which is higher polluting) seems environmentally appropriate.

Aluminium produced in Europe is thought to be exposed to strong international competition, because production costs can be significantly cheaper outside of the EU. This is demonstrated by the table below, showing rising imports (in relative and absolute terms) from outside the EU in 2003 and 2004, i.e. before entering into force of the EU ETS.

Table 3.3.4.4: International exposure of European aluminium market

Year	Production (Mt)	Imports (Mt)	Exports (Mt)	IPR	ER
2003	1.96	2.54	0.02	0.57	1%
2004	1.92	2.60	0.04	0.58	2%

Source: LETS (2006) (from ENTEC 2007b)

Notes: Figures are for production and trades of unwrought, non-alloy aluminium for EU25 countries. Import Penetration Ratio (IPR) is the proportion of home consumption that is made up of imports. Export Ratio (ER), which represents the proportion of home production that is exported.

The competitive intensity of the global aluminium sector does usually not allow passing through costs to customers without losing market shares, or, in the case of the aluminium market dominated by a small number of global players[58] avoiding carbon leakage. ENTEC 2007b provides an example showing that aluminium production in the EU may experience cost increases exceeding the average earnings before interest and taxes (EBIT) by 1.4% of total costs, even if the aluminium sector was not included in the EU ETS. They would arise from EU ETS related indirect costs increases (pass through of opportunity costs) from power generation. In the event of including the aluminium sector in the EU ETS, another 5.6% may come on top of it due to the direct emissions from alumina smelting and carbon anode baking.

However, it is important to note that the above example is based on full auctioning (zero free allocation) to the EU ETS sector. While it may be assumed that a large proportion of the carbon costs for power generation have been passed through and has affected the cost base of aluminium producers, although the extent of these effects remain disclosed, measures to address the specific situation of the aluminium sector in a transitional period to a global carbon market may, if justified, alleviate potential pressure to the European aluminium sector.

Employment: In the light of the above, it should not be excluded that the EU ETS may have negative effects on employment in the aluminium sector. In this respect it is very important to bear in mind, however, that decisions to close down factories or plants or to reduce the employment are extremely unlikely to be affected by only one factor. In particular, in the case of aluminium other reasons than the EU ETS impact may prevail. Access to cheap energy, but also other relevant geographical factors may certainly play an important role, as has been demonstrated by the move of aluminium producers to Island, long before the EU ETS became operational.

To summarise: the aluminium sector – primary and secondary production – is very well suited for inclusion in the EU ETS from a technical point of view. Its inclusion would also eliminate

[58] E.g. Alcan accounts for about 27% of production, Alcoa about 16% and Norsk Hydro about 10% (ENTEC 2007b).

some competitive distortions on the internal market and could provide incentives for new abatement measures. Bearing in mind the longer-term objective of establishing an undistorted and clear carbon price signal would also strongly advocate including the aluminium sector in the EU ETS. On the other hand, it can not be excluded that concerns on competitiveness of certain aluminium plants would result in relocation, and possibly, carbon leakage. This, however, may happen irrespective of the inclusion of the aluminium sector in the EU ETS.

3.3.4.5. Nitric, adipic and glyoxalic acid production emitting N2O

Environmental effectiveness: N2O emissions from the production of nitric, adipic and glyoxalic acid production amount to approximately 55 MtCO2eq, which roughly corresponds to 2.5% Phase II allocations with a slightly declining trend of 0.1% per year between 2010 and 2020.

The screening turns out to advocate including production of nitric, adipic and glyoxylic acid in the EU ETS (see Annex 6). Low uncertainty, good data collection possibilities, clear installation boundaries and abilities to identify the operator as well as good verification possibilities to be carried out at a small number of sizes in combination with low to medium complexity of MRV and a medium to high abatement potential underline the technical feasibility of including the sector in the EU ETS.

Economic efficiency: The relatively low abatement costs for both nitric and adipic acid production very much support inclusion of the sector also from an economic point of view.

As for nitric acid production, the average European plant emits 6 kg of N_2O per tonne of HNO_3, corresponding to about 2 tonnes CO_2eq per tonne of 100% HNO_3 (ENTEC 2007b). The BAT requirement under the IPPC Directive[59] is to emit less than 1.8 kg of N_2O per tonne of HNO_3. Any emission reductions beyond this threshold would be additional and could be traded on the ETS. According to EFMA[60], the cost of reducing emissions from 2.5 kg to 1 kg N_2O/tHNO_3 is between €1 and €5/tCO_2 equivalent. This would be possible on the basis of existing technology. EFMA also suggests that approximately 10 MtCO_2 equivalent can be reduced in addition to IPPC-related reductions.

Under a free allocation method based on additionality to the BAT split view (i.e. reductions beyond 2.5 kg/HNO3) and depending on the carbon price on the market, the inclusion of N2O from nitric acid production can allow operators not only to recover the costs of ETS-related abatement but also pay for IPPC compliance. The IEEP study of 2005 suggests that under a price of €20/tCO_2, and an allocation based on a 2.5 kg benchmark, with average in-house abatement costs below €20/tonne of abatement of CO_2 equivalent, the nitric acid producers could gain significant net revenue from abatement. LETS 2006a concludes that under prices of €10/tCO_2 the industry would incur no net gains from entering the ETS, but would not suffer major costs either.

Overall abatement costs for adipic acid production are considerable lower than those for nitric acid producers and are estimated to amount to 0.5€/tCO_2eq.

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[59] Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control (OJ L 257, 10.10.1996, p. 26).

[60] European Fertilisers Manufacturers Association

Administrative costs: The outcome of the screening implies relatively low administrative costs for both operators and regulators, since clear installation boundaries, low uncertainty and good data collection possibilities in connection with a limited amount of installations facilitate their inclusion. The necessary monitoring and reporting guidelines are currently being developed due to the planned opt-in of N2O in accordance with Article 24 of the Directive. As a consequence, almost no additional costs would be incurred at Community level.

Competition and competitiveness: Some Member States are planning to opt in N2O emissions unilaterally already for the second trading period. This may result in competitive distortions and inconsistency across the EU and for this reason, formal inclusion of the sector concerned in the EU ETS may promote well functioning of the EU internal market.

Due to the above initiative of some Member States, MRG are already under development. The full inclusion of the sector would thus not create any additional administrative costs. Also the impact on public authorities is expected to be minimal, as there are only few sites that would be affected.

There is no particular competitive pressure in comparison with non-EU competitors, as the exposure to international competition is relatively low. The IPR of adipic acid production went down from 5 to 3% between 2003 and 2004 and that of nitric acid production from 0.5 to 0.1% at the same period.

Employment: There are no indications that inclusion of nitric, adipic and glyoxalic acid production would affect employment in the industry concerned.

3.3.5. Compliance of options with objectives - summary on inclusion of other sectors and gases

In relation to the objective of expanding the scope of the EU ETS to other sectors and gases, the inclusion of the sectors and gases discussed will help to enhance the environmental coverage of the system, provide a clear long-term carbon price signal across a larger part of the EU economy and reduce intra-EU competitive distortions with sectors/products already covered. In addition, given the types of activities contained within the sectors, emissions reductions are likely to be achieved in a more cost-effective manner under the EU ETS relative to alternative systems.

Petrochemicals and ammonia: The inclusion of these chemicals appears technically feasible and warranted given the potential for abatement, relatively low administrative costs of inclusion and significant CO2 emissions. An explicit recognition as an Annex I activity may be necessary to fully include process emissions.

Aluminium: The primary aluminium sector gives rise to a significant level of direct process emissions (both CO_2 and PFCs) that are technically and administratively possible to include within the ETS. A key issue for this sector is international competitiveness, as primary aluminium is already exposed to the impact of the EU ETS through indirect effects on electricity prices, and it has limited potential to pass through increased costs. Secondary aluminium is far less carbon intensive and the cost-impact is far more marginal, and emissions are covered automatically via the move to a broad interpretation of combustion installation. Given the importance of an undistorted carbon price signal for the overall objectives of the

EU ETS, and the need to ensure dynamic efficiency, inclusion of the sector would be in line with the objectives of the review of the EU ETS.

N_2O emissions from nitric and adipic acid production are (relatively) technically and administratively straightforward to include in the system. International competitiveness issues are relatively limited. The main issue is how to allocate to the sector within the ETS due to a high proportion of low cost abatement options (particularly from nitric acid plants) and strict benchmarking methods are likely to be necessary.

International competitiveness is a key issue for aluminium but, at least in the short term less so for the other sectors considered. It is, however, important to bear in mind that overall competitiveness of EU industries depends on a number of factors, among which the EU ETS may figure, but may not play a decisive role in the short and medium term.

Table 3.3.5. Summary of the impact of options in relation to relevant problems and objectives

Option	Environmental Effectiveness	Economic Efficiency	Administra-tive Costs	Competition/ Competitiveness	Employment
Petrochemicals and chemicals	+	+	0/+	0/+	0
Ammonia	+	+	0	-/0	-/0
Aluminium	+	0/+	0	-/0	-/0
N2O emissions	+	+	0/+	+	0

+ positive effect, 0 neutral/no or negligible effect, - negative effect

3.4. Overview of trade-offs emerging from options on streamlining the scope, increasing cost-effectiveness as regards small installations and inclusion of new sectors and gases

Streamlining the scope via the move to a broad interpretation of combustion installation in combination with an activity based approach along with the specific inclusion of the abovementioned other sectors and gases will help to expand the scope of the ETS relative to Phase II, whilst the implementation of rules to exclude small emitters will help to render the overall system more cost-effective.

Expansion will help to achieve the EU's key objectives of enhancing the environmental coverage of the system, provide a clear long-term carbon price signal across a larger part of the EU economy and reduce intra-EU competitive distortions with sectors/products already covered. Exclusion of a number of small emitters from the system does not offset its expansion, but will render it more efficient in administrative terms.

Whilst there is a high level of uncertainty within some aspects of the data, the table below shows that, on balance, the scope of emissions covered under the ETS is likely to be expanded under the options considered above.

Overview table: Trade-offs between streamlining the scope, cost-effectiveness for small installations and inclusion of other sectors and gases

Option	Impact on coverage of EU ETS		Comments
	Estimated emissions covered (MTCO2eq)	share of Phase II allowances	
Current situation: Phase II allowances	2083	100%	on the basis of 24 NAPs approved
Streamlining the scope			
Broad interpretation of combustion installation of which	40 – 50	2 – 2.5%	
- petrochemicals and other chemicals	20 – 25		
- gypsum	unknown		
- ammonia	up to 15		
- other	remaining		
Potential additional inclusion from streamlining the scope	40 – 50	2 – 2.5%	
Inclusion of other sectors and gases			
- adipic, nitric and glyoxylic acid production	up to 55	2.5%	
- aluminium (CO2 and PFC)	up to 12	0.6%	
- ammonia	up to 30	1.5%	
Potential additional inclusion from inclusion of other sectors and gases	up to 97	up to 4.6%	
Potential additional total inclusion	up to 137 - 147	up to 6.6 – 7.1%	
Cost-effectiveness of small installations			
- option 3: combination of capacity and emission threshold			no of installations excluded (2006 verified emissions):
20 MW plus 25 kt	- 50	- 2.5%	appr. - 6300
20 MW plus 10 kt	- 15	- 0.7%	appr. - 4200
- option 5a: 3 MW aggregation threshold	- 1	> 0.1%	appr – 800 (most, but not all of them may already be excluded by combination of capacity and emission threshold)
Combination of option 3.6 and 3.8a: Potential exclusion from the EU ETS			no. of installations excluded
20 MW plus 25 kt	- 50 to 51	up to – 2.6%	appr. – (6300 + ~800)
20 MW plus 10 kt	- 15 to 16	up to – 0.8%	appr. – (4200 + ~800)
Potential impact of combined policy options			
	$MtCO_2$	share of Phase II allowances	
Potential total inclusion minus exclusion based on combination of option 3.6 and 3.8a:			no of installations excluded (2006 verified emissions):

20 MW plus 25 kt	up to 86 - 96	up to 4 – 4.5%	appr – (6300 + ~800)
20 MW plus 10 kt	up to 121 - 131	up to 5.8 – 6.3%	appr. – (4200 + ~800)

Implementation of a broad interpretation of combustion installation, the inclusion of other sectors and gases as discussed as well as increased cost-effectiveness for small installations by a combined implementation of options 3.6, 3.7 and 3.8a would lead to an additional net gain in terms of coverage of the EU ETS in the case of a 25 kt emission threshold of 4 – 4.5% with approximately 60% less installations without compromising the environmental effectiveness of the system, as regards installations excluded from the system. In the case of a 10 kt emission threshold the corresponding figures would be 5.8 – 6.3% with appr 40% less installations.

3.5. Carbon capture and storage

Directive 2003/87/EC, which lays down the provisions governing the EU Emissions Trading System (EU-ETS), does not explicitly refer to carbon capture and storage (CCS) as a potential option to curb greenhouse gases from European industries. However, CCS projects can be recognised through Member State inclusion under Article 24 of the Emissions Trading Directive ("opt-in"). Inclusion of CCS beyond 2012 is particularly important given the long-term potential for emissions reductions from CCS. While estimates vary widely and are subject to considerable uncertainty it is thought that capacity exists to store several decades worth of current global CO_2 emissions (approximately 30 $GtCO_2$/year). The IPCC gives an estimated range of the economic potential for the cumulative global reduction of emissions from CCS in this century of 220-2200 $GtCO_2$ - by comparison current EU ETS emissions are of the order of 2 $GtCO_2$/year.

3.5.1. Identification of Problems

In the light of the great potential offered by CCS, the technology should contribute to achieving overall GHG reduction targets of the EU. However, the current state of technology does not yet allow making widespread use of CCS, which is still under development.

In order to exploit the potential of CCS in the longer term, the further development of CCS to contribute to mitigating GHG emissions under economic conditions is necessary. Economic incentives have to be provided, which help to advance CCS in a technology neutral manner.

3.5.2. Identification of Objective

– Contributing to the exploitation of the long-term potential offered by Carbon Capture and Storage to achieve the GHG emission reductions set by the EU Heads of State and Government by including CCS in the EU ETS, thereby providing necessary financial incentives to promote and use CCS, in particular in the long term.

3.5.3. Policy Options and Screening

Beside the current situation characterised by unilateral opt-in on initiative of Member States on the basis of Article 24 of the Directive, there are two options to be explored:

(11) **Option 3.11: Opt-in of classes of project:** Admit classes of projects one by one, through the current opt-in procedure, but with a harmonised generic approval possible for any opt-in, applicable throughout the EU.

(12) **Option 3.12: Mandatory inclusion of all CCS:** Include all CCS projects up front, by explicit reference to CCS in Annex I of the Directive

3.5.4. Impacts – Comparing the Options

Effectiveness

- **Coverage:** Most expanded coverage in terms of installations and emissions might be achieved by option 3.12, although the economic incentive for CCS provided by emission trading would be expected to result in full uptake under option 3.11. However, only few projects will be operational by 2020 (according to modelling based on PRIMES, baseline suggests by 2020 <0.5% of CO2 from power and steam are captured), so, in real terms, there is probably no difference in effect between both options.

- **Transparency:** In the long run, a consistent harmonised approach for CCS is needed for the sake of transparency. This consideration clearly advocates option 3.12: Explicit inclusion of CCS in Annex I would provide a clearer positive signal to the market with regard to the future of CCS in the ETS. However, a fundamental prerequisite of option 3.12 would be that suitable MRGs can be prepared for all CCS projects and all environmental and liability issues of CCS can be managed.

- **Environmental integrity:** The latter might be in particular important, if unsuitable storage sites are used, which in the long and longer-term would release CO2. A solution of this problem depends on an appropriate legal framework laid down in proposal XXXX. If acceptance of all classes of CCS projects were restricted to projects permitted under the proposed framework, there should be no risk of inclusion of projects that possess poor long-term storage integrity.

- **Innovation:** Depending on the regulatory framework, recognition of CCS under the ETS will have a major impact on CCS deployment and thus on relevant research and development. Recognition of CO_2 captured and stored as not emitted will incentivise the operator to deploy CCS where it is cheaper to do so than to surrender allowances. Although at present market prices, the currently high costs of CCS mean that it is unlikely to be deployed on market grounds alone, this will change as the carbon market matures and CCS becomes cheaper.

The different ways of recognising CCS may only have a limited differential impact on CCS innovation. Full inclusion of CCS projects up front (option 3.12) might induce a higher amount of CCS projects than a case by case inclusion of CCS (option 3.11), due to the increased certainty and transparency for developers and investors, which might bring about a broader range of CCS technologies in the case of the former. For this reason, there might be a change in innovation induced by option 3.11, which might not occur in the event of option 3.12, which would entail a higher degree of regulatory uncertainty to the investment.

Efficiency

– **Technical feasibility/simplicity**: With a case by case inclusion of classes of projects into the ETS (Option 1) and the relevant application of Article 24(3), the appropriate monitoring and verification guidelines best suited to certain classes of projects would likely be harmonised and implemented across the EU. The question is whether the MRGs adopted for opt-in would be likely to apply to all potential CCS projects robustly. For capture and transport, this is likely to be the case, but for storage it might be different. If the recently launched MRG project[61] of the Commission proves the technical feasibility of robust MRG also for storage, then there is no reason from this point of view speaking against option 3.12. Otherwise, option 3.11 would be preferable.

– **Transaction and administrative costs**: Keeping the current situation is likely to incur only limited additional administrative costs, however, using the potential of CCS would depend on Member States. Option 3.12 is more costly in the short term for the Commission, but a harmonised approach, as emerging from option 3.12, would decrease these costs in the long-term. Opting in classes of projects (option 3.11) would likely also require additional upfront costs, although to a lesser degree than option 3.12 as only individual classes of projects need to be assessed. Option 3.11 also implies a learning-by-doing and hence, may allow for a more streamlined implementation for subsequent classes of project reducing transaction costs over the longer-term. In addition, a more limited but harmonised approach under option 3.11 may reduce administrative costs overall compared to the ad-hoc opt-in approach under the baseline, where projects are assessed on an individual basis.

– **Functioning of the allowance market**: Due to the fact that only a small number of CCS projects are likely to be operational up to 2020, the impact on the carbon price due to the introduction of CCS is expected to be small. However, representatives of the energy intensive industry have expressed concern about the impact on electricity prices over the longer-term (see Annex 1), in particular, if the EU ETS is solely thought to provide the necessary financial mechanisms for funding CCS projects.

Consistency

– **Competitive distortion**: Both options would tend to reduce competitive distortions, which may not be the case under the current situation.

– **Energy security**: The availability of commercial CCS will have an effect on energy security, since it would allow coal to remain an integral part of the energy mix in a carbon-constrained world. Inclusion of CCS in the ETS will have a positive effect on promoting CCS commercialisation, and hence on energy security in the longer term. However, since the number of projects included in the ETS before 2020 is likely to be similar under all three options, the options would not have differential impacts on energy security.

Summary

The following table summarises the results:

[61] The project launched by the competent Commission services is supposed to deliver its result by mid 2008.

	Option 3.11 (opt-in classes of projects)	Option 3.12 (include all CCS projects)
Effectiveness		
Coverage	0	0
Transparency	0	+
Environmental integrity	0	0
Impact on innovation	0	0+
Efficiency		
Technical feasibility/simplicity	0	?
Transaction and administration costs	0	0
Functioning of the allowances market	0	0
Consistency		
Competitive distortions	+	+
Energy security	0	0
Legal issues among Member States	0	0

Note: Analysis is structured comparatively, i.e. + (improvement), 0 (negligible impact), - (deterioration) ? unknown/lack of information

3.5.5. Compliance of options with objectives

In the long term (i.e. beyond 2020), the inclusion of all CCS projects in the ETS (Option 2) appears like a promising approach – harmonised coverage, reduced carbon prices, increased energy security and an improved functioning of the internal market would be expected. However, up to 2020, only a few CCS projects will be operational. Therefore, the positive effects of option 3.12 will be more in terms of investor confidence in the technology, since it provides a clearer signal as to the future of CCS under the ETS.

Environmental integrity is fundamental to the ETS, and so questions of liability and accountability must be addressed before allowances are allocated to CCS projects. However, all of these issues are being addressed in the enabling legal framework for CCS, and so do not impact on the choice between options.

The main choice between options 3.11 and 3.12 depends on whether Monitoring and Reporting Guidelines (MRGs) can be established that are sufficiently robust to cover all potential CCS projects. If not, then option 3.12 would potentially jeopardise the environmental integrity of the ETS. For capture and transport, there seems to be no doubt that suitable MRGs can be established. The question whether there is any potential issue for storage will be assessed separately. If there is no issue for storage, there is no real obstacle to option 3.12.

Thus the decision between option 3.11 and option 3.12 depends on the possibility of establishing suitable MRGs. If it is confirmed that suitable MRGs can be established, option 3.12 is preferable because it provides a clearer signal as to the future of CCS under the ETS.

For this reason, the actual choice of the option must be taken in the light of the approach and the decision laid down in the an extra proposal to be adopted by the Commission.

3.6. Transport

3.6.1. Road Transport

3.6.1.1. Identification of Problems

Road transport has significant impacts on climate change, with about 19% of the overall EU emissions of CO_2 coming from the fuel consumed by passenger cars and heavy vehicles. While the EU as a whole has reduced its emissions of GHG by just under 5% over the 1990-2004 period, the CO_2 emissions from road transport have increased by 26%. This proves that road transport represents one of the fastest growing GHG emission sources at all. Attempts to reduce these emissions did not turn out to be successful so far.

In its conclusions on the "Review of the EU Emissions Trading System", the Council (Environment) invited the Commission "to consider a possible extension of the scope of the EU ETS to … surface transport, thereby exploring all necessary implementation aspects as well as advantages and disadvantages and questions of practicability"[62].

3.6.1.2. Identification of Objectives

Pending further analysis by the Commission services, the objective of the following section is to provide a preliminary exploration of the pros and cons of including the emissions from road transport in the EU ETS (including ways to actually implement this inclusion) against the achievement of the objective of reducing the climate change impacts of road transport.

3.6.1.3. Options and screening the options

There are two options, which will be explored against a number of relevant assessment criteria:

(13) **Option 3.13 Downstream approach:** The road transport sector is considered one virtual installation under the ETS through which the registered owners of vehicles will receive an account for allowances in accordance with a formula decided upfront. For every fuel purchase an amount of allowances is deducted from the registered owner's account that corresponds to the emissions released when the fuel is burned. This implies that fuel purchases in the EU will only be possible if the buyer has a covered account for allowances and that all fuel purchases will be electronically traced. The option would correspond to the polluter-pays-principle and be compatible with the design of the EU ETS as regards the principle of direct emissions (the recipient of allowances is the one that actually responsible for the emissions).

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62 Council of the European Union, Document 11429/07.

(14) **Option 3.14 Upstream approach:** Fuel suppliers are defined as participants in the ETS. They have to hand in allowances according to the total emissions emitted by the fuel they sell to road transport. Monitoring can be based on the well-established system for energy taxation.[63] An alternative upstream approach could be that vehicle producers become the accountable entity. Under this approach, when selling a vehicle, producers would have to surrender allowances corresponding to the total lifetime emissions of the vehicle.

Screening the options delivers the following findings:

– **Environmental effectiveness and cap**: Including the road transport sector in the EU ETS would imply an additional coverage of another 875 $MtCO2$[64] and would increase the share of the EU ETS in total EU GHG emissions from currently 37% to 54%. Various options exist to set the cap: a possible cap could be to reduce emissions from road transport by 20% compared to 1990 levels. Alternatively, a "low ambition" cap could be set at current emission levels, but the less ambitious the cap, the more burden would be left to other sectors more sensitive to international competition. In both cases, continued growth in transport usage would require measures addressing transport demand (including infrastructure charging, promotion of modal shift, public transport etc) combined with more efficient or less carbon intensive vehicles (e.g. via the EU CO2 and cars strategy and the use of biofuels taking into account the proposed greenhouse gas reduction mechanism introduced in the fuel quality directive in order to avoid any double counting of savings) or, otherwise to purchase credits either from the ETS itself (i.e. from domestic reductions) or by use of the CDM and JI market. The implications of such an approach, however, would need to be further scrutinised, in order to avoid adverse effects on the EU ETS and/or the credit market. In terms of environmental effectiveness, an assessment would need to be carried out to see whether emissions would actually be delivered in the road transport sector or in other sectors, due to relatively higher abatement costs for road emissions.

– **Efficiency: U**nder both options, emissions could in principle be technically monitored. Under the downstream approach (Option 3.13) all fuel sales at gasoline stations in the EU would be automatically monitored - upfront free allocation of allowances to car owners by means of a formula would allow the car owner to “pay” through emission rights, an approach that is easy to monitor electronically, provided the necessary infrastructure facilities are in place. Under the upstream approach (Option 3.14), the total quantity of fuel sold from fuel traders (e.g. to petrol stations) must be monitored. The practical implementation of an upstream ETS approach for road transport was the subject of a study on behalf of the German Federal Environmental Agency. One finding of this study was that monitoring will be very easy and effective if it is based on the already mandatory monitoring of fuel trades for energy taxation (see ENTEC 2007b). Transaction costs for market participants are likely to be considerably lower under the upstream approach due to the new infrastructure facilities that are required under the downstream approach. While

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63 This approach is discussed in a study by UBA 2005. In Germany, for example, energy taxes for fuel need to be paid when fuel is taken from bonded warehouses.

64 See Annual European Community greenhouse gas inventory 1990-2005 and inventory report 2007, available from http://reports.eea.europa.eu/technical_report_2007_7/en

these costs would be born by a much higher number of participants (number of vehicle (cars and trucks) owners), they would result in very high aggregated administrative costs.

– **Consistency**: A number of other instruments are already in place, or are proposed, in the transport sector. There are also questions relating to multiple instruments, which need to be addressed when considering bringing road transport into the EU ETS - in particular in view of the existing fuel excise duty system, which already constitutes an instrument to address demand for road transport fuels. The use of multiple policy instruments, such as fuel taxes, efficiency standards (CO_2 and cars strategy), the proposed greenhouse gas reduction mechanism (review of the fuel quality directive) and ETS in the road sector, may not necessarily constitute a double burden if properly designed, but would in any case require further analysis, in order to establish the best cost-benefit ratio in relation to the objective to cope with GHG emissions from the transport sector. In particular, taking into account the Commission proposal to regulate life cycle greenhouse gas emissions from fuel, inclusion of road transport into the ETS could contradict the aim of the proposed fuel system, or introduce a dual regulatory system for the same emissions.
  The upstream approach would require a change in the underlying design of the current ETS system, since it would not follow the principle of direct emissions where allowance recipients have a direct control over the actual emissions (especially in the case of inclusion at the level of vehicle producers, where monitoring needs would be based on expected emissions).

In the light of these results, it is too early to take a decision on the options identified at this stage bearing in mind that the Commission is working on a solution to the problems identified in the framework of ongoing initiatives.

3.6.1.4. Compliance of options with objectives

None of the options examined can be recommended for implementation at the current stage. Further investigation and detailed analysis, in particular as far as a comprehensive cost-benefit analysis including comparison with alternative measures, is concerned, will be carried out, in order to arrive at a well-founded and substantiated conclusion on whether the road transport sector should be included in the EU ETS or not.

3.6.2. Shipping

3.6.2.1. Identification of Problems

Estimates on shipping emissions vary, but indicate that CO2 emissions from shipping may contribute between 2-5% to anthropogenic CO2 emissions and rise in line with the growth in international trade. The IMO estimates ship CO2 emissions will rise between 37% and 72% by 2020[65].

[65] IMO Study of GHG emissions from Ships (2000), growth compared to year 2000.

In its conclusion on the review of the EU ETS, the Council (Environment) invited the Commission "to consider a possible extension of the scope of the EU ETS to … surface transport"[66].

In the 2nd ECCP meeting on the review of the EU ETS[67], the Commission indicated that with respect to the ETS and shipping, there are currently a number of European policy options under consideration. One of these options is including shipping in the EU ETS.

However, shipping by its very nature is very much an international industry. The international dimension of shipping is highlighted by the fact that shipping delivers 90% of European external trade. For these reasons, it would be most appropriate to tackle the problem of CO2 emissions from ships in the framework of a global agreement rather than employing a regional approach.

There are currently no international rules to reduce CO_2 emissions from ships. Under the 1992 UNFCCC, all Parties committed to promote reductions in transport emissions. The Kyoto Protocol to the UNFCCC calls on Annex I parties to pursue reductions of GHG emissions from ships through the International Maritime Organisation. Despite discussing the issue since 1992 there has been little progress and to date there has been no meaningful discussion of measures to actually reduce emissions. The EU also see the opportunity to address the problem of emissions from international maritime transport as part of the post 2012 negotiations within the framework of the UNFCCC.

However, as announced in the 6th Environmental Action Plan (2002), in the absence of progress towards a global agreement, the EU will take action. However, the scope and timing of such European action will depend on the progress of the on-going international negotiations.

Against this background, the option of including CO2 emissions from ships within the EU ETS is not further pursued in the framework of this impact assessment.

3.7. Land use, land use change and forestry (LULUCF)

3.7.1. Identification of key issues

Terrestrial ecosystems play a crucial role in the global carbon cycle. Land use, land-use change, and forestry (LULUCF) activities can lead to emissions of greenhouse gases and their removal from the atmosphere, and the contribution of such activities to net anthropogenic greenhouse gas emissions has been recognised under the Kyoto Protocol. Roughly 20% of global greenhouse gas emissions can be attributed to deforestation. The EU recognises that tackling these emissions is a crucial element in the overall strategy to limit global warming to maximum 2°C above pre-industrial levels.

The key issue is whether under the current circumstances inclusion of LULUCF activities in the EU ETS can be envisaged or whether alternative instruments outside the EU ETS are more appropriate to tackle emissions from LULUCF. For example, auction revenues could

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66 Council of the European Union, Document 11429/07, http://register.consilium.europa.eu/pdf/en/07/st11/st11429.en07.pdf

67 See Annex 1.

contribute towards LULUCF activities that increase carbon sequestration or avoid them being a source of emissions.

A number of factors render it difficult over time to measure the precise evolution in net carbon balances of terrestrial ecosystems. First of all, emissions and removals under LULUCF are inherently reversible, as carbon stored can at some point be released. Much scientific uncertainty remains about the nature of GHG balances of terrestrial systems, especially on the long run in the light of climate change. For example, the capacity of carbon sequestration by forests diminishes with time, and climate change may have further negative influence on the natural carbon uptake by the terrestrial biosphere. The terrestrial carbon balance depends on several complex and interrelated factors such as temperature, precipitation rates, fires, the effects of past management, the use of fertilisers, air pollution, etc., and the net balance over a certain time therefore is hard to estimate with a high level of certainty. On top of this, in the case of project-based activities there is a significant risk of leakage when changes in land use practices in one area are annihilated by displaced LULUCF activities in another area.

Due to some of the complexities mentioned above, the current accounting framework for LULUCF under the Kyoto Protocol is incomplete, inconsistent and contains arbitrary elements. Despite the significant methodological advances in the past years, some key issues (like the separation of natural and management effects) are still not resolved and modalities are subject to change after 2012.

For afforestation and reforestation activities under the CDM, two particular types of credit have been created, temporary certified emission reductions (tCERs) and long-term certified emission reductions (lCERs), which Parties may use towards their international commitments under the Kyoto Protocol. The modalities also re-iterate that the treatment of LULUCF under the CDM in future commitment periods shall be decided as part of the negotiations on the second commitment period. No such modalities have been developed in relation to JI projects. Modalities for accounting under Articles 3(3) and 3(4) of the Kyoto Protocol have been developed for the national level, and cannot be automatically applied to the level of individual land holdings and operations.

Global annual emissions from deforestation account for roughly 6 billion tons of CO_2eq. This is three times higher than the amount of emissions regulated under the EU ETS. As long as the EU ETS is the only major functioning trading system in the world, allowing credits from avoided deforestation into the EU ETS could result in serious imbalances between supply and demand for credits. In addition, the rules and modalities for estimating emission reductions from deforestation are not yet agreed upon. For these reasons, avoided deforestation is not considered any further in the options assessed.

3.7.2. Identification of Options

There are several potential options for the inclusion of LULUCF in the ETS. They should be explored in light of the issues identified above.

(15) **Option 3.15:** maintain the status quo, i.e. no use of LULUCF related activities in the EU ETS. This is without prejudice to the proposal that proceeds from the auctioning of allowances within the EU ETS be used to

mitigate greenhouse gas emissions, in particular to fund measures to avoid deforestation[68]

(16) **Option 3.16:** allowing the use of credits (and debits) from LULUCF CDM and JI project activities in to the ETS. In this respect it is important to note that in the event of an international agreement post 2012 the types of LULUCF activities that will exist under the CDM could be subject to important changes.

(17) **Option 3.17:** Providing for domestic offsetting projects (DOPs). These could generate credits (or debits) tradable in the ETS market, or they could be activities done by installations covered by the ETS, and counted towards their own compliance (but not tradable), e.g., a power company would do a major afforestation scheme, that would be assessed and counted solely towards their own compliance.

(18) **Option 3.18:** Including the LULUCF sector (forestry, agriculture etc.) in the ETS for all lands or for holdings over a certain size, by analogy to other installations.

3.7.3. Assessment of Options

Environmental effectiveness All options to include LULUCF in the EU ETS (via JI/CDM (option 3.16) as well as via domestic projects (3.17) or by including the entire sector (3.18)) pose problems concerning the temporary and reversible nature of LULUCF activities. As forests and cultivated land are dynamic ecosystems, changes in carbon capture are not only linked to the developer's influence, but are subject to environmental factors and calamities like pest outbreaks and fires[69]. Thus liability for carbon losses inherent in LULUCF activities is as much an issue as is the uncertainties with respect to monitoring and verification processes.

Indeed, the use of temporary credits creates significant liability risks. For example, companies that consider closing down might be tempted to sell their permanent credits and replace them with cheaper temporary credits. If the company ceases to exist, it can no longer replace the temporary credits with permanent ones. As a result, the Member State in which the company operated would have to cover for the expired credits. These liability risks were a major reason for not allowing the use of credits from LULUCF in Phase I and II. Council and Parliament also excluded any possible JI credits relating to LULUCF from the EU ETS because, as mentioned above, no modalities have been developed in relation to the non-permanence and other issues arising in relation to JI LULUCF projects. As long as these liability problems persist, including LULUCF credits in the EU ETS (be it through option 3.16, 3.17 or 3.18) could potentially undermine the system's environmental integrity.

Furthermore, if the environmental effectiveness of the ETS is to be retained, any inclusion of LULUCF must be backed by reliable monitoring and verification of the carbon emissions avoided through LULUCF projects. All options considered to include LULUCF activities in the EU ETS suffer from the same difficulties of adequately measuring the amount of carbon sequestered through LULUCF activities. While this is technically feasible doing it to a

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[68] COM(2006) 818.

[69] This has been demonstrated by the recent huge forest fires in Greece.

precision comparable to that in other sectors (necessary for fair trading) would involve disproportionate transaction costs. This problem is further enhanced through the risks of leakage when a LULUCF sequestration activity results in the displacement of emitting activities outside the boundaries of the project. Lack of additionality and double-counting of LULUCF projects is a serious issue which can undermine the environmental credibility of emissions trading systems. Finally, high inter-annual variability of LULUCF emissions and removals pose a monitoring challenge and can pose a significant compliance risk. All in all, whereas emissions reductions in industry can be quantified by precise measured input and output values,[70] this is not the case for LULUCF activities.

Finally, some concerns have also been raised with respect to the way LULUCF projects could be implemented. The potential use of faster growing non-native or genetically modified species could pose threats to local ecosystems. Furthermore, there are concerns that indigenous or local populations could be denied access to their traditional land resources due to LULUCF projects[71].

Against the criteria of environmental effectiveness, option 3.15 that continues the exclusion of LULUCF activities from company-level trading seems most appropriate. All other options suffer from problems of non-permanence, high uncertainty or leakage that could undermine the environmental integrity of the EU ETS.

Economic efficiency

Allowing the use of CDM credits from LULUCF in the EU ETS (Option 3.16) would increase the abatement options for operators under the EU ETS and thus could drive down short term compliance costs. However, ultimately these temporary credits would need to be replaced by permanent credits, and over time compliance costs could rise again. What's more is that LULUCF projects could delay the development in carbon-efficient technologies and thus increase the long term costs to achieve more ambitious emission reductions throughout the economy. Hence there seems to be possible trade-off between short-term and long term cost-effectiveness.

The liability issue caused by the use of temporary credits in fact comes down to an indirect subsidy from the State to LULUCF developers, as they would receive the benefits of cheaper compliance costs, while a share of the liability risk would be borne by the public.

Domestic offset projects (DOPs, option 3.17) from LULUCF could increase the abatement possibilities for operators and thus increase short-term compliance costs. But this would come with substantial administrative costs and require the creation of a new currency, the establishment of monitoring and reporting guidelines, and a clear delineation of what type of LULUCF activities would be eligible. Monitoring and reporting guidelines could be taken from those existing for CDM projects but these only exist for afforestation and reforestation, and do not cover the multitude of other possible LULUCF activities. To retain the integrity of the system, the non-permanence risk will have to be managed by monitoring of the projects indefinitely (even after the installations using the credits closed down), or through other means.

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70 ibid

71 http://unfccc.int/methods_and_science/lulucf/items/3064.php

Including LULUCF activities as a sector in the EU ETS (Option 3.18) would increase the coverage of the EU ETS but generate major monitoring and reporting costs. Monitoring and reporting would need to be carried out on a very large number of land holdings. Few, if any, Member States have appropriate monitoring capabilities, and the cost of developing them would have to be covered by all participants. Inclusion would also come with important economic liabilities for the owners if for any reason (e.g. droughts or forest fires) their carbon stocks would be converted into carbon sources. It should be noted that LULUCF inventories leave a lot to be desired even at the Member State level (especially as they relate to soil carbon), and they are not harmonised across the EU. The EU ETS should use consistent methodologies across the EU and it would be reasonable to expect holding-level inventories to be consistent with national systems. Therefore, a coherent LULUCF inventory consistent across the EU and at the level of holdings, Member States and the Community does not seem to be attainable in the foreseeable future.

The Commission emphasised in its guidance on allocation plans for the 2008 to 2012 trading period of the EU ETS[72] that both simplicity and transparency of the Community trading system are important, in particular with respect to possible future links to other trading systems. The inclusion of temporary credits (option 3.16) and the creation of new types of credits (option 3.17 and 3.18) would substantially reduce the simplicity and transparency of the EU ETS for all market participants by masking real supply and demand patterns.

Furthermore, uncertainties about the way LULUCF activities will be treated in a future climate regime remain high. Currently, the use of LULUCF credits for compliance with Kyoto targets is only acceptable in the first Kyoto period. Pre-empting an international decision on the use of LULUCF activities by recognising their use in the EU ETS now could result in the need to review the rules in a later stage to make them coherent again with what was agreed internationally. This would increase uncertainty in the system and contradicts the aim to maximise predictability of carbon credit demand and supply dynamics. It should also be noted that for the same reasons (replacement liability and uncertainty of international rules) temporary credits do not guarantee a secure revenue for the project owners either, so they are not ideal for the promotion of long-term practices, although most of the desirable LULUCF activities require long-term, sustainable management practices.

Because of trade-offs between short- and longer term compliance costs and a lack of long term certainties about project revenues (option 3.16), potentially high administrative costs of options 3.17 and liability costs of option 3.18, it seems that the benefits of the inclusion of LULUCF in the EU ETS in terms of economic efficiency are not clear cut. If, furthermore, inclusion of avoided deforestation activities would be envisaged the inequalities in supply and demand of credits that this could entail could result in the collapse of the EU ETS.

Consistency

It is desirable that allowance prices be sufficiently high for the EU ETS to contribute substantially to achieving the EU's internal renewable energy and energy efficiency targets. Besides behavioural change, innovation, new technologies and additional research in carbon-efficient ways of production and consumption are needed to allow reaching even deeper global emission reductions beyond 2020.

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72 COM(2005) 703.

Introduction of tCER and lCER type credits in the EU ETS would create a two-tiered carbon market comprising both of permanent reductions and more uncertain and volatile temporary reductions. The latter can be interpreted as a right to delay permanent reductions. Consequently, temporary credits increase the uncertainty about future demand for permanent emissions reductions. The greater the circulation of temporary credits today, the higher the demand for permanent credits will be in the future. If in future commitment periods temporary credits are no longer accepted, then the legacy of tCER and lCER used earlier would have a considerable impact on the carbon market, leading to increases in prices of EUAs on the ETS market. Consequently, firms overall compliance costs could increase regardless of whether or not they actually employ temporary credits.

The introduction of LULUCF activities in the EU ETS be it through the CDM (option 3.16) or through domestic activities (options 3.17 or 3.18) therefore seems to create potential inconsistencies with the aim for greater transparency and predictability, and with the achievement of the EU's domestic renewable energy and energy efficiency targets.

3.7.4. Compliance of options with objectives

In the light of the above, broadening the scope of the Directive with a view to recognising LULUCF activities cannot be recommended. The main reasons are:

- There are considerable risks related to the temporary and reversible nature of LULUCF activities in a company-based trading system. Insufficient modalities have been developed in relation to the non-permanence, uncertainties and potential leakage problems arising in relation to LULUCF projects, jeopardising the environmental effectiveness of the EU ETS.

- LULUCF projects cannot physically deliver permanent emissions reductions. Applying these in a company-based trading system would impose great liability risks on Member States and is contrary to the intentions of the EU ETS to steer the EU towards a low-carbon economy.

- Simplicity, transparency and predictability of the ETS would be reduced considerably;

- The inclusion of LULUCF projects in the ETS would require a quality of monitoring and reporting that is comparable to the monitoring and reporting of emissions from the installations currently covered by the system. This is not available at present and is likely to incur costs which would substantially reduce their attractiveness of reducing short-term compliance costs.

- Because of the sheer quantity of potential credits entering the EU ETS the functioning of the carbon market might be undermined (unless their role in the ETS is limited, which would make the potential benefits marginal).

- Further research should identify other instruments to tackle global deforestation and create incentives to increase the carbon content of terrestrial ecosystems. Using part of the proceeds from auctioning allowances in the EU ETS could generate means to invest in LULUCF activities both inside and outside the EU, and may provide a model for future expansion. This will also allow least developed countries to benefit from the carbon value of their forests without undermining the environmental integrity of the EU ETS.

4. ROBUST COMPLIANCE AND ENFORCEMENT

Monitoring, reporting and verification (MRV) matters of the EU ETS are indispensable for the environmental integrity of the EU ETS. The plant installations' monitoring plans and the verified emission reports are crucial as they determine the amount of allowances which have to be surrendered each year and thereby establish whether an operator is able to sell excess allowances or, for compliance reasons, needs to buy missing allowances or acquire equivalent carbon credits. In order to allow the market function properly, market players must have trust and confidence in the overall performance of the MRV system. Moreover with respect to linking with other emissions trading systems, the role of monitoring, reporting and verification must be considered key for the reputation of the EU ETS.

4.1. Monitoring and reporting

4.1.1. Identification of Problems

Monitoring and reporting of emissions is currently implemented by the Monitoring and Reporting Guidelines (MRG)[73] established in accordance with Article 14 of the EU ETS Directive. Consistent implementation of the MRG is required in order to guarantee that "a ton is a ton", no matter where and by whom it has been emitted.

Current practice of Member States (MS) and Competent Authorities (CAs), however, shows a range of different implementation and application of MRG requirements, such as for monitoring:

– A range of different interpretations and definitions used at national level for permitting concepts like 'combustion activity', 'site', 'installation boundary', 'de minimis source', 'installation' and 'standby generation';

With respect to reporting the following issues have been found by recent evaluation projects:

– Inconsistent approaches between annually reported and baseline data, but also inconsistent reporting templates or different treatment of critical problems such as the issue of "transferred CO2"[74];

– Varying reporting requirements mean that some operators put more effort into reporting than others, potentially leading to concerns over 'fairness' with the current system. Moreover some competent authorities (CAs) reporting systems are more efficient than others e.g. paper based through to online reporting. This situation would remain with the status quo option.

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73 EU ETS Monitoring and Reporting Guidelines 2007/589/EC. Commission Decision of 18 July 2007 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council.

74 "transferred CO2" is CO2 that is not released to the atmosphere, as laid down in the EU ETS Directive, but transferred to other installations, from which it is vented to the atmosphere, but not accounted for under the EU ETS. For most Member States, there is no information available on transferred CO2, but eleven Member States presented some information on transferred CO2 in their Article 21 report on 2006 (see EEA 2007a).

In general several implementation problems affect the application of the MRG:

– Differences in the way in which CAs enforce the MRG through inspection activities (in addition to the independent verification process) and the nature of any penalties imposed for non-compliance.

For these reasons, there is no level playing field across the EU in terms of monitoring and reporting implying different levels of accuracy. This jeopardises the environmental integrity and the credibility of the system and is likely to incur higher costs than necessary.

Evaluation projects on behalf of the Commission and several Member States have identified a lack of transparency, information on quality and consistency, possibly leading to a trust issue, as well as costs as the main challenges for the further development of compliance.

In addition, the current system is relatively complex with varying monitoring and reporting regulations and responsibilities in Member States.

4.1.2. Identification of Objectives

Against this background, the main objectives can be identified as:

– Ensuring a common approach with respect to monitoring and reporting in order to guarantee environmental effectiveness and integrity of the system and improving cost-effectiveness;

– Seeking higher consistency and transparency, which, in the long-run, can lead to savings for all stakeholders involved;

– Improving cost effectiveness of monitoring and reporting standards, since they are assumed to enhance the trust in the reports to the market and would thereby positively albeit indirectly affect the efficiency of the market.

4.1.3. Policy Options and Screening[75]

4.1.3.1. Options for Monitoring and screening of options

(19) Option 4.1: keep system as it is (status quo)

(20) Option 4.2: Keep system as it is, but provide further guidance for MS authorities

(21) **Option 4.3: Broaden the legal basis in the Directive** to include guidelines for permitting (including installation definition), inspection and enforcement measures (penalties)

(22) Option 4.4: Use a Regulation instead of a Commission decision

Screening the options leads to the following conclusions:

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[75] Screening criteria are meant to be the same as used in Chapter 3 "Scope", see footnote 28.

– **Effectiveness**: Options 4.1 and 4.2 are not likely to achieve the objectives, as they do not address the broad variance of practices currently applied in Member States for the same purpose. Options 4.3 and 4.4 would offer the potential to ensure a level playing field in terms of monitoring, thereby providing an essential precondition for the overall environmental effectiveness of the EU ETS.

– **Efficiency**: Implementation of options 4.3 and 4.4 would, in the short term, incur higher costs in comparison to options 4.1 and 4.2. In the longer term, however, the higher costs would pay off through higher consistency and transparency of the system.

– **Consistency**: None of the options is likely to adversely impact on other Community policies. However, with a view to the international dimension, credibility and trustworthiness of the EU ETS vis-à-vis third countries/regions would be reinforced by option 4.4 through its drive for harmonisation, thus underlining the leading role of the EU in GHG emission reduction policies.

The table below summarises the results of the screening:

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
4.1: Keep current system	-	0	0	Discarded
4.2: Current system with further guidance	-	0	0	Discarded
4.3: Legal basis for guidelines	√	0/-	√	Retained
4.4. Regulation	√	0/-	√	Retained
√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,				

As a result of the screening, options 4.1 and 4.2 are discarded and will not be further analysed.

4.1.3.2. Options for Reporting and screening the options

(23) **Option 4.5: Keep system as it is**: This option would involve retaining the current reporting requirements in the MRG 2007 through Phase III.

(24) **Option 4.6: Broaden the reporting requirements**, e.g. reporting of production data. This option involves making changes to the MRG 2007 to require operators to report additional data and information, such as production data and nature of activities on sites relating to benchmarked allocations.

(25) Option 4.7: Promotion of higher reporting frequency for large installations

(26) **Option 4.8: Improvement of reporting by an IT based common reporting format** defined by a Commission decisions

Screening these options would deliver the following results:

– **Effectiveness:** Option 4.5 may not reach the objectives identified despite the new MRG adopted in 2007, as it does not effectively address the problems occurred. In addition, it would not ensure the necessary collection of data, in case allocation through benchmarks will be implemented in Phase III. This deficit would not occur with option 4.6. Higher reporting frequency, as implied by option 4.7, does not necessarily ensure higher quality and consistency, unless it is taken into account whether or not the data released have been verified, their coverage and the process for submitting the data. On condition that this is

ensured, it might increase transparency on the market and help to avoid unnecessary volatility of allowance prices. An IT based common reporting format (option 4.8) could have the potential to successfully achieve the objectives and ensure better comparability of the reports. This could help to increase transparency and to identify inconsistencies, which so far cannot be excluded.

– **Efficiency**: Bearing in mind the new MRG, option 4.5 might bring about some improvements, as experience grows. Option 4.6 is likely to entail higher costs, which however, should be justified in the light of possible needs for benchmarking allocation as well as more effective and reliable reporting. Higher reporting costs will certainly be involved, if option 4.7 is implemented. This has to be measured against the benefits of this option. IT based reporting formats may incur high one-off costs, but in the longer term may turn out to incur considerably less costs.

– **Consistency**: None of the options would create any problems in terms of consistency, but option 4.7 could increase market transparency and alleviate price volatility.

The table below summarises the results of the screening:

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
4.5: Keep current system	-	√	0	Discarded
4.6: Broaden reporting requirements	√	0	0	Retained
4.7: Higher reporting frequency	√	-	√	Retained
4.8. IT based reporting format	√	√	0	Retained
√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,				

Consequently, option 4.5 will not be further pursued.

4.1.4. Impacts – Comparing the Options

The assessment criteria used in the following chapter remain the same as in the preceding chapter, i. e. environmental effectiveness, economic efficiency, administrative costs and competition. However, impacts on economic efficiency and administrative costs are often jointly considered, since in terms of monitoring and reporting economic efficiency is closely related to the relevant administrative costs incurred by regulators and operators. Impacts on competition are mainly considered in terms of ensuring a level playing field across the internal market, but are not assessed in terms of competitiveness with non-EU competitors, as they do not seem to be relevant in this respect.

4.1.4.1. Monitoring

Environmental effectiveness: Option 4.3 would harmonise the way GHG permits are issued and the sources covered at sites to varying degrees. In turn, this will reduce competition issues, improve consistency of coverage of the System and strengthen its environmental integrity. Commission guidelines or regulations on compliance activities would improve consistency in CA performance and seek to ensure that any non-complying installations are found and dealt with consistently across the EU. A benefit of greater guidance/regulation on compliance includes increasing the ability to find and penalise installations that have made purposeful misstatements in their emissions reporting or are not monitoring as required (if these were not picked up by the verifier). This will add integrity to the System and provide an additional check on the performance of verifiers. However, if established as Guidelines they

would need to be transposed into national legislation and there would be room for inconsistencies and interpretation under this approach. It may therefore be more effective to include requirements for permitting and compliance within regulations, particularly if regulations on M&R are promulgated.

Option 4.4 would allow for the highest level of consistency in implementation. Greater consistency provides more comparable and reliable monitoring results. There will be greater trust in the emissions reports so that participants can be more confident that one tonne CO2 monitored equals one tonne CO2 emitted, i.e. that operators will report and surrender the 'right' number of allowances for their type of installation improving the environmental effectiveness and integrity of the System. Despite regulations making the requirements consistent across the EU, there could still be differences in the interpretation of these requirements if any details are ambiguous or unclear. Therefore, in common with the status quo scenario, any areas of likely 'interpretational' differences need to be considered during the development of the regulations, and, where necessary, one set of guidance on the regulations provided with examples and further explanations. Reviews of M&R from Phase I and Phase II will assist with understanding where the key interpretational issues lie and how best to resolve them. However, it is recognised that this may be relatively difficult and time-consuming to achieve.

Administrative costs: Option 4.3 will entail broadening the legal basis in the Directive for the MRG to include guidelines or a regulation on permitting and compliance. This firstly requires amendments to the Directive. The Commission would then need to scope out a work programme, which will require a certain amount of EC staff time. The programme may also involve the use of a consultant (estimated at €100,000-200,000 depending on complexity) and considerable time of commission staff for negotiations and discussions in workshops and working group meetings, as well as costs for translation into 22 languages (Commission internal), and publication. MS and CAs would first need to have input into developing the guidelines and regulations on permitting and compliance. If developed as Guidelines, MS would then need to amend national regulations/legislation. The total costs of doing this across the EU are very difficult to estimate. If developed as Regulations, MSs incur lower costs since they will not be required to amend existing legislation, but repeal any contrary existing legislation. Some of the installation GHG permits and M&R Plans may need to be reviewed and modified to deal with additional requirements in any new guidelines/regulations not currently implemented by MSs. Assuming permit variations cost operators (or in some cases the CA) around €600 each[76] (costs involved in applying for the variation, checking the application and reissuing the permit) then the costs of reissuing permits could potentially reach up to a maximum € 6million,[77] but this figure will depend on the number of existing permits that will not need to be re-issued as they already meet the new requirements (it can be assumed that e.g. all smaller gas-fired combustion installations would not be affected, which cover approximately 50% of all installations).

According to option 4.4, i.e. if the Directive is amended to enable the Commission to establish a regulation on M&R for Phase III, the Commission would need to outline how the regulation will be developed, consulted on and then implemented, with projects to undertake any necessary evaluations/assessments. Based on previous costs or review of Monitoring&Reporting Guidelines, this is likely to involve the use of consultants

[76] The UK charges £240 (€360) for a variation to a permit, and the operator has to apply for the variation.

[77] Based on 10,000 installations requiring a revised GHG permit.

(approximately € 50,000-100,000) and would require EC staff time. Firstly, MS and CAs would need to spend time inputting into the regulation development and consultation. As a rough estimate, if each of the 27 MSs spends 15 to 20 days attending meetings, assessing drafts and commenting on the regulation, this would equate to around 400 to 550 working days (costing in the range of €0.2-0.3 million, excluding travel and expenses costs). Secondly, MSs will also need to repeal existing legislation, the costs of which are very difficult to determine on an EU wide basis. However, assuming it takes 10 to 20 working days to repeal legislation (as opposed to amending or developing it), this would equate to between 250 - 500 days over the 27 MS (around €0.15 to €0.3 million). Therefore total costs to the 27 MS and CAs of this option would be in the vicinity of €0.3 to 1m.

Efficiency of the trading system: With respect to option 4.3, broadening the legal basis to allow for guidelines or regulations on permitting and compliance aspects would ensure that any definitions used and enforcement actions are more consistent, potentially reducing inefficiencies in time-consuming CA determinations. However, on the other hand they may adversely affect the ability for MS to integrate permitting/compliance requirements with existing national legislation and well established approaches to issues such as enforcement of environmental laws, potentially reducing current efficiencies. A M&R regulation as proposed by option 4.4, would make the requirements consistent and there would be one common 'system for all', by streamlining the rules for all operators and CAs.

Competition on the internal market: Within option 4.3 the broad range of approaches to permitting within different MSs has the potential to cause competitiveness concerns. New guidelines, and to a greater extent regulations, covering permitting/compliance could provide greater certainty, leaving MS, operators and verifiers less leeway for variations. For example, comparable installations in different MS are then either both in or both out of the System, and should be subject to the same inspections and fines for non-compliance. The broad range of approaches to permitting and compliance within different MSs has the potential to cause competitiveness concerns. A new Regulation, as mentioned in option 4.4, could provide greater certainty, leaving MS, operators and verifiers less leeway for variations. For example, comparable installations in different MS are then either both in or both out of the System, and should be subject to the same inspections and fines for non-compliance.

Table 4.1.4.1 Summary of the impact of options in relation to relevant problems and objectives

Option	Environmental Effectiveness	Economic Efficiency	Administrative Costs	Competition/ Competitiveness
4.3: Legal basis for guidelines	0/+	0/+	-/0	-/0
4.4: Regulation	+	+	-/0	+

+ positive effect, 0 neutral/no or negligible effect, - negative effect

4.1.4.2. Reporting

Environmental effectiveness: Option 4.6 would look at expanding the reporting requirements. As allocation methods for some sectors may move towards using benchmarking rather than historical emissions, more information is needed to support the development of appropriate benchmarks for different activities across the EU and then subsequently check/verify that the correct benchmarks have been used at particular installations (e.g. to

pick up any process changes that would make application of a particular benchmark incorrect). This information is therefore needed to ensure that comprehensive and comparable data is used to develop environmentally and economically effective benchmarks that take into account the relevant aspects of the process and plant characteristics.

With respect to option 4.7 higher reporting frequency would help to:

- improve transparency and knowledge of likely long and short positions within installations, sectors and MS;
- help to avoid end of year 'surprises' and sudden impacts on the carbon price;
- be useful for timely assessments of the key influences on carbon emissions such as fuel prices, temperatures, seasons, economic cycles etc.;
- enable more regular reporting of the system's aim to reduce emissions.

Option 4.8: There is strong support for harmonising monitoring and reporting through IT sysstems. This option is covered further with others in section 4.3.

Administrative costs: With respect to option 4.6 the design of the mechanism to measure additional metrics to annual emissions can be complex. Therefore sufficient resources need to be allocated for the preliminary research and design of this option. There would be costs involved in including extra reporting fields in CA reporting systems etc. and to receive and check the additional information. However, this should be relatively easy with minor costs for most installations and their products, if the existing system can handle changes. Issues such as batch operations, intermediate holding of partially finished stock and reformulation of product in response to market demand may lead to high implementation costs for the CAs. Operators would need to ensure additional information is collected and reported in accordance with any requirements. Overall costs of reporting such additional information are likely to be low for most installations since most of the information is already monitored by the operator.

With respect to option 4.7, Voluntary - operators that volunteer to report more frequently would need to decide whether to have data verified before releasing them, if so, there would be an increase in costs. Otherwise, voluntary quarterly or six monthly reporting is unlikely to substantially increase costs for larger installations, since the data are collected on a relatively continuous basis and should be available. There may however be additional costs for smaller installations that don't calculate emissions on such a regular basis and would have to spend extra time and money on interim reporting.

Compulsory for larger installations – Requiring six monthly reporting of verified emissions data by large installations, could involve, on average, an additional three to four days of a verifier's time per year. At €840 per day,[78] this would equate to a total of around €2 – 2.5m per year for the 719 installations emitting >500ktCO_2 in Phase I, this number may change for Phase II and III.[79] There will also be costs involved in the operator transferring the verified figure to the registry, and the co-ordination of the release of such market sensitive information to the public e.g. through the CITL.

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78 PWC (2007) uses daily rates of €600 for competent authority and operator staff and €840 for verification staff.

79 Based on 2006 data of 716 installations emitting more than >500ktCO2 per year (EEA, 2007).

Obviously these costs would be avoided if verification is not required. However, there will be concerns over the accuracy of unverified data being released into a financial market. Therefore if this option is pursued and data are publicly released they should be properly verified. Mid-year verification may reduce the year end verification costs only marginally since most of the verification work will have to be done for each period with a comparable level of assurance, independently of the duration of the period.

An additional reporting system for receiving and checking such interim reports may be needed, or the existing registry system would need to be changed. Such a change to the CITL registry system would entail associated costs. There may be some technical problems with reporting the data more regularly such as where fuel use bills are not provided in time for a six month report. The problem would be magnified by the adoption of quarterly reporting.

Compulsory regular reporting of unverified emissions data by all installations may increase costs for smaller installations that do not regularly calculate emissions. However, this should not pose a significant extra cost for operators of larger installations that already keep a regular account of emissions to understand their trading needs. There will need to be a system developed for collating and reporting the unverified data, which would incur additional costs for CAs and MS.

Option 4.8: There is strong support for harmonising monitoring and reporting through IT projects. This option is covered further with others in Section 4.3.

Efficiency of the trading system: Option 4.6 will be implemented in conjunction with the benchmarking method of allocation and on the basis of the benchmarking methodology. Assuming that benchmarking would add to the efficiency of the ETS, the use of appropriate reporting would contribute to the enhanced efficiency.

With respect to option 4.7, voluntary reporting for all: Promoting more regular *voluntary* reporting is unlikely to improve the efficiency of the System. Companies can already report emissions data more frequently. Since this has not happened to any great extent, it is unlikely to have any specific benefits for the operator. Under this option, some installations might report and others might not, giving rise to incomplete and potentially biased information about emissions which would probably hinder rather than help the market to function.

Compulsory reporting for >500k emitters: *Compulsory* reporting by larger emitters could have useful benefits. Around 7% (approx. 700) of the total number of installations emit more than 500ktCO_2 per year and are responsible for over 80% of the emissions. Therefore, more regular reporting from these installations would cover the majority of emissions in the system. However, to maintain integrity of the data and any market decisions made on the data, they would need to be verified, potentially adding costs (see below for further discussion).

Compulsory reporting for all but only annual verification: Requiring all installations to *report unverified data more regularly* poses risks that incorrect information will be released and decisions will be made using incorrect data. This may undermine trust in the carbon price and therefore the System. It would also be an additional requirement on smaller to medium installations for which the review is attempting to reduce costs. It's therefore unlikely to improve the efficiency of the System.

Option 4.8: There is strong support for harmonising monitoring and reporting through IT projects. This option is covered further with others in Section 4.3.

Competition: Within option 4.6 the confidentiality of commercially sensitive information will need to be protected by the existing provisions, otherwise some operators may be materially affected, which would cause competition or distributional equity problems.

With respect to option 4.7, *voluntary* reporting for all installations is unlikely to improve fairness for installations since some will report and others will not, giving an incomplete picture of emissions at different times, based on unverified and potentially erroneous data, which may also affect the level playing field for the internal market.

Compulsory regular reporting by larger installations would lead to greater transparency for the market, provided the information is released at the same time to all market participants, taking into account that the information is market sensitive and can affect the carbon price.

Compulsory reporting for all installations may be considered unfair for the smaller installations that contribute only 20% of the emissions and whose data may not significantly affect the carbon market, in comparison to much larger installations.

As for option 4.8, there is strong support for harmonising monitoring and reporting through IT projects. This option is covered further with others in Section 4.3.

Table 4.1.4.2. Summary of the impact of options in relation to relevant problems and objectives

Option	Environmental Effectiveness	Economic Efficiency	Administra-tive Costs	Competition/ Competitiveness
4.6: Broaden reporting requirements	+	+	-	-/0
4.7: Higher reporting frequency	+	0/+	-/0	-/0
4.8: IT based reporting format	+	+	+	+

+ positive effect, 0 neutral/no or negligible effect, - negative effect

4.1.5. Compliance of Options with Objectives

Ensuring a common approach in order to guarantee environmental effectiveness and integrity of the system and improving cost-effectiveness; The option of using a Regulation instead of a decision will result in higher harmonisation. This objective will lead to higher distributional equity among installations across the EU. It is likely that there will also be less discretion for CAs in considering monitoring and reporting plans and therefore greater equity in the way operators are treated and requirements are imposed upon them.

Seeking higher consistency and transparency, which, in the long-run, can lead to savings for all the stakeholders involved, thereby justifying short-run design costs of more complex options such as a regulation; Under the status quo option for monitoring, inconsistent approaches developed under the Guidelines will continue to advantage installations in some MS over similar installations in other MS, potentially affecting their competitiveness. Therefore improving the way the guidelines are applied across similar sized and types of installation is very important to ensure equity in the treatment of installations. The broad range of approaches to permitting and compliance within different MSs has the potential to cause competitiveness concerns. New guidelines, and to a greater extent regulations, covering

permitting/compliance could provide greater certainty, leaving MS, operators and verifiers less leeway for variations.

Improving cost effectiveness of monitoring and reporting standards, since they are assumed to enhance the trust in the reports to the market and would thereby positively albeit indirectly affect the efficiency of the market. Varying reporting requirements mean that some operators put more effort into reporting than others, potentially leading to concerns over 'fairness' with the current system. Some CA reporting systems are more efficient than others e.g. paper based through to online reporting. This situation would remain with the status quo option.

4.2. Verification and Accreditation of Verifiers

4.2.1. Identification of Problems

Verification of monitoring reports is important; otherwise, operators underestimating their emissions would not only benefit (surrendering less allowances than required), but would also undermine the environmental integrity of the system. The EU ETS Directive and the MRG only regulate some fundamental requirements and aspects of the verification process. Details are left to Member States. Most, but not all Member States developed specific national verification guidance often based on internationally acknowledged criteria. Quality checks of verification reports are also carried out in many Member States, but not in all (EEA 2007a). A level playing field concerning the quality of verification does therefore not exist.

The same goes with respect to Community-wide accreditation of verifiers, where Member States show a very diverse picture with a wide range of standards for accreditation of verifiers (EEA 2007a). This is not deemed to comply with the requirements of the internal market and might incur higher costs than necessary, if qualified verifiers are not able to do their job across the internal market.

As a result of the described lack of binding guidance on verification and accreditation in the ETS Directive of 2003 a plurality of 27 systems across Member States has evolved. Some Member States developed detailed national legislation and/or guidance on accreditation and verification while others have preferred to make reference to EA Guidance EA 6/03 and appoint the national EA member with the task to accredit verifiers. It is worth noting that even some of the former systems – making reference to EA 6/03 and assigning the responsibility for accreditation to the national EA member – yield a range of diverse results.

4.2.2. Identification of Objectives

The specific objectives for verification and accreditation are:

– Consistent and comparable level of verification and accreditation;

– Harmonised internal market for verification and accreditation services;

– Improving cost-effectiveness.

Improved verification standards are assumed to enhance the trust in the reports to the market and would thereby affect positively albeit indirectly the efficiency of the market. This criterion is not addressed separately in the remainder of this section.

4.2.3. Policy Options and Screening

4.2.3.1. Verification process

(27) **Option 4.9: Keep system as it is**. This means retaining the current MRG 2007 through Phase III and implementing any potential changes through subsequent reviews.

(28) **Option 4.10: Provide legal basis (Article 15) for verification (and accreditation) guidelines like the MRG**;

(29) **Option 4.11: Provide legal basis (Article 15) for a Regulation on verification (and accreditation)**: This option would allow the Commission to develop a regulation on verification in consultation with verifiers, operators, MS and CAs and pass it through comitology to the Climate Change Committee.

(30) **Option 4.12: Provide legal basis (Article 15) for MS to use existing guidelines and frameworks for dealing with verification** (EA 6/03 and/or ISO 14064/14065): According to this option the Directive would be amended to require verifiers and CAs to apply existing guidelines on verification such as EA 6/03 and/or ISO 14064/14065.

(31) **Option 4.13: Initiate a CEN working group on verification and accreditation standards**, which take into account more EU ETS specific circumstances than the ISO standards to serve as a link between the Directive's basis and the need of CAs and accreditators

Screening the options leads to the following results:

– **Effectiveness**: Option 4.9 would not result in achieving the objectives identified and risks keeping inconsistent verification practices in Member States. Options 4.10, 4.11 and 4.12 offer the potential to ensure consistent application of verification measures, thus increasing reliability and credibility of the system. With respect to option 4.13, it is very doubtful, whether a CEN standard developed by a CEN working group would have a stronger impact than the currently existing ISO standards.

– **Efficiency**: Options 4.9 and 4.13 are not likely to achieve the objectives at least costs due to the uncertainties involved (see above), when pursuing the options, while option 4.10, 4.11 and 4.12 would need to be further analysed, in order to determine the least cost approach.

– **Consistency:** None of the options is likely to raise any consistency concerns.

The table below summarises the results of the screening:

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
4.9: Keep current system	-	-	0	Discarded
4.10: Legal basis for guidelines	√	√	0	Retained
4.11: Legal basis for regulation	√	√	0	Retained
4.12: Legal basis to use existing guidelines	√	√	0	Retained
4.13: CEN working group	-	-	0	Discarded

√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,

Consequently, options 4.9 and 4.13 are discarded, while options 4.10, 4.11. and 4.12 will be further analysed.

4.2.3.2. Accreditation

Due to the limited harmonisation with regards to accreditation of verification, the trust in the information verified is ultimately affected, which can have an impact on the efficiency of the trading system.

(32) **Option 4.14: Keep system as it is** (only Annex V as legal basis)

(33) **Option 4.15: Provide legal basis (Article 15) for accreditation (and verification) guidelines** like the MRG: This option would allow the Commission to promulgate guidelines on accreditation in consultation with MS, operators, CAs, accreditation bodies and verifiers.

(34) **Option 4.16: Provide legal basis (Article 15) for a regulation** on accreditation (and verification)

(35) **Option 4.17: Provide legal basis (Article 15) for MS to use the framework of EA** for accreditation and mutual recognition of foreign verifiers.

(36) **Option 4.18: Add extensive requirements for accreditation** including competency requirements and procedures of accreditation of verification bodies as well as individual verifiers, supervision, mutual acceptance and peer review directly to the Directive (comparable to the EMAS regulation)

The screening leads to the following results:

– **Effectiveness**: In principle, the same arguments would apply as to verification. The current situation (option 4.14), which gives rise to certain problems in the framework of the internal market, is not promising in terms of achieving the objective. All other options clearly offer the potential to improve the current situation and achieve the objectives in question, although the approach implied by option 4.18 may appear quite cumbersome.

– **Efficiency**: All options except 4.14 are likely to entail higher costs compared to the current situation. These costs, however, have to be seen in the light of the objectives to be achieved.

– **Consistency**: Achieving the objective would have a positive impact on the well functioning of the internal market.

The table below summarises the results of the screening:

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
4.14: Keep current system	-	0	-	Discarded
4.15: Legal basis for guidelines	√	-	√	Retained
4.16: Legal basis for regulation	√	-	√	Retained
4.17: Legal basis to use existing CA frame	√	-	√	Retained
4.18: Adding requirements to Directive	0	-	√	Discarded

√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,

Consequently, options 4.14 and 4.18 are discarded, while options 4.15, 4.16. and 4.17 will be further analysed.

4.2.4. Impacts – Comparing the Options

4.2.4.1. Verification

The assessment criteria used in the following chapter remain the same as in the preceding chapter, i. e. environmental effectiveness, economic efficiency, administrative costs and competition. However, impacts on economic efficiency and administrative costs are jointly considered, since in terms of verification economic efficiency is closely related to the relevant administrative costs incurred by verifiers, regulators and operators. Impacts on competition are mainly considered in terms of ensuring a level playing field across the internal market, but are not assessed in terms of competitiveness with non-EU competitors, as they do not seem to be relevant in this respect.

Environmental effectiveness: Option 4.10 would look at amendments to the Directive (Article 15) to enable the Commission to implement a Decision containing specific guidelines on verification. More comprehensive guidelines on verification transposed into MS legislation will enhance transparency, clarify requirements and should improve the consistency with which verification is performed across the EU. This in turn would improve the environmental integrity of the System and 'trust' in the verification process itself. However, guidelines on verification could still be subject to interpretation and variations by MSs as they are transposed into national legislation. They may lead to inconsistencies and therefore may not achieve a fully harmonised approach to verification in the long run generally sought by verifiers, operators and MS. In addition, Guidelines take time to be turned into national legislation, potentially causing delays in harmonisation.

With respect to option 4.11 a regulation on verification could entail direct requirements to the relevant individuals themselves (verifiers, verification bodies, CAs etc) without being interpreted 27 times and applied differently in 27 national legislations. Consistent requirements applied in this way would improve the quality of verifications and their ability to determine and correct errors and misstatements, thus ensuring better data quality. Data integrity would therefore be improved and maintained in the longer term. Promulgating regulations on verification only once at EU level, that apply directly within MS is arguably the most efficient way to achieve a harmonised approach to verification since once passed they apply directly to individuals and there is no need to turn the requirements into national legislation and no delays in their application.

Regarding option 4.12 existing systems have proven track records. They have been developed and redesigned based on experience by volunteer technical experts from sectors and competent authorities. However, they may not cover all the aspects required to deal with all the various aspects of the EU ETS and may not ensure the quality of verifications sought for the EU ETS. This is likely to be a relatively efficient option since it does not entail developing new regulations or guidelines. It would simply provide greater legal weight to existing frameworks and guidance documents prepared by already established organisations. Many MS already use existing frameworks (applied in the absence of more detailed EU requirements) and therefore this option could be applied relatively efficiently. However,

efficiencies from streamlining requirements may not be realised under this option since such existing systems are already reasonably diverse and difference may perpetuate.

Efficiency and administrative costs: According to option 4.10 MS and CAs would need to have input into any new Guidelines on verification. Although difficult to determine, this could take around 10 to 20 days per MS in terms of attending meetings and preparing responses to consultation. Across 27MS this would constitute around 300 to 600 working days (up to around €0.4m). New Guidelines as a Commission Decision will then require changes to current MS processes and regulations. Potential costs of these changes are again difficult to determine, but could be considerable in total across 27 MSs. Assuming it takes roughly around 30 to 40 working days for a MS to make changes to existing legislation/guidance, this would equate to around 800 to 1000 days (€0.5-€0.6m) across the 27 MS when new Guidelines on verification are issued. The development of one set of EU wide guidelines on verification could have significant cost savings for MS after an initial period of revising national guidance/regulations. Therefore a consistent set of requirements set at a European level would avoid each MS going through the process again (depending on timing of the new guidelines).

With respect to option 4.11, it is safe to say that the development costs of a regulation on verification alone would require a certain amount of EC staff time. However, costs would be reduced if the regulation is built on existing frameworks and is developed alongside other regulations such as for MR (if the option is chosen). There would then be ongoing costs from reviewing the effectiveness of the regulation and making any changes over time. As for any new Guidelines, MS would be required to have input into a new regulation on verification. Given the stronger legal weight of a regulation, MS might take a more active role in its development than for Guidelines. Assuming each MS would spend 20 to 40 days being involved in developing a regulation, this would be around 500 to 1000 working days equating to up to €1.0 million. Cost savings for CAs may come from the regulation applying directly to the verifier and other parties named. There would be no need to subsequently amend national legislation if the regulation is amended since it applies directly. There would also be no delays in achieving improved harmonisation of requirements since they would apply immediately. With respect to operators if the regulation leads to additional verification requirements compared with processes currently used then verification costs will increase. The reverse may also be true. Overall, there should be a more uniform cost to verifications fluctuating more with the scale and complexity of the plant and time taken to perform the necessary checks, and less with the ability of the verifier or requirements set by CAs.

Option 4.12 is likely to be a relatively cost-effective option for the Commission since much of the guidance material and frameworks are prepared and run by other organisations. Building on existing frameworks such as the EA 6/03 Guidance will almost certainly be more cost-effective than preparing them separately as for option 2.1.3 above. There will be potential costs for MS if the proposed legal basis requires them to change already established regulations and processes. However, given that many of the existing organisations already play a significant role in many of the MS, costs of formalising their involvement and existing guidance should not be very great. For operators the costs of this option are likely to be relatively minor since many verifiers already adhere to ISO and EA6/03 requirements, and therefore the overall costs of verifications is not likely to change significantly.

Competition: With respect to option 4.10 increasing regulatory density on EU level with Guidelines would ensure more streamlined processes in each MS, reducing current variations and treating installations more consistently. But given MS transposition is still required, it

may not successfully harmonise requirements and achieve sufficient equity across all participants.

Regarding option 4.11, the major advantages of a regulation on verification are improved quality, consistency and harmonisation of requirements. Roles and responsibilities will be clearly spelt out. Time spent and quality of verification should become more consistent. Consistent rules regarding site visits could be established and competitiveness issues reduced. Finally there would be consistent expectations of what the verification will cover/involve and verifiers would perform verifications throughout the EU in a consistent manner.

Option 4.12 would clarify roles and responsibilities, and delegate much of the system to other organisations and guidance material. It would enhance consistency in verifications, but there may still be significant variations in how the requirements are applied, particularly if more than one organisation's approach is applied. CA, MS, operators and verifiers will need to be represented on working groups responsible for developing the existing guidance and frameworks so that they are fair for all operators/CAs in the EU ETS.

Table 4.2.4.1. Summary of the impact of options in relation to relevant problems and objectives

Option	Environmental Effectiveness	Efficiency & administrative. costs	Competition/ Competitiveness
4.10: Legal basis for guidelines	0/+	-/0	-/0
4.11: Legal basis for regulation	+	-/0	+
4.12: Legal basis to use existing guidelines	0/+	0/+	0/+

+ positive effect, 0 neutral/no or negligible effect, - negative effect

4.2.4.2. Accreditation

The assessment criteria used remain the same as in the preceding chapter, i. e. environmental effectiveness, economic efficiency, administrative costs and competition. Again, impacts on economic efficiency and administrative costs are jointly considered, since in terms of accreditation economic efficiency is closely related to the relevant administrative costs incurred by verifiers, regulators and operators. Impacts on competition are mainly considered in terms of ensuring a level playing field across the internal market, but are not assessed in terms of competitiveness with non-EU competitors, as they do not seem to be relevant in this respect.

Environmental effectiveness: Option 4.15 proposes a Commission Decision containing guidelines on accreditation transposed into MS legislation/regulations they would provide a more solid legal basis for accreditation requirements and reduce inconsistencies. However, the Guidelines would still be subject to interpretation by each MS and turned into national legislation. They therefore would not necessarily achieve a fully harmonised approach. There would also be delays in harmonisation caused by the time taken for MS to transpose any requirements.

With respect to option 4.16, providing a legal basis for accreditation through Article 15 and a regulation on accreditation would lead to strengthening and harmonising the requirements for accreditation throughout the EU. In turn, this should enhance the quality and consistency with

which verifiers/verification bodies perform their work and provide a more level playing field for verifiers, such as when it comes to quoting for verification work and facing competition. More robust verifications, by better qualified and scrutinised verifiers will ensure that emissions data is more accurate and has fewer misstatements. This will help to protect the environmental integrity of the System.

Option 4.17 would strengthen the legal requirements for accreditation and make good use of existing frameworks with proven effectiveness. Organisation/s such as the European Cooperation for Accreditation (EA) would be able to support the accreditation bodies (ABs). This common umbrella would allow for higher harmonisation. It is likely that it would be an efficient option for EA Members to be established as the ABs for the EU ETS since the majority of MS accreditation bodies are already members of the EA and since all MS have an EA member. This would help increase uniformity since there are cases where MS that have EA members don't use an AB that is an EA member for the EU ETS.

Efficiency and administrative costs: According to option 4.15 one set of comprehensive guidelines on accreditation established and agreed at an EU level are likely to be more efficient, than guidelines and rules promulgated a number of times across 27 MS. Amendments to Article 15 could be made relatively cost effectively through this review of the Directive. However, the guidelines would then need to be developed and implemented. Potential costs of developing guidelines would require a certain amount of EC staff time. Costs would be incurred from inputting into the guidelines and transposing the guidelines into national legislation or amending existing national legislation. As for the MRG, MS may also need to prepare guidance on the Guidelines. Many verifiers are already accredited (under fixed or temporary arrangements) to perform verifications for the EU ETS. Therefore, any additional requirements to improve the quality and consistency of their performance should not be overly onerous or expensive.

With respect to option 4.16 costs of a regulation on accreditation will be relatively similar to formal guidelines in the form of a Commission decision. **A** regulation on accreditation is unlikely to significantly influence verification costs for operators, particularly since the majority of verifiers are already accredited and would simply be required to upgrade and/or enhance their current systems, qualifications and procedures. Verifiers would tend to pass on any costs to the operators.

Regarding option 4.17, its costs may be lower than those for developing Guidelines on accreditation since it makes use of existing organisations and frameworks.

Competition: With respect to option 4.15 guidelines on accreditation would improve the abilities of verifiers, consistency with which they perform verifications and provide a more level playing field for verifiers in terms of the expectations and requirements of the accreditation process. They would be subject to more consistent scrutiny, and costs of accreditation would even out. However, since guidelines still need to be transferred into national legislation, there may be inconsistencies in application and therefore may not necessarily achieve the harmonisation in accreditation generally sought by participants

Regarding option 4.16, a regulation on accreditation with reference to existing Guidelines is likely to provide the most consistent and fair approach across the EU. However, under regulations referring directly to verifiers there is a potential risk that verifier accountability may become too onerous (i.e. missing misstatements or errors may make them liable for enforcement actions etc. threatening some of them out of the market).

With respect to option 4.17, more consistent accreditation may reduce MS concerns that verifiers in some MS do not meet the same standards as those accredited by their own accreditation body. This would in turn free up the market and allow for verifiers to operate throughout the EU (subject to language requirements). This also relies on greater harmonisation of verification requirements across MSs (options considered above), greater communication between MS and assurance that poor performing verifiers will be dealt with by MS accreditation agencies.

Table 4.2.4.2. Summary of the impact of options in relation to relevant problems and objectives

Option	Environmental Effectiveness	Efficiency & administrative. costs	Competition/ Competitiveness
4.16: Legal basis for guidelines	0/+	-/0	-/0
4.17: Legal basis for regulation	+	-/0	+
4.18: Legal basis to use existing CA frame	0/+	0/+	0/+

+ positive effect, 0 neutral/no or negligible effect, - negative effectCompliance of Options with Objectives

Consistent and comparable level of verification and accreditation: A regulation on verification and accreditation would provide the highest level of certainty with regards to the uniformity of implementation at MS level, but would also require significant design efforts. If this option is unfeasible, the next highest level of consistency across the EU can be achieved through verification guidelines. More comprehensive guidelines on verification transposed into MS legislation will enhance transparency, clarify requirements and should improve the consistency with which verification is performed across the EU. This in turn would improve the environmental integrity of the System and trust in the verification process itself. In both cases, the policy design process can rely on existing frameworks. The policy implementation process could aösp rely on a CEN working group as options are not entirely mutually exclusive, although combinations would require some adjustments.

Harmonised internal market for verification and accreditation services: A regulation on verification could entail direct requirements to the relevant individuals themselves (verifiers, verification bodies, CAs etc) without being interpreted 27 times and applied differently in 27 national legislations. Consistent requirements applied in this way would improve the quality of verifications and their ability to determine and correct errors and misstatements, thus ensuring better data quality. Data integrity would therefore be improved and maintained in the longer term. Promulgating regulations on verification only once at EU level, that apply directly within MS is arguably the most efficient way to achieve a harmonised approach to verification since once passed they apply directly to individuals and there is no need to turn the requirements into national legislation and no delays in their application.

More consistent accreditation may reduce MS concerns that verifiers in some MS do not meet the same standards as those accredited by their own accreditation body. This would in turn free up the market and allow for verifiers to operator throughout the EU (subject to language requirements). This also relies on greater harmonisation of verification requirements across MSs, greater communication between MS and assurance that poor performing verifiers will be dealt with by MS accreditation agencies.

4.3. Improving cost-effectiveness:

The development of one set of EU wide rules on verification and accreditation could have significant cost savings for MS after an initial period of revising national guidance/regulations. For example, many MS are now looking to update their guidance/regulations (PWC, 2007) and therefore a consistent set of requirements set at a European level would avoid each MS going through the process again (depending on timing of the new guidelines). Cost savings for CAs may come from the regulation applying directly to the verifier and other parties named. There would be no need to subsequently amend national legislation if the regulation is amended since it applies directly. There would also be no delays in achieving improved harmonisation of requirements since they would apply immediately.Exploring options of using advanced IT applications

4.3.1. Identification of Problems

Since the earliest phases of the review of the compliance system of the EU ETS it has been recognised that the use of common IT systems or at least the application of common IT standards for the exchange of information between different actors has an important role to play in the drive towards harmonisation of verification across the 27 Member States. In the first trading period no respective legal mandate existed. Consequently, a significant number of national IT systems has been set up with varying coverage of the compliance chain and a lack of comparability of data. Under the current situation, CAs would continue to use different data management solutions for different aspects of the compliance system (excluding registry software) – varying from reporting templates and databases for storing general installation information to simple workflow systems and basic tools for running checks on emissions reports and verifications. Fully integrated IT solutions are rare, and some do not use databases to store all the relevant information and must refer to filed paperwork for assessments. Only a few MS use the same or similar software.

As a result of this diversity, the quality and comparability of information from each member state can be expected to vary. Furthermore, on an aggregated level it is hard to manage and compare the information. The way in which the data are stored may mean they are not directly comparable (e.g. units/coverage might differ) and further data manipulation is required, possibly leading to errors. This could lead to a lack of reliability of and trust in the system.

Without changes to this situation there may be limited improvements to the trust in the certainty of the compliance information provided, which can affect the efficiency of the market.

4.3.2. Identification of Objectives

Against this background, the main objectives can be identified as:

– Ensuring a common approach in order to guarantee environmental effectiveness and integrity of the system

– Improving cost-effectiveness

4.3.3. Policy Options and Screening

(37) Option 4.19: Keep situation as it is

(38) Option 4.20: Commission to provide a common reporting format

(39) Option 4.21: EU wide harmonised reporting and compliance check workflow system, potentially linked with the registry

(40) Option 4.22: Extend scope of registry to also store emission reports and verification statements

Screening the options leads to the following results:

– **Effectiveness**: While the current situation (option 4.19) is characterised by a large variety of IT systems in Member States, which aggravate comparison and compatibility of data, the remaining options would achieve a more harmonised data management and are promising in terms of complying with the objective.

– **Efficiency**: All options except 4.19 would incur higher costs compared to the current situation. However, again this has to be seen in the context of achieving the objective concerned. Identification of the least-cost or best cost-benefit option is left to further analysis.

– **Consistency**: None of the option would adversely impact on other Community policies or objectives.

The table below summarises the results of the screening:

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
4.19: Keep current system	-	0	0	Discarded
4.20: Common reporting format	√	0/-	0	Retained
4.21: Harmonised reporting/compliance	√	0/-	0	Retained
4.22: Extended registry scope	√	0/-	0	Retained
√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,				

Consequently, option 4.19 is discarded, while options 4.20, 4.21 and 4.22 will be further analysed.

4.3.4. Impact of Options

The assessment criteria used remain the same as in the preceding chapter, i. e. environmental effectiveness, economic efficiency, administrative costs and competition. Again, impacts on economic efficiency and administrative costs are jointly considered, since in terms of using advanced IT applications, efficiency is closely related to the relevant administrative costs incurred by regulators and operators. Impacts on competition are mainly considered in terms of ensuring a level playing field across the internal market, but are not assessed in terms of competitiveness with non-EU competitors, as they do not seem to be relevant in this respect.

Environmental effectiveness: According to option 4.20 specifying a common reporting format through Guidelines or a regulation would mean that the Commission (in consultation with MSs) would define a common standard for exchange of information on reporting of

emissions (pursuant to MRG 2007). MSs could then decide how far to go with IT solutions in addition to using the standard on reporting. This option would therefore lead to greater harmonisation in what is reported, but would not necessarily provide the efficiencies offered by linked IT solutions/databases. A common reporting format would form the basis for better (more complete and consistent) reporting. The targeting of the compliance checks (inspections) of the CA would be easier, and the checks would be more sophisticated, providing for a level playing field at a higher quality level for the whole EU concerning the compliance checks to be expected.

Regarding option 4.21 this would provide a comprehensive and mandatory approach for all on the use of IT and for the entire compliance system, significantly improving consistency and harmonisation. A standardised system may ensure better comparability and completeness of data, easy access to information and automated data error checks to improve data quality and reduce errors. More robust and trustworthy data, that's easier to access for assessments and compliance checks, will increase environmental integrity of the system. It may be more efficient for this option to be linked with existing software such as the registry. If this is technically feasible, these links should be explored further.

With respect to option 4.22 the registries could be used to store additional information such as emission reports and verification opinion statements. However, since registries constitute banking systems made up of specialised databases, the storing of complex data or large documents with a completely different purpose would be a considerable burden for registry administrators. Although easy access to this information would provide greater transparency, it may have limited additional benefits. It would only provide a relatively small amount of the desirable information in one location, and it still might not be in a format that is easy to access and analyse. This option would not simplify or speed up requirements for operators and will not reduce the number of different reporting formats and systems currently used by CAs. However, if option 4.3 above is not pursued, this would at least provide a central database containing useful reports for subsequent assessment of the effectiveness of the System. In addition, the standardisation of reporting formats and other complex technical standards would be needed, making the previous options still a prerequisite.

Efficiency and administrative costs; According to option 4.20 improved uniformity and transparency in information reporting would enhance the efficiency of the markets. A common reporting format would be relatively cost-effective to include into Guidelines and/or regulations as proposed under several of the other options. For some MS and CAs, this option would avoid reinventing requirements and therefore reduce time and effort, and allow the flexibility to use whatever IT systems are developed. For others with existing IT systems, changes would need to be made, but these would not be overly onerous provided the existing system is set up to allow for changes and include new reporting fields etc. Increased consistency through a common format would also harmonise reporting for verifiers, making it easier – particularly for those operating in more than one MS. As MS would incorporate ETS reporting into their eGovernment environments, every operator would benefit from one common platform per MS for many CAs contact issues (e.g. reporting, applying for permits, etc.).

With respect to option 4.21, improved uniformity and transparency in information reporting would enhance the efficiency of the markets. Costs cannot be judged on a standalone basis, but in the context of general eGovernment systems, such as a general (environmental) permit database. Total costs might be lower if every MS uses what is already in place than if all MS purchase one software package for ETS alone, even if considered in an isolated ETS

perspective, it would be more beneficial. Costs of developing a stand-alone ETS information system may be considerable, requiring upfront investment and considerable consultation with operators, MSs and CAs to reach agreements. Operators are likely to continue to develop their own IT systems outside any formal requirements from the Commission or CAs. However, if a system can be developed for EU ETS reporting that can be integrated into their existing systems and the process becomes more automated; there may be some cost savings in terms of time spent providing the relevant data to CAs; this is exactly what the common reporting format should achieve. This option may only achieve relatively minor cost savings for the smaller, less complex installations (PWC, 2006(a)) since they will collate data and report relatively infrequently.

Regarding option 4.22 improved uniformity and transparency in information reporting would enhance the efficiency of the markets. This option would require changes to the registries regulation, MRG and Directive, which would not be straight-forward. There would also be costs associated with adding-on software to the existing database.

Competition: With respect to option 4.20 a common reporting format would improve the equity with which operators are treated. They would be subjected to much more consistent information requests by CAs.

According to option 4.21 a mandated reporting and compliance workflow system would improve the equity with which operators are treated. They would be subjected to much more consistent information requests by CAs. CA would carry out more harmonised and possibly more frequent compliance checks as other costs / workloads would be reduced due to automatisation.

Regarding option 4.22 this option applied to all installations would be fair and equitable and ensure emissions reports from all operators are available in the public domain.

Table 4.3.4. Summary of the impact of options in relation to relevant problems and objectives

Option	Environmental Effectiveness	Efficiency & administrative. costs	Competition/ Competitiveness
4.20: Common reporting format	+	+	+
4.21: Harmonised reporting/ compliance	+	+	+
4.22: Extended registry scope	-	+	+

+ positive effect, 0 neutral/no or negligible effect, - negative effect

4.3.5. Compliance of Options with Objectives

– Ensuring a common approach in order to guarantee environmental effectiveness and integrity of the system

A common reporting format would form the basis for better (more complete and consistent) reporting. The targeting of the compliance checks (inspections) of the CA would be easier, and the checks would be more sophisticated, providing for a level playing field at a higher quality level for the whole EU concerning the compliance checks to be expected. Increased consistency through a common format would also harmonise reporting for verifiers, making it

easier – particularly for those operating in more than one MS. As MS would incorporate ETS reporting into their eGovernment environments, every operator would benefit from one common platform per MS for many CA contact issues (e.g. reporting, applying for permits, etc.).

– Improving cost-effectiveness

A common reporting format would be relatively cost-effective to include into Guidelines and/or regulations as proposed under several of the other options. There may be concerns about the costs of replacing or upgrading existing systems, however, recent assessment of national initiatives shows that it would not necessarily require MS and companies to implement new systems. The framework could be developed offering harmonisation without hampering the subsidiarity principle and MS can continue using their existing systems.

4.4. Compliance and enforcement

4.4.1. Identification of Problems

With respect to compliance and enforcement, relevant provisions in Member States are very different implying different levels of incentives to comply. MS have considerable flexibility to determine the types of offences that penalties are applied for. Under the status quo, the only consistent penalty in the Directive is one for failing to surrender sufficient allowances by 30 April each year – namely €40 per allowance in Phase I and €100 per allowance in Phase II and potentially Phase III.

For any other non-compliance events (e.g. failing to monitor in accordance with the MR plan), each CA would continue to implement different requirements as set down in national legislation and policies. This will potentially perpetuate rather confusing, inequitable and variable compliance requirements for operators (PWC 2006). A series of additional policy options is necessary in order to improve the effectiveness and equity with which installations are treated in terms of inspections, compliance and any penalties levied for non-compliance.

4.4.2. Identification of Objectives

Against this background, the main objectives can be identified as:

– Reinforce compliance

– Ensure compliance also in the longer term

4.4.3. Policy Options and Screening

(41) **Option 4.23: Develop Commission Recommendation on practical issues of the complete compliance chain**; A Commission recommendation on practical issues of the complete compliance chain would be issued as a communication from the Commission and would serve as a source of information for CAs.

(42) Option 4.24: Develop Inspection Rules / Recommendations

(43) **Option 4.25: Penalties and sanctions**:

(44) **Option 4.25a: keep situation as it is**: Member States to choose penalties and sanctions, except for allowances not surrendered

(45) **Option 4.26: Penalty for not surrendering allowances**:

(a) keep situation as it is (€100/t)

(b) gradually increasing penalty taking into account inflation rate

(c) automatic penalty expressed in allowances deducted from allocation in the following year

Due to the technical character and the similarity of the options concerned, the screening is carried out in a rather sweeping manner, although a part of the options cannot really be compared. For example, option 4.23 and 4.24 would be much more comprehensive, as it addresses the whole chain, while, on the other hand, the remaining options only address specific parts of the compliance chain. Screening the options leads to the following results:

– **Effectiveness**: Generally, all options including those maintaining the status quo could be effective in the sense that they provide incentives to operators to comply with the rules and provisions of the EU ETS. Option 4.26a may, however, in the longer term only entail a reduced incentive for compliance.

– **Efficiency**: While most of the options would only incur minor costs compared to the current situations, Options 4.23 and 4.24 are somewhat outstanding in that they would require more input, before they can be implemented.

– **Consistency**: None of the option would adversely impact on other Community policies or objectives.

The table below summarises the results of the screening:

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
4.23: Commission Recommendation	√	0	0	Retained
4.24: Inspection rules/recommendation	√	0	0	Retained
4.25a: Current situation	√	0	0	Retained
4.26a: Penalty: current situation	-	0	0	Discarded
4.26b: Penalty: inflation rate adjustment	√	0	0	Retained
4.26c: automatic penalty	√	0	0	Retained
√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,				

Consequently, option 4.26a is discarded, while the remaining options will be further analysed to the extent possible.

4.4.4. Impacts – Comparing the Options

The assessment criteria used remain the same as in the preceding chapter, i. e. environmental effectiveness, economic efficiency, administrative costs and competition. However, impacts on environmental effectiveness and economic efficiency are jointly considered, since both criteria are closely interrelated in terms of penalty provisions. Impacts on competition are

mainly considered in terms of ensuring a level playing field across the internal market, but are not assessed in terms of competitiveness with non-EU competitors, as they do not seem to be relevant in this respect.

Environmental Effectiveness and Efficiency: Option 4.23, a Commission recommendation on practical issues of the complete compliance chain would be issued as a communication from the Commission and would serve as a source of information for CAs. Such a recommendation would be a much more extensive text than a legal text and could therefore explain issues to a higher level of detail. That would contribute to all stakeholders' understanding of the issues, which in turn would add to harmonisation throughout the EU.

Option 4.24 would only cover a limited part of the compliance chain, namely the way in which the CAs undertakes inspections of installations. Therefore this is not a stand-alone option, but additional to the options named in the previous sections dealing with Monitoring and Reporting. The recommendation considered here still allows the CAs to determine how often sites need to be inspected and the nature of enforcement action taken. As a recommendation that needs to be integrated into national law, it is likely to improve the consistency which CAs perform inspections, but there are still likely to be some variations in its application throughout the 27 MS.

Option 4.25a, under the status quo, the only consistent penalty in the Directive is one for failing to surrender sufficient allowances by 30 April each year – namely €40 per allowance in Phase I and €100 per allowance in Phase II and potentially Phase III. For any other non-compliance events (e.g. failing to monitor in accordance with the MR plan), each CA would continue to implement different requirements as set down in national legislation and policies. This will potentially perpetuate rather confusing, inequitable and variable compliance requirements for operators (PWC, 2006). There are concerns that the current penalties and variable enforcement may not provide sufficient deterrents through into Phase III to ensure the integrity of the System.

Option 4.26b, gradually increasing the penalty to take account of inflation (around 2%) would increase the penalty year on year. If added annually to the existing penalty of €100, this may retain its deterrent affect over longer time periods.

Option 4.26c, the advantage of this option would be that the penalty would be adjusted automatically to the carbon price and the penalty would de facto decrease the total cap, improving the environmental integrity of the system, however, in the last year of an allocation period this provision could be seen as "borrowing". This would require further study, as the issue of borrowing may entail a number of other serious implications.

Administrative Costs: Concerning option 4.23 there may be considerable costs involved in developing the recommendation, especially considering the broad range of issues to be covered and the input needed from MS, operators, verifiers, CAs and accreditation bodies. Indicative costs can be assumed from previous sections in terms of the costs involved with developing guidelines and/or regulations on these issues: Participation in the development of the recommendation will entail some expenses

Option 4.24 With respect to the Commission indicative costs can be assumed in terms of the costs involved with developing guidelines and/or regulations on these issues. Participation in the development of the recommendation will entail some expenses for MS and operators.

Option 4.25a, retaining the current system would be the most cost-effective option for the Commission, MS and CAs since not changes to existing legislation and requirements would be required.

Option 4.26b, administrative costs to **CA**s would include costs for publishing the nominal amount of the penalty each year and to operators this would constitute the costs of informing themselves on the penalty level each year.

Option 4.26c, the administrative costs would be minimal.

Competition: Option 4.23 the option should achieve some quality and consistency improvements in certain aspects, particularly where there is a current lack of certainty such as for verification, accreditation and compliance requirements.

Option 4.24, a recommendation on compliance inspections will essentially 'even out' the treatment of installations and compliance costs across the EU, but perhaps not to the same degree as a regulation.

Option 4.25a, since all operators are in the same System, they should be subject to similar compliance checks and penalties/enforcement action. If one installation in a MS is seen to 'get away with it', then potentially another installation may attempt to do likewise. Alternatively, if one operator is penalised and another gets away with it this can adversely affect competition and the integrity of the System. Although ongoing information sharing through existing forums such as IMPEL may bring some degree of harmony into compliance procedures and the imposition of penalties over the longer term, such groups are unlikely to create a fully consistent approach because there is no legal mandate for their decisions/recommendations. Therefore, to improve consistency in enforcement and penalties in Phase III, additional policies have been considered.

Options 4.26b, 4.26c, all installations should be subject to the same potential penalties. This may be more about the way in which the penalties are levied rather than the level of the penalty itself.

Table 4.4.4. Summary of the impact of options in relation to relevant problems and objectives

Option	Environmental Effectiveness	Efficiency & administrative. costs	Competition/ Competitiveness
4.23: Commission recommendation	+	-	0/+
4.24: Inspection rules/recommendation	0/-	-/0	0/+
4.25a: current situation	-	0	-
4.26b: Penalty: inflation rate adjustments	+	+	+
4.26c: Automatic penalty	0	0/+	+

+ positive effect, 0 neutral/no or negligible effect, - negative effect

4.4.5. Compliance of Options with Objectives

Reinforce compliance: Since all operators are in the same system, they should be subject to similar compliance checks and penalties/enforcement action. If one installation in a MS is seen to 'get away with it', then potentially another installation may attempt to do likewise. Alternatively, if one operator is penalised and another gets away with it this can adversely affect competition and the integrity of the System. Under the proposed options regarding penalties, the level of the penalty will go beyond that decided by the MS. Different "punishment cultures" and economic situations of the MS have to be taken into account but aiming at a more harmonised approach. Ensure compliance also in the longer term: Developing a commission recommendation on practical issues of the complete compliance chain would constitute a source of information for CAs and would allow for a more uniform interpretation of the legal texts. Changing the current penalty level for failure to surrender allowances is recommended, in order to allow an adjustment with inflation and potential carbon price increases and to maintain a high level of compliance. Detracting a multiple of allowances from future allocations would lead to a better representation of the allowance value, but the technicalities of this option interacting with borrowing (if the multiple used is not high enough) would have to be addressed.

4.5. Registries

4.5.1. Identification of Problems

Since the 2005 January start of the EU ETS, the registry system, i.e. the 25 Member State registries and the Community Independent Transaction Log ("CITL" have operated successfully and efficiently. The amount of registry system downtime due to technical problems was small, and no complaints arrived from the general public regarding the execution of core tasks, i.e. the transfer of allowances between accounts, the management of accounts and the management of verifications and surrenders. At the same time, the current system is not very cost-effective, as it requires the maintenance of a costly IT-infrastructure in each Member State and at the Commission. This infrastructure is made necessary only by the current legislative framework. It is generally accepted by the expert working in the field that the objective of "*accurate accounting of the issue, holding, transfer and cancellation of allowances*" set out in the Directive could be attained at a much lower cost in a single European registry.

Currently, registries are directly connected to the CITL and two registries transfer allowances between each other through the CITL. However, as the first commitment period under the Kyoto Protocol starts in 2008, Member State registries (that also function as registries for the purposes of the Kyoto Protocol) should also be connected to the International Transaction Log ("ITL") managed by the UNFCCC for the purposes of the Kyoto Protocol. This means that every single transfer of allowances (within a registry or between two registries) will need to pass through the ITL. Though the technical standards for the registry-ITL-CITL co-operation are well developed and the Commission has a good working relationship with the ITL, the ITL's entry into the EU ETS introduces technical, political and administrative risks into the operations of the registries system. The technical risks come from the fact that messages will have to pass through more systems, which increases the scope for errors. (Also, more sovereign participants make the resolution of errors more difficult and lengthy.) The administrative risk comes from the fact that the ITL is not under the direct control of the Commission or the EU Member States, and neither its policies nor its daily operative practice

can be defined by the Communities. The political risk arises from the fact that countries outside the EU would be able to influence the future development of the EU ETS.

Another issue impacted by the introduction of the ITL into the registries system is the possibility of connecting the EU ETS with other trading systems. As after linking to the ITL, the ITL will be situated between a Member State registry and the CITL, any trading system wanting to connect to the EU ETS would also have to transfer messages through the ITL. While the rules developed by the UNFCCC Secretariat currently allow this, these rules are subject to the oversight of the Parties to the Kyoto Protocol, and it cannot be excluded that third countries could obstruct the extension of the EU ETS both in terms of coverage and linkage to emission trading systems established other than by Parties to the Kyoto Protocol.

4.5.2. Identification of Objectives

The objectives of a revision of the provisions on registries should address the following issues:

- The registries system should provide the same level of service to operators at a lower cost to the public (both in terms of IT infrastructure and human resource)

- The registries system should be able to reliably serve the needs of the operators in the EU ETS without being dependent on the reliability of the ITL's functioning

- The registries system should be able to set up connections with trading systems outside the EU without routing such messages through the ITL.

4.5.3. Policy Options and Screening

(46) Option 4.27: keep the system as it currently is.

(47) Option 4.28: revise provisions of the Directive with a view to merge registries into a single EU-wide registry.

4.5.4. Impact of Options

Under the option 4.27, the current high operating costs would remain. At this stage the CITL is not yet connected to the ITL, so we do not know how efficient the co-operation between the ITL and the CITL will be. As regards the possibilities of connecting the EU ETS with other trading systems, the negative impact of the current system cannot yet be assessed as linking negotiations have not advanced to this level of detail.

Under option 4.28, a single European registry would be used to carry out trading in EU allowances, and while the registries system would remain connected to the ITL, daily EU ETS transactions between EU Member States would not need to pass through it. Only transactions with other parts of the Kyoto Protocol registries system (e.g. Japan, CDM registry) would be routed to the ITL. This would make the operations of the EU ETS much safer and less error-prone. There are two ways of implementing this option:

a) the single European registry takes over all registry functions (i.e. both EU ETS related functions and Kyoto Protocol related functions. This solution results in the greatest savings as there would be no need for IT-infrastructure at a

Member State-level. At the same time, this solution would require the (technically complex) merger of the single registry with the CITL in order to allow intra-registry trading without the interposition of the ITL.

b) the single European registry only takes over the management of transactions within the EU ETS. For this purpose, the allowances trading in the single European registry would have to be copies of AAUs kept frozen in Member States' Kyoto Protocol registries. A clearing mechanism would need to be developed to periodically book EU ETS transactions between Member States into their Kyoto Protocol registries.

As the details of a registry system are currently laid out in the relevant Commission regulation on registries (required by the Directive 87/2003/EC), the review of the Directive should limit itself to the framework provisions provided in the Directive. Detailed rules of the registries system should continue to be provided by Commission regulation. Improvements to this regulation could meet the above objectives, without requiring co-decision. The Commission is open to such improvements, as long as they can be implemented in practice, increase certainty and predictability for operators, and reduce administrative complexity and costs.

4.5.5. Compliance of Options with Objectives

Option 4.28 is capable of fulfilling the established objectives.

5. FURTHER HARMONISATION AND INCREASED PREDICTABILITY

5.1. Identification of Problems

5.1.1. Problems as regards cap setting

In phase I and II of the EU ETS, the overall cap of the EU ETS is equal to the sum of national caps determined by the Member States, following assessment by the Commission. The national caps had to be established in line with Commission decisions assessing consistency with the criteria laid down in Annex III of the Directive and with the guidance documents issued by the Commission. This approach allowed a large degree of flexibility for Member States to take account of specific and national circumstances, including the different reductions of emissions required to comply with agreed efforts to comply with the Kyoto-protocol, different economic growth rates and differences in the potential to reduce emissions. This approach entailed, however, the following problems:

– **National caps set higher than environmentally efficient levels:** The existing rules create a "prisoner's dilemma"[80] where each individual Member State recognises the collective interest to set restrictive caps for optimal reduction of emissions in the EU, but also has an interest to maximise the national cap. This has been clearly demonstrated by the allocation beyond needs in the first trading period. The outcome for the second trading period is expected to be a significant improvement, but it required strong intervention from the Commission as many Member States were reluctant to impose restrictive caps on the trading sector. Higher caps in the trading sector often required higher and more costly emission reductions in the non-trading sector. This behaviour pattern risks compromising the environmental effectiveness of the system as too many allowances in the market lead to a lower allowance price, thereby reducing the incentive to develop and deploy clean technologies and hampering the evolution towards a less carbon intensive economy. It also requires a larger share of emissions to be reduced in the non-trading sector and if marginal cost of reducing emissions in the non-trading sector is higher (as appears to be the case), overall cost increases, which is to the detriment of the overall EU economy.

– **Lack of a level playing field:** Different levels of ambition for the ETS sector in Member States translated into different allocations at sector and installation level. Differences are most pronounced for the power generating sector, but also the allocations to other sectors varied. As a consequence, distortions of competition between Member States' trading sectors and also within sectors occurred.

– **Uncertainty and lack of predictability:** The approval of NAPs has been a long lasting and cumbersome process, generating prolonged uncertainty as regards the scarcity in the market. While in theory the Commission should adopt decisions on the NAPs by 15 months before the start of the subsequent trading period, practical experience shows that late delivery of complete plans by Member States lead to the final NAP decision is adopted less than 6 months prior to the subsequent trading period. Predictability of the overall

[80] The "prisoner's dilemma" is a notion developed in game theory that describes the situation where the optimal outcome occurs when players cooperate, but where individual incentives and distrust lead to the situation that no player actually pursues cooperation.

regulatory framework and of the future price of allowances is crucial for investment decisions. In case of too much uncertainty, operators will refrain from making long-term investments and will rather focus on short term abatement measures, because the benefits from long term investments are discounted more heavily. Investments with long-term benefits include in particular innovative investments in new technology, so uncertainty has particular negative effects on the structural transformation of the economy into a low-carbon economy and these negative effects may persist for long time horizons. Because of these negative impacts, uncertainty indirectly increases the overall cost of emissions reductions and the carbon price.

- **Undue volatility of allowance prices, negative impact on the functioning of carbon markets:** Prolonged uncertainty about the EU-wide cap has a negative impact on the functioning of the allowance market. Uncertainty arises, among others from the relatively large number of regulatory decisions to be taken. Market participants reacted both to announcements of proposed NAPs by Member States and to Commission decisions assessing the NAPs. Volatility triggered by regulatory decisions reduces the efficiency of the system and should be limited as much as possible.

- **Complexity and lack of transparency:** The current system leads to high complexity as regards the level of the national caps and as well as regards the procedures by which these caps are decided. Transparency for market participants inside and outside the system, and for the wider public is limited. This negatively impacts on confidence in the EU ETS.

- **Negative impact on the credibility of the EU vis-à-vis third countries:** The absence of scarcity in the first trading period had a negative impact on the EU's credibility when pressing for more ambitious climate change policies in third countries.

- **High administrative burden:** The process involves a high administrative burden including a high level of transaction costs to Member States, the Commission and companies covered by the system. This runs counter to the need to ensure simplicity and a sufficient level of transparency with respect to cap setting required by both operators in the EU ETS taking investment decisions and systems possibly linked up to the EU ETS.

5.1.2. Problems as regards allocation

While a stringent cap guarantees environmental effectiveness, economic efficiency is to be ensured by a well-functioning market where marginal abatement costs are equalised across installations. All installations would buy allowances as long as their marginal abatement cost is above the allowance price on the market and would implement emission reduction measures, as long as their marginal abatement cost is below the market price of allowances.

Article 10 of the Directive stipulates that for the first and the second trading period at least 95% respectively 90% of allowances has to be allocated free of charge. By far the largest share of allowances has been allocated on the basis of "grandfathering", which means allocating allowances on the basis of historical emissions. Only a limited share has been allocated on the basis of "benchmarking", which means allocations based on a certain benchmark multiplied by historical output, historical use of inputs, capacity etc. In practice, however, Member States have applied these methods in many different ways and have added a wide variety of specific allocation rules. This has brought about the following problems:

– **Negative impact on efficiency:** Allocation methods have had a negative impact on the economic efficiency of the ETS. The methods affects behaviour of new entrants, decisions to close installations and the operating of existing installations:

  - Allocations to new entrants create a perverse incentive to invest as they are normally based on capacity to be installed and/or projected production. This reduces the signal from the allowance price to invest in low-emission intensive equipment and/or in production capacity of substituting products that entail lower emissions. Perverse incentives have been particularly strong as most Member States based the allowances to new entrants on technology or fuel-specific benchmarks, taking away much of the incentive to invest in the most efficient and least carbon intensive technology. As a result, the allowance price signal for new investments is severely diluted and there is no or insufficient incentive to invest in low carbon technologies. [81]

  - Closure rules, in combination with free allocation, have weakened incentives to close down old emission-intensive plants. Closing an installation with high emission intensity is less attractive if that reduces the number of allowances to be received for free. This is true even when the operator receives an allocation from a new entrants reserve for replacement capacity: without the closure rule, it would have (even more) excess allowances that could be sold on the market. But allocating allowances to closed installations has been perceived as undue and could actually create strong incentives to close down installations without replacement investment within their boundaries as the sales of allowances could be more profitable than continuing production.

  - With respect to existing installations, the availability of free allowances reduces the financial necessity for undertakings to reduce emissions, in particular where the cost of emissions as a percentage of turn-over is not very high and where such costs can be easily recuperated by increasing prices, even though such behaviour may not be economically rational. Moreover, expectations of future free allowances to be based on current or future emissions significantly reduced the incentive to reduce emissions. Also where installations expect future allocations for free to be differentiated according to e.g. fuel use, technology, the incentive to switch fuels or invest in low emission technology is reduced.

All these mechanisms lead to under-investment in low-cost abatement measures, and as explained above, the negative effects of non-optimal investment may last over a long time period. As a consequence, a higher allowance price is needed to realise compliance with the overall cap on emissions. There is emerging empirical evidence that these negative effects effectively occurred[82].

– **Distortions of competition:** The variety in allocation methodologies has generated distortions of competition across Member States. Differences in allocation levels stem in particular from the application of different reduction factors, from different methods to

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81 See e.g. Lindboe 2007, where the cost of allocating to new entrants in the electricity sectors of Denmark, Finland, Germany, Norway and Sweden has been estimated at € 4 billion, i.e. some 25% of the toal investmens in the electricity sector over the period 2006-2022.

82 E.g. final report 3rd ECCP-meeting.

account for expected production growth and from different ways to take into account early action and clean technology[83]. Differences in allocation levels have been most pronounced in the power generating sector, whereas they remained smaller in industrial sectors. Location decisions of the investors may have been distorted particularly by the rules for allocating to new installations and transfer rules which restrict the benefit of keeping allowances after closure to the same operator, site or to investment in the same Member State.

– **Undesirable distribution effects:** Thirdly, the system has led to distributional effects seen by many as undesirable and unjustified. The rational for allocating allowances for free derives from concerns about competitiveness and net "carbon leakage", i.e. relocation of production out of the EU that actually increases global emissions, and from the desire to provide some compensation for sunk costs when introducing the EU ETS. In practice, however, allocations for free have had significant redistribution effects, most prominently but not exclusively in the power generating sector.[84] In competitive markets, charging the opportunity cost of resources, whether received for free or not, is rational economic behaviour for any market participant[85]. Charging the (opportunity) cost of allowances is, however, more difficult where prices are determined on world markets. Obviously, this is not the situation for many sectors, notably not for the power generating sector, which given the local nature of demand is relatively well able to pass through the opportunity costs of allowances in the prices charged to its customers without risking to lose market share.

– **Complexity and lack of transparency:** The current wide range of allocation methodologies has considerably increased the complexity of the allocation process and thus negatively affected simplicity and transparency.

5.2. Identification of objectives

5.2.1. Objectives as regards cap setting

As regards cap-setting, the overall objectives of the review can be further specified as the identification of measures designed to set the cap in a manner that:

- environmental effectiveness and economic efficiency
    - achieves the overall emission reduction target for the EU and Member States at least cost. This requires identification of the appropriate level of the overall cap and design of the system in a way that ensures that this level is adopted and maintained;

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83 Apart from effects on actual production and pricing, allocations also affect financing costs and financial power of the companies concerned.

84 See e.g. Cramton 2002, Sijm 2006a, Sijm 2006b, Smale 2006, Walker 2006. When addressing the distributional effects of the ETS, solutions must be sought in the allocation methods. Inclusion of the (opportunity) cost of emissions in final product prices is an intended effect of the ETS, as it ensures correct carbon price signals, shifting demand towards less emission-intensive products. Such substitution effects are essential for achieving emission reductions at lowest cost.

85 As the EU ETS affects all players in a sector in the same way, under perfect competition, full inclusion of the opportunity cost in prices is the expected market result.

- increases predictability of the future cap by increasing the stability of the regulatory framework, without unduly limiting flexibility to adjust to new information on e.g. actual climate change, technological developments and actions undertaken elsewhere in the world;

- increases the EU's credibility on climate change policy vis-à-vis third countries, since climate change is a global problem;

- allows predictable adaptation to a target for emission reduction of 30% instead of 20% once there is further international agreement on climate change policy.

- **minimises distortions of competition** between Member States and sectors included in the EU ETS by establishing a level playing field for operators;

- avoid unduly negative impact on **competitiveness and employment** of the EU economy, though facilitating the structural transformation to a low carbon economy**;**

- **minimises** the time and **administrative cost** to authorities and operators;

- increases simplicity and transparency;

5.2.2. Objectives as regards allocation

As regards allocation to existing, new and closing installations, the overall objectives of the review can be specified as the identification of allocation methodologies that

- environmental effectiveness and economic efficiency

    - ensure that the installations covered by the system reduce emissions within the EU at least costs. The carbon price must convey a clear, un-distorted signal both directly for operators involved as well as in final product markets, ensuring dynamic efficiency of the EU ETS in the mid and longer term;

    - avoid carbon leakage to the extent that such methodologies are cost-efficient compared to other instruments, thereby contributing to the environmental effectiveness of the system;

- establish a level playing field and **eliminate** distortions of competition;

- avoid unduly negative impact on **competitiveness and employment** of the EU economy, though facilitating the structural transformation to a low carbon economy**;**

- **minimise** the time and **administrative burden** to authorities and operators

    - increase transparency, simplicity and predictability of allocation methodologies;

- **avoid undue distributional effects;**

As regards distributional effects, the guiding principles are in the first place the "polluter pays principle" and the principle of "internalisation of external cost". In line with the first principle, the costs of measures to deal with pollution should be borne by the polluter who causes the

pollution. The second principle implies that, in order to ensure efficient markets, all costs associated with the protection of the environment should be included in the companies' production costs. In addition to these two principles, the Commission should ensure that new policies do not inflict undue sunk costs upon companies, while companies should take care to factor climate change into their investment decisions.

5.3. Cap-setting: level of harmonisation

The policy options for cap-setting concern three aspects. The present section concerns the issue how to decide on the cap. In section 5.4., criteria for setting the level of the caps are discussed. Section 5.5 assesses design options to increase predictability of the cap-setting system.

5.3.1. Policy Options and Screening

The following options as regards the level of harmonisation are to be considered.

(48) **Option 5.1**: **status quo**. National caps set by Member States in line with criteria in the Directive and subject to control by the Commission.

(49) **Option 5.2**: **national caps set by Member States in line with reinforced criteria in the Directive and subject to strengthened control by the Commission**. Some problems of the current approach could be remedied by including stricter criteria for cap-setting in the Directive and giving stronger powers to the Commission to ensure respect of these criteria. The criteria could e.g. concern the method to calculate expected needs and the minimum ambition level compared to historical emissions or expected needs. A procedural provision could be included to have the cap decided by the Commission in case the Member State does not submit its proposal on time.

(50) **Option 5.3: an EU wide cap with criteria in the Directive for setting the level at a later stage.** Under this option only one single EU wide cap will be set. The effort-sharing agreement for the post-Kyoto target would concern only the non-ETS sectors. The Directive would include criteria for setting the level of the cap, as well as the procedures and timing of the decision. The actual cap would be set only later, in accordance with these procedures. The EU-wide cap would be 'distributed' to individual Member States by determining the number of allowances that each of them is allowed to auction and/or allocate for free.

(51) **Option 5.4: an EU wide cap set in the Directive**. This option is equal to the previous one, except that the cap for the third trading period is set directly in the Directive. Criteria for setting the cap for later trading periods and the corresponding procedures and timing of these decisions could be included in the Directive or left to a subsequent review.

Screening[86] the options leads to the following results:

– **Effectiveness**: The status quo (option 5.1) does not take away the "prisoners' dilemma" which led to overall caps beyond the environmentally efficient levels. Moreover it cannot be expected to bring about any improvements in terms of minimising competitive distortions or increased simplicity and transparency. It might also be doubtful, whether this option would allow easy adoption of a 30% target in case of an international agreement. The other options have the potential to successfully overcome these shortcomings of the status quo approach.

– **Efficiency**: In particular options 5.3 and 5.4 are promising with respect to achieve the objectives at less administrative cost than the status quo option would imply. Under certain conditions (sufficiently detailed criteria laid down in the Directive), this would also apply to option 5.2.

– **Consistency** seems best ensured by options 5.3 and 5.4, since any adverse impacts on competition on the internal market can be avoided. Although option 5.2 may seem to allow some more flexibility to take into account national circumstances, options 5.3 and 5.4 are not at all inconsistent with the objectives of economic and social cohesion across the EU, since different national circumstances can be fully taken into account when deciding on other aspects of the system, notably the distribution of rights to auction allowances (see section 5.6).

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
5.1: Status quo	-	-	-	Discarded
5.2: improved national cap setting with oversight	√	√	√	Retained
5.3: criteria for EU wide cap	√	√	√	Retained
5.4: EU-wide cap in Directive	√	√	√	Retained
√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,				

Option 5.1 is therefore discarded and will not be further pursued.

5.3.2. Impacts – Comparing the options

An EU wide cap, so both options 5.3 and 5.4, would strongly improve environmental effectiveness, as they avoid the current "prisoners' dilemma" which generated the upward pressure on national caps in the first and the second trading period. Option 5.2, strengthened harmonisation of national caps, may help to limit the shortcomings of the current system, but it will be difficult to define additional criteria with sufficient precision and as this option does not take away the situation of a "prisoners' dilemma" it would once again place reliance on the Commission for an optimal outcome. Member States will continue to have incentives to over-allocate to installations on their territory and/or to maximise the revenues from auctioning, and therefore they can be expected to strive for high national caps.

[86] To recall, the screening criteria are the following: **effectiveness**: the extent to which options can be expected to achieve the objectives of the proposal; **efficiency**: the extent to which objectives can be achieved for a given level of resources/at least cost; and **consistency**: the extent to which options are likely to limit trade offs across the economic, social and environmental domain.

Options 5.3 and 5.4 provide more safeguards for a level playing field between companies within and outside the trading sector, as they best avoid different levels of ambition that could result in differentiated levels of allocations for free.

Option 5.4 provides most predictability and transparency on how the cap would look like and how it is composed. Options 5.2 and 5.3, in contrast, bear the risk of absence of a timely decision on a cap, since the procedures for deciding the cap could only start once the revised Directive enters into force. This would jeopardise the smooth continuation of the system into the third trading period. Options 5.2 and 5.3 would bring some more flexibility to adapt to new information over the next few years, but it will still be difficult to take such information into account, so this advantage is considered to be limited.

5.3.3. Comparing the options with the objectives

From the assessment of the impacts above, it appears clearly that option 5.4 best complies with the objective to increase the effectiveness and predictability of the system. In addition, it renders the identification of an EU-wide cap more efficient, thereby minimising the time and administrative burden of cap-setting for authorities and operators. Option 5.4 is, furthermore the simplest and most transparent way to set the cap and therefore also ranks best as regards the EU's international credibility. Finally, option 5.4 is the easiest to adapt the target for reducing emissions to 30% compared to 20% in the absence of international agreement.

An EU-wide cap takes away some flexibility from Member States, but the need to shift the effort between the ETS and non-ETS sector would be very much reduced if the effort-sharing agreement for the 2020 emissions reduction target concerns only the non-trading sector[87]. Moreover, as set out in the respective impact assessment, the Commission's proposal for this effort-sharing is consistent with the different abatement potentials in non-trading sectors of different Member States and with the different financial strength between Member States. Finally, flexibility for achieving the reduction targets for the non-ETS sector and for the production of renewable energy is provided for by the possibility for Member States to trade their achievements as regards emission reductions and renewable energy production. An EU wide cap set in the Directive is the option most consistent with these considerations.

[87] The ETS by definition sets a carbon price which equals marginal cost of abatement measures in the trading sectors. Therefore, the optimal effort-sharing does not depend on marginal cost curve of abatement options in the ETS-sector in the individual Member State concerned.

Table 5.3.3. Summary of the impact of options in relation to relevant problems and objectives

Option	Effectiveness in appropriate cap-setting	Comp-etition	Pre-dictability	Simplicity trans-parency	Interna-tional credi-bility	Admini strative costs	Ability to adapt to 30% target
5.2: improved national cap-setting with oversight	0	0/+	0/+	0/+	0/+	0/+	0/+
5.3: criteria for an EU-wide cap	++	++	0/+	0/+	+	+	++
5.4: EU-wide cap in the Directive	++	++	++	++	++	++	++

Key: ++ (significant improvement) + (improvement) - (deterioration) -- (significant deterioration) 0 (negligible change) n.r. (not relevant

As option 5.4 scores better on all criteria, this option clearly stands out as the preferred option.

5.4. Cap-setting: level of the cap

5.4.1. Policy options and screening

The following options for setting the level of the overall cap are to be considered.

(52) **Option 5.5 Status quo.** Currently, Annex III to the Directive contains general criteria Member States have to respect when setting national caps. These refer, inter alia, to the Member State's obligations to achieve Kyoto targets and to the potential to reduce emissions.

(53) **Option 5.6 Efficiency approach.** Under this approach the equilibrium of marginal abatement costs of the trading and non-trading sectors defines both the cap for the trading and non-trading sectors, within the scope of the overall EU target.

(54) **Option 5.7 Equal effort approach.** Under this approach the overall cap is determined at a level where total abatement cost in the trading and the non-trading sector are equal.

(55) **Option 5.8 Proportional reductions approach.** Under this option emissions of the trading and the non-trading sectors are reduced proportionally down to 20% compared to 1990 levels to meet the overall EU target.

(56) **Option 5.9 Benchmark based approach.** Under this option, the cap is defined by a bottom-up approach based on the abatement potential within each sector.

Depending on the choices made pursuant to the previous section, there could also be a need for national caps. In theory, options 5.5, 5.8 and 5.9 could be applied both at EU and Member State level. This is, however, not the case for option 5.6 and 5.7. Since the ETS results in one single carbon price that determines marginal abatement cost in the trading sector throughout the EU, under these options, a decision on any of the national caps would have a direct impact on the decisions of all other national caps. Therefore, only one common decision at EU level is possible.

Screening the options leads to the following results:

– **Effectiveness**: Only option 5.6 would comply fully with the objective of least abatement cost to reduce emissions. Options 5.5 and 5.9 are actually not effective in setting a cap. The outcome of option 5.5 is undetermined, as it does not address the question how to make the cap consistent with the post 2012 target to reduce emissions, not at the EU-level, neither at Member State level. The outcome of option 5.9 is not known either, as the cap would rather be determined by assumptions as regards the period within which the required reductions could be achieved, since it is not realistic to expect industry to comply with ambitious benchmarks immediately upon entry into effect of the new overall cap. Cap-setting under option 5.7 may as well proof unfeasible due to data and modelling requirements.

– **Efficiency**: Options 5.6 and 5.8 would score best against this criterion, since there would not be much new research required, while options 5.7 and 5.9 would entail more costs as the required modelling would be much more complicated. By far the most expensive and thus least efficient option would be 5.9, as it would mean to develop appropriate benchmarks for each sector, irrespective whether they would be used in the genuine allocation process.

– **Consistency**: All options are sufficiently consistent with EU objectives in other domains. Option 5.6 offers best conditions for a level playing field for companies under and outside the ETS, but other options do not necessarily harm the functioning of the internal market.

Both option 5.6 and option 5.8 score significantly better than the other options and should be further pursued.

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
5.5: Status quo	-	√	-	Discarded
5.6: efficiency approach	√	√	√	Retained
5.7: equal efforts	-	0/-	√	Discarded
5.8 : proportional reductions	0	√	√	Retained
5.9: benchmark based	-	-	√	Discarded

√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,

5.4.2. Impacts – Comparing the Options

The impacts of option 5.6, the efficiency approach, have been analysed in detail with the help of economic modelling. The details can be found in the Commission's impact

assessment with respect to the effort-sharing of the post 2012 emissions reductions target. The analysis results in an overall cap for 2020 emissions of 1720 Mt CO_2[88].

Table 5.1 below summarises the expected emission reductions compared to 1990 emissions for the various sectors concerned:

Table 5.1: overall cap under the efficiency approach

	Change in overall emissions between 1990 and 2020 (%)	
	Trading sector	**Non-trading sector**
ETS including aviation	21%	10%

Option 5.8, proportional reductions, would result in an overall cap for 2020 emissions of 20% reduction compared to 1990 emissions, which is significantly above the cap set in accordance with the efficiency approach of option 5.6. The effort for the non-trading sector is correspondingly higher. As the marginal abatement cost in the latter will be higher, option 5.8 leads to higher total cost of reducing emissions in the EU. See section [5.2.2] of the Commission's impact assessment on "Energy for a Changing Europe – Limiting Global Climate Change to 2 degrees Celsius, next steps to implement the Energy and Climate change package" for more details on the economic and environmental effects of this option.

As demonstrated also by the modelling, the impacts will not be spread completely evenly over Member States. Positive employment effects, e.g., will be largest in Member States with currently high unemployment. Increases in energy efficiency will be highest in the new Member States that have the largest potential to increase energy efficiency. This also implies that a relatively larger share of total reductions in emissions will be located in these Member States. A fair distribution of efforts between Member States can, however, be achieved in the distribution of rights to auction allowances, taking into account the allowances to be allocated for free in the different Member States.

Applying option 5.8 at Member State level, i.e. reducing emissions of the trading and non-trading sector proportionally within each Member State, is likely to increase overall costs of abatement much more significantly. This results from the fact that some Member States may have relatively cheap abatement potential in the trading sector, whereas others can reduce emissions rather within the non-trading sector.

The efficiency approach is likely to provide best pre-conditions for a level playing field between sectors covered by the ETS and those in the non-trading sector. This is most relevant where sectors partially fall within and without the scope of the ETS (e.g. due to the potential exclusion of small installations).

Administrative costs of the different approaches are rather similar.

[88] This does not take into account the inclusion of new sectors and gases.

5.4.3. Compliance with Objectives

The efficiency approach of option 5.6 complies best with the first objective, which is setting a cap in order to reduce overall emissions within the EU at least cost. Given the overall cost levels that will be required in the medium and long term, both to achieve emissions reductions in the order of 80% by 2050 and to adapt to the effects of climate change, the case for the efficiency approach is considered very strong.

Compared to the importance of the first objective, the scoring of the options under the other objectives is less relevant and given the small difference between the outcomes of both options, the impacts are very similar.

Table 5.4.3. Summary of the impact of options in relation to relevant problems and objectives

Option	Effectiveness in setting appropriate cap	Minimising distortions of competition	Simplicity trans-parency	International credibility	Administra-tive costs	Ability to adapt to 30% target
5.6: efficiency approach	++	++	+	+	0	+
5.8: proportional reduction	+	++	++	+	0	+

Key: ++ (significant improvement) + (improvement) - (deterioration) -- (significant deterioration) 0 (negligible change) n.r. (not relevant

The importance of reducing emissions within the EU at least cost outweighs the disadvantage of somewhat smaller transparency. Therefore, option 5.6 is the preferred option.

5.5. Cap-setting: design options to increase predictability

5.5.1. Policy options[89] and screening:

(57) **Option 5.10: Status quo.** The current Directive provides for 5-year trading periods. Status quo trading periods would therefore concern 2013-2017 and 2018-2022.

(58) **Option 5.11: Longer trading period 2013 – 2020.** Under this option, the trading periods from 2013 onwards would have the duration of eight years.

(59) **Option 5.12: Longer trading period 2013 – 2030.** Under this option, the trading periods would have the duration of 18 years.

89 All options must take into account the need to ensure that emissions in 2020 effectively comply with the EU's commitment. The cap for any trading period on its own may not suffice, as low emissions in other years could imply higher emissions in 2020.

(60) **Option 5.13: Set the cap for two consecutive 5-year periods.** Under this option, the cap for both the third and fourth trading period would be set prior to the start of the third trading period. The cap for the fifth trading period would be set prior to the start of the fourth trading period and so forth.

(61) **Option 5.14: Cap set out on the basis of a trend-line to 2020 and beyond.** Long-term rules would set the trajectory of the cap in general, in addition to set the cap for 2020. For example, a rule could specify that the cap will decrease by a fixed quantity per year. As under option 2, trading periods could have the duration of eight years[90].

Note that, compared to the status quo, predictability is already increased as the cap for the next trading period would be set as part of the revision of the Directive. The adoption of the Commission proposal already provides a clear indication of the desired level of the cap. Adoption by the Council and the Parliament will provide certainty.

Screening the options leads to the following results:

– **Effectiveness**: The status quo, option 5.10, does not allow increasing predictability of the cap and is therefore not considered to be sufficiently effective. Option 5.12, on the other hand, is too long for a single trading period, lacking flexibility to adapt to new information, e.g. on actual climate change, emissions or efforts made elsewhere in the world. The pretended certainty of option 5.12 would furthermore not be credible, as the length of the period would be much longer than the legislative process. For these reasons, option 5.12 is not retained for further scrutiny either. Options 5.11, 5.13 and 5.14 would provide increased predictability.

– **Efficiency**: Options 5.11, 5.13 and 5.14 would ensue almost no additional costs compared to the current situation. The uncertainty involved in option 5.12 does not allow any statement on the costs involved, while the current situation (option 5.10) is difficult to assess due to its incompliance with the objective.

– **Consistency**: There are no problems of consistency involved with any of the options under consideration.

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
5.10: Status quo	-	-	√	Discarded
5.11: 8 year trading periods 2012-2020	√	√	√	Retained
5.12: 18 year trading periods 2012-2030	-	-	√	Discarded
5.13: two consecutive 5-year periods	√	√	√	Retained
5.14: Trendline with 8-year trading period	√	√	√	Retained

√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,

In the light of the above considerations, options 5.11, 5.13 and 5.14 will be further pursued and analysed.

[90] The timing of revision to the trajectory could be specified in the Directive.

5.5.2. Impacts – Comparing the Options

Environmental effectiveness in this respect means finding the right balance between long-term certainty and flexibility to adjust to new information on e.g. actual climate change, on technological developments and on actions elsewhere in the world. Option 5.11 provides least certainty and most flexibility, leaving the options for cap-setting after 2020 entirely open. Under options 5.13 and 5.14 predictability is significantly improved at the expense of somewhat reduced flexibility. Compared to option 5.13, option 5.14 creates more certainty and predictability as regards reductions after 2020. The currently available information justifies continuation of the trend-line as an appropriate point of departure for the future legislator. This in itself increases predictability and the environmental effectiveness.

Prolonging the trading period from 5 to 8 years is likely to reduce average administrative costs per year, in the first place for public authorities but also for businesses.

5.5.3. Compliance of Options with Objectives

As indicated above, option 5.14 provides most predictability in further reductions of the cap also after 2020 and therefore, this option strikes the best balance between predictability and flexibility. For the same reasons, this option is also most effective in increasing the EU's credibility vis-à-vis third countries. There are no significant differences between the three options as regards their assessment under the remaining relevant objectives.

Table 5.5.3. Summary of the impact of options in relation to relevant problems and objectives

Option	Predic-tability	Simplicity transparency	International credibility	Administra-tive costs	Ability to adapt to 30% target
5.11: 8-year trading period	+	+	+	+	+
5.13: two consecutive five-year periods	+	+	++	+	+
5.14: 8-year trading period plus trend line thereafter	++	+	++	+	+

Key: ++ (significant improvement) + (improvement) - (deterioration) -- (significant deterioration) 0 (negligible change) n.r. (not relevant

The preferred option is to set a trend-line that will achieve the cap for 2020 and gradually reduce future caps beyond that year.

5.6. Allocation: auctioning versus allocation for free

5.6.1. Policy Options and Screening: auctioning vs allocations for free

(62) **Option 5.15: Status quo.** Article 10 of the Directive prescribed for the second period that at least 90% of allocations to be allocated free of charge, but for the period after 2012 no rules are laid down.

(63) **Option 5.16: full auctioning.** Under this option, all allowances are to be auctioned. The Directive would include provisions ensuring efficient auctioning open to any installation to be executed in a way to minimise undue price volatility, to ensure smooth interaction between the primary and secondary market, to minimise transaction cost for installations concerned and minimising cash-flow requirements for companies. Auctions can be carried out either at European level or by Member States. The first may bring some savings of administrative cost. Such savings are, however, likely to be limited, since by 2013 many Member States will already have carried out auctions and therefore built up experience and they are likely to take each other's experience into account. In fact, they could well decide to 'pool' auctions and use the same market participants and infrastructure if that turns out to be most cost-efficient. Having the auctions carried out at European level would, on the other hand, require further financial provisions to redistribute the revenues. It appears preferable to leave some flexibility and ensure that appropriate provisions can be developed.

Auctioning will generate significant revenues. In line with the objectives, a significant part of the revenues can and should be used for mitigating greenhouse gas emissions and adapting to climate change. Another part of these revenues can be used to cover the administrative cost in relation to this Directive. In addition, the distribution of rights to auction allowances can be used to redistribute (part of) the efforts of the national emission reduction targets and of the national targets for the share of renewable energy. Finally, as discussed in section 5.8.3 below, part of the revenues could be used for measures to avoid carbon leakage.

(64) **Option 5.17: Allocations for free up to a pre-determined sector allocation, auctioning of the remainder.** Allocating allowances for free could be a transitional measure until all allowances are auctioned. In order to ensure that all sectors adapt to climate change policy, the sector allocations could be set at steadily decreasing levels e.g. 20-50% below the sector's historical emissions, e.g. average emissions over the period (2008-2012). Allowances would be allocated for free only in absence of international agreement with the main trading partners. Options for allocation methods at installation level are discussed in section 5.7 below.

(65) **Option 5.18: Allocations for free up to a pre-determined sector allocation only for sectors where "carbon leakage" is shown to be real risk, auctioning of the remainder.** This option is equal to the previous, except that in the transition phase allocations for free are given only to installations in sectors where carbon leakage is shown to be a real risk. This excludes allocation for free to installations supplying electricity or heat, refineries installations of facilities for the capture, transport or permanent storage of greenhouse gas emission and aviation. As regards the remaining sectors, in order to be eligible for allocations for free, it must be shown that the sector is exposed to significant international competition from similar installations located in third countries which are taking no action to reduce greenhouse gas emissions, therefore entailing a risk of an increase in emissions at the global level. The Directive could directly identify the eligible sectors or alternatively lay down the procedures and criteria by which these sectors are to be identified. The eligibility of sectors would have to be reviewed in an appropriate time frame, e.g. each 4-5 years.

Screening the options leads to the following results:

– **Effectiveness**: Option 5.15, the status quo, does not bring any solution for the identified problems, notably the negative impact on efficiency of the system and the undesired distributional effects. Option 5.17 may achieve some of the objectives, but only partially and the problem of undesired distributional effects would remain to a significant extent. Options 5.16 and 5.18, potentially combined with other instruments like border adjustment measures, are likely to achieve the objectives to a much greater extent, as they allow taking into account an eventual global agreement on climate change policy, the actual risk of carbon leakage and alternative instruments to address these issues.

– **Efficiency**: The current situation, option 5.15, is the least efficient as the minimal level of auctioning implies foregoing very significant revenues to the authorities with very limited contribution to achieving the objectives. Option 5.17 may constitute some improvement, but is still inefficient compared to options 5.16 and 5.18. Whether allocating any allowances for free is efficient or not (i.e. the choice between options 5.16 and 5.18) is analysed in detail below.

– **Consistency**: Option 5.16 and 5.18 would in principle be fully consistent with other Community policies, while option 5.17 might entail a potential for inconsistency, which might concern the non-auctioned part of the ETS sectors and be similar to the competition problems occurring in the current situation (option 5.15).

Against this background, options 5.16 and 5.18 are retained for further analysis.

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
5.15: Status quo	-	-	-	Discarded
5.16: full auctioning	√/0	√	√	Retained
5.17: allocation for free of [50-80]%	0/-	√/0	√/0	Discarded

5.18: free allocation only to avoid leakage	√	√/0	√	Retained

√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,

5.6.2. Impacts – Comparing the Options as regards auctioning and allocation for free – Competitiveness and carbon leakage

Efficiency of the ETS and distortions of competition

Auctioning best ensures efficient functioning of the ETS as the cost taken into account in decisions on abatement measures will be equal to the allowance price and as there is no need to set rules for allocating allowances for free which have generated the identified problems. Any allocation for free almost inevitably reduces the signal from the allowance price. Such negative effects can be partially avoided, e.g. by full harmonisation of allocation rules, by not updating the historical base periods, etc., see sections 5.7, 5.8 and 5.9 below, but some weakening of efficiency will remain, in particular due to the inevitable need to develop some rules for new entrants and closures. Auctioning furthermore requires operators to incur a financial outflow for all the allowances they require, either through in-house abatement or participation in the carbon market. It will reduce irrational behaviour of operators not taking abatement measures simply because of the availability of free allowances. Therefore, full auctioning is not only the most straightforward option in this respect, but also the only option that entirely solves efficiency problems.

Fairness and distributional effects

Auctioning automatically sets an end to the identified undesirable distributional effects. This is particularly important with respect to the energy sector, but also significant parts of industry can be expected to pass-through a significant part of the cost of allowances on to their clients, see below.

As operators will have to buy all their allowances on the market, auctioning is the only option that fully respects the polluter pays principle. It best rewards operators having undertaken early-actions to reduce emissions.

Compared to the other options full auctioning bears larger risks of inflicting undue sunk costs upon operators. This risk is, however, likely to be limited. First of all, climate change policy has been developed as from the 1990s and by 2013 operators will have had many years to adapt to this policy. Moreover many operators have demonstrated to be able to pass through at least a part of their costs of emissions and by 2013, the total benefits generated under the current system may actually have outweighed any sunk costs.

Impacts on the power generating sector

The ETS is designed to have a strong impact on the power generating sector, see the Impact Assessment on the effort-sharing of the EU's commitment to reduce greenhouse gases by 20% in 2020 for a more detailed assessment, in conjunction with the options for achieving the 20% target for renewable energy. Differences between

impacts of auctioning and allocating allowances for free are relatively important for the power generating sector. Firstly, full auctioning avoids generating undesirable distributional effects as experienced under the current system and as can be expected to continue in case of the option of allocating allowances for free is chosen. However, even in case of full auctioning, profits in the power generating sector are likely to increase significantly, mainly due to the fact that carbon-extensive generators benefit from higher power prices set by carbon-intensive generators.

Differences between impacts on actual pricing and production will not be very large, as already now these decisions largely take into account the opportunity cost of grandfathered allowances. Estimates of the pass-through rates vary, but are generally high, i.e. up to 70-90 percent, depending on the country, market structure, demand elasticity and CO_2 price considered. Demand for electricity generally is relatively price-inelastic.

In contrast, auctioning is expected to increase the fall in the production of electricity generated from fossil fuels that is matched by a large increase in biomass and smaller increase in wind power. Small falls in electricity production from other sources, for example nuclear, are expected, as they become relatively more expensive compared to renewables, see the table below. These impacts stem in the first place from the allowance price, but the impacts are strengthened since with full auctioning closure rules, allocations from new entrants reserve and expectations for free allocations in subsequent trading periods would no longer distort the signal from the allowance price. Auctioning thereby gives the strongest incentives for investments in renewables and other low emission intensive power generating capacity.

Table 5.2 Changes in fuel inputs to power generation

	Scenario B	Scenario A	% change
Coal	458366	447056	-2.5
Oil	29343	27432	-6.5
Gas	1259495	1158629	-8.0
Biomass	796497	1220450	53.2
Wind	663100	703470	6.1

Note(s) : Figures show level of electricity generated from each source. Scenario B is allocation for free based on benchmarks, whereas scenario A assumes full auctioning
Source(s) : E3ME

Impacts are largest for power producers relying most on coal and lignite. This also means that impacts are unevenly spread across Member States. The differences in impacts materialise only in the long run, mainly after 2020. See section 6.3.2 of the impact assessment on the package of measures to achieve the objectives for climate change and renewable energy for more details of the impacts on the power generating sector, in conjunction with the impacts from other policy options for achieving the overall CO2 emissions reduction target and the target for renewable energy.

Impact on industry: competitiveness

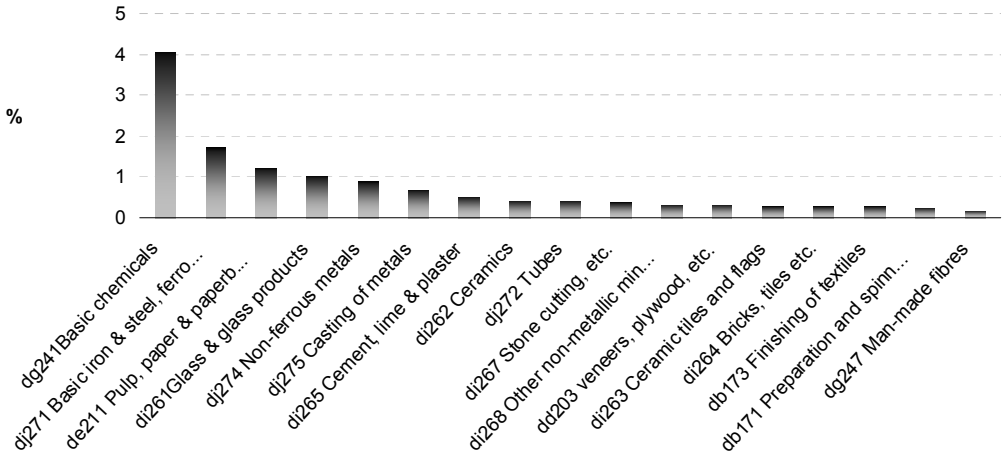
Obviously, when comparing full auctioning to allocating allowances for free, due regard must be given to the aspects of competitiveness and carbon leakage. Competitiveness is the performance of firms relative to competitor firms in terms of: profitability, market share, production cost, and levels of investment, which should

not be confused with (short term) profitability levels[91]. Furthermore, relocation of activities out of the EU leads to (net) carbon leakage only if production elsewhere has the same or higher emission intensity.The following sub-sections assess (1) the share of energy intensive industry, (2) direct impact on production cost, (3) exposure to competition, (4) sector specific features and (5) macro-economic modelling.

Impact on industry (1): share of energy-intensive industry

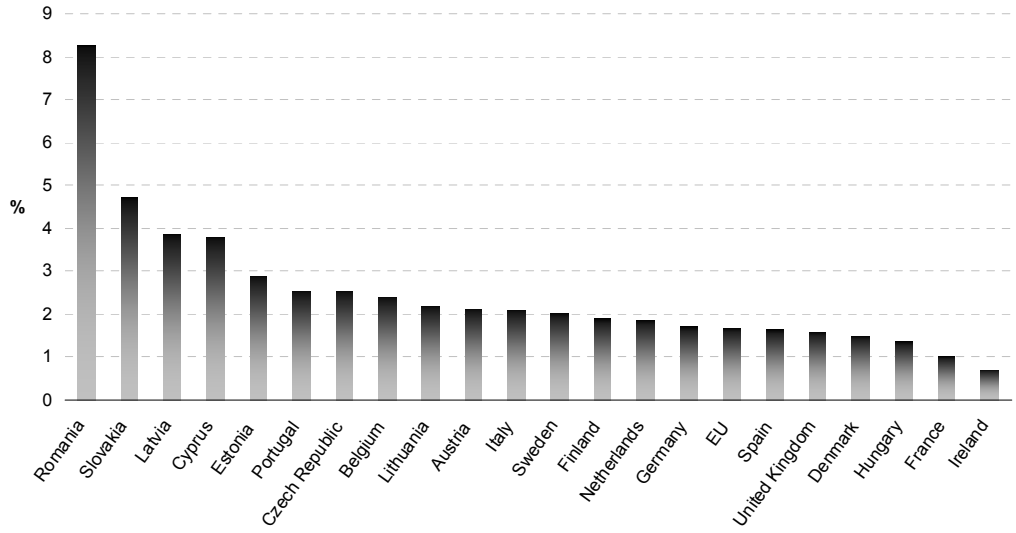
The direct impacts of the ETS are most important for energy-intensive industry. The share of these industries concerned in the overall manufacturing industry varies, but is limited for most, see figure 5.1 below. In addition, figure 5.2 shows that the distribution of energy intensive industry varies across Member States.

Figure 2: Value added in Energy-intensive industries as a percentage of value added in all manufacturing industry, 2004



[91] Reduced profitability levels also lead to reduced tax income. In other words, profit taxes mitigate the impacts on businesses and effectively shift part of the burden on to the tax payer.

Figure 3: Energy costs as a percentage of manufacturing industry turnover, 2004



Impact on industry (2): impacts on production cost of industry

A number of recent studies analysed the cost of allowances as a part of total production cost or production value.[92] Note that such cost-figures have limited relevance for the choice between auctioning and (some) allocating allowances for free. Firstly, in particular the indirect impact via increased electricity prices is expected under either option, since electricity producers are likely to continue to charge the opportunity cost of allowances irrespective of receiving them for free or having to buy them on the market. Secondly, the opportunity cost of allowances needed for direct emissions will also remain for production and investment decisions and allocating allowances for free does not appear to be an efficient or even effective instrument to remedy impacts on competitiveness (see discussion below).

Generally, the impact of a € 20/tCo2 allowance price on output prices lies between 0.1 and 5%, assuming a full pass through of costs along the upstream supply chain. Main exceptions where higher price increases would be required to fully recover the costs of emissions are primary steel (5-9.4%), primary aluminium (7.5-10%), cement and lime (20-30%) and ammonia (25-48%)[93]. For most of the energy-intensive sectors, the cost increases are directly related to the carbon content of the fossil fuels they use. The main exception is primary aluminium where the cost increase is in the first place due to the pass through of costs in the electricity price[94]. Typically, production from

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92 See for more details e.g. studies by Carbon Trust, McKinsey 2006, Demailly 2006, Grubb 2006, Neuhoff 2006, Matthes 2007, Climate Strategies 2007 and Bergmann/Hayden/Schmitz 2007.

93 DG ECFIN 2007. Other studies compared the cost of emissions to production cost rather than value. This generally leads to higher percentages

94 Most estimates of cost assume an increase of the electricity price by about € 9-10 per kWh. The impact of the ETS on electricity costs for industrial consumers varies per company, sector and country, but also for different types of demand. Impacts on long term-prices for base-load demand differ from the impacts on forward prices for medium load demand and spot prices

recycled material requires only a fraction of the energy the production from virgin materials needs, thus impacts on production of iron and steel, aluminium, copper and glass from recycled inputs is much less affected.

Calculations at sector level hide a large differentiation within the sectors concerned. Hourcade et al[95] analyse in further depth such differentiation.

– For the emissions from cement production, e.g., what matters is whether or not the clinker is produced in the installation or imported, whether the cement is produced in dry kilns with pre-heater and pre-calciner requiring 45% less energy input compared to long kilns. Also the clinker content of cement is important in determining the cost of emissions.

– For steel, emissions are much higher when produced in blast oxygen furnace (BOF) compared to electric arc furnace (EAF). The latter involves melting scrap metal. Mitigation potential exists both for BOF and EAF processes. Like the situation of clinker in cement production, it matters a lot whether the iron producer produces its own coke.

– In the pulp and paper industry, products range from pulp, newsprint, fine papers, packaging and sanitary and household paper, and each product category is subdivided in multiple qualities. In addition, raw materials may either be wood or recovered fibre and there is a wide variety of processes with much higher emission intensities for mechanical pulp and paper compared to chemical pulp and paper. Abatement measures include energy saving by new modes of operation, introduction of more energy efficient technologies and fuel switching (including the use of combined heat and power (CHP)). The mitigation potential of these measures differs considerably by region.

Calculations at sector or product level will never reflect particularities of individual producers concerned. Variation in impacts on costs will arise in particular from different fuels used, different types of energy supply contracts, quality of products, age and efficiency of installations. Of course, it is precisely the objective of the ETS to encourage each individual installation to invest in abatement measures and to minimise emissions and thereby minimising the cost of buying allowances.

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for short-term fluctuations in demand. Spot electricity prices are likely to absorb allowance prices to a very high extent, although a large part of the market price is established by the so-called "merit curve" and the price effect may depend on the emissions of the marginal supplier in this curve. This may be less so for long-term and forward contracts due to indexation formulae and other arrangements, including partial or full ownership of electricity generation. Indexation formulae for long-term contracts are likely to include price floors and ceilings, which will affect pass through at certain levels, while ownership allows for savings stemming from differences between allowance prices and internal abatement costs. The sectors with the largest self-generation capacity in the EU are the chemical sector, followed by pulp and paper, refineries and metals and mining (IEA 2007). There are, however, no reasons to assume that internal accounting prices for self-generated electricity and heat would not reflect the opportunity cost of the allowance price.

95 Hourcade et al 2008.

Apart from indirect impacts due to higher electricity prices, there are also indirect impacts on industries further down the production chain that use products produced in sectors directly affected. Such impacts will be generally small.

Impact on industry (3): exposure to competition and ability to pass through the cost of allowances

Carbon leakage and competitiveness problems would not arise in case all companies competing in the same market are confronted with the same carbon price. In such a situation, all companies would pass through the cost of emissions on to their customers[96]. This situation may, however, not arise, particularly as long as no international agreement on climate change policy has been reached, and the ability to pass-through the cost of emissions in prices may be limited by competition pressure from competitors outside the EU that do not have a similar cost.

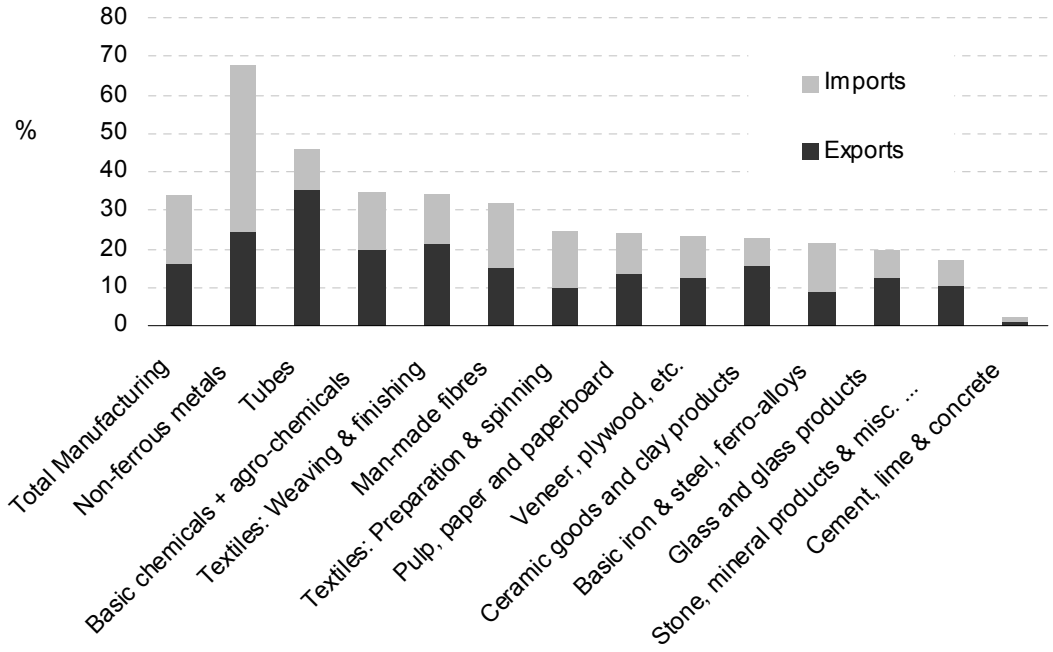
The 'ability to pass-through the cost of emissions' and 'international competitive pressure' are, however, difficult to measure in an objective manner. Various indicators can be used.

The most straightforward and objective indicator of the degree of international competitive pressure that industry branches face is **'openness to trade'**. Figure 5.6.3 below shows the ratio of extra-EU exports and imports to turnover of a number of energy-intensive sectors. It must be noted that high openness to trade does not automatically imply a bad/good international competitiveness position. For assessing the exposure to international competition, one may rather focus on the duration of a trade surplus/trade deficit, but still taking into account that trade may for a significant part be determined by long-term capacity constraints (or surplus) or specialisation on the supply side.

The “cement and concrete” branch stands out as being considerably less open to trade than the other energy-intensive sectors, with exports and imports together amounting to less than 10% of turnover. Other construction-related branches (stone, glass) also appear among the relatively closed branches. At the other end of the scale, both “basic precious and non-ferrous metals” (which includes aluminium manufacture) and the branch “basic chemicals, pesticides, other agro-chemicals” are relatively open to trade.

Figure 5.6.3: Openness to extra-EU trade 2004/2005

[96] In less competitive markets, producers may actually accept a reduction of the profit margin which they were able to obtain due to their market power. This would, however, not justify compensatory measures.



Source: EUROSTAT Prodcom and UN Comtrade databases[97]

For comparison, changes of the nominal effective exchange rate as experienced over the past years have by far more important impacts than a unilateral increase of costs due to a carbon constraint. Based on modelling the impacts of changes of the nominal effective exchange rate, using trade data on the 2001-2006 period, suggests that the ETS would trigger a decline in exports relative to the baseline of less than 1% over a ten-year period from most energy intensive industries, primary aluminium and iron and steel from integrated steel plants being an exception to this[98].

The ability to pass-through the cost of emissions in product prices may be assessed by using various other indicators. **Demand price elasticity** could be estimated, although it must be ensured that the estimate is based on statistical data on comparable price changes that affect all producers in a similar way as the carbon price under the ETS. Such information is only scarcely available in particular at disaggregated level.

The degree of **market concentration**, **market structure** and **structure of ownership** may also provide relevant information. Due to the need of significant capital requirements, energy intensive industries tend to operate in fairly concentrated markets. Some of these industries have a significant track record of collusion and infringements of the competition rules. If companies proof to be able to increase prices by collusion, they can not be expected to have great difficulties in increasing prices to a similar extent when facing increased cost of emissions.[99] As regards

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97 For reasons of data availability, values for exports and imports refer to extra-EU trade for the year 2005, while the turnover figures refer to data from 2004.

98 Bergmann/Hayden/Schmitz 2007 2007.

99 Moreover, reduced profits from market power cannot be held as an objection. In case of less than perfect competition, prices would exceed marginal cost by a certain profit margin. The cost of emissions constitutes part of the marginal cost and hence, in case it increases, the price would increase by less than the proportional amount, reducing the producer's profitability.

market structure, one would generally expect a greater ability to pass-through the cost of emissions onto sales prices the more products are differentiated in types, qualities, and so on. With respect to structure of ownership in the industry, it should be analysed to what extent the same market participants can shift production across the globe and the incentives that may exist for maintaining production at several places e.g. in view of spreading risks.

Impact on industry (4): sector specific assessment

The various indicators discussed above may not tell all information and can be complemented by sector specific considerations[100]. Looking at the lasting trade deficit e.g. for primary aluminium, one would expect international competitive pressure to make it difficult for producers in the EU to pass through the cost of ETS to their clients. However, primary aluminium production is also a showcase for a global market characterised by a global oligopoly, and in which EU producers have the advantage of being able to rely on a highly depreciated capital stock. Moreover, some expect part of the primary aluminium production in the EU to be phased out in any case over the next ten or so years, in view of comparative cost developments, the need to renew long-term energy supply contracts and the ongoing increase of production capacity elsewhere, irrespective of the impacts of emission trading.

Another example is the cement industry, where opinions diverge on the potential growth of imports from non EU producers in particular those situated close to the main European ports and close to the eastern borders of the EU. Cement is, however, a heavy product having a low value in relation to its weight and is hence relatively costly to transport. Shipping costs have, furthermore, increased significantly between 2002 and 2004. In addition, market concentration in the cement industry is rather high and prone to collusion and formation of cartels.[101] An analysis of trade flows[102] shows that the bulk of the growth of imports can be mainly attributed to the rise in consumption in Italy and Spain, which is mostly driven by growth of consumption and the lack of new domestic capacities. Local producers were unable to satisfy this demand because they had previously closed down some plants to rationalise production. Also the import of 8 million tonnes of cement from China to the EU in 2006 has not significantly affected the growth rate of non-EU imports. These imports mainly substituted the sharp decline in Turkish and Egyptian cement imports. This would suggest that import volumes are determined by the imbalance between local capacity and demand rather than a supply-side push. In fact, according to experts, outside the EU there would be few, if any, new cement production capacities being built for export to the EU. Exports come from domestic excess capacities. Investing for exports entails a significant risk for the investor, not only as regards the export markets, but also for its domestic market. Moreover, investing for exports requires also investments in harbour facilities in Europe for handling these trade flows and making appropriate arrangements with shipping companies.

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100 See e.g. ICF 2007 for an assessment of the economic impact of energy prices on competitiveness of a number of energy intensive industries.

101 In 2006, e.g., a national cartel in Germany was broken up with the effect that the cement price subsequently decreased from about € 70 per tonne to about € 50 per tonne.

102 Hourcade 2007.

Impact on industry (5): macro economic and multi-sector modelling

The preceding considerations are based on partial analysis. Macro-economic modelling allows assessing the consequences for the overall economy, taking into account general equilibrium considerations and secondary impacts e.g. due to effects on the terms of trade, use of the revenues of auctioning, etc.

*En*tec 2007 modelled the impacts of three options for a revised ETS: a scenario where all allowances are auctioned, a scenario where all allowances are allocated to industry based on benchmarks and a hybrid approach where power generation and aviation are not allocated allowances, but other sectors receive allowances for free, although declining up to 2020. The identified impacts can be summarised as follows:

- The negative impact on GDP is most limited in case of full auctioning, i.e. 0.1% compared to the baseline scenario. Under both other scenario's, the model predicts a negative impact of 0.2%. Note that these figures do not rate the positive value of achieving the reduction of emissions!

- In case of full auctioning, due to the use of the revenues, employment increases by 0.1%. In case of allocations for free, employment decreases by 0.1%, whereas it remains unchanged under the hybrid option.

- The potentially negative impact for the basic metals and non-metallic mineral sectors are confirmed but the model arrives at low impacts of 0.1 to 0.2% in terms of production losses (in case allowances are allocated for free). Note that E3ME assumes a reduction of CO2 emissions of around 15% in 2020 compared to 1990 (without JI/CDM) with an allowance price of around €36/tCO2 in 2020. It does not include RES targets and assumes a carbon price of €22/t CO2 in the baseline[103]. Results of the model indicate that some types of benchmarking (based on scaling down allocations for industries resulting from Phase II of the EU-ETS)(option benchmark in may even worsen the impacts for some sectors compared to auctioning. A hybrid approach (partial auctioning combined with benchmarking) or full auctioning with recycling to decrease labour costs would increase GDP and have favourable impact for all sectors including the i.e. labour intensive sectors since demand increases.

Table 5.3 Sectoral impacts on industry output compared to 2020 baseline

	Scenario A	Scenario B	Scenario H
Agriculture and mining	0.2	0.0	0.1
Basic metals	0.0	-0.2	-0.1
Non-metallic minerals	0.0	-0.1	0.0
Wood & paper	-0.1	-0.3	-0.1

[103] ENTEC UK (2007) Support for the impact assessment in the context of the review of the Directive 2003/87/EC. Draft final report: task 2: further harmonization and increased predictability, July 2007, Chapter 8.

Chemicals nes	0.4%	0.4%	0.4%
Rubber & Plastics	0.2%	0.2%	0.2%
Air transport	0.9	0.9	0.9
Electricity	-0.1	-0.1	-0.1
Non-ETS manufacturing	0.1	0.1	0.1
Construction	-0.1	-0.1	-0.1
Services	-0.1	-0.2	-0.2

Notes: Figures show percentage difference from baseline at an EU25 level in 2020. Scenarios are A (auctioned allowances), B (benchmarked) and H (hybrid allocation).

Source(s): E3ME

The impacts on GDP and employment may differ per Member State, but this depends not least on the distribution of allowances that Member States may auction or allocate for free, see section 5.2.4 of the Commission's impact assessment "Energy for a Changing Europe – Limiting Global Climate Change to 2 degrees Celsius, Next steps to implement the Energy and Climate change package".

The results are in line with the outcome of the GEM-E3 model, indicating that auctioning is positive for the economy as a whole and also EEI since recycling increases GDP and demand. GEME3 results, do however, suggest somewhat higher impacts for the energy production sector, the ferrous and non-ferrous metal sectors and the other energy intensive industry. Still these impacts are only a few percentages. Exports volumes might decrease slightly more but the increase in export price partially compensate for the loss of revenues. Remarkably, for all sectors, the negative impacts on output and exports volume are smaller compared to the scenario where all allowances are given for free.

Table 5.4. Sector impact GEME3 with auctioning and free allocation in 2020

	Domestic Production Volume		**Exports Volume**		**Price Exports rel. EU average**	
	Free allocation	**Auction**	**Free allocation**	**Auction**	**Free**	**Auction**
Agriculture	-0,6%	-0,4%	-1,0%	-1,1%	0,9%	1,1%
Energy Production	-6/0%	-6.0%	-4,8%	-4,9%		
Ferrous and non ferrous metals	-2.0%	-1,9%	-3,6%	-3,5%	2,1%	2,2%
Chemical Products	-1,1%	-0,9%	-1,4%	-1,3%	0,7%	0,7%
Other energy intensive	-1,4%	-1,3%	-2,5%	-2,5%	1,6%	1,6%
Electric Goods	-0,7%	-0,6%	-0,9%	-0,8%	0,4%	0,3%
Transport equipment	-1.0%	-0,9%	-1,3%	-1,2%	0,6%	0,5%
Other Equipment Goods	-0,8%	-0,6%	-1,1%	-0,9%	0,5%	0,4%

Consumer Goods Industries	-0,6%	-0,4%	-1,3%	-1,2%	0,7%	0,7%
Construction	-0,3%	-0,2%	-0,2%	-0,6%	0,0%	0,4%
Telecommunication Services	-0,2%	0,0%	-0,3%	-0,2%	0,2%	0,2%
Transport	-1,4%	-1,2%	-3,1%	-3,1%	1,9%	2,0%
Services of credit and insurances	-0,2%	0,0%	-0,4%	-0,2%	0,3%	0,1%
Other Market Services	-0,3%	-0,1%	-0,6%	-0,5%	0,3%	0,3%
Non Market Services	-0,0%	0,1%	0,0%	0,0%	0,4%	0,4%

These results are largely in line with the outcome of other modelling[104].

Of course, the issue of competitiveness is closely interrelated with impacts on employment. Climate change mitigation offers many employment opportunities, but the transformation to a low carbon economy also implies certain structural change. However, the impact on employment will closely reflect the impact on domestic volume of production in the sector concerned.

Net carbon leakage

As indicated before, negative impacts on competitiveness may, however, not lead to net carbon leakage. Some third countries may actually offer conditions where producing the same product leads to lower emissions compared to production in Europe. E.g., in Iceland huge hydropower installations are under construction for the production of aluminium. Another example may be found in the Middle East where oil producing countries currently flare significant volumes of gases resulting from oil-drilling operations. From an environmental point of view, it is highly preferable to use these gases in a useful way, reducing energy needs elsewhere.

Transparency, simplicity and administrative cost

Auctioning is transparent and simple. Allocating for free can be done in more transparent and simple ways than has been the case so far, but is likely to remain more complex.

For public authorities and regulators, administrative costs of auctioning include set-up costs of auction design, creation of infrastructure, marketing to potential participants. The centralisation of the process would reduce set-up costs. There will be additional administrative costs to regulators of conducting the auction, including support to participants.

If all allowances are auctioned, administrative costs for regulators are likely to be lower compared to the costs of administering the system of grandfathering or

[104] E.g. Bollen 2004, COWI 2004, Kouvaritakis 2005, Quirion 2006. See Bergmann/Hayden/Schmitz 2007 for a discussion on the most relevant models. This paper also discusses ex-post evidence of impacts, e.g. in COMETR 2007.

benchmarking, depending on the degree of harmonisation of the methods to allocate for free. Of course, the costs of auctions could be covered by auction revenues.

Obviously, a combination of auctioning and allocation for free would mean higher administrative costs for the public authorities. More importantly, identifying sectors eligible for allocations for free as foreseen under option 4 will bring an additional administrative burden to the Commission and all participants involved in the process.

For businesses, administrative costs of auctioning include learning about auction rules, preparing a bidding strategy, training costs, and the cost of personnel time. Typically, transaction costs are fixed per installation and small emitters incur proportionately higher costs per unit of production compared to their larger counterparts. Intermediaries could however greatly reduce these costs for small emitters. Centralised, one-off auctions would entail lower transaction costs for participants.

5.6.3. Compliance of Options with Objectives

On most accounts, the option of full auctioning compares favourably to other options. It best ensures efficiency, transparency and simplicity of the system and it avoids undesirable distributional effects from arising. The key question is whether, in case of absence of international agreements on climate change policy, any allocation for free should be retained in order to avoid carbon leakage. Doing so comes at the cost of foregoing the revenue of auctioning and generating distortions into the system, even when allocation rules are designed in order to minimise the distortions. The choice for allocation for free therefore requires comparing the effectiveness and efficiency of alternative instruments that may contribute to avoiding carbon leakage.

Avoiding net carbon leakage requires in the first place strengthening the competitive position of the companies most exposed to international competition. The options below concern instruments that can target specifically these companies, but these come in addition to broader structural reform measures, e.g. increasing competition in energy markets, that are at least as important for competitiveness.

Allocating allowances for free

The effectiveness of allocating allowances for free will vary by sector or even by installation. Receiving an upfront allocation does not necessarily change production decisions that will still take into account the opportunity cost of allowances. In other words, having received the allocation, it may still be most profitable for the operator to close down its installation and sell its allocation on the market (as far as it can keep it under the closure rule). Allocating allowances for free will therefore be most effective in industries with high exit costs and strong incentives to maximise capacity utilisation.

Allocating allowances for free can be a rather inefficient way to use resources, depending on the nature of competition. In some sectors, carbon leakage may be a risk only for installations near the EU borders and sea-ports. Allocating for free will, however, generate political and competitive pressures throughout the EU so, if

allowed, it is likely that most Member States will decide to allocate for free also to installations not immediately exposed to third country competitors.

On a higher level, inefficiency will also stem from reducing the dynamic incentives deriving from competitive pressure, in particular by reduced pressure to increase efficiency of operations, to innovate and to develop new technologies e.g. for reducing emissions.

Allocating for free is inconsistent with some other measures, in particular trade measures such as a border tax adjustment or inclusion of importers in the system.

Allowing higher levels of JI/CDM

See section 6.4.2 for the advantages and disadvantages of allowing the use of higher levels of JI/CDM credits for operators exposed to international competition. As set out in section 6.2.1, it is preferred to have the use of JI/CDM credits subject to an overall quantitative limit. Setting differentiated levels for JI/CDM credits that may be surrendered within that limit may favour the sectors with the higher levels to the extent that arbitrage in the markets fails to equalise the real price of JI/CDM credits (taking into account the higher risks) and the allowance price.

International sectoral agreements

Global sectoral agreements may contribute to ensuring that energy intensive industries achieve the same performance benchmark (CO_2 content of products) worldwide. The cost of abatement measures would hence be comparable worldwide as well, with remaining differences attributable to true competitive advantages. In case installations within a sector would all be covered by linked trading systems, the cost of remaining emissions could be equalised as well. Of course, this instrument has great advantages, not least the real emission reductions that can be expected around the globe and the absence of the need for constant financial funding apart from the administrative cost of achieving these agreements and the corresponding cost of data gathering, monitoring and enforcement.

Trade measures

In the absence of an international agreement on global climate change policy, and if other measures or international sectoral agreements are not adequate in limiting carbon leakage, consideration could be given to extending the coverage of these domestic measures to imported goods. A number of issues would require careful consideration and analysis in this case to ensure the effectiveness of the measures in limiting carbon leakage and to avoid any unintended negative effects. Among the issues for consideration are the higher cost of inputs that would emerge, which may cause problems for European producers further downward in the production chain, potentially limiting any positive effects in terms of avoiding net carbon leakage. A careful analysis of legal implications, in particular WTO compatibility, would also be required.

One instrument for consideration is to include imported products in the system. This could imply that an importer of a product with high carbon intensity would be obliged to surrender allowances. Also a refund of allowances to exporters could be thought of.

There would be practical difficulties to set the level of allowances to be surrendered by importers, deciding to which imports from which countries or source the system would apply and setting up an effective monitoring system. In addition, the measure would need to be designed in a way that ensures the integrity of the ETS, in particular the absolute cap on emissions. If this can be ensured, such a system may effectively contribute to avoiding net carbon leakage. There is, however, the same caveat as regards increasing costs for producers further downward in the production chain applies, as well as considerations with respect to WTO compatibility.

Reducing labour costs or investing in innovation, research and development and training

Macro-economic modelling referred to above demonstrates that the ETS brings considerable benefits to overall welfare in case the revenues are used to reduce labour costs. The revenues of auctioning could also be used for innovation, research and development and training in the sectors concerned or in other sectors[105]. The use of revenues in this way may bring much greater value for tax-payer money than allocating allowances for free. Of course, it may not be efficient to spend revenues from auctioning only on R&D, innovation and training in the sectors most affected by the ETS and such spending may not suffice to outweigh cost increases due to the ETS. At the same time, it should be avoided that lasting lump-sum transfers in the form of free allocations are used to retard structural economic reform.

With a view to these alternatives, the general conclusion is that allocating for free is a costly instrument whose use would be cost-efficient only under highly exceptional circumstances.

Table 5.6.3. Summary of the impact of options in relation to relevant problems and objectives

Option	Environ-mental Effective-ness	Economic Efficiency	Level playing field/ com-petition	Simplicity, transpa-rency, pre-dictability	Distribu-tional effects	Administra-tive costs
5.16: full auctioning	0	++	++	++	++	+
5.18: allocations for free for avoiding net carbon leakage	0/+	+	0/+	0	+	0/+

Key: ++ (significant improvement) + (improvement) - (deterioration) -- (significant deterioration) 0 (negligible change) n.r. (not relevant

In conclusion, the preferred option is full auctioning. As a transitional measure, in order to facilitate adaptation and avoid undue 'sunk costs', any allocation for free

105 In case this involves State aid in the meaning of Article 87(1) of the Treaty, the aid must comply with the relevant State aid rules. An important general requirement is that the aid must have an incentive effect on the behaviour of the beneficiaries and that certain aid ceilings must be respected in order to avoid undue distortions of competition. Defensive direct production subsidies, in contrast, are not likely to be efficient as they stifle the dynamic incentives of competition and such subsidies are not allowed under the State aid rules as they run directly counter to the basic principles of State aid policy.

should be phased out gradually. Only in certain sectors where there is a demonstrated risk of net carbon leakage, there may be a need for a longer transitional period or for other instruments to be put in place, notably the inclusion of imports and exports.

5.7. Allocation methods for any remaining allowances allocated for free

5.7.1. Options and screening as regards any remaining allocations for free

The policy options described below apply only to allocating allowances for free to the extent they are warranted under the chosen option under section 5.6 above.

(66) **Option 5.19: Status quo**, limited harmonisation based on a single criterion generally prohibiting favourable treatment of certain installations or sectors. This option represents the status quo.

(67) Option 5.20: Harmonised grandfathering. Under this option allowances up to the sector allocation are distributed proportional to historic emissions of the installations concerned. This form of allocation has been predominant in the first two trading periods. In order to avoid any perverse incentive weakening the signal from the allowance price, the historical period on which allocations are to be based ends at the latest in 2006. Installations for which no historical emission data is available will be allocated allowances on the basis of benchmarks similar as is done for new entrants (see section 5.8 below). The number of special rules, e.g. for early action to reduce emissions and use of clean technology, is minimised and these rules, if any, would be drawn up as simple as possible.

(68) **Option 5.21: Fully harmonised benchmarking:** Under this option, allocations of allowances for free are determined on the basis of benchmarks, i.e. a fixed number of allowances per unit of output. The Directive would lay down the procedures by which the benchmarks are established and the principles on which they are to be based.
Benchmarks could possibly also be applied to capacity figures, but capacity may be difficult to identify in an objective manner and the correlation between capacity and production (and hence potential problems of competitiveness and carbon leakage) may be rather loose. Benchmarks could possibly also be applied to inputs, but inputs are only loosely correlated to production as well. Basing allocations on capacity or inputs may, however, not be entirely excluded, in particular when the output products concerned cannot be defined with sufficient precision.
The benchmarks are to apply EU wide. Differentiating benchmarks according to Member State inevitably distorts competition.
Benchmarks are to be specified for broadly defined product categories. Differentiation according to processes and product qualities should be minimised in order to maintain appropriate price signals resulting from differences in emissions intensity.

Differentiation of benchmarks according to the type of fuel used is excluded for the same reasons.
The level of benchmarks must not exceed the level of emissions that can be achieved by best available techniques (BAT). Indirect emissions from electricity consumption cannot be taken into account, since this would convert allocations into production subsidies and these costs are passed through to varying degrees anyway. Moreover producers using electricity from renewable or carbon neutral sources do not face such costs.
A further reduction factor is applied if necessary to ensure that the total allocations to a sector do not exceed the sector allocation as determined under options 5.17 and 5.18 in section 5.6 above[106] .
Output data of individual installations is sensitive information for competitors. Therefore, in order to ensure confidentiality of annual data, the output data on which allocations should be based would cover a historical period of at least three years ending at the latest in 2006. The Directive would provide a basis for developing guidance to ensure proper data collection. Options based on later production data or updating of production data have not been retained for further scrutiny in order to avoid any perverse incentives weakening the signal of the allowance price.

(69) **Option 5.22: Hybrid approach: harmonised benchmarking only for large emittors, more discretion for Member States as regards allocations to small emittors**: This option is similar to the previous option, except that allocation methods for smaller emitters are left to the discretion of Member States, subject to certain criteria set in the Directive. The distinction between the two groups could be based e.g. on a capacity threshold of 60 MW, on a sector basis or on a combination of both.

(70) **Option 5.23: Relative performance benchmarking:** Under this approach, for each installation a relative benchmark is determined which compares to its competitors as regards emissions intensity. The cleaner the installation, the higher the relative benchmark. It could also be a "bonus-malus" system where installations are identified within a limited number of efficiency categories. In order to avoid perverse effects, the relative benchmark would be applied to historical emissions over a historical period ending at the latest in 2006. Alternatively, the relative benchmark could be applied to allocations determined for the second trading period. This option does not mean that allocations will be adjusted to actual production (ex-post adjustments).

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106 In line with the IPPC-Directive, the maximum values for pollution in the permits for installations covered by that Directive shall not exceed levels that can be achieved by BAT. Even though CO2 emissions do no longer fall within the scope of the IPPC-Directive, allocations at levels exceeding BAT means that the operator does not have to make any effort in order to comply with its obligation to surrender allowances for its emissions. This would directly go against the principles of the State aid rules for environmental protection.

Screening the options leads to the following results:

Given the problems described above, option 5.19 is not retained for further scrutiny. All other options meet at least the minimum levels of effectiveness and efficiency and none of these options is fully inconsistent with EU objectives in other domains.

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
5.19: Status quo	-	-	-	Discarded
5.20: harmonised grandfathering	√	√	√	Retained
5.21: benchmarking	√	√	√	Retained
5.22: partial benchmarking	√	√	√	Retained
5.23: relative performance benchmarking	√	√	√	Retained
√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,				

5.7.2. Impacts – comparing of options for allocating for free

Effectiveness, carbon leakage

Since the number of allowances to be allocated for free is rather determined according to the option chosen as set out in the preceding section, all options have similar effects as regards environmental effectiveness and their potential to avoid carbon leakage.

Efficiency of the system

All options, except the status quo, exclude updating of the historical base period, and therefore avoid as much as possible perverse incentives. However, allocating allowances to relatively new installations for which the historical data is not available would require special rules, which inevitably constitutes an incentive to invest, weakening the signal of the allowance price. This is, however, very similar for all these options. Obviously, the lower the allocation, the smaller the perverse incentives are.

Impact on competition and the internal market

Variation in benchmark values can cause significant distortion in the market, but if they are set for appropriate, broad, product categories and at appropriate levels, harmonised benchmarking has the least distortive effects on competition. The hybrid option 4, leaving discretion to Member States as regards the allocation methods towards smaller installations, would have negative impacts in this respect, even though the actual size of these impacts may be limited.

Administrative cost and feasibility

Options 5.20, harmonised grandfathering, and 5.23, relative performance benchmarking, are probably the two options that have lowest administrative cost and are easiest to put into place. Benchmarking involves cost of collection and verification of output data and potentially a high administrative cost of setting and updating benchmarks. In fact, the option of harmonised benchmarking may not be easily feasible due to confidentiality of production data, difficulties to compile the data

and/or difficulties in determining the appropriate benchmarks. Option 5.22, partial benchmarking, may reduce the administrative cost of setting benchmarks for the EU, but would add potentially larger administrative costs to the Member States that have to decide on the allocation to smaller installations.

Distributional impacts and fairness

As regards respect of the polluter pays principle, harmonised benchmarking is the second best option after auctioning, since it does not reward the use of technology that is more polluting than the benchmark. The main disadvantage of grandfathering is that historical allocations do not differentiate between operators with clean versus obsolete technology and do not reward those that have reduced emissions before the system started. Relative benchmarking ranks in between the option of grandfathering and harmonised benchmarking in this respect.

Simplicity and transparency

Grandfathering offers most transparency while under benchmarking transparency depends on the process by which benchmarks are set. Setting relative benchmarks and categorisation of installations in a limited number of groups may be simpler and more transparent than setting benchmarks under the option of harmonised benchmarking. In addition, collecting the historical data does not raise issues of confidentiality.

5.7.3. Compliance of Options with Objectives

In order to ensure environmental effectiveness and efficiency of the system, any allocation for free must be harmonised as much as possible and must avoid basing allocations on updated historical data (be it output or emissions). In case this is ensured, the choice of allocation method is largely determined by fairness concerns on the one hand and the administrative cost and practical feasibility on the other. On the basis of the impacts above, and in case of absence of an international agreement on climate change policy, the preferred option is harmonised benchmarking aiming at a system of broadly defined benchmarks with minimum differentiation, only for a limited number of sectors where allocating allowances for free is justified by the need to avoid carbon leakage.

Table 5.7.3. Summary of the impact of options in relation to relevant problems and objectives

Option	Environmental Effectiveness	Economic Efficiency	Level playing field/ competition	Simplicity, transparency, predictability	Distributional effects	Administrative costs
5.20: harmonized grandfathering	0	+	+	+	0	+
5.21: fully harmonized benchmarking	0*+	+	++	+	++	0/+
5.22: hybrid approach	0/+	+	0/+	0/+	+	0/+
5.23: relative	0/+	+	+	+	+	0/+

performance benchmarking	

Key: ++ (significant improvement) + (improvement) - (deterioration) -- (significant deterioration) 0 (negligible change) n.r. (not relevant

5.8. Allocation: new entrants

5.8.1. Policy Options and Screening

All options are subject to the principle of non-discrimination and to the requirement not to favour certain installations above others in line with the State aid rules. The exclusion of one or certain sectors from the new entrants reserve may not necessarily constitute a selective advantage to all others. In the current Directive, these principles are laid down in criterion 5 of Annex III to the Directive. In addition, in line with the State aid rules, in order to avoid allocations beyond expected needs, the Commission has consistently required allocations to new entrants not to exceed levels that can be achieved by best available techniques, without however specifying precise levels. The options to be assessed concern therefore the level at which the NER, if at all, is set and administered and the guiding principles for allocations from the NER.

(71) **Option 5.24: Status quo**, Member States free to set the size and administer the NER. Under the current ETS Directive only criterion 5 and the State aid rules are binding.

(72) **Option 5.25: Fully or partially harmonised NERs to be administered by Member States**. Under this option, the rules for the structure and the size of the NER would be further harmonised. In particular differentiation according to technology or fuel could be prohibited. The Commission could also set specific maximum values for the benchmarks to be used[107]. Member States could maintain discretion e.g. to exclude a certain sector from the reserve or to set allocations at lower levels than the values specified by the Commission.

(73) **Option 5.26: One single EU-wide NER.** Under this option, all new entrants would receive their allocation from a central reserve at the EU level. The allocation rules are the same for all new entrants. Member States would remain responsible for processing applications subject to control by the Commission. The size of the reserve would be set at a level that covers expected needs for the allocation period concerned and would be deducted from the allowances to be auctioned, thereby having an impact also on the auctioning revenues for each Member State. The Directive would set out the main principles and the procedures to put in place more detailed rules.

[107] The Directive would rather lay down the procedure by which maximum values would be determined.

(74) **Option 5.27: No NER at all.** Under this option, all new entrants have to buy allowances in the market.
Both harmonised NERs at Member State level as well as an EU-wide NER have to mirror the rules for allocations to existing installations at least partially. Mirroring implies in the very first place that new entrants in sectors that are not eligible for any allowances for free are not allocated any allowances from the NER. In case allowances to existing installations are allocated on the basis of benchmarks based on BAT, the same benchmarks should apply to new entrants, if applicable subject to similar reduction factors.
The strongest case for not-mirroring the rules for existing installations is to reduce the perverse incentives that inevitably arise from any allocation to a new entrant. It could e.g. be perceived that allocations to new entrants are set only at levels of 40-60% of BAT-levels. These choices depend on the other choices on allocation. For the remainder of this section, it is reasonable to assume both the harmonised NERs at Member State level as the EU-wide NER to mirror rules for existing installations to a large extent.

Screening the options leads to the following results:

Given the perverse incentives and distortions of competition generated under the current system, the option to maintain the status quo is not retained for further scrutiny. All other options meet at least the minimum levels of effectiveness and efficiency and none of these options is fully inconsistent with EU objectives in other domains. As regards option 5.27, it is worth noting that the absence of a NER means foregoing a potential instrument to avoid carbon leakage.

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
5.24: Status quo	-	-	-	Discarded
5.25: harmonised NERs at MS-level	√	√	√	Retained
5.26: single EU-wide NER	√	√	√	Retained
5.27: no NER	-/√	√	√	Retained
√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,				

5.8.2. Impacts – Comparing the Options

As regards environmental effectiveness, the main differences in impacts concern the possibility to avoid carbon leakage. NERs at Member State level may in theory offer somewhat more flexibility to adapt the rules to minimise carbon leakage without allocating allowances to new entrants if the circumstances would not require doing so. Given the evaluation of allocation methods, the principle of non-discrimination and the reluctance of Member States to be unduly strict on allocations to new entrants, the benefit of this flexibility appears to be rather limited.

Any allocation to new entrants has the effect of an investment subsidy, thereby inevitably reducing the signal from the allowance price and rendering the ETS less efficient. The chosen technologies may still reflect optimal abatement measures, but without the allocation, the new investment may not take place at all, so any NER

discourages product substitution. Harmonised rules, exclusion of fuel or technology specific benchmarks may reduce perverse incentives to some extent. Moreover, in case allocations to existing installations are given only when carbon leakage is a serious risk, the allocations to new entrants are likely to be justified for the same reason, therefore not having the same negative impact on efficiency of the system.

A harmonised approach encourages a level playing field in the internal market. The option of one single EU-wide reserve is the best guarantee for equal treatment of similar installations across the EU. Given the desire to attract investments, Member States may seek to maximise allocations from NERs if they have the authority to do so. Control on estimating capacity and/or expected production levels will remain, however, rather difficult. The option of not having a NER would distort competition in favour of incumbent installations receiving allocations for free.

Allocations to new entrants furthermore increase the likelihood of entry in the market and therefore render markets more competitive. Not allocating to new entrants may actually lead to barriers to entry, thereby increasing the market power of incumbent producers on the market.

Allocations for free to new entrants are likely to lead to undesirable distributional effects to the same degree as for existing installations. In less competitive markets, entry may however increase total supply and thereby reduce prices and profits for the producers that see their market power reduced.

Administrative costs will obviously be lowest in the absence of a NER. Administrative costs of harmonised NERs at Member State level will be higher than in the case of a single EU wide NER due to the cost of national administrations having to set their rules within the harmonised framework.

5.8.3. Compliance of Options with Objectives

The advantages of New Entrant Reserves are largest when allowances are to be allocated for free only to sectors where carbon leakage is a serious risk.

Under many angles it may not matter very much whether to have a central EU-wide NER or harmonised NERs at Member State level. The first, however, scores significantly better in guaranteeing a level playing field and may overall entail lower administrative costs.

Table 5.8.3. Summary of the impact of options in relation to relevant problems and objectives

Option	Environ-mental Effective-ness	Economic Efficiency	Level playing field/ com-petition	Simplicity, transpa-rency, pre-dictability	Distribu-tional effects	Administra-tive costs
5.25: harmonized NER at MS level	+	0	+	0/+	0/+	0/+
5.26: single EU-wide NER	+	0	++	+	0/+	0/+

5.27: no NER	-	++	-	++	+	++

Key: ++ (significant improvement) + (improvement) - (deterioration) -- (significant deterioration) 0 (negligible change) n.r. (not relevant

Considering the various scores, option 5.26, a single EU-wide NER appears to be the preferred option as it best safeguards a level playing field and it may be useful to have as an instrument to avoid the risk of net carbon leakage.

5.9. Allocation: closure rules

The options under this section are only relevant for installations receiving allocation for free.

The present Directive does not establish rules concerning the closure of existing installations. Accordingly, Member States set up their own provisions. There are three key elements.

- The definition of 'closure' varies among Member States. Some have, e.g., set minimum levels of production below which an installation is assumed to be closed..
- The period after closure during which operators continue to receive allowances varies. Member States generally set the rule that no allowances are given for closed installations as from the year following closure.
- In addition, a range of rules have been put in place to address specifically replacement investment, where allocations to closed installations are transferred to replacement investment by the same operator, on the same site or, more generally, within the same Member State.

5.9.1. Policy Options and Screening

The following options are assessed:

(75) **Option 5.28: status quo.** The current rules provide full freedom, apart from the criterion generally prohibiting favourable treatment of certain installations or sectors.

(76) **Option 5.29: No closure rule.** Under this option, operators would continue to receive allowances throughout the trading period concerned, but would not receive allowances after closure in a subsequent trading period.

(77) **Option 5.30: a harmonised closure rule without transfer rule.** Under this option, the definition of closure and the number of years after closure during which operators continue to receive allowances are harmonised. Replacement investment might be eligible for allocations from the new entrants reserve, but no transfer rules would

be allowed. Allowances not allocated to installations due to closure would not be forfeited, but are added to the new entrants reserve[108].

(78) **Option 5.31: a harmonised closure rule with a harmonised transfer rule.** This option is equal to the previous, but in addition an EU-wide transfer rule is put in place. Under this rule, an operator that closes its installation continues to receive allowances until the end of the trading period if it can prove that production has been transferred to a new or existing installation without any restrictions as regards location in the EU and operator. The new installation, or the capacity expansion of the existing installation, would not be eligible for allocations from the new entrants reserve.

A transfer rule is relevant only in case the allocation per unit of production to existing installations is higher than the allocation to new entrants. In sections 5.7 and 5.8 above it is, however, concluded that if any allocating of allowances for free remains, the preferred option is to have these allocations based on harmonised benchmarks both for existing and new installations.

Screening the options leads to the following results:

Given the problems resulting from the present lack of harmonisation, option 1 is not retained for further scrutiny. All other options meet at least the minimum levels of effectiveness and efficiency and none of these options is fully inconsistent with EU objectives in other domains.

Option	**Effectiveness**	**Efficiency**	**Consistency**	Result
5.28: Status quo	-	-	-	Discarded
5.29: harmonised NERs at MS-level	-/√	√	√	Retained
5.30: single EU-wide NER	√	√	√	Retained
5.31: no NER	√	√	√	Retained
√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,				

5.9.2. Impacts – comparing the options

The main impacts of the options concern a trade-off between increasing efficiency of the ETS and avoiding net carbon leakage. Closure rules significantly reduce the incentive to close down installations, so option 5.29 brings the largest improvement in terms of efficiency. That option, however, may also induce more net carbon leakage. A harmonised closure rule (with a transfer rule) has the opposite effects: less improvement of efficiency, better impacts in terms of avoiding net carbon leakage. The size of these impacts depends very much on other choices. In case allowances are allocated for free only to sectors with a proven risk of net carbon leakage, the negative impacts on efficiency under option 5.31 would be minimised. In case all sectors

[108] Another option would be not to allocate the allowances not allocated due to closure at all, thereby effectively reducing the overall cap on emissions in the trading period concerned. Such a rule would, however, go against the principles of a "cap and trade" system, creating undue uncertainty about the actual cap and is therefore not retained for further scrutiny.

would receive allowances for free, the negative impacts on efficiency under option 5.30 is likely to be significant. In case a transfer rule would become relevant, the negative impacts on efficiency of option 5.31 would be larger.

It may be noted that the overall cap is not very much affected, as even under the current system most, if not all, Member States add forfeited allowances to the new entrants reserve and most of them auction the remainder of such reserves towards the end of the trading period.

Not having any closure rule may have a relatively strong negative impact on the economy, since it generates the strongest incentive for closure. In particular installations where the value of emissions is high compared to the net margin over production cost may be tempted to close down at the beginning of the trading period and sell all allowances they continue to receive.

Closure and, if relevant, transfer rules inevitably impact on competition and as explained in section 5.1.1, the (potential) distortions as regards location of production from non-harmonised rules are important. Therefore, any closure rule and particularly any transfer rule, if relevant, must be fully harmonised.

As regards distributional effects, it must be taken into account that continuing to allocate allowances to operators after closure of the installation can be perceived as undue. In fact, this is one of the main arguments for the existence of closure rules.

Closure and transfer rules inevitably involve administrative costs both for the authorities and for companies, e.g. due to the need to monitor whether installations are closed or not and whether production is effectively taken over by installations benefiting from the transfer rule. It is difficult to say whether overall administrative costs would be higher or lower with a harmonised transfer rule.

5.9.3. Compliance of Options with Objectives

From the assessment above, it results that the impacts and the compliance with objectives depend on the choices on auctioning and allocation for free. In case allowances are allocated for free only in sectors with a proven risk of net carbon leakage, the option of harmonised rules for closure with an EU-wide transfer rule would best comply with the objectives. In case installations in all sectors were to receive allowances for free, the negative impacts on efficiency are likely to outweigh the benefits of avoiding net carbon leakage. Harmonisation of the transfer rule, defining it as open as possible, would limit distortions of competition.

Table 5.9.3. Summary of the impact of options in relation to relevant problems and objectives

Option	Environ-mental Effective-ness	Economic Efficiency	Level playing field/ com-petition	Simplicity, transpa-rency, pre-dictability	Distribu-tional effects	Administra-tive costs
5.29: no closure rule	-	+	++	++	-	++
5.30: harmonized closure rule, no	0	+	++	++	+	+

transfer rule						
5.31: harmonized closure rule with transfer rule	0	+	++	+	+	+

Key: ++ (significant improvement) + (improvement) - (deterioration) -- (significant deterioration) 0 (negligible change) n.r. (not relevant

Only in case allowances are allocated for free only in sectors with a proven risk of net carbon leakage, the preferred option is to have a harmonised closure rule. It follows from the previous sections that there should not be a need for any (harmonised) transfer rule.

6. LINKING WITH EMISSION TRADING SYSTEMS IN THIRD COUNTRIES, AND APPROPRIATE MEANS TO INVOLVE DEVELOPING COUNTRIES AND COUNTRIES IN ECONOMIC TRANSITION

6.1. Linking to other systems

6.1.1. Introduction

Article 25 of the ETS Directive provides the legal basis for linking the EU ETS with emission trading systems of third countries[109]. So far, agreement has been reached to link the EU ETS with the EEA countries Iceland, Liechtenstein and Norway. The recent launch of the International Carbon Action Partnership (ICAP[110]) underlines the growing interest of other countries and regions in the world in considering linking up with the EU ETS.

Any link of the EU ETS with another emission trading system would need to be established through the use of Article 300 EUT. This article requires the Commission to make *recommendations* to the Council, which authorises the Commission to open negotiations on such linking agreements. The negotiations are conducted by the Commission in consultation with Council committees (e.g. the Climate Change Committee), and the final agreement is approved by Council by qualified majority.

Against this background, considerations concerning linking the EU ETS with other emission trading systems in the framework of this impact assessment can only deal with the general principles related to linking rather than the concrete impacts which

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109 The term "linking" under heading 6.1 has to be understood in the sense of Article 25 of the ETS Directive. Linking established through acknowledgment of credits created by JI and CDM project is dealt with in the following section (see 6.2).

110 ICAP is a new initiative that aims to contribute to the establishment of a well-functioning global cap and trade carbon market. It has been launched in the framework of a high level event on 29 October 2007 in Lisbon and brings together public authorities from countries and regions that have implemented or are actively pursuing the implementation of carbon markets through mandatory cap and trade systems, to share experience and knowledge. It includes a number of US states as well as the EU as founding members. For more information, see http://www.icapcarbonaction.com/ and http://ec.europa.eu/environment/climat/emission.htm#brochure

may affect the EU ETS when linked up with another concrete trading system. In this case, a separate impact assessment is likely to be required. The following sections will therefore deal with general rather than specific deliberations.

6.1.2. Identification of Problems

Currently, the EU ETS is the largest GHG emission trading system based on trade between companies in the world. By this, it provides a model for other countries and regions that seek to reduce GHG emission at least cost. As it emanates from the Commission Communication "Towards a global carbon market"[111], the ultimate goal of GHG emission trading is developing a world-wide carbon market for a number of reasons:

- Environmental effectiveness: a global carbon market under a cap-and-trade system would ensure that environmental objectives are met globally. In the longer term, it is unlikely that the necessary emission reductions can be achieved by only a part of the world offsetting growing emissions in other parts of the world.

- Efficiency: a global carbon market would allow identifying least cost abatement options at a global rather than regional scale, thereby considerable decreasing overall costs at which a given emission reduction target can be achieved.

- Avoidance of leakage: in a global system, the risk of leakage triggered by relocation of production facilities from places with more stringent to less stringent rules in place would be avoided.

- Fairness and acceptability: in the longer term, a global market is indispensable, in order to ensure a certain degree of fairness in terms of sharing the burden between all polluters. This is without prejudice to considerations relating to the different stages of economic development the various countries are facing. Overburdening one region may undermine the political acceptance of emissions trading.

While there are many reasons advocating linking the EU ETS with emissions trading systems of other countries, there are also risks involved. Linking can undermine the systems involved. Poorly-designed linking of systems can reduce their environmental effectiveness by negatively affecting the total reductions to be reached. Price caps in one system, for example, may increase the risk of higher emissions throughout the linked system as in practice the price cap comes to apply for both systems. Linking can also result in environmental guarantees built into systems being bypassed. This is for instance the case when different criteria are used for the eligibility of credits from offsetting projects, e.g. JI or CDM projects, in the different linked systems. Poorly designed linking could also negatively impact on competition between companies covered under the systems and can adversely influence the market price of emission reductions.

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[111] COM(2006) 676.

To sum up: while linking with emission trading systems of third countries is highly desirable for the reasons set out above, it must not undermine the environmental effectiveness and proper functioning of the system.

6.1.3. Identification of Objectives

In the light of the preceding section, the following objectives can be identified:

1. Identification of criteria for assessing the potential for linking

2. Developing criteria for linking with other systems

It is worth highlighting that these criteria will be identified and developed in a general rather than specific manner.

6.1.4. Criteria for assessing the potential for linking

In the light of the above objectives, the following does not refer to policy options, but criteria to be applied when it comes to linking the EU ETS to another trading system. The following criteria are assessed against effectiveness, efficiency and consistency.

- Type of system
- Voluntary/mandatory systems
- Stringency of cap
- Units used
- Registry standards
- Use of intervention measures
- Direct/indirect approach
- Use of banking
- Use of borrowing
- Sources/activities covered
- Emissions covered
- Monitoring & Reporting
- Compliance and enforcement
- Project credit provisions

A detailed assessment of these elements or criteria is contained in ENTEC 2007b.

Summary

Having assessed each element against its impact, almost all elements are deemed to have sufficient impact to form the basis of an assessment of the suitability of a system to be linked to the EU ETS with the exception of the criteria "Sources/activities covered" and "Emissions covered".

Table 3.1 summarises the assessment. In addition to these elements, the sustainability of a linking agreement needs to be considered, this would include considering how to adapt to changes in either system. A review clause would be required in a linking agreement in order to return to the issue if major changes occur.

Table 3.1 Summary of Potential Differences

Element	Potential impact on			Critical?
	Effectiveness	**Efficiency**	**Consistency**	
Type of system	-	0	0	Y
Voluntary/Mandatory	0/-	+/-	0	Y
Stringency of cap	-	-	0	Y
Units used	-	0	-	Y
Registry standards	0/-	0/-	-	Y
Use of intervention measures	-	-	0	Y
Direct/indirect approach	-	-	0	Y
Use of banking	0/+	+/-	0	Y
Use of borrowing	-	+/-	0	Y
Sources/activities covered	0	0	0	N
Emissions covered	0	0	0	N
Monitoring & reporting	-	0	0	Y
Compliance and enforcement	-	-	0	Y
Project credit provisions	0	0	0/-	Y

Key: Positive impact - Negative impact-0 Negligible or no impact

6.1.5. Developing Criteria for linking with other systems

The decision on whether or not to link with an emissions trading system will be made on a case-by-case basis, so the assessment will need to be appropriate to the situation. In particular, the assessment needs to be proportionate to risk and take into account the level of potential impacts. e.g. size of market etc.

To address the potential negative impacts, two conceptual approaches have been considered:

- *Exclusion criteria* – using some criteria to assess the suitability of a system for linking. This may be binary (yes/no, i.e. elements must be harmonised or it will not be desirable/possible to link) or quantitative (e.g. a threshold level)

- *Control measure* – if possible, put some measures in place to restrict the link in some way and minimise the negative impacts.

For each element, the issues involved are outlined and possible criteria and control measures are identified. Where appropriate and evident, issues for further consideration are highlighted. A more detailed analysis is available from ENTEC 2007b.

Criterion 1: Units Used

The EU ETS could not be linked to systems directly using AAUs without undermining its effectiveness and environmental integrity.

Criterion 2: Registry Standards

If trading systems are to be linked, then their registry systems must be able to accurately exchange data. Registry standards already exist under the Kyoto Protocol[112], but this does not apply to other countries. As a potential criteria, the availability of an UN compatible registry or, if this turns out not to be possible, a "translation system" to bridge the two standards might offer a solution.

Criterion 3: Type of System

Cap-and-trade systems are not incompatible with baseline-and-credit systems, so the larger issue is the nature of the target (i.e. absolute vs. relative). If the proposed link was to a system in a country that has not ratified the Kyoto Protocol, then a relative target could risk undermining the environmental integrity of the system.

For this reason, the EU ETS should only link with systems aiming at absolute targets.

Criterion 4: Voluntary/Mandatory

As outlined above, linking to a voluntary system might affect the environmental integrity of the system and risk competitive distortions. For this reason, only links to mandatory systems may be considered. Alternatively, in order not to exclude links to voluntary systems but sort out potential adverse effects on the EU ETS, a requirement to demonstrate additionality could be set up. Opting into the mandatory system might also represent a possible criterion.

Criterion 5: Stringency of Cap

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[112] See Decision 12/CMP.1 - Guidance relating to registry systems under Article 7, paragraph 4, of the Kyoto Protocol.

The target in both systems needs to be tight enough to impose a binding constraint on emissions. This means that the total quantity of allowances is smaller than the level of need under business-as-usual conditions. In order to arrive at such a level, a formula could be used to calculate the maximum allowable limits for the cap in the linked system (similar to the approach taken by the Commission in Phase II) or to set a threshold by assessing the allowance price. However, this might only be possible, if there is a sufficient level of transparency on the market.

Whatever the arrangements for linking are, it is likely that there will be a difference between the allowance prices in the 2 systems. On linking, the prices will converge.

Criterion 6: Monitoring and Reporting

In order to ensure the integrity of the EU ETS, monitoring and reporting standards must be rigorous enough to be reliable and accurate. The use of EU standards or the definition of appropriate minimum requirements would be relevant criteria.

Criterion 7: Compliance and Enforcement

As with monitoring and reporting, standards of a linked system must be rigorous enough to avoid leakage or gaming. Make-good provisions, introduction of minimum penalties and of other sufficient sanctions to ensure compliance must be considered.

Criterion 8: Intervention Measures

There are a range of intervention measures, generally designed to control costs. Potential criteria for linking the EU ETS with systems employing intervention measures may be not to establish links to systems with intervention measures or to define a list of acceptable intervention measures.

Criterion 9: Direct / Indirect Approach

Emissions can be controlled directly at source or indirectly - at the level of end-users. Linking two systems with different approaches can be technically complex. Therefore, links will only be made to systems that trade direct emission reductions.

Criterion 10: Banking / Borrowing

Differences in banking / borrowing provisions can be problematic in situations where there are doubts about the appropriateness of the allocation and differences in allocation stringency between trading periods. For this reason, only a certain level of banking/borrowing should be acceptable. If it is not adhered to, a restriction on trading between the systems could come into play.

6.1.6. Compliance of options with objectives

Emissions trading systems can differ in several ways, but not all of these are significant. There are several critical elements that must be considered when linking systems, but no major technical obstacles to linking have been identified.

When considering these critical elements, different approaches can be taken. In some cases the potential negative impacts can be reduced or avoided through a variety of control measures. Given the variety of systems, some flexibility and pragmatism is needed for linking the EU ETS, but this must be balanced against cost-effectiveness.

There are also some over-arching issues that have been identified for further consideration.

– **EU ETS Harmonisation:** There are some elements of the EU ETS that are not consistent across the EU Member States. In order to ensure the sustainability of a link, it is important to have internal harmonisation of the EU ETS as wide as possible as a step towards external linking as this will minimise the change within the EU ETS. More consistent harmonisation would simplify the process of linking at a later stage. However, this does not need to delay progress on linking of trading systems. A cautious approach would be prudent and a pilot period could be used to reduce risks.

– **Market Smoothing**: Linking systems would result in an adjustment in allowance prices as the prices in the two systems converge. Given the broader context of the review, more consideration should be given to how to minimise the market shocks resulting from this and how to provide improved predictability.

– **Potential Barriers in Legal Framework**: The Directive currently only permits links to Annex B countries that have ratified the Kyoto Protocol. Linking to systems in other countries would require an amendment. Furthermore, amendments of the legal framework would be required to enable linking. Two have been identified (Robinson et al, 2007) as:

    - The recognition of EU allowances by the system linked to and the recognition of other ETS units in the EU ETS would need to be established. In order to address the issue of recognising non-EU ETS allowances, a new regulation would have to be drafted.

    - The definition of an allowance also identifies it as 1 tonne of CO2e, but there is no reason why the EU ETS should not be linked to a system with allowances of a different denomination. This may need amending of the Registry Regulation.

– **Legal Infrastructure Required:** Having defined the criteria, the actual process and infrastructure for linking agreements would need to be developed. At present, the provisions in the Directive (Article 25) set out a two-stage process where firstly, the Commission would reach an agreement with the entity wishing to link its system to the EU ETS. However, the Member States would have a strong say in the comitology committees accompanying the negotiations and the final conclusion of an agreement by the Council. Also the sustainability of the linking agreement should be considered in that there should be clear review clauses to allow both systems to adapt to changes in either system or external changes that might influence effectiveness, cost-efficiency or consistency.

– **Contents of Linking Agreement**: The legal and governance issues stipulated in an agreement for mutual recognition of allowances needs to be considered:

  - How prescriptive should provisions be;
  - How to change provisions of systems
  - Frequency of meetings, aim of meetings of regulators of linked systems;
  - Rules for expansion of membership;
  - Legal provisions for withdrawal of membership;
  - Links to international trade law;
  - How a link between different ETS could be severed.

The Commission has already tendered out work to consider the structure and content of an agreement.

6.2. Use of offsets[113]

6.2.1. Entitlements

6.2.1.1. Identification of Problems

Offsets allow EU operators to meet obligations under the ETS by investing in projects to reduce emissions in developing countries. This can be a short term cost-efficient way for companies to meet their obligations, and an incentive for developing countries to come within an international agreement.

But they have their problems too as too much use of foreign offsets could avoid EU countries to make real domestic change increasing future domestic abatement costs and may undermine chances of achieving an international agreement post 2012. Doubts also persist about the real emissions reduction impact of some offset projects. Finally some industrialised countries resist the idea that offsets can cut the costs for emerging competitors.

Finding a balance means improving the environmental integrity of offsets and determining the right level of entitlements for EU operators. These entitlements will need to be fixed with reference to the degree of incentive needed for EU operators, and made flexible to allow for the evolution of international negotiation.

Following the experience of phase 1 and allocations for phase 2, serious concerns have been raised about an over-supply of CERs/ERUs entering the EU ETS, resulting

[113] Because uncertainty prevails about the exact shape and scope for JI/CDM beyond 2012 the more general term "offsets" is used. JI and CDM are still used when dealing with the second trading period and rules for transition to the third period.

in insufficient supplementarity in the total effort to bridge and taking away incentives for emission reductions and technological change within the EU.

Under the conditions for phase 2 around 1400 Mt of credits are allowed to enter the EU ETS, or a yearly average of 280 Mt. Relative to 2005 emissions the estimated phase 2 cap represents a reduction of approximately 130 $MtCO_2$. If full use of credits is made by operators, few domestic reductions would occur and in an extreme case emissions in the EU ETS could even increase by 150 Mt, i.e. the difference between 280 and 130 Mt making it more difficult to achieve the EU's overall 2020 reduction targets.

Banking provisions ensure that any excess credits or their equivalent allowances can be transferred to the third commitment period. With expected higher prices towards the end of the third commitment period, there exists an incentive to bank as many allowances/credits as possible. This could water down the impact of the EU ETS on the achievement of the 2020 energy and climate package. Keeping a similar high entitlement for use of offsets in phase 3 could exacerbate this problem.

Increased access to offset credits might be able to alleviate competitiveness concerns. However, domestic reductions achieved through the EU ETS contribute cost-effectively to the overall EU GHG emission reduction targets for 2020, and the need to continue reducing GHG also in the longer term, as already envisaged by the European Council in March 2007[114]. More use of JI/CDM credits would require other, more costly measures to be taken in other areas.

Finally, a too generous use of offset credits may reduce incentives for large-emitting developing countries to take ambitious measures as part of an international agreement on climate change, as they would benefit from the issuance of offset credits without the need to take on any commitments in terms of reducing GHG emissions for themselves.

Another problem relates to the un-harmonised access to these credits in different Member States. Despite a narrowing down of the discrepancies by the Commission, the level of use still differs between Member States. If more harmonised rules are accepted in phase 3 for allocation of allowances, keeping access to offsets un-harmonised could distort the level playing field between companies competing in the internal market.

With respect to setting the entitlement for use of offsets in the EU ETS two scenarios need to be clearly distinguished:

– No international agreement: In the absence of an international agreement the EU would still need the flexibility that offsets offer, but if phase 2 entitlements are kept unchanged the problem of over-supply is likely to persist in phase 3.

– International agreement: In case an international agreement is reached the ambition level of the EU's overall reduction target increases from -20% to -30% compared to

[114] In its conclusions of March 2007, the European Council envisaged developed countries to collectively reduce their emissions by 60% to 80% by 2050 compared to 1990.

1990 levels. In this case a higher entitlement of offset credits may be needed to avoid excessively high compliance costs.

6.2.1.2. Identification of Objectives

Against this background, the following objectives may be identified:

– In the absence of an international agreement develop more harmonised quantitative provisions on the use of offset credits to avoid market distortions, guarantee a sufficiently high amount of reductions within the EU and contribute efficiently to the 2020 energy and climate legislative package; In case an international agreement has been reached, provide structures and procedures to reassess the internationally agreed rules for the use of offsets and adapt them to the needs of the EU ETS and the overall EU climate and energy package.

6.2.1.3. Policy Options and Screening

Two scenarios could occur:

In the event of an international agreement, increased access would be allowed in tandem with the increase in the level of emission reductions to be achieved through the EU emissions trading system. This would be done pending EU scrutiny of the agreed international rules. In the event that the conclusion of an international agreement is delayed beyond 2012, additional credits from projects or other emission reducing activities may be used in the Community trading system in accordance with agreements that may be concluded with third countries. Agreements reached shall provide for the use of offsets in the Community emissions trading system from renewable energy or energy efficiency technologies which promote technological transfer and sustainable development.

In the absence of a global agreement several options for setting these entitlements have been assessed:

(79) **Option 6.1 status quo**: non-harmonised approach whereby Member States continue to give similar level entitlements as in phase 2 to their installations (subject to approval by the Commission).

(80) **Option 6.2 Mandatory unlimited entitlements** to the use of offsets;

(81) **Option 6.3 Harmonised EU entitlements below phase II levels**: an EU-wide harmonised provision for the use of offsets, banking envisaged entitlements from phase 2 into phase 3. This option assesses the impacts of a lower EU-wide harmonised level of entitlements for the third period. The level of entitlement has to be determined bearing in mind that the EU ETS plays a crucial role in achieving the EU's 2020 renewables and overall emission reduction target in a cost-effective way. A balance should be struck between maximising the effect of the EU ETS in achieving these targets and allowing flexibility in abatement options by use of offsets. To avoid not achieving a sufficiently high price on the market for the EU ETS

to significantly contribute to the 2020 energy and climate objectives, it is suggested that in the third commitment period only ERUs/CERs generated until 2012 and CERs generated after 2012 from projects registered prior to 2012 will be allowed for compliance in the EU ETS. To avoid oversupply, the crediting period for these projects should be limited to a period of seven years.

(82) **Option 6.4 differentiated EU sector averages**: quantitative provisions on the use of ERUs/CERS are harmonised at an EU-level but differentiated by sector to allow increased shares of JI/CDM for sectors submitted to auctioning and prone to international competitive pressures.

Screening the options leads to the following results:

– **Effectiveness**: Options 6.1 and 6.2 would allow a significant supply of offset credits to be introduced in the EU ETS, thereby considerably lowering the allowance prices. As a consequence, the incentive to lower EU carbon-intensity may be postponed or greatly watered down. In the longer term, this is likely to result in inabilities to meet overall EU GHG reduction targets. It also contradicts the requirement for supplementarity and could lead to potentially no efforts depending upon the costs of remaining abatement potential in Phase III versus long-term offset prices being undertaken within the EU. This would lower investment in clean technology which is vital for longer term emissions reduction. In addition, a lack of domestic reductions will thwart EU's ambitions in negotiating greater participation in an international post-2012 agreement. Options 6.3 and 6.4 would safeguard the environmental effectiveness of the EU ETS by ensuring the necessary scarcity of JI/CDM credits, in order not to adversely affect the level of domestic abatement.

– **Efficiency**: Option 6.3 would score best in this regard, as there is no additional need for monitoring the amount of national offset credits anymore, while option 6.1 remains neutral. Additional costs would be incurred by option 6.4 due to the differentiation of sectors, which would need to be established. Option 6.2 is likely to incur costs in the long-term, as the higher lock-in of inefficient technologies now may result in increased costs for both operators and authorities, and seriously hamper achieving an international agreement on further emission reduction cuts.

– **Consistency**: Option 6.3 would improve consistency with other Community policies, in particular with respect to the Lisbon Strategy and Sustainable Development, while option 6.4 is likely to be neutral in this respect. Adverse impacts on the Lisbon objectives and Sustainable Development may accrue from options 6.1 and 6.2, as the need to adapt is considerably reduced. Competitive distortions on the internal market should also not be excluded due to the non-harmonised or unlimited supply of JI/CDM credits.

Option	**Effectiveness**	**Efficiency**	**Consistency**	**Result**
6.1: Status quo	-	0	-	discarded
6.2: mandatory unlimited entitlements	-	-	-	discarded
6.3: harmonised EU entitlement	√	√	√	retained

6.4: differentiated EU sector averages	√	-	0	retained

√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,

In the light of the above considerations, options 6.1 and 6.2 will not be further pursued.

6.2.1.4. Impacts – comparing the options

The assessment criteria used for comparing the impacts of the options are environmental effectiveness, economic efficiency, administrative costs as well as competition and competitiveness.

Environmental Effectiveness: As already set out in the chapter on "Further harmonisation and increased predictability", higher compliance costs could affect investment decisions of industrial sectors exposed to the risk of carbon leakage as a consequence of international competition. Option 6.3 is designed to ensure a level of scarcity that is considered necessary to trigger the meaningful abatement measures. This, however, may lead to carbon leakage.

A lack of domestic reductions will thwart EU's ambitions in negotiating greater participation in an international post 2012 agreement. Therefore, avoiding over-supply of offset credits and introducing specific harmonised quantitative entitlements on offsets, such as in option 6.3 is recommended.

The principle reason for having differentiated EU-wide sector limits for offsets, as implied by option 6.4, is to help reduce the cost impact on sectors particularly exposed to competition and as a result reduce the likelihood of leakage of emissions outside of the system. By tailoring higher limits towards these sectors this option is likely to perform better in terms of leakage reduction than harmonised EU-wide limits across all participants (option 6.3).

Economic efficiency: A harmonised and restricted use of credits, as envisaged by option 6.3, would increase the incentive to reduce emissions through new technologies and practices, and substantially help achieve cost-effectively the EU's 20% renewables target. In the same manner, it could lead to more substitution away from GHG-intensive products on the EU market towards less-carbon intensive goods and production and larger incentives for investment in clean technology development, which in turn could help achieve lower abatement costs both domestically and internationally in the long-run. Therefore, option 6.3 is likely to establish an incentive to dynamic efficiency, in particular in the light of the 2020 emission reduction target. With more domestic reductions also come more ancillary energy security and health benefits. As for the detailed quantitative impacts of this option, please refer to the impact assessment on the effort sharing decision.

Option 6.4 is more likely to reduce efforts to undertake emissions reductions within the EU, at least within these sectors, unless the differentiated offset limits could be set such that the total import of these credits into the ETS is the same as under the reference case or option 6.3 (harmonised EU-wide limits), with lower or even zero limit for sectors such as power generation and a higher limit for more exposed sectors. This would lead to the same overall emissions reduction within the ETS as a whole,

but with carbon efficiency improvements more focused in the less exposed sectors. However, it remains open whether incentives to ensure dynamic efficiency would prove to be as efficient as assumed under option 6.3.

With respect to a well functioning carbon market and given that the offset credit levels would be determined at EU level, one can expect an improvement in the functioning of the internal market arising from both options.

Administrative costs: Compared to the baseline or reference scenario, option 6.3 would entail reduced administrative costs due to the application of uniform ceilings across the entire EU. This is opposed to differentiated offset limits across ETS sectors, which are likely to require higher administrative costs, as upfront costs would be needed in the short term to design and assess the split in differentiated offset limits across the ETS sectors. But the implementation of harmonised limits by EU-wide sector rather than at a Member State level is unlikely to lead to significant difference in administrative costs to public authorities over the longer term. Costs may increase for businesses if they would have to prove competitiveness pressures in order for a sector to become eligible for higher limits.

Competition and competitiveness: Given that the offset credit levels are determined at EU level, option 6.3 would entail no major distributional equity deficiencies. An installation level limit would reduce flexibility as opposed to a first come first serve system. The latter would also be fairer in that companies with higher than average abatement costs could have access to a higher than average share of credits if they use them first. The differentiation by sector under option 6.4 should lead to an overall improvement in the equity of treatment as industries' first concern is achieving a level playing field across the ETS within its own sector and with competitors outside the EU. Because of the higher access to offsets this option could reduce these competitiveness concerns and the risks of unintended leakage from these sectors. This should therefore increase the equal treatment of those exposed as opposed to the non-exposed installations. On the other hand, it may be difficult in practice to accurately define sector differentiations, therefore raising possible state aid concerns. Competitive distortions in case there is competition across sectors (e.g. in the construction business) could also occur. Furthermore, if the overall amount of offsets should not be increased, in order to implement domestic abatement measures rather than offsetting emission by credits, option 6.4 could lead to potential distributional equity problems, as other sectors not considered eligible for a higher amount of offsets, would need to bear a stronger share of the overall reduction pie. There may be more efficient and effective ways of dealing with the competitiveness issues rendering option 6.4 redundant.

While in the short-run a higher level of domestic abatement can expose some sectors to more international competition, in the long-run, as the geographic coverage of carbon constraints increases, the international competitiveness of EU operators would be enhanced under option 6.3.

Employment: In the short term and due to the potentially higher risk of carbon leakage, employment effects accruing from option 6.3 cannot be fully excluded, but are very likely to be limited and even not relevant, if a comprehensive international

agreement is likely to be concluded in the foreseeable future. Option 6.4 would allow addressing this issue in a more tailor-made manner.

Another relevant aspect to be considered is that a separate key impact of quantitative provisions on access to offset credits is on sustainable development outside of the EU, as this is a requirement for approval of CDM projects. In general where a higher level of offsets is allowed within the ETS this leads to higher demand for CDM credits, and hence should lead to an improvement in sustainable development (SD) in developing countries (albeit at the expense of investment in emissions abatement inside the EU). However, this only holds true if the offsetting mechanisms truly contribute to SD in the host countries. For many current projects doubts have been raised about this and calls have been made to limit in qualitative ways access to some of these credits (see section on standards).

Table 6.2.1.4. Summary of the impact of options

Option	Environmental Effectiveness	Economic Efficiency	Administrative Costs	Competition/ Competitiveness	Employment
6.3: harmonised EU entitlements	0/+	+	+	0/+	0
6.4: differentiated sector offset levels	+	0/+	-	0/+	0/+

+ positive effect, 0 neutral/no or negligible effect, - negative effect

6.2.1.5. Compliance of options with objectives

The options considered include

- 6.3 Harmonised EU entitlements banking envisaged entitlements from phase 2 into phase 3.
- 6.4 Differentiated EU-wide sector offsets entitlements.

Under the harmonised EU average approach (option 6.3), lower offset project limits will provide signals to investors through a higher carbon price, but these would have to be combined with a reduction in uncertainty with regards to the length of the trading period[115] and other impacts on returns on investment. In addition, the risk of leakage would have to be dealt with as some industries can be damaged by the short-term price disadvantage of this sub-option.

Option 6.4 proposes a way to limit leakage—through differentiated allocation of offset credit rights among sectors. It would involve a number of different problems.

[115] longer trading periods than five years will provide greater certainty for long-term investment in capital intensive technology.

For this reason, if other potential measures to give more favourable treatment to exposed sectors such as revenue recycling from auctioning or trade related measures are deemed sufficient by themselves then Option 6.3 would be the preferred choice.

6.2.2. Standards

6.2.2.1. Identification of problems

There is a general will to preserve and further increase the quality of JI and CDM projects issuing credits entering the EU ETS market. Despite stringent scrutiny by the CDM Executive Board doubts prevail regarding the permanence, additionality and/or negative social and environmental externalities of some types of offset projects. Because CERs/ERUs are used to substitute domestic reductions, doubts about their additionality could create emissions to rise further. Project such as HFC-23 reductions from HCFC-22 production facilities have problems of their own as they generate large supplies of cheap credits, crowding-out investments in other projects with more positive impact on sustainable development and long term technological change.

In the light of the considerable range of how various types of offset credits are used in different countries and regions of the world, it is worth clarifying the following issues:

- The use of Assigned Amount Units (AAUs) was ruled out at a very early stage of the review process, as the reasons why this was initially not foreseen in the EU ETS have not changed. AAUs are a creation of international public law, and their credibility depends upon all countries granted AAUs taking on more stringent requirements in the same system. The EU ETS is a robust company-based system whose operation is independent of external events, and holdings of allowances are guaranteed to remain valid. As from 2013, there is no certainty on the continued issue of AAUs. Against this background, AAUs cannot be converted into EU allowances. This situation will remain unchanged in the future, also in the event of an international agreement post 2012.

- Allowances represent a legislative entitlement to emit greenhouse gases under the EU ETS. CERs and ERUs, provided their environmental integrity is ensured, represent legislatively approved and verified reductions in greenhouse gas emissions possibly used in the EU ETS for compliance purposes. Contrary to EU allowances and credits issued under the Kyoto Protocol, verified emission reductions (VERs) cannot guarantee legislatively approved regulatory standards including for additionality and robust baselines. They lack the credibility and reliability accruing from legislative approval that EU allowances and Kyoto Protocol credits have to undergo[116]. For this reason, risks in terms of misuse, double counting and even fraud related to VERs are considerably higher compared to systems that are based on

[116] This does not mean that VERs should not be used for voluntary balancing greenhouse gas emissions, if a company or person wishes to do that (As an example see TÜV Süd: VER+ - A robust Standard for Verified Emission Reductions (Criteria Catalogue), available from http://www.tuev-sued.de/uploads/images/1179142340972697520616/Standard_VER_e.pdf). However, this has to be clearly distinguished from the legal commitment arising in the EU ETS or Kyoto Protocol context to comply with emissions and for which purpose, allowances and credits have to comply with legislatively approved regulatory standards.

international or EU laws and subject to the respective reporting, monitoring and verification rules.

6.2.2.2. Identification of objectives

In the absence of an international agreement the EU ETS needs to develop more harmonised qualitative provisions and standards on the use of offset credits to safeguard its environmental integrity.

In case an international agreement has been reached, structures and procedures need to be foreseen to scrutinise quality standards set internationally on the use of offset credits, and adapt if necessary to safeguard the environmental effectiveness of the EU ETS.

6.2.2.3. Policy options and screening

To limit the risk of problematic credits reducing the system's environmental integrity, a number of options are considered[117].

(83) **Option 6.5 Reference case (current negative list)**: nuclear and LULUCF projects continue to be excluded, but the existing provision for use of the guidelines from the World Commission on Dams (WCD) for large hydro projects will be further clarified.

(84) **Option 6.6 harmonised listing of projects which are insufficient***:* the most controversial project types could be excluded based on their type affiliation, as was already the case in phases 1 and 2. In phase 3 this list would be complemented at regular intervals by the Climate Change Committee to cover new developments in the offset markets. Of particular interest are HFC-23 type projects. Member States would be obliged to accept all remaining project types.

(85) **Option 6.7 Use criteria (criteria)***:* projects will have to meet general or specific use criteria to be agreed upon via comitology. Specific criteria could be developed for each project type, thus allowing a more differentiated set of entry criteria. One example for general use criteria could be the Gold Standard[118]. This is effectively an extended positive list including provisions on the project type (only projects in the domain of renewable energies and end-use energy efficiency improvements will be accepted);

(86) **Option 6.8 Use criteria combined with a discounting factor (discounting)**: As in option 6.7, though with a discount on credit

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117 Note that no further qualitative restrictions (apart from the existing ones) would occur in options 6.3 and 6.4 on quantitative restrictions as this would change market access for credits already accepted in the system in phase 2.

118 The Gold Standard (GS) is a labelling scheme for JI and CDM projects developed in 2003 by a consortium of WWF, SSN and Helio International. The GS is a non-profit foundation under Swiss Law funded by public and private donors.

transfers into EU ETS for project types with very low specific abatement costs per unit CO2 eq, such as HFC-23 projects. The level of discount is proportionate to the difference between emission reductions caused by the project and the EU benchmark for the same type of projects.

Project-based standards based on the project type are designed to represent a community-wide harmonised way to tackle the influx of doubtful credits.

Screening the options leads to the following results:

– **Effectiveness**: While option 6.5 obviously would not allow achieving the objective in question, the other options score much better in this respect: a simple command-and-control option, a negative (or a positive list) under option 6.6 would have the best performance in terms of environmental protection against risks from problematic projects, i.e. nuclear, large hydro, HFC or LULUCF. This option would be particularly effective where an entire class of projects is to be dismissed. The option to complement the list with new project types could improve environmental effectiveness in the face of new developments. The introduction of use criteria e.g. based on the Gold Standard under option 6.7 would also ensure that projects are clearly additional and furthermore in line with sustainable development. More specific criteria would allow for a more differentiated approval process. Combining the use criteria with discounting for low-cost projects (option 6.8) would limit the number of cheap credits transferred from problematic but not altogether banned projects into EU ETS than without discounting. Hence it could further increase environmental effectiveness of the EU ETS compared to use criteria only.

– **Efficiency**: Option 6.6 would be the most cost-efficient way to exclude credit transfer from unwanted project classes from EU ETS. They are very simple to implement and design, resulting in low administrative costs, as does in principle also option 6.5. However, option 6.6 allows achieving the objective in question at low costs, a fact which does not apply to option 6.5 (see above). The administrative costs of option 6.7 would also be moderate for general criteria but relatively high if particular criteria are chosen. Transaction costs for the project developer would be higher, since the requirements for the project design document (PDD) would be higher. Financing for the project developer would be more difficult as uncertainty about project approval may increase. This also applies to option 6.8, which would also entail higher administrative costs both for implementation and for monitoring, as the setting and comparing of benchmarks would require higher costs. The system would be more complex than introducing solely particular use criteria and would demand more sophistication in order to establish a fair and applicable, legally waterproof discounting system. Project developers would on the one hand have better access to financing than under strict use criteria, since project approval will be more likely.

– **Consistency**: Option 6.5 and 6.6 do not create any consistency problems, however, both options would not promote other objectives of EU policy either. In the case of option 6.7, sustainable development could be supported. This, would, albeit to a smaller extent, also be the case with option 6.8. The qualification is due to the fact

that discounting would lead to smaller improvements in social and environmental terms than it would be the case without discounting.

Option	Effectiveness	Efficiency	Consistency	Result
6.5: Status quo	-	0	0	discarded
6.6 Listing insufficient projects	√	√	0	retained
6.7 Acceptance criteria	√	-	√	retained
6.8 Criteria combined with discounting	√	-	0	retained

√ meeting the screening criteria, 0 neutral, - not meeting the screening criteria,

In the light of the above considerations, options 6.6, 6.7 and 6.8 will be further pursued.

6.2.2.4. Impacts – comparing the options

In the following section, the options that qualified during screening are assessed in connection with the most important CDM types against the criteria of environmental effectiveness, economic efficiency, administrative costs and social impacts in the host countries. The suitability of the options concerning the relevant type is discussed.

Environmental effectiveness: Option 6.6 aims primarily at entirely eliminating highly problematic project classes from EU ETS, such as HFC, nuclear, and LULUCF projects. This option would offer the best protection against unwanted project types, offering simple monitoring and enforcement. For example, the introduction of a listing of projects which are insufficient for project approval would considerably reduce the incentive for construction of additional HCFC-22 producing facilities for the mere fact of selling off HFC23 credits. This would probably also give incentive to prevent a further switch to HCFC-22 refrigerants. It follows that with less HCFC production, less ozone-depleting substances would be produced. Firms would have incentive to switch to alternative non-ozone depleting refrigerants.

Option 6.6 is, however, totally unsuited for project classes encompassing both wanted and unwanted projects, as is the case with most other project types.

The option would on the other hand have no effect on the environmental effectiveness of other projects not in the negative list. The obligation for Member States to accept other project types would increase transparency.

Option 6.7 might be even more environmentally effective than option 6.6, since additional requirements imposed on projects would most likely translate into a reduction of available offsets, leading firms to comply with emission targets via domestic carbon emission reductions. Thus the approach would not only raise the environmental quality of offsetting projects, but also provide incentives for firms to invest in carbon efficiency improvements in the EU. The overall impact on GHG emissions would be positive, as there would be increased certainty about the additionality of emission reductions. More specific or particular use criteria would offer even more possibilities to differentiate within the project classes and facilitate the exclusion of unwanted projects as well as prevent the unwanted exclusion of environmentally sound projects, thus eliminating the shortcoming of a too-general use criterion.

While discounting (option 6.8) can be considered as a simple and objective method of addressing additionality problems, but also concerns about very low-cost credits (e.g. N_2O projects) that can lead to windfall profits for developers and can undermine other types of projects, it is less effective in eliminating undesirable projects than the former two options. For this reason, it scores worse in terms of environmental effectiveness compared to the other options. However, it is worth noting that discounting could be used to avoid the reward of competitors outside Europe via CDM credits for standards already achieved in Europe, an aspect, which might become more important in the longer term.

Economic Efficiency: Option 6.6 could have a rather high impact on the offset market, if certain project classes were to be excluded. Furthermore, as problematic project classes sometimes also offer the lowest abatement costs per CER it can be assumed that the average production price for CERs and thus the average CER market prices will tighten. The financial market impact would be very predictable, since exclusion criteria would be clear-cut, allowing the market to adjust in time and anticipate the changes in supply. But the value of CERs from pre-2012 project coming on-line after 2012 would suffer.

Under option 6.7, transaction costs for the project developer might be higher in the short term. Project financing could also be more costly due to the existing uncertainty about the project approval. This would be of particular importance in project classes where both highly unfavoured and favoured projects coexist, as in energy efficiency. Overall abatement costs might be higher than the case without use criteria. Using specific criteria (as opposed to general criteria) would lower financing and transaction costs for the project developer, but would raise the administrative costs. The higher short-term costs have, however, to be seen in the light of other long-term objectives of the EU, such as sustainable development. Higher economic efficiency in the short-term might not necessarily mean the same in the long and longer term. Acceptance criteria (option 6.7) might be more effective in addressing those considerations, as it would be the case under options 6.6 and 6.8.

Option 6.8 in combination with use criteria would open the door for market mechanisms and re-allow certain low cost projects to enter the market, probably lowering the average production prices for credits and simultaneously enlarging the volume of allowed credits, thus lowering the market price for credits allowed into the EU ETS, when compared to the criteria-only option. By crediting only beyond the level of the EU benchmark it would also avoid the reward of competitors outside Europe via offset credits for standards already achieved in Europe.

Still, compared to the status quo, market prices would be higher due to the provisions that discounting would place on the influx of credits into the market. It follows that *abatement costs* will be slightly higher than in the current situation, but lower than in a criteria-only setting.

Discounting could be especially useful for projects aiming at the abatement of substances with a high global warming impact, but not banned from transferring credits into ETS. In these project categories, such as nitrous oxides or HFC-23, high windfall profits occur due to the very low abatement costs per CO_2 equivalent. This entails over-supply and crowding-out of other project types, and constitutes a subsidy

for production elsewhere. The discount factor would effectively even out this competitive distortion between the different project types and thus allow for a more diversified supply of CERs, potentially lowering price volatility for CER.

Administrative costs: The key advantage of option 6.6 is its ease of implementation, the low monitoring costs and the simplicity of the mechanism and as a consequence, no measurable impact on administrative costs. Compared with the current situation and with the negative list option, use criteria, as under option 6.7, would require higher administrative costs. Monitoring and enforcement would become more costly with more sophisticated standards. The design of option 6.8 will require selecting project types to be subjected to discounting and the discount rate/benchmarks to be used. This will entail possibly considerable administrative costs at EU level. Furthermore, discounting of selected project types will add to the complexity of the offset system and will increase transaction (learning) costs for project developers.

Competition and competitiveness: Provided the matter of quality of offsets is decided at Community level, it is not expected to have any significant impact on competition on the internal market nor on competitiveness vis-à-vis non-EU competitors.

Employment: Bearing in mind the low additionality of some of these past projects, employment impacts from option 6.6 will be minimal, as realisation will not be affected. Effectively applied quality standards, as implied by option 6.7, would most likely change the shape of the carbon offset market and thus may also have widespread positive social impacts. Some undesirable projects would become less likely to be realised, while others would be favoured, based no longer solely on the ratio of emissions reduction costs versus global warming impact, but rather on broader quality-related criteria. Consequently, the definition of these criteria would lay the path for the social development of all possible CDM or JI host countries. Option 6.8 is not expected to have any social impacts for the EU.

Option Comparison

While there are indeed intrinsic advantages in each of the discussed policy options, for some the negative impacts outweigh the benefits. The preferable options are those where the balance between environmental integrity and economic efficiency seems likely and the option appears relatively easy to implement and enforce. The suitability also depends on the chosen path of harmonisation.

- **Option 6.6 (listing projects which are insufficient)** is the first choice if simplicity is the key argument and flexibility for adding further problematic project types in the future. It offers clear-cut environmental results at low administrative cost.

- **Option 6.7 (Use criteria)** for project approval would be preferable if the aim is to achieve social and environmental sustainability in all projects delivering credits into the EU ETS. Such criteria could complement a negative list. But this option entails higher administrative and transaction costs.

- **Option 6.8 (Discounting)** would improve market efficiency but would entail administrative costs to determine the level of discounting/benchmarks. It is

recommended that it is undertaken only for specific project types with high risks of windfall profits (e.g. N2O or HFC-type projects).

Table 6.2.2.4: Summary of the impact of options

Option	Environmental Effectiveness	Economic Efficiency	Administrative Costs	Competition/ Competitiveness	Employment
6.6: listing insufficient projects	0/+	0/+	+	0	0
6.7: Acceptance criteria	+	+	-	0	+
6.8: criteria with discounting factor	-/0	-/0	-	0	0

+ positive effect, 0 neutral/no or negligible effect, - negative effect

6.2.2.5. Compliance of options with objectives

- The analysis concludes that listing options which are insufficient is the simplest to administer, but are least subtle and can lead to the exclusion of a large number of valid projects. In order to avoid this, such an approach could be complemented by other measures such as use criteria or could be combined with discounting for specific project types. While the former scores much better in terms of administrative costs, the latter might – however, only under certain circumstances – be more suitable to address the potential problem of windfall profits, if no other instruments were available.

6.2.3. Additional projects into the EU ETS

6.2.3.1. Identification of problems

Domestic offsetting projects are projects similar to CDM or JI projects in the sense that they also generate credits, but the projects are not approved by the CDM Executive Board of the Joint Implementation Supervisory Committee.

Including domestic offset projects would extend the scope of the EU ETS and its price signal to other sectors, but would require establishing a new unit of trade and carries certain environmental risks, and reduces simplicity and transparency of the system.

6.2.3.2. Identification of objectives

Develop conditions to allow inclusion of domestic offset projects in the EU ETS. Foresee stringent rules for their use to guarantee the environmental integrity of the EU system (options 6.9 and 6.10).

6.2.3.3. Policy options and screening

(87) **Option 6.9:** Member States' discretion on use of domestic projects. Domestic offset projects (DOPs) are similar to CDM or JI projects in the sense that they also generate credits, but the projects are not approved by the CDM Executive Board of the Joint Implementation Supervisory Committee, but by individual Member States.

(88) **Option 6.10:** Community offsetting projects: They are similar to domestic projects but projects are approved and credits are issued in a harmonised way at EU level.

As only two options are retained no pre-screening was carried out.

6.2.3.4. Impacts – comparing the options

Environmental integrity: DOPs would extend the carbon price signal to other sectors outside the EU ETS. But a number of environmental problems could arise undermining the environmental integrity of the EU ETS. These problems include a lack of external scrutiny on the level of additionality. Double counting problems could also arise if the reductions achieved in the non-trading sectors are already accounted for to achieve the national reduction targets. If too low baselines are used these projects could be used to subsidise certain sectors and reduce the environmental integrity of the EU ETS. DOPs individually authorised by Member States (option 6.9) are very likely to entail these shortcomings, as there is no Community-wide agreed and approved approach. This might not be the case, if these projects are based on binding guidelines or rules (option 6.10), agreed at Community level with a view to ensuring environmental effectiveness of these projects across the EU. A Community wide approach could also prevent Community wide projects to act as a disincentive for including new sectors into the EU ETS.

Economic efficiency: DOPs can also add more flexibility in terms of choice on how to comply with emissions targets, which increases liquidity in the carbon market. Thus, price volatility will be limited and investing will be less subject to uncertainty, alleviating the financial burden placed on firms in the EU. New areas could be opened up for cost-effective emission reductions provided that relevant baselines can be agreed upon. Again, an approach based on individual Member States (option 6.9) is not likely to turn out as promising as a Community-based one (option 6.10), since the abatement potential is likely to be restricted to the Member State concerned or in other words, projects could not benefit from the abatement potential available from other Member States. For this reason, economic efficiency in terms of this kind of projects is much better ensured by option 6.10.

Administrative costs: On the other hand, creating an additional mechanism like COP projects requires substantial additional administrative costs to develop and implement the legislation and national structures. It will also be costly to develop and agree on baselines that determine the quantity CO_2 reductions delivered by the projects. Additional administrative costs will occur for the administrative body responsible for approving the different DOP and calculating the number of allowances that developers receive for carrying out the projects. Either option increases administrative

costs, albeit to a different extent: while the full costs of setting the administrative design of offset projects would occur in each Member State under option 6.9, this would not be the case under option 6.10, where Member States would incur only a fraction of these costs with the balance born by the Community. Overall Community costs might be higher than costs occurred for a single Member State under option 6.9, but overall administrative costs are expected to be much smaller under option 6.10. However, both options score negatively compared to the "baseline" option of not allowing COPs.

DOPs could also suffer from strong competition from JI projects, which already have the JISC in place to determine additionality and thus could be done at lower administrative costs.

The development of such projects would require a new currency to be created to trade in the EU ETS. This would increase administrative costs and reduce transparency. Different additionality checks in the Member States will also create less transparency and confidence to the system.

Consistency: COPs, just like DOPs generally are problematic if they interfere with other instruments designed to achieve a reduction in greenhouse gases. The problem is that the emissions reduction credited to the COP might in part be generated by other instruments, which would still result in double counting of emissions reductions.

Competition and competitiveness: Option 6.9 is not likely to create a level playing field across the internal market. The level of costs incurred (administrative costs and compliance costs) might vary from Member State to Member State, a fact which may also depend on whether certain companies can participate or cannot participate in these projects. For this reason, competitive distortions could occur in two respects under option 6.9: first, some companies of a certain sector/area may participate, others not resulting in varying overall operational costs for the companies of the sector/area. Second, the baseline against which the credits could be created might also vary from Member State to Member State, opening the door for windfall profits and thus competitive distortions or subsidies. These shortcomings are by far less likely to occur under option 6.10.

Employment: No measurable effect can be identified at this stage.

Table 6.2.4.4.2: Summary of the impact of options (options 6.13 and 14: case of international agreement, 6.15: no international agreement)

Option	Environmental Effectiveness	Economic Efficiency	Administrative Costs	Competition/ Competitiveness	Employment
6.9: MS discretion	-	-	-	-	0
6.10: Community offsetting projects	0/+	0/+	-	0	0

+ positive effect, 0 neutral/no or negligible effect, - negative effect

6.2.3.5. Compliance of options with objectives

The analysis suggests that DOPs and COPs would entail some benefits in terms of increased flexibility and reduced price volatility, but that they would come at high administrative costs and risks of double counting. Given the context of increased harmonisation, which is one of the aims of the ETS review and the potential to reduce administrative costs, the analysis concluded that a mechanism for EU action to be taken or a mechanism to make EU-wide ranging decisions through comitology is recommended. Implementing the administrative procedures at EU-level would lower administrative costs and ensure that Member States can have confidence in the integrity and validity of any such projects.

6.2.4. Transition and predictability

6.2.4.1. Identification of problems

There is insufficient clarity on how credits acquired prior to 2012 (banking) or expected to be issued post 2012 from projects initiated before 2012 will be treated in the EU ETS. As mentioned before, there exists also continuous uncertainty about the international architecture post-2012. The revised EU ETS also needs to provide adequate structures and procedures to cope with the different situations post-2012, in particular with respect to achieving the 20% or 30% targets.

6.2.4.2. Identification of objectives

For the transition period between phases 2 and 3 structures and rules need to be developed for access to and use of JI/CDM credits issued prior to 2013 and to be issued from projects certified by the Executive Board prior to 2013.

6.2.4.3. Policy options and screening

6.2.4.3.1. Options for transition period: banking CERs/ERUs

The EU ETS Directive is not explicit about banking JI/CDM credits. But Article 11b(5) of the linking directive states that a Member State that authorises private or public entities to participate in project activities shall remain responsible for the fulfilment of its obligations under the UNFCCC and the Kyoto Protocol and shall ensure that such participation is consistent with the relevant guidelines, modalities and procedures adopted pursuant to the UNFCCC or the Kyoto Protocol. During the first commitment period under Kyoto JI and CDM credits are each subject to banking limitations (2.5% each to a Party's total assigned units). Phase 2 of the EU ETS corresponds to the first Kyoto commitment period. As a result of Art 11b(5) banking between phase 2 and 3 of the EU ETS falls under the same rules. In this context three options are available for the transition period between phase 2 and 3 of the EU ETS:

(89) **Option 6.11: current state:** leave to Member State discretion how much banking is to be allowed by companies in EU ETS, while remaining nationally below the 2.5% of assigned amounts limit for both JI and CDM (5% overall)

(90) **Option 6.12:** adopt **harmonised maxima for banking ERU/CER credits** in the EU ETS after 2012 (per installation, sector, collectively), again remaining nationally below the 2.5% assigned amount limit for both JI and CDM (5% overall).

As only two options are considered no pre-screening is deemed necessary.

6.2.4.3.2. Accepting credits post-2012

The EU needs to provide structures and rules that allow the smooth transition of offset use in EU ETS to different potential situations post 2012. Policy options to be included in the revised EU ETS Directive include:

(91) **Option 6.13**: If certain projects are (not) allowed internationally then develop **Community-level arrangements** for the refusal (authorisation) of projects.

(92) **Option 6.14 international agreement**: In the case an international agreement is reached international rules for use of offsets will be used in the EU ETS and credits can enter from all countries having ratified the new agreement. The EU retains the right to scrutinise international rules and adapt them through comitology for use under the EU ETS.

(93) **Option 6.15 no international agreement**: Under this option, in case there is no international agreement or the conclusion of an international agreement is delayed beyond 2013, the EU would sign bilateral agreements with host countries of JI/CDM allowing the recognition of additional credits from projects or other emission reducing activities. Agreements reached shall provide for the use of credits in the Community emissions trading system from renewable energy or energy efficiency technologies which promote technological transfer and sustainable development.

The proposed options of dealing with the uncertainty of the post-2012 phase are not mutually exclusive. Therefore no pre-screening was deemed necessary.

6.2.4.4. Impacts – comparing the options

6.2.4.4.1 Options for the Transition Period: Banking

Environmental Effectiveness: Allowing banking would provide a positive signal to holders of credits who would no longer tend to use them all for compliance in the second commitment period due to uncertainty of their value beyond 2012. This would result in higher EU domestic emission reductions in the second trading period than in the case without banking, which is particularly important in view of the potential risks of serious oversupply of credits in the second trading period (see chapter on entitlements). Certainty about banking would also lead to higher project development levels and hence higher supply of credits.

Leaving the decision with regards to the level of banking to the Member States (option 6.11) would add complexity to the market and would therefore add to transaction costs. This would be exacerbated by a differentiated approach to banking by project type. Finally, a lack of a harmonised EU approach to banking could have negative effects on linking as coordination would be more difficult relative to an EU-wide approach.

Contrary to that, a harmonised EU-wide approach to ERU/CER banking, as suggested by option 6.12, within the limits of an international agreement (either existing UNFCCC decision 5/CMP.1 or any replacing decision) would provide positive signals to JI/CDM investors in a transparent and uniform manner. Uniform banking provisions would also allow coordinated EU balancing of carbon price concerns (as banking has an impact on prices in phase 2 and 3) and promotion of domestic investments in clean technology. In addition, a harmonised approach would allow for effective negotiations for linking at the international level.

Economic Efficiency: Due to the likelihood of higher levels of banking under option 6.11, this option would lead to lower carbon prices in the third trading period. A harmonised approach to banking (option 6.12), however, would allow banking levels that would contribute to reaching an optimal carbon price which would not be prohibitive and would allow for domestic investments in clean technology. Some levels of banking would have positive effects on ERU/CER supply as well as on demand as it would allow the smooth functioning of JI/CDM transactions through reducing potential buyer losses associated with over-estimations of ERU/CER requirements.

Administrative costs: Compared to the baseline, none of the options would entail rising administrative costs. Authorities at national and Community level nor operators would be affected by higher administrative costs. However, option 6.12 provides for more transparency and clarity across the market and might therefore score slightly better, as additional information requirements emerging from different approaches in Member States would not exist.

Competition and competitiveness: Option 6.11 entails the potential to jeopardise a level playing field, if Member States apply a divergent approach with respect to banking provisions. This would not be the case if a harmonised approach (option 6.12) were applied.

Employment: None of the options is expected to have a measurable effect on employment in the EU.

Table 6.2.4.4.1: Summary of the impact of options compared to the status quo/baseline

Option	Environmental Effectiveness	Economic Efficiency	Administrative Costs	Competition/ Competitiveness	Employment
6.11: status quo	0	0	0	0	0
6.12: harmonised	+	+	0/+	+	0

approach	

+ positive effect, 0 neutral/no or negligible effect, - negative effect

6.2.4.4.2. Accepting credits post-2012

Environmental Effectiveness: Under option 6.13, the environmental effectiveness of accepting projects refused internationally would depend on the strictness of the assessment at EU level that would ensure that projects are indeed additional and that their monitoring, reporting and verification procedures are robust. The environmental impact on the refusal of projects would depend on the way this is done.

In the case an international agreement is reached international rules for use of offsets will be used in the EU ETS and credits can enter from all countries having ratified the new agreement. The EU retains the right to scrutinise international rules and adapt them through comitology for use under the EU ETS, in order to ensure environmental effectiveness.

By committing to recognise registered CERs and ERUs from continuing projects in countries that support the post-2012 agreement (option 6.14), the EU would provide positive signals both to investors in JI/CDM projects as well as to host countries:

- Investments in JI/CDM have been made under conditions of uncertainty. However, there is a strong belief that a post-2012 agreement, which will create demand for offset credits will emerge. Signals from the EU supporting this expectation will increase investor confidence, which is necessary in order to ensure an uninterrupted supply of offset credits, particularly in the light of the lead-time required for the identification and development of projects; On the other hand the conditional use of these projects on the basis of the host country's adherence to a new global deal increases uncertainty, which may negatively impact the development of new projects.

- Developing countries and transition economies are more likely to back a post-2012 agreement if they know that future investments in offset projects depend on their support for the agreement. The table below presents total numbers of CERs at stake from the six largest sources[119].

Table 6.2 CDM Credit Supply 2012-2030

Top 6 Host Countries	Difference in kCERs (CERs to 2012 and to 2030)
China	2,681,449
India	285,925
Brazil	292,619
South Korea	206,399

[119] The equivalent cannot be provided for ERUs as the UNEP RISOE database does not contain information on expected ERUs to 2030.

Mexico	98,277
Malaysia	127,908

Source: UNEP RISOE

Despite high expectations with regards to a post 2012 agreement, existing projects started with the assumption that carbon-revenues are only certain until 2012. Projects whose financial viability depends on the continuation of the carbon revenue stream post-2012 are undertaken at the risk of the investors. Therefore, a balance between ensuring true additionality and rewarding risky but environmentally additional investments is to be achieved.

The additionality problem can be controlled by committing initially to accept credits from registered projects only up to a certain point in time (for the 7 or 10 year period, as per UNFCCC EB rules). This would prevent credits stemming from the renewal of ongoing projects (i.e. issuance of credits after the initial 7 year period) to enter the EU ETS. The table below represents the difference between total expected CERs from ongoing projects between 2012 and 2030 and CERs from registered projects for the period between 2012 and 2020/2030:

Table 6.3 CDM Credit Supply 2012-2030

Projects	Credits to 2012	Credits 2012 – 2030 (2020 for Registered Projects)
Registered	1.0 million	1.9 million
Total*	1.9 million	3.7 million

*excluding rejected, withdrawn and forestry projects with an approved lifetime of 20 years.

Source: UNEP RISOE CDM database, updated 18 July 2007.

In terms of volumes, the supply of registered CERs would correspond to total 2005 verified emissions of installations covered by the EU ETS. Assuming, for example, that installations would be required to reduce emissions by 10% compared to 2005 levels, and in the absence of any quantitative limits on their use there would be a large over-supply of CERs even if only the registered ones are accepted.

In the absence of a post-2012 international agreement, establishing bilateral agreements with host countries (option 6.15) would foster the development of new high quality offset projects, which would allow for the continuation of a supply of credits and would have a softening effect on the EU ETS allowance price. It would also provide additional negotiation leverage for reaching a post-2012 international agreement, while environmental effectiveness is fully ensured through the bilateral agreements.

Economic Efficiency: The introduction of new abatement methods through Community-level arrangements (option 6.13) has the potential of reducing overall abatement costs and can therefore contribute to cost-efficiency improvements.

However, additions of project types not recognised internationally, as possible under option 6.13, would add to complexity, increase potential for incorrect interpretation of rules and would ultimately add to transaction costs. Member States may have increased uncertainty about achieving their international emission targets if companies are meeting parts of their targets with credits that are not recognised internationally. In the case projects accepted internationally are to be refused in the EU, reaching acceptance on provisions by project type may be costly and time consuming. However, once the types of projects to be rejected are decided upon, the implementation of the option can take the form of a gateway in the registry.

Under option 6.14, consistent and transparent messages to investors with regards to the standing of different projects in the EU ETS would enhance economic efficiency and would allow for low-cost projects to be developed in the future. The operators affected do not only include project developers, but also EU operators trading on the CER market. The rejection of credits from continuing projects hosted in countries that would not back a post 2012 agreement can however lead to losses among investors and to higher risk premiums on CDM in the future.

In the absence of a post-2012 international agreement, establishing bilateral agreements with host countries (option 6.15) would foster the development of new high quality offset projects, which would allow for the continuation of a supply of credits and would have a softening effect on the EU ETS allowance price. It would also provide additional negotiation leverage for reaching a post-2012 international agreement.

Administrative costs: The creation and operation of a EU institution mandated with the approval of project types not authorised at international level can entail significant transaction costs. For comparison, the CDM Executive Board had in 2005 $9 million funding, which is considered extremely low in the context of the number, diversity and complexity of the projects that require consideration, and in comparison to Member States institutions for the administration of national climate change programmes[120]. The number and diversity of projects likely to be considered by the proposed community body would potentially be considerably lower, but still considerable[121].

Option 6.14 would not entail any rise in administrative costs, as already established structures can be relied upon. If there were no international agreement (option 6.15), administrative costs would be higher by nature for the parties involved. However, there would not be any alternative, if project credits were not to be entirely excluded from access to the EU ETS. If the Executive Board seizes to exist under this option the EU would incur *administrative costs* on top of the typical costs related to JI/CDM administration. These would be higher than the costs of operating under an international agreement and would include costs related to:

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120 DEFRA, 2005.

121 As a matter of cost distribution—it is possible to create a self-funding institution (where the funding would be obtained in the form of a fee for each considered project). This would add to the transaction costs of the projects and would be borne by the purchasing ETS operators and/or CDM project developers.

- The EU regulator would entail three additional costs

– Reaching the bilateral agreements (likely to be incurred by international relations services);

– Providing a mechanism that ensures the additionality and sustainability of projects (this role is currently fulfilled by the UNFCCC CDM Executive Board and the JI Supervisory Committee) [122];

– Creating a new currency;

- Operators would incur two types of additional costs under bilateral agreements;

– Learning (administrative) costs related to keeping up to date with the list of countries that the EU has bilateral agreements with;

– Risk premiums and lost opportunities ensuing from the uncertainty of whether the EU will reach an agreement with a given host country;

Competition and competitiveness: Community-level arrangements under option 6.13 and 6.14 would ensure a level playing field across the internal market and for this reason, would not create any competition concerns. Competitiveness effects vis-à-vis non-EU competitors are not likely. More attention should be paid to the matter of competitiveness under option 6.15. The likely effect, however, might depend on the partner countries with which the EU would conclude the bilateral agreements.

Employment: No measurable effects on employment can be anticipated at this stage.

Table 6.2.4.4.2: Summary of the impact of options (options 6.13 and 14: case of international agreement, 6.15: no international agreement)

Option	Environmental Effectiveness	Economic Efficiency	Administrative Costs	Competition/ Competitiveness	Employment
6.13: autho-risation/ refusal of projects	+	-	-	0	0
6.14: EU commitment	+	+	0	0	0
6.15: bilateral agreements	+	+	-	-/0	0

The table does not compare the different options, as they are based on various starting points (international agreement, no international agreement). It only provides indications summarising the arguments presented above.

[122] The UNFCCC is the umbrella convention for the Kyoto Protocol, therefore the discontinuation of the protocol will not automatically lead to the disappearance of the CDM EB and the JISC.

+ positive effect, 0 neutral/no or negligible effect, - negative effect

6.2.4.5. Compliance of options with objectives

The EU ETS Directive guarantees that EU allowances can be banked beyond 2012. The Kyoto Protocol puts limits on banking of ERU/CER. Banking of these is discretionary for member States which over-achieve their reduction commitments. These are followed by MS independently. The proposed policy options address the uncertainty of the international situation for ERUs/CERs after 2012 and include:

- Leave banking at Member State discretion;
- Adopt harmonised recognition of banking ERU/CER credits after 2012.

The second option scored highest against the assessment criteria as it allowed for the highest level of uniformity and market transparency, and also allowed for some flexibility with regards to banking, which will aid the efficient functioning of the ETS.

Another aspect dealt with as part of the predictability section is the treatment of JI/CDM credits after 2012. The options considered include:

- If certain projects are refused (accepted) internationally, develop Community-level arrangements for the authorisation/refusal of projects;
- To commit the EU now to recognise CERs and ERUs from continuing projects based in countries which have ratified the post 2012 agreement;
- In case there is no international agreement, then until it is concluded, to provide for bilateral agreements (e.g. through mutual recognition as for linking trading systems).

The analysis suggests that the proposed options are not mutually exclusive. The EU can have a system of approving and/or rejecting certain projects or project types, establish bilateral agreements to recognise JI and CDM projects from certain hosts between 2012 and the date when an international agreement is concluded, and commit to accepting credits from continuing projects in countries that will support a post-2012 agreement. The relevance of all three options is contingent on the progress of international negotiations.

7. CONCLUSIONS – THE PREFERRED OPTIONS

7.1. Scope

7.1.1. Streamlining the current scope

In the light of the analysis undertaken in chapter 3.1, a combination of option 1 and 2 is likely to deliver the best results. This means codifying a broad interpretation of combustion installation in the Directive, underpinned by a new definition of

combustion installation and supplemented by a list of activities, where necessary in order to ensure consistency and avoid competitive distortions. Such an approach would allow a consistent application of the scope, provide legal certainty to Member States and would ensure a consistent coverage of process emission. Furthermore, it would contribute to the environmental effectiveness of the EU ETS by broadening its coverage.

7.1.2. Cost-effectiveness as regards small installations

With a view to increasing cost-effectiveness to small emitters through identification of an appropriate threshold to include/exclude installations in/from the EU ETS, a combination of capacity and emission thresholds (i.e. keeping the existing 20 MW capacity threshold and combine it with a 10kt emission threshold) in combination with a conditional opt-out should be preferred, as it represents – in terms of environmental effectiveness – the best relation between emissions lost, i.e. not covered anymore by the EU ETS (appr. 16 MtCO2) and small installations excluded (4200 plus 800). These 4200 installations[123] account on average for approximately 3800 tCO2 each. For comparison: Applying an emission threshold of 25kt would remove approximately 6300 installations, each with an average emission of close to 8100 tCO2. This means that the loss of emissions covered by the EU ETS would more than triple, while the number of small installations excluded would only rise by 50%. Taking into account the 800 installations addressed by option 3.8a would not fundamentally change this finding, while the combination with option 3.7 would ensure that alternative equivalent measures for the small operators excluded are in place.

7.1.3. Inclusion of other sectors and gases

As the analysis has shown, inclusion of CO2 emissions from petrochemicals, ammonia and aluminium would fully comply with the objectives of the review and enhance the environmental effectiveness of the EU ETS. This also goes for N2O emissions from the production of nitric, adipic and glyoxalic acid production and PFC emissions from the aluminium sector. Inclusion of these sectors and gases would enhance the coverage of the EU ETS by up to roughly estimated 97 MtCO2 or up to 4.6% of Phase II allowances. In combination with streamlining the scope of the EU ETS, overall coverage would increase by up to 137 to 147 MtCO2 or 6.6 to 7.1%.

7.1.4. Carbon capture and storage

While acknowledging carbon capture and storage within the EU ETS is highly desirable for environmental reasons, the actual choice of how CCS should be acknowledged in the EU ETS, may depend on the possibility/feasibility of establishing appropriate and reliable monitoring and reporting rules. If this can be ensured, up front inclusion of all CCS activities by explicit reference to CCS in Annex I of the Directive is preferred.

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[123] The number of 800 installations possibly excluded by implementation of Option 5a are neglected here, since the number represents only a vague estimation. Including the number would not change the result.

7.1.5. Transport

Emissions from both the road transport and shipping sector are not recommended for inclusion in the EU ETS at the current stage, as set out in the previous chapters. In the longer term, however, this may not be excluded, if emissions trading turns out to represent a cost-effective measure to curb CO2 emissions from these sectors.

7.1.6. Land use, land use change and forestry (LULUCF)

For the reasons set out in chapter 3.7.4, land use and forestry should not be included in the EU ETS.

7.2. Monitoring, Reporting, Verification

Among the options considered, establishing regulations for Monitoring and Reporting (MR) is likely to bring the highest benefits in terms of improving consistency in the application of MR rules across the EU. Procedurally this is a complex option, and would require efforts from a range of stakeholders including the European Commission, the MS and competent authorities as well as operators. The alternatives to an EC regulation would have lower legal stringency and would entail higher uncertainties about the uniformity of their application.

The preferred option with regards to the frequency of reporting is increased reporting frequency for large installations (over 500,000 tCO_2e/year) as this would allow for the release of verified information only, while keeping a balance between reporting costs and annual emissions per installation.

Similarly to MR, a regulation on verification and accreditation of verifiers would provide the highest level of certainty with regards to the uniformity of implementation at MS level. Therefore it would be preferred, but would also require significant design efforts. If this option is unfeasible, the next highest level of consistency across the EU can be achieved through verification guidelines. In both cases, since the options are not entirely mutually exclusive, the policy design process can rely on existing frameworks and institutions such as the EA and ISO.

The options of providing a common reporting format and an EU-wide harmonised reporting system scored highest against the criteria of using advanced IT applications. The main trade-offs are between increased efficiency and transparency of the ETS system versus respecting a high degree of subsidiarity and potential efficiency gains from integrating a common reporting format into existing e-government systems of individual MS.

Developing a commission recommendation on practical issues of the complete compliance chain would constitute a source of information for CAs and would allow for a more uniform interpretation of the legal texts. Developing such a recommendation can involve considerable costs on the part of the EC.

Changing the current penalty level for failure to surrender allowances is recommended, in order to allow an adjustment with inflation and potential carbon

price increases and to maintain a high level of compliance. Detracting a multiple of allowances from future allocations has been assessed, but the technicalities of this option would need to be further studied.

7.3. Further Harmonisation and increased predictability

7.3.1. Cap-setting: level of harmonisation

Among the options considered, an EU-wide cap set in the Directive would most increase effectiveness and predictability of the EU ETS and best comply with the requirement of transparency and simplicity. It would also strengthen the international credibility of the EU while, at the same time, minimising internal administrative costs. For these reasons, an EU-wide cap set in the Directive is the preferred option.

7.3.2. Cap-setting: level of the cap

In order to achieve a given emission reduction target at least costs, an approach based on the equilibrium of marginal abatement costs (efficiency approach) between the trading and non-trading sector is most suitable and should be pursued.

7.3.3. Cap-setting: design options to increase predictability

Basing future quantities on a trend-line in combination with 8-year trading periods strikes the best balance between predictability and flexibility.

7.3.4. Allocation: auctioning versus allocation for free

The analysis has shown that, compared to any other allocation method, full auctioning of allowances scores best in increasing the efficiency of the system and taking away undesirable distributional effects. However, in exceptional circumstances and in the absence of international agreement on climate change policy, some allocation of allowances for free could be an efficient instrument to avoid net carbon leakage.

7.3.5. Allocation methods for any remaining allocations for free

If any allowances should be allocated for free, it should be done in a harmonised as possible manner, in order to ensure environmental effectiveness and the efficiency of the EU ETS.

7.3.6. Allocation: new entrants

In the event that some allowances are allocated for free in order to avoid carbon leakage, it also is preferred to set up a single, EU-wide new entrants reserve for new installations in these sectors. This would also help to ensure a level playing field in the internal market.

7.3.7. Allocation: closure rules

If there are allowances allocated for free, a harmonised closure rule with a harmonised transfer rule would best avoid competitive distortions and other adverse effects.

7.4. Linking and JI/CDM

7.4.1. Linking to other emission trading systems

In the light of the above analysis, all barriers to linking EU ETS to all mandatory emission trading systems capping absolute emissions in all countries or regions should be removed. This should be done through arrangements to be adopted through comitology. For each such a case a separate impact assessment is likely to be justified.

7.4.2. Use of offsets

A large number of policy options were considered with regards to use of offsets, including quantitative and qualitative provisions as well as rules with regards to banking and use of offset credits post-2012.

Entitlements

In the event an international agreement can be reached access would be allowed in line with provisions in the agreement. This would be done pending EU scrutiny of the agreed international rules. In the event that the conclusion of an international agreement is delayed beyond 2012, additional credits from projects or other emission reducing activities may be used in the Community trading system in accordance with agreements that may be concluded with third countries. Agreements reached shall provide for the use of offsets in the Community emissions trading system from renewable energy or energy efficiency technologies which promote technological transfer and sustainable development.

In absence of an international agreement option 6.3 EU-wide harmonised provisions for the use of offsets below phase II levels would be preferred. This would avoid insufficiently high prices on the market for the EU ETS to significantly contribute to the efficient achievement of the 2020 energy and climate package.

But because a high degree of uncertainty remains about the amount of banked credits and future supply and demand dynamics for offsets, the Directive will contain a provision for reviewing this level of entitlement through comitology to account for new developments. As such this provision should not create more uncertainty in the market than that already existing from the absence of clarity about there being an international agreement post 2012, and thus should not create undue regulatory instability.

Under option 6.4 the limit set in option 6.3 could be diversified for sectors open to competition as a tool to limit leakage. The main trade-off between this option and the harmonised allocation is greater intra-ETS equity under the ETS-wide limits versus the ability to help compensate sectors exposed to international competition. If other potential measures to give more favourable treatment to exposed sectors such as

revenue recycling from auctioning or trade related measures are deemed sufficient by themselves then option 6.4 would become redundant.

Standards

The analysis concludes that option 6.6 harmonised listing of projects which are insufficient, is the simplest to administer but is also least subtle and can lead to the exclusion of a large number of valid projects. This could be complemented by other measures such as use criteria combined with discounting (based on benchmarks) for specific project types, but this would entail a trade-off between higher environmental integrity and higher administrative costs.

Some methods are better suited for certain project or project types than others. The maintenance of current harmonised standards continues to be appropriate for nuclear power projects and LULUCF, whereas discounting might be most suitable for credits resulting from N_2O and HFC reductions.

EU offset projects

The analysis suggests that Domestic and Community Offset Projects (DOP/COP) would entail some benefits in terms of increased flexibility and reduced price volatility, but that they would come at high administrative costs and risks of double counting.

Given the context of increased harmonisation, which is one of the aims of the ETS review and the potential to reduce administrative costs, the analysis concluded that a mechanism for EU action to be taken or a mechanism to make EU-wide ranging decisions through comitology is recommended (COP). Implementing the administrative procedures at EU-level would lower administrative costs and ensure that Member States can have confidence in the integrity and validity of any such projects.

Predictability post 2012

On the choice between Member State discretion vs. EU harmonised limits on banking, the second option scored highest against the assessment criteria as it allowed for the highest level of uniformity and market transparency, and also allowed for some flexibility with regards to banking, which will aid the efficient functioning of the ETS.

On the treatment of JI/CDM credits after 2012 the analysis suggested that the proposed options are not mutually exclusive. The EU can have a harmonised system of approving and/or rejecting certain projects or project types, establish bilateral agreements to recognise JI and CDM projects from certain hosts between 2012 and the date when an international agreement is concluded, and commit to accepting credits from continuing projects in countries that will support a post-2012 agreement. The relevance of all three options is contingent on the progress of international negotiations.

8. OVERALL ASSESSMENT OF ADMINISTRATIVE COSTS

In the following, an overview of administrative costs accruing from the preferred options to operators and regulators (public authorities) at Member State and Community level compared to the baseline is provided. However, caveats have to be put in assessing these administrative costs of Member States due to the following reasons:

– In all but two Member States more than one competent authority is responsible for administrative tasks of the ETS;

– Approximately half of the Member States also involve regional or local authorities in the administration for granting permission of installations, monitoring, reporting and verification or other issues.[124]

– Coordination of ETS reporting with other reporting requirements (see EEA 2007a)

For these reasons, it is not possible to give quantitative figures on the administrative costs incurred by regulators in the different Member States. The following summarises the main findings on administrative costs from the preceding chapters and attempts to draw qualitative conclusions with respect to their impacts on overall administrative costs for operators and regulators, where possible in the short and in the long term. In this context, it is important to note that "short term" impacts on administrative costs often mean set-up and/or one-off costs, which may be incurred already before the start of the post-2012 trading period. With respect to regulators, it will, where possible and appropriate, be distinguished between the Community and Member State level. Following this assessment, administrative costs to the Community will be roughly quantified in terms of required additional resources.

In line with the relevant assessment criteria, administrative costs are meant the costs incurred by operators and regulators to establish and maintain the system.

[124] For a detailed overview on the various competent authorities in Member States, see EEA 2007a.

Table 8.1: Impacts on administrative costs emerging from preferred options identified in chapters 3 - 6

Option	Impact on operators		Impact on regulators			
			Member State level		Community	
	short term	long term	short term	long term	short term	long term
Scope						
3.1: codifying broad interpretation	-	0	-	0	0	0
3.2: activity list	-	0	-	0	0	0
3.6:Combination of capacity and emission	0/+	0/+	0/+	0/+	0	0
3.7: Opt-out	+	0	+	0	0	0
3.8a: Aggregation capacity threshold	+	0	+	0	0	0
Petrochemicals and chemicals	0/+	0/+	-/0	0	0	0
Ammonia	-/0	-/0	-/0	-/0	0	0
Aluminium	-/0	0	0	0	0	0
N2O emissions	-/0	0	0	0	0	0
3.12 include all CCS	-	0	-/0	-/0	-	0

projects						
Robust Compliance and enforcement						
4.4: Regulation on monitoring and reporting	-/0	0	-/0	0	-	0
4.8: IT based reporting format	-/0	+	0	+	-	+
4.11: Legal basis for regulation on verification	0	0	-/0	0	-	0
4.17: Legal basis for regulation on accreditation	-/0	0	-/0	0	-	0
4.21: Harmonised reporting/ compliance	-/0	+	-/0	+	-	+
4.26b: Penalty: inflation rate adjustments	0	0	0	0	0	0
4.28: single EU-wide registry	0	0	+	+	-/0	+
Further Harmonisation and Increased Predictability						
5.4: EU-wide cap in the Directive	+	+	+	+	+	+
5.6: efficiency approach	0	0	0	0	0	0
5.14: 8-year trading period plus trend line thereafter	+	+	+	+	+	+
5.18: allocations for free for	0/+	+	-/0	+	-	0/+

avoiding net carbon leakage						
5.21: fully harmonized benchmarking	+	+	+	+	-	0/+
5.26: single EU-wide NER	+	+	+	+	-/0	0/+
5.31: harmonized closure rule with transfer rule	+	+	+	+	0/+	+
Linking with Emission Trading Systems in Third Countries, and Appropriate Means to Involve Developing Countries and Countries in Economic Transition						
6.3: harmonised EU entitlements	0	0	+	+	+	+
6.6: listing insufficient projects	0	0	0	0	0	0
6.10: Community offsetting projects	0	0	-/0	-/0	-	-/0
6.12: harmonised approach	0	0	0	0	0	0
6.15: bilateral agreements	-/0	0	0	0	-	-/0

"-" rising costs, "+" declining costs, "0" neutral or negligible change

On the basis of the table above, the following conclusions can be drawn:

Scope: Applying the suggested approach in order to streamlining application of the Directive may incur higher short term administrative costs for both operators and MS regulators due to the higher number of installations covered. Small installations with annual emissions below 10.000 tonnes may incur considerably lower administrative costs, if opted out of the ETS under the conditions specified above. This is expected to lead to lower administrative costs in the short and longer term for operators and MS regulators. As for new sectors to be included as from 2013, slight improvements might be possible for operators in the petrochemical and chemical sector, once the sector is consistently covered by the EU ETS. Public authorities may face some additional burden in the short term. Including emissions from ammonia production would not raise excessively high administrative costs for operators and regulators. Operators in the aluminium sector may face one-off administrative costs when setting up the necessary monitoring and reporting facilities, which however are considered quite low in terms of tonnes emitted. This would also apply to N20 emitting installations. Although a new greenhouse gas would be included in the EU ETS, no additional costs would be incurred at Community level due to the planned opt-in of some N2O plants in the 2nd trading period. With respect to the inclusion of CCS, the main costs would remain with the Community, where the relevant monitoring & reporting provisions would have to be developed. Operators would need to install the necessary equipment, which to a considerable extent might be necessary anyway and irrespective of inclusion of CCS into the EU ETS.

Robust compliance and enforcement: In the short term, a regulation on monitoring, reporting, verification and accreditation would bring about higher administrative costs mainly for the Community level, but to a smaller extents also for operators and national regulators. In the longer term, in particular if combined with an IT based reporting format, cost savings are expected to clearly outweigh these short-term costs. Inflation rate adjustments for penalties will only involve negligible administrative costs. A Community-wide registry will entail cost savings for regulators at Member State and Community level in the longer term, irrespective of the detailed design of such a registry laid down in a registry regulation.

Further harmonisation and increased predictability: an EU-wide cap laid down in the Directive in combination with an 8-year trading period and a declining trend line thereafter would bring about administrative cost savings for all parties involved, while the way how to determine the cap might not differ in terms of administrative costs, since gathering the relevant information and calculating the respective figures does not involve large differences. With respect to allocation, a hybrid approach involving auctioning and allocation for free under harmonised conditions would only allow administrative cost savings to occur in the longer term, while in the shorter term set up costs for both free allocation and auctioning cannot be avoided. Harmonised rules on new entrants reserve as well as closures would free up administrative cost expenses at Member State level.

Linking with Emission Trading Systems in Third Countries, and Appropriate Means to Involve Developing Countries and Countries in Economic Transition: Harmonised EU-entitlements would entail lower administrative costs for regulators at Member State and Community level. Listing insufficient projects would not have any measurable impact on administrative costs of parties concerned. Community offsetting projects would require additional administrative costs to develop, implement and update the legislation and national structures at Community level, but may not involve substantial administrative costs at MS level. With respect to banking provisions, no change in administrative costs is anticipated to

emerge from an harmonised approach. Bilateral agreements to be concluded in the absence of an international agreement would by nature involve higher administrative costs at Community level, but also at operator level, at least in the short term, as operators would need to familiarise themselves with the rules accruing from the various agreements.

While it is not possible to quantify the changes in administrative costs for public authorities and operators, it is safe to say that the proposed approach evolving from the options indicated in table 8.1 will result in considerable savings of administrative costs at operator and Member State level. The savings are likely to emerge from stronger harmonisation across the EU. On the other hand, in order to compensate lower administrative costs at Member State level, higher administrative costs at Community level will be required. They are estimated in the following taking into account findings represented in table 8.1. Table 8.2 below indicates the estimated additional resources required for the relevant Commission services to carry out the options identified. All other options are assumed to be sufficiently covered by existing resources.

Table 8.2: Impacts on administrative costs at Community level

Option	Additional short term human resources	Additional long term human resources
4.4: Regulation on monitoring and reporting	**1**	**0,5**
4.8: IT based reporting format	**1**	**0,5**
4.11: Legal basis for regulation on verification	**0,5**	**0,5**
4.17: Legal basis for regulation on accreditation	**0,5**	
4.21: Harmonised reporting/ compliance	**1**	**0,5**
4.28: single EU-wide registry	**1**	**0,5**
5.18: allocations for free for avoiding net carbon leakage	**1**	**0,5**
5.21: fully harmonized benchmarking	**3**	**0,5**
5.26: single EU-wide NER	**0,5**	**0,5**
5.31: harmonized closure rule with transfer rule	**0,5**	**-**
6.10: Community offsetting projects	**1**	**1**
6.15: bilateral agreements	**1**	**1**
Total	**12**	**7**

On the basis of these rough estimations and bearing in mind the standard salary of € 0,117 million per official, additional costs incurred by the Community would amount to € 1.404 million per year in the short term (i.e. to set up the system and ensure a proper start), which would be reduced to € 0.819 million in the longer term, i.e. to monitor and adapt the system over the whole trading period. The declining need for additional human resources is supposed to be implemented in a gradual manner, which can be demonstrated by the following explanations:

– The analysis has shown that allocation for free as opposed to full auctioning is likely to play a more important role in the beginning of the post-2012 trading phase, which is expected to diminish once an appropriate international agreement is in place or through a declining role of free allocation. However, a full set of benchmarks allowing Community-wide harmonised allocation would nevertheless be developed, even if an international agreement enters into force in 2013, unless full auctioning is implemented from day one of the post-2012 trading period.

– Auctioning rules would need to be developed, no matter whether they apply to all or only a few sectors/installations.

– As for monitoring, reporting, verification and accreditation matters, the rules need first to be developed, but once they are in place, the requirements for additional resources is expected to go down, since there may only be a need to further adapt the rules to ongoing developments. This may also apply to rules for new entrants and closures.

– Rules for community offsetting projects would need to be developed. Their implementation and compliance would need to be fully monitored and ensured. For this reason, additional resources are likely to be needed also in the longer term. This also goes for the development of bilateral agreements, which may not be needed, if an appropriate international agreement would be concluded before the start of the post-2012 trading period.

Although the table attempts to indicate additional resources required to carry out the preferred options identified in the analysis, it does not necessarily imply that the full amount of resources would need to be new, since the new system may free up human resources so far working on issues, which are becoming superfluous, such as the NAP assessment.

It is also clear that the new system would involve considerable gains for Member States in terms of administrative costs, which mainly accrue from a more harmonised approach at Community level. It is obvious that such an approach brings about considerable reductions of administrative costs at Member States level, which would not occur if the current differentiated approach requiring 27 Member States to set up 27 national allocation plans, were to be maintained.

9. MONITORING AND EVALUATION

The amendments to Directive 2003/87/EC shall be implemented by the Member States within nine months after its entry into force (Article 3). Member States shall inform the Commission thereof and communicate relevant texts of national law.

Measurement of progress on the application of the Directive is regulated in Article 21 of the Directive, which in its first paragraph requires Member States to submit to the Commission a report on application of the Directive every year. This report shall pay particular attention to the arrangements for the allocation of allowances, the use of ERUs and CERs in the Community system, the operation of registries, the application of the monitoring and reporting rules, verification and issues relating to the compliance with the Directive. Member States reports shall be drawn up on the basis of a questionnaire or outline drafted by the Commission in accordance with a procedure laid down in Article 6 of directive 91/692/EEC. On the basis of the reports from Member States, the Commission shall publish a report on the application of the Directive within three months of receiving the reports from the Member States.

Furthermore, Article 21(3) requires that the Commission shall organize an exchange of information between the competent authorities of the Member States concerning developments relating to issues of allocation, the use of ERUs and CERs in the Community system, the operation of registries, monitoring, reporting, verification and compliance with this Directive.

Annex 1: ECCP Report

Overall report

of the four ECCP meetings on the review of the EU ETS

27 July 2007

Final Report of the 1st meeting

of the ECCP working group on emissions trading

on the review of the EU ETS

on

The Scope of the Directive

8-9 March 2007

Centre Borschette, Rue Froissart 36, 1040 Brussels

Agenda item 1: Welcome and Introduction of the Review Process

The Chairman, Mr ***Jos Delbeke***, welcomed participants to the meeting, the first of four meetings dealing with the review of the EU ETS. The Chair explained that these meetings were input to the Commission's preparation of a legislative proposal for the 2nd half of 2007.

Mr ***Peter Carl*** outlined the overall framework including the EU's commitment to limit average global temperature increases to 2°C above pre-industrial levels. In this context, he stressed the role and the importance of the EU ETS in stimulating innovation and conveying strong economic signals, to achieve a low carbon and sustainable economy. The most important feature of the EU ETS is to send a strong signal on carbon price. The current architecture is sound, and the review should streamline the current scheme by making it simpler and more predictable.

Agenda item 2: The Review of the EU ETS – Expectations and Challenges

Mr ***Urban Rid*** emphasised the same priorities, adding that Germany considers the EU ETS to be the centre pillar of EU climate change measures. Germany would favour stronger harmonisation of allocation rules, and linking the EU ETS with trading schemes of third countries. He proposed including clear formula for calculating the caps in the Directive. As for the scope, Mr Rid advocated unambiguous definition of installations and a sound cost-benefit analysis for inclusion of additional activities. He also emphasised the importance of dealing with carbon capture and sequestration (CCS).

In his intervention, Mr ***Anders Wijkman*** MEP expressed his wish for the EU ETS to develop into a global system. The review should render the system simpler and easier to understand. In his view, grandfathering allowances has led to huge windfall profits and over-allocation. For the future, he would be in favour of auctioning allowances and using the revenues to stimulate and promote investments in the renewable energy sector. A maximum of harmonisation and a more important role for the Commission is necessary. Transport emissions have been

growing, and need action – for aviation, the Parliament has supported a separate system, while for other transport emissions, there are opportunities and risks in pursuing trading.

The Chair thanked Mr Rid and MEP Wijkman for their interventions, noting the strong calls for harmonisation on overall levels of allocation.

He informed participants that the Commission services will produce a report after each of the four review meetings, a draft of which will be sent to participants for comments. Following consolidation of the comments, the report will be published on the EU ETS review website[125]. However, there will not be one single consolidated report after the four meetings, since it is considered more important to report after each meeting. The four reports will serve as a major input to the legislative work of the Commission to be carried out in the 2nd half of the year.

Agenda item 3: Expanding the EU ETS to other sectors and gases

Presentations

Mr ***Christian Egenhofer*** (CEPS) highlighted the economic rationale for expanding the EU ETS, which would generally lead to lower abatement costs and could potentially reduce compliance costs by up to 30-40% provided conditions including accurate monitoring reporting and verification issues are met.

Mr ***Jochen Harnisch*** (Ecofys) presented the technical assessment criteria used and results of an Ecofys study on expanding the EU ETS, which indicated that a number of additional sectors might be included in the EU ETS if some potential barriers can be successfully overcome. In his second presentation, he concluded that MRV (monitoring, reporting, verification) for small emitters will be greatly simplified from 2008 onwards through the revised MR (monitoring & reporting) Guidelines. While the inclusion of complex activities in the EU ETS may require amendments of the Directive, the MR Guidelines, specific verification guidance and the addition of simple activities may be straightforward.

The presentation by Mr ***Tore Jenssen*** (EFMA) advised that including N2O from the production of nitric acid and adipic acid in the EU ETS is feasible. Mr Jenssen recommended allowing opt-in of N2O from 2008, in order to gain experience, and that JI and CDM credits should be allowed.

According to the presentation by Mr ***Philip Luyten*** (CEFIC,) considering inclusion of CO2 from petrochemical and chemical production processes, would depend on the solution of a number of issues with a view to improving the current scheme.

Mr ***Eirik Nordheim*** (EAA) highlighted the global competition that the European Aluminium industry is part of and stated that the aluminium industry for a number of reasons is not in favour of inclusion in the present EU ETS, but is prepared to enter into agreements with the EU authorities in order to explore further reduction possibilities based on industry benchmarks and applying MRV principles equivalent to ETS including penalties for non-compliance.

Regarding CH4 emissions from coal mines**,** Mr ***Bogalla*** (Euracoal) expressed doubts on whether some a sufficient degree of accuracy of monitoring, reporting and verification would

[125] http://ec.europa.eu/environment/climat/emission/review_en.htm

allow their inclusion in the EU ETS. He also underlined the need to ensure an acceptable cost-benefit ratio when including methane emissions from coal mining in the EU ETS.

Mr ***Matthias Duwe*** (CAN Europe) emphasised that any change to the EU ETS must make it more reliable in ensuring absolute reductions in emissions. He identified a number of sectors suitable for inclusion in the EU ETS, subject to these fulfilling certain environmental criteria.

Discussion

The discussion confirmed that an expansion of the EU ETS would in principle further reduce abatement costs and thus renders the scheme more efficient. More harmonisation across sectors and Member States would be required in particular with respect to monitoring, reporting and verification. Opt-in provisions in the second trading period would offer the possibility to gather experience and learn with a view to arriving at a more harmonised approach from 2013 onwards. The availability of reduction potential may constitute a criterion in the short term, but in the view of many stakeholders should not play a role in the longer run, since there are already sectors included in the EU ETS with a limited reduction potential.

According to some representatives from the industry, such as BusinessEurope, sectors that have already carried out abatement measures at low costs but would face high costs to implement additional measures following inclusion in the EU ETS should be very carefully considered.

The energy intensive industry highlighted the matter of international competitiveness and the pass-through of costs as well as the positive environmental contribution emerging from indirect emission effects (e.g. lighter and better material entailing lower transport emissions). Improvements to the EU ETS should also address these problems.

In their view, environmental additionality should also play a role. Companies, in particular small and medium sized ones, should only face additional burden, if there is a positive environmental effect. In this regard, the exclusion of sectors and the matter of process emissions may be worth considering. Other industry representatives, such as the Carbon Trading Sector, suggested that the make-or-buy rule as criterion should apply to the various ETS sectors. All installations should face reduction requirements. The matter of competitiveness should not constitute a reason not to include a sector, since it could be addressed by alternative means, such as linking or allocation methodologies.

Double regulation should be avoided as much as possible, which is ensured by Article 26 of the ETS Directive relieving installations to be covered by the ETS Directive from an emission limit value under the IPPC Directive.

It was also stressed that the EU ETS may and should serve as a nucleus for a global system. For this reason, too, the scheme should be kept simple.

Conclusions

- Following a broad-ranging discussion, the Chairman summarised the findings of the presentation and the results of the discussion as follows:

- There are solid economic reasons indicating that further extension of the EU ETS could reduce abatement costs and thus render the scheme more efficient.

- While there is no objection in principle including new sectors should be subject to certain conditions, such as an harmonised approach across Europe including MRV, clearer legal definitions, recognizing technology and the international dimension.

- Opt-in might be used as a test ground for benchmarks and robust rules on monitoring, reporting and verification.

- All sectors need to contribute to the reduction of GHG emissions, however, it might be a question which policies should be applied.

- The matter of international competitiveness of ETS sectors must be seen in the context of alternative measures and instruments available to authorities.

Agenda item 4: Unilateral inclusion of additional activities and gases under Article 24 of Directive 2003/87/EC

Presentations

Mr ***David Mjureke*** (Swedish EPA) suggested that the definition of installation in the Directive should be amended to allow treatment of a complete district heating system as one single installation. In addition he recommended applying a general opt-in for all known and unknown installations complying with certain opt-in criteria.

Mr ***Magnus Cederlöf*** from the Finnish Ministry of Environment suggested simplifying the opt-in procedures with a view to avoiding separate approval from the Commission, if certain conditions were met.

In his presentation on the opt-in of N2O, Mr ***Christophe Ewald*** from the French Ministry of Ecology and Sustainable Development, highlighted the emission reduction potential of this option as well as the most important elements linked to opting-in N2O from the French point of view.

Discussion

The Commission clarified that subject to full legal checks where required and appropriate there is no need for second time application for installations already opted in the scheme. Concerns that unilateral inclusion into the EU ETS may lead to a non-harmonised scope were not confirmed.

Experience gathered so far showed that pooling did not prove to be interesting for the operators. This may relate to the need of having a legal entity to take responsibility for all pooled emissions. Generally, opting-in should be considered a useful option, since emissions trading ensures the reduction of emission at least costs, but it was also stressed that the same environmental effects might be achieved through IPPC permits. Double regulation, i.e. applying both the ETS and the IPPC Directive to the industry may only be justified under specific circumstances, such as the risk of impacting negatively on human health.

Conclusions

Summing up the discussions, the Chairman concluded that

- The opt-in option was generally considered a solid option.

- Until a harmonised approach is available from 2013 onwards, the opt-in of new gases and sectors should be applied pragmatically and as far as possible in a harmonised way, in order to prevent distortion of competition.

- While in principle double regulation should be avoided, as laid down in Directive 2003/87/EC, there could be exceptions to this rule for the sake of higher-ranking values, such as protection of human health.

Agenda item 5: Streamlining the application of the current scope

Presentations

According to Mr ***Stefan Moser*** (European Commission), competitive distortions on the internal market with respect to the application of the scope of the ETS Directive are thought to be considerably reduced in the 2nd trading period thanks to the guidance submitted by the Commission and the pragmatic approach taken by Member States. Including additional emitters meant to increase the environmental benefit of the EU ETS. Discussions should focus on how the definition of combustion installation in Annex I of the ETS Directive can be improved.

In her presentation on "Further improvement in harmonising the application to installations in the current scope", Ms ***Dian Phylipsen*** (Ecofys) pointed out most important gains could be achieved by harmonising the application of definition of furnaces, especially including ammonia plants as well as by harmonising the definition and treatment of process emissions.

Discussion

The achievements of the Climate Change Committee in terms of streamlining the application of the Directive allowed considerable improvements in the national allocation plans for the 2nd trading period. However, further legal certainty and clarity with respect to the definition of a combustion installation is needed.

As for how to define a combustion installation, the matter of process emissions was raised. There is no unanimous view on whether a clear definition of process emissions is preferred or whether Annex I of the Directive should be extended through adding new activities. The Commission took the view that with the EU ETS internalising the costs of carbon, process emissions ought to be included.

According to some industry representatives, including all large installations in the EU ETS, in order to exclude small ones would meet some resistance, as it may make some industrial sectors leaving Europe.

Industry representatives raised a number of specific concerns, in particular relating to the production processes of lime, the ceramic industry, but also to the treatment of the glass industry and its competing products.

The need to keep the EU ETS simple, also with a view to evolving a nucleus of a global carbon market and to rendering it attractive to other parts of the world, was generally highlighted.

Conclusions

In concluding the discussions, the Chairman highlighted the following points:

- The definition of combustion installations should be improved or a definition of process emissions should be established with a view to ensuring consistent application across the EU.

- In this respect, there is a need for further harmonisation, legal certainty, but also simplification.

- On the basis of written input from stakeholders, a meeting of the Climate Change Committee with participation of industry experts could, if need be, further examine relevant definitions.

- Further work should be built on codifying the agreement achieved in the Climate Change Committee.

Agenda item 6: Improving cost-effectiveness as regards small installations

Presentations

Mr ***Paul van Slobbe*** (Netherlands) identified a misbalance between the number of installations and the share of allowances allocated to them as well as high MRV costs for small installations. He proposed first, for small installations, to ensure the same scope in all Member States, then to exclude small installations by means of a list of these installations and finally cut down the costs of participating in the EU ETS for all installations.

Mr ***Stefan Moser*** (European Commission) set out the pros and cons of including/excluding small installations as well as a number of policy options to deal with the issue. His analysis addressed the possibility of both changing the currently existing aggregation clause and identifying specific categories of combustion installations for targeted exclusion.

Discussion

The discussions showed that there is a trend of improving the cost-benefit ratio for small installations under the EU ETS. Representatives from the energy intensive industry did not confirm this observation.

While some participants advocated excluding small installations from the EU ETS, others advised to be cautious when discussing restricting the scope of the ETS. If it comes to exclusion of small installations/emitters, the question of alternative, equivalent measures would clearly arise. In the event of excluding installations or sectors, a harmonised approach at EU level was considered necessary in view of the potential to link the EU ETS with other trading systems in third countries.

In order to define a threshold for including/excluding small installations, some stakeholders suggested an approach based on emissions, while others would prefer either capacity, or a combination of both capacity and emissions or refused any emissions based threshold. It has also been suggested to exclude those installations from 2013 onwards the emissions of which were below 25 kt/yr during the period 2008-12.

The diversity of the various industrial sectors, such as ceramics, pulp and paper was highlighted. Voluntary agreements were suggested as a possible solution, but did not meet much agreement, but rather doubts on the credibility of such an approach at EU level.

While participants from the pulp&paper industry considered the matter of strategic behaviour of companies not really relevant, others reported strategic behaviour of companies aiming at updating their permit with a view to staying below the threshold of being included in the ETS.

Conclusions

Following the discussions, the Chairman identified a number of major elements emerging from the debate:

- Monitoring, reporting and verification costs still represent a higher per ton cost for small installations despite the considerable progress achieved.
- All sectors need to contribute to the reduction of GHG emissions, however, it might be a question which policies should be applied.
- Feasible options in order to define "small installations" might be a capacity and an emissions threshold.
- With respect to harmonisation, a possible starting point could be to draw up a list of small installations of, for example, hospitals, to exclude from the scope of the Directive.
- Opting-out small installations has to be measured against alternative instruments, while the opt-in should be maintained as an effective way of dealing with emission reductions.

Agenda item 7: Carbon dioxide capture and geological storage activities

Presentations

In his presentation, Mr ***Scott Brockett*** (European Commission) gave an overview on the various aspects and risks related to CCS and presented suggestions how to cope with existing barriers. He highlighted the role of CCS for meeting the reduction targets as well as the need to manage the risks involved.

Mr ***Tim Dixon*** from the UK Department of Trade and Industry presented the work on CCS undertaken in the UK with a view to opting-in CCS in the EU ETS. He stressed the CO2 mitigation potential of CCS and highlighted the efforts currently underway to give confidence for an environmentally sound CCS.

Mr ***Göran Lindgren*** from Vattenfall and Mr Hans-Aasmund Frisak from Statoil presented the CCS projects employed by their companies demonstrating the various technologies applied.

For Mr ***Stefan Singer***, WWF, CCS represents an uncomfortable, but necessary option and should become mandatory for all stations by 2020 at the latest.

Discussion

The debate acknowledged the potential contribution of CCS to the overall GHG emission reduction objectives.

However, a number of issues were raised on the relation between CCS and ETS: It was argued that the EU ETS should cover the full chain of CCS. In this context, the questions arose whether a new type of storage credits should be created and whether one ton of CO2 put in storage should equal one ton of CO2 avoided. If storage credits where to be created, they should be part of the allocation process, in order to provide the necessary incentives for the upstream CCS chain. It was generally considered very important to formally recognise CCS in the EU ETS Directive from the 3rd trading period onwards rather than relying on a pure opt-in approach.

In the light of the costs of CCS, industry representatives highlighted their concerns as for the ETS to bring about the financial incentives for CCS. Therefore, CCS should enjoy political and financial support from technology programmes in the short term, while in the long term markets will give the necessary price signals. In this respect, some stakeholders raised concerns, whether a mandatory approach on CCS would be able to deliver by 2020 and would prefer an incentive based one.

Participants of the meeting were pleased to note that both the steel and the cement sector are interested in the abatement potential offered by CCS. The steel sector set up a consortium looking at breakthrough technologies in this respect, which, however, will need adequate support in the framework of the 7th Framework Programme and from the European Investment Bank.

Representatives from the energy intensive industry were worried about CCS plants that may serve as marginal supplier of electricity. Against this background, the Commission clarified that economic theory requires internalisation of external costs. The industry concerned was invited to provide a detailed analytical and empirical analysis on CCS as a marginal supplier of electricity.

Conclusions

The chairman identified the following major elements emerging from the debate:

- The option of CCS is important and promising. While it does not provide a silver bullet, it effectively contributes to the overall solution.

- De facto, there are two time frames available now:

    - The opting in procedure, immediately available, which, for instance, will be followed by the UK for the 2nd trading period;

    - A harmonized approach from 2013 onwards. In that respect, account will need to be taken of the different technologies applied, their specific aspects in the short and in the long-term as well as the potential to include specific provisions on CCS in the 3rd phase of the EU ETS.

Agenda item 8: Emission reduction projects within the Community

Presentations

In his presentation on "Emission reduction projects within the Community", Mr ***Frank Convery***, UCD Dublin, highlighted positive and negative aspects of domestic offset projects (DOPs, here used as equivalent to emission reduction projects within the Community). The

former could only come true provided that a number of conditions are met. The extension of the EU ETS to DOPs would inevitably require harmonisation across Member States and compliance with a number of pre-conditions. Mr Convery proposed a pilot scheme to be set up, in order to test the viability of these projects under field conditions.

Mr ***Ignacio Sánchez García*** from the Spanish Ministry of Environment addressed the various aspects such as how to link domestic projects with the EU ETS without affecting the well functioning of the trading scheme, how additionality could be ensured, how to deal with eligibility criteria and MRV.

Discussion

In the debate, stakeholders highlighted the various benefits and drawbacks of domestic offset projects: On the positive side, it was argued that in order to achieve a 20% GHG emission reduction, all opportunities including DOPs should be used. As for sectors not included in the ETS, DOPs could unfold some synergies between the ETS and non-ETS sectors, as they may allow preparing the ground for later inclusion in the ETS by discovering the price of carbon in the non-ETS sector. Furthermore, DOPs may bring about new business opportunities for industry and may lead to increased liquidity on the market.

On the other side, adverse effects from DOPs interfering with both the ETS and non-ETS sector may appear: declining prices on the carbon market triggered by DOPs may reduce the incentives accruing from the ETS to reduce emissions and for this reason may justify some limitations, while DOPs are also seen as a potential barrier for identifying new policies and measures in the non-trading sector.

It was generally admitted that complex approaches would be required to allow DOPs, since there are no convincing concepts available yet to ensure environmental additionality, to avoid double counting, to ensure the necessary monitoring, reporting and verification, to set the necessary emissions development baseline and to set up a sufficiently simple design of the DOPs.

In the event that the inclusion of DOPs into the EU ETS should be further pursued, these problems must be overcome. Monitoring, reporting and verification requirements, but also the overall design of the system should preferably be harmonised at European level. A list of potential DOPs projects or pilot projects might be set up to decrease the uncertainty for project developers.

Conclusions

Following the debate, the chair highlighted three major points emerging from the debate:

- There is a mixed perception of emission reduction projects within the Community (or domestic offset projects) showing a number of drawbacks:
    - they are administratively complex to handle;
    - they may bring about adverse price effects on the market:
    - the requirement of additionality is difficult to ensure and finally,
    - they may interact with existing domestic policies and measures

- A pilot scheme with a limited list of projects to establish the merits and demerits of DOPs might be envisaged. Among others, transport might represent a potential area in this respect.

In the context of the debate on emission reductions projects within the Community, the UK made a brief presentation on the matter of road transport. It was concluded that the issue merits further reflection.

Agenda item 9: Concluding remarks

Before concluding the meeting, it was requested to introduce a new agenda item on the functioning of the carbon market including the impact of the EU ETS on power prices, which might be dealt with in one of the forthcoming meetings. The suggestion should be further elaborated, in order to provide a sound basis for decision.

The Chair concluded the meeting by pointing out that

- a report will be established, which will be sent for comments to participants. The deadline for submitting comments should be fully respected as otherwise the process might be very cumbersome to manage. The report will not be verbatim and will not identify the positions of the various stakeholders, but rather sum up the issues discussed with a view to identifying converging and diverging views on the various subjects.

- the presentations will be put on the web. The relevant address is http://ec.europa.eu/environment/climat/emission/review_en.htm.

- the next meetings will take place as indicated in the invitation to this meeting.

Final Report of the 2nd meeting

of the ECCP working group on emissions trading

on the review of the EU ETS

on

Robust Compliance and Enforcement

26-27 April 2007

Berlaymont, Rue de la loi 200, 1049 Brussels
Centre Borschette, Rue Froissart 36, 1040 Brussels

Agenda item 1: Welcome and Overview of the Review Process

The Chairman, Mr Jos Delbeke (European Commission) welcomed participants. After introducing Ms Yvon Slingenberg as the new Head of Unit in charge of the EU ETS, he pointed out that a draft agenda for the 3rd meeting and the final report of the 1st meeting has been sent to participants after having received a number of comments that have been taken into account in the final version. He asked for comments on these two documents as well as on the agenda of today's meeting. Participants did not have comments on any of these documents.

Agenda item 2: Monitoring, Reporting and Permitting

Presentations

Mr ***Howard Leberman*** (UK Environment Agency) highlighted the importance of consistent, robust and full implementation of the monitoring and reporting Guidelines (MRG). In his view, accreditation of independent verifiers is critical. He advocated amending the Directive to ensure a single standard for accreditation, which should be ensured by the European Co-operation for Accreditation (EA) and stressed the role of monitoring, reporting and verification for the reputation of the EU ETS, notably in relation to linking with other emission trading schemes.

In his presentation, Mr ***Dop Schoen*** was not in favour of transforming the MRG into a Regulation due to the resulting lack of flexibility of the legislative instrument. He asked the EU Commission and Member States to better enforce the MRG, and to ensure consistent and aligned application thereby make sure that there is a level playing field. As for the verification process, among other issues, Mr Schoen stressed that based on the strategic assessment the verifier should decide whether there can be an exemption for the site visit of particularly remote locations such as offshore platforms. He advocated introducing Community level accreditation for verifiers through the national accreditation bodies. The feasibility of monitoring other GHG before including them into the EU ETS should be checked. In general, the MRG should allow flexibility and pragmatic solutions.

According to Mr ***Ronald Kalwij*** (Royal Cosun), monitoring cost for SME (small and medium enterprises) are still 10 times higher then for large installations despite the new monitoring system. He identified a number of further improvements, such as verification of the energy

bill to be conducted by the corporate controller, no monitoring of bio fuels, monitoring of the whole site, even if monitoring is applicable to only one part of the plant, exclusion of spare boilers.

Mr ***Tomas Wyns*** (CAN-Europe) addressed some shortcomings of the current MRV system such as a different interpretation and implementation of the Monitoring Protocols (MP) in Member States. He recommended that the M&R rules should be implemented in a more harmonised way. With a view to rendering the MRV system with the MP foolproof, he advocated ensuring a good technical verification of MPs and establishing a legal link between verification of CO2 reports, MP and permits.

Mr ***Jochen Harnisch*** (Ecofys) set out some key problems emerging from different implementation at MS level of permitting, monitoring and reporting. He recommended an approach based on more harmonisation accruing from EU legislation for which he identified a number of policy options, among which the establishment of a M&R Regulation. Mr Harnisch concluded by highlighting the role of the MRV system of the EU ETS, which can serve as a blueprint for other schemes. In his view, international linking makes further harmonisation of MRV inevitable.

Discussion

The debate showed that there is a general agreement among all stakeholders on the need for further harmonisation. However, stakeholders are split on the way how to achieve it. In the light of 2020 emissions reduction targets, some Member States, supported by some NGOs, favoured a harmonised approach based on Regulation, as this will have a direct effect and may help to make the system fully fraud-prove. Other Member States as well as representatives from the industry pointed to the need of subsidiarity, and wondered whether currently existing problems could not be solved by better implementation through Member States. Representatives from the industry stressed that current MRG are already binding and could be tighter, if need be. Any solution should be cost-effective and should be based on an analysis of the underlying problems including those of small installations. With respect to the latter, opting out based on an emission threshold or an approach taking into account sector specific features was suggested. Some Member States proposed that competent authorities should validate all monitoring plans before issuing the greenhouse gas permit.

A number of stakeholders addressed institutional matters. Some of them advocated a depoliticised and independent European Agency, which, according to some NGOs, should also be responsible for accreditation and for the assessment of the implementation of the Directive in Member States. Some Member States considered the idea of an agency rather difficult.

While representatives of the Carbon trading sector were in favour of quarterly reporting in the interest of transparency, some representatives from Member States and the industry pointed to the additional burden, in particular for small installations emerging from these stipulations. They highlighted that an appropriate balance must be kept.

According to the Carbon trading sector, site visits should continue to be a significant feature of the MRV scheme, while other industry representatives again highlighted the principle of proportionality.

Representatives from the energy intensive industry suggested reconsidering the fall back approach enshrined in the new MRG, while the Commission justified it as an innovative idea that would prevent any unjustified deviation, while reinforcing the principle of cost-effectiveness.

Conclusions

The chairman indicated he did not intend to present a coherent summary, but highlighted three points:

- Monitoring, reporting, verification and permitting are closely linked together. Many achievements can be recognised, but lots of things still remain to be done. It is very important to acknowledge this in the light of market developments and the international dimension. There is a high degree of agreement among stakeholders on both the elements to be addressed and the need for further harmonisation. This does not mean that everything has to be regulated into the last detail, since Member States and operators pointed out that there are different national circumstances and different circumstances of operators. Thus, a complementary comitology approach might be appropriate to deal with technical details and guidance.

- There have been many comments on institutional issues, such as a plea for a European Agency, which should be depoliticised, independent, centralised, managing information in order to prevent leaks, catering for more regular reporting, but has also to be seen in the international context. A common system of accreditation of verifiers has also been suggested. Responsibilities of the different parties involved in monitoring, reporting, verification and permitting must be very clear, as otherwise even a revised and improved system may not work.

- It has been recognised that more can be done for small installations. However, the way to follow is not clear, since any kind of emission related threshold would require monitoring and thus not solve the problem of monitoring costs. There are also calls for a diversified threshold for small installations in different sectors, which, taking environmental integrity into account, may be difficult to handle. Furthermore, simplicity is an important matter for small installations.

Agenda item 3: Compliance and Enforcement Issues in Relation to Expansion of the EU ETS

Presentations:

Mr ***Roman Michalak*** (Republic of Poland) presented the Polish system of forest management, where he concluded that responsible forest management would contribute to the achievement of EU reduction goals. As a main challenge, he identified conserving and increasing carbon pools through afforestation and reforestation & sustainable management versus substitution of non-renewable energy by use of biomass.

Mr ***Günther Seuffert*** (European Commission) presented status and challenges of monitoring biological sinks. He identified a number of uncertainties in terms of monitoring sinks, such as the fact that the atmosphere does not see stock changes but fluxes, but also risks related with terrestrial sinks, which may easily turn into a source of carbon (permanency risk). Hence, current monitoring/reporting of sinks may not be adequate to guarantee accurate estimates.

Instead, the methodology for conservative estimates could further be developed, to allow easier estimation, and to guarantee at the same time that sinks are not overestimated.

Mr ***Mark Major*** (European Commission) presented the state of play on ETS and shipping. According to him, there are currently a number of policy options under consideration. Mr Major set out the advantages and disadvantages of including shipping in the EU ETS and concluded that the Commission will continue to pursue international action, study the EU policy options and consult stakeholders.

In his second presentation, Mr ***Jochen Harnisch*** (Ecofys) presented issues and policy options for MRV emerging from possible new activities to be included in the EU ETS. With respect to N2O from the chemical industry, CCS, aviation, shipping, domestic projects and sinks a number of specific issues would need to be considered, with some of them (in particular concerning N2O, CCS, aviation, and to a lesser extent shipping) feasible and others, such as sinks and domestic projects, challenging, as they may require to introduce new elements, usually not available in a cap-and-trade scheme. In his view, the right hierarchy of instruments would be determined by the political will defining the corner stones and the degree of flexibility required by the technical issues involved. The risk involved, however, may be that the hierarchical legislation becomes fragmented and internally inconsistent.

Discussion

In the debate, most stakeholders taking the floor expressed deep concerns about sinks to be included in the EU ETS. Doubts concerning the permanence of sinks, leakage risks, the matter of additionality as well as the complexity involved were mentioned in this respect. NGOs highlighted the role of forests for the climate, but stressed that the EU ETS is not the appropriate tool to deal with forests. Very few Member States were in favour of giving sinks a role in the EU ETS, and some of these only on condition that MRV issues were properly addressed. Representatives of the carbon trading sector also recognised the complexity of including sinks into the ETS, but were however convinced that the market would find ways to mitigate the risks.

Some Member States explicitly asked the Commission whether shipping, road transport and sinks would be considered for inclusion, at least in terms of the impact assessment.

Conclusions

In concluding the session, the Chairman responded to the questions concerning the potential inclusion of sinks, road transport and shipping in the EU ETS. He confirmed that the impact assessment on the review of the EU ETS Directive would deal with some transport issues. However, there are still many topics, which are not clear yet, such as the scope of "road transport" which could encompass passenger cars, lorries and long-haul distance transport or any of them separately. The Chairman made clear that the EU ETS will not be extended to road transport at the expense of current taxation regimes, as this would be environmentally detrimental. As for shipping, he confirmed that the Commission is currently studying three options: including shipping in EU ETS, a variation in harbour dues or a mandatory CO2 index limit, which would involve the IMO. In his view, it is too early to have a clear view on road transport and shipping, but no option will be excluded at this stage.

Agenda item 4: Verification

Presentations

The analysis by Mr ***Jeroen Kruijd*** (PWC) showed a large variation in terms of verification and accreditation in MS. In particular he underlined the unclear quality of the process. He identified a number of policy options with respect to both verification and accreditation, among which the adoption of verification and accreditation Guidelines or a verification and accreditation Regulation. He concluded that a harmonised EU verification and accreditation would by far be the most desirable approach to ensure trust in the EU ETS. International linking and market operation requirements would make further harmonisation of verification and accreditation inevitable. Finally, he pointed out that transparency in requirements and performance of verification and accreditation should be enhanced and the role of the competent authority herein clarified.

Mr ***Johan Pype*** (Tractebel Engineering) pointed to the large difference among verifiers concerning their role, but also how verifications are notified and executed. He reported a similar observation on the range of knowledge of verifiers. Against this background, he considered increased harmonisation and the development of verification guidelines very important.

Ms ***Anne-Marie Warris*** (IETA) presented her views on accreditation and verification and what has to be done in terms of harmonisation. She also identified a number of elements that should be an integral part of accreditation in the future, such as impartiality, consistency ('a tonne is a tonne'), harmonisation, comparability and transparency. Among other things, she advocated a single 'standard' for accreditation process and functions, and a peer evaluation, which should take place at regular intervals.

Mr ***Wolfgang Seidel*** (German Emission Trading Authority, DEHSt) presented requirements for good verification and outlined the potential for harmonisation of accreditation and verification. He confirmed specific needs for an EU-wide regulation of verification, which could be accompanied by an accreditation forum at Community level, which could provide further guidance. He argued against a centralised accreditation at Community level and concluded that uniform application of the provisions on monitoring, reporting and verification is essential for a level playing field within the EU ETS and that there is a need and a potential for harmonising verification of emission reports.

Discussion

The debate showed a clear tendency in favour of a more harmonised approach on verification including verification standards applying across the EU. However, Member States appear divided on whether this should be achieved by means of legislative measures (Regulation) or through better guidance by the Commission. While some Member States considered the harmonisation of Monitoring Plans at EU level the most important issue, others called for better implementation and application of existing legislation.

Some stakeholders advocated Community-level accreditation of verifiers (through national accreditation bodies), in which the specifics of individual sectors should be taken into account, while some Member States and representatives of the energy intensive industry would not support this approach. National accreditation bodies should be recognised, which may, however, apply common criteria on accreditation.

On the matter of site visits, some representatives from the industry prefer the verifier to decide on the need for site visits. In their view, he should also have the competence to decide on exemptions, for instance in the case of small emitters and remote areas. Others would also like to see the CA (competent authorities) involved, while some MS want the CA to decide.

Representatives from the industry put forward the idea of a Verification Forum comprising verifiers, Member States and the Commission. The suggestion was much welcomed by almost all stakeholders including the Commission.

The debate also confirmed that all non-conformity issues but the emissions fall under the responsibility of the Member States and their CAs respectively.

Conclusions

Following the debate, the chairman drew the following conclusions:

- While a lot has been done and achieved in terms of verification, there is still room for better implementing the current legislation.

- The role of the competent authorities in Member States is essential, but subject to important differences in practical implementation.

- The Commission would look favourable to a Forum of and with verifiers and MS, but would involve also small verifiers, in order to take account of the fact that verification is a diversified business. Subject to agreement of stakeholders, the Chairman proposed to organise the Forum before the summer break, in order to allow contributing to the legislative work of the Commission.

- There is a general call for using some standards. Whether this could be achieved by means of harmonisation by legislation, guidance, guidelines or voluntary processes, is left open for the time being. However, there is a clear impression that the legislative issue must be addressed, in order to provide the necessary structure to other processes based on guidance or voluntary action.

- With respect to accreditation bodies, it is considered premature to conclude whether a centralised body or the European Cooperation for Accreditation should be the preferred route. However, regular checks and follow up of what accreditation bodies are doing need to be provided for.

Agenda item 5: Perspectives for Compliance and Enforcement in the EU ETS

Presentations

Ms ***Lesley Ormerod*** (Environment Agency, UK) presented the results of work of the IMPEL EU ETS group, which confirmed that robust, harmonised MRV & compliance underpin the EU ETS. However, common approaches and definitions are required as well as focussing of effort on the biggest emitters. Accreditation and verification must be performed to the highest standards and consistently across Europe. It has also to be borne in mind that strong environmental integrity and a comparable set of rules would provide the basis for linkage of the EU ETS with developing schemes in other countries.

Based on the experience of the 1st Trading Period, Ms ***Iris van Tol*** (Emissions Authority, The Netherlands) presented various ideas on inspections and sanctions with a view to achieving a high level of compliance in the entire EU. She highlighted the need for a clear structure of responsibilities between the public and private domain as well as clear monitoring and reporting structures and requirements supplemented by an adequate inspection and enforcement strategy as well as the importance of a high level of acceptance by the industry. Finally she advocated the establishment of an institutionalised forum of competent authorities and the need for developing EU guidance on inspections and sanctions.

Mr ***Jarno Ilme*** (Energy Market Authority, Finland) set out the potential offered by IT to further improve the EU ETS. He showed that effective utilization of IT represents an essential tool for enforcement, inspection and overall compliance. He concluded that the development of IT systems of operators, verifiers and CAs should be encouraged.

Mr ***Sanjeev Kumar*** (WWF) presented ideas on improving enforcement in the EU ETS. Based on his analysis of the problems and solutions how to cope with them, he concluded that penalties must be included in the revised Directive to ensure a platform on which Member States could further build upon. Furthermore, all enforcement issues must be accessible to the public, while good practice and continuous improvement should be encouraged and supported.

Mr ***Reid Harvey*** (US Environmental Protection Agency) described monitoring, verification and enforcement currently applied in the US cap-and-trade programmes (SO2 and NOX). Main lessons learnt included applying reduced requirements for smaller emitters; imposing progressively stringent substitute data requirements for data loss to ensure continuous reporting; requiring comprehensive electronic reporting to enable targeted audits and introducing automatic statutory penalties greater than cost of allowances.

In his second presentation, Mr ***Jeroen Kruijd*** (PWC) set out various policy options on enforcement. He also presented elements for the architecture of a EU ETS Compliance System. In his view, the EU ETS needs proper legal instruments for enforcement as well as further harmonisation, in particular in the light of linking the EU ETS with other emissions trading schemes. Important elements for such a system would be standards, structures and adopting information technologies.

Discussion

The debate showed that a number of Member States impose sanctions in the case of non-compliance, while others do not foresee any sanction. Representatives of NGOs supported an enlarged scope of the Directive to include provisions on penalties in the event of non-compliance. Some Member States and competent authorities considered existing rules sufficient and highlighted the need to ensure compliance with existing rules before introducing new ones.

The matter of more frequent reporting, i.e. quarterly reports instead of annual ones, were raised in the debate. A number of industry representatives including cross sector associations pointed to increasing costs and rising administrative burden in this respect without bringing about any added value for the market and that there was a risk of unwarranted market reaction due to not properly verified information being brought into the public domain. Some companies including large emitters suggested they would just pursue a compliance strategy.

Furthermore, the uncertainty of the first years of the EU ETS triggered by a lack of verified emissions data would not exist anymore.

The Commission acknowledged the fact that many companies pursue a compliance strategy. However, it is also convinced that this is about to change, since companies, on top of their compliance efforts, would increasingly develop a market strategy, in order to benefit from market opportunities. Experience has shown that piecemeal information creates volatility in the market and constitutes discrimination, since information is not available to everybody at the same time and at the same quality. It also has to be borne in mind that more frequent information may diminish the focus on particular data release dates, as can be seen from the US market, and thus provides for more stability on the market. For these reasons, the matter of additional costs has to be weighed up against more and better market information enabling market participants to benefit from market opportunities.

Some industry representatives wondered whether more inspections would not lead to rising burden for the operators and bring about more inconsistency due to the different MS practices involved in inspections.

Conclusions

The Chairman acknowledged that many useful elements have been raised in the debate, also proving the different ways of implementation in terms of compliance and enforcement at Member States level. The Commission would need to make use of the many existing networks such as IMPEL, in order to identify the most essential elements addressed in the debate for its further work. He pointed out that sanctions and penalties would only represent one element of the whole enforcement cycle and, for this reason, have to be seen in a wider context. The examples of the US and Finland representing more automatic ways of collecting information may provide promising solutions and options. He also noted that as for reporting, the matter of costs has to be borne in mind and weighed up against the benefit of more information.

Agenda item 6: Registries

Presentations

Mr ***Istvan Bart*** (European Commission) briefly presented the registry systems in Member States and their relation to the Community Independent Transaction Log (CITL). According to Article 30(f) of the Directive, the review should consider whether a single Community registry would be appropriate. Relevant issues to be taken into account are costs, optimisation of IT functions, functioning under the UNFCCC infrastructure and the role of Member States.

Mr ***Andrei Marcu*** and Mr ***Peter Zaman*** (both IETA) presented their views on registry developments beyond 2012. They set out the current situation in the light of relevant UN documents and considered advantages and disadvantages of a single European registry. In the short term, it was recommended to get the system going by December 1, 2007. However, IETA would support any outcome that will allow to implement the "best solution" within the given parameters.

Discussion

The discussion focussed whether exchanges of allowances should first be registered under the ITL or whether the CITL should be the first addressee for MS registries. This has to be very

carefully considered. Many stakeholders agreed that the operational independence of the EU ETS is absolutely essential. The ability of entities to communicate across different systems was also emphasised.

Representatives from the industry warned against greatly increasing transactions costs in the EU ETS as a consequence of the current system, if developing countries demand an extension of the share of proceeds as part of an post 2012 agreement.

NGOs took the view that including new sectors in the EU ETS might not happen, if it is subject to approval from parties outside the EU ETS.

Some Member States underlined the importance for the EU to be compliant with the Kyoto Protocol and identified the need for further discussions.

Some stakeholders urged the EU Commission to reprioritise the need for Member States to meet their Kyoto Protocol Article 17 commitments and for the national registries to connect to the ITL as planned.

Conclusions

In concluding the session, the Chairman pointed out that currently the EU ETS represents the only framework, where carbon trading among companies is underpinned by robust monitoring, reporting and verification rules and compliance is enforced by sanctions. Article 17 of the Kyoto Protocol has to be seen as an enabling provision allowing trading. There are no spontaneous compliance provisions at UN level. The only existing ones are those at EU level, which are good.

Agenda item 7: Concluding Remarks by the Chair

The Chairman concluded that during the last two days a very good harvest of ideas has been reaped concerning the improvement of monitoring, reporting, verification and permitting. It is now up to the Commission to decide which of the various options will be further explored and possibly incorporated in the legislative proposal. He also stressed that better implementation of what is already on the table would also be a clear option.

Final Report of the 3rd meeting

of the ECCP working group on emissions trading

on the review of the EU ETS

on

Further Harmonisation and Increased Predictability

21 – 22 May 2007

Centre Borschette, Rue Froissart 36, 1040 Brussels

Agenda Item 0: Welcome and Introduction

The chairman, Mr Jos Delbeke (European Commission) welcomed participants and highlighted the importance of the meeting. He also appreciated having a balanced list of speakers and presentations on the agenda of the meeting.

Agenda Item 1: Cap-setting: EU-wide versus national caps

In his presentation, Mr ***Felix Matthes*** (Öko-Institut) identified four general options to define the split of an EU-wide cap between the ETS and non-ETS sector:

- Efficiency approach
- Equal burden approach
- Grandfathering approach
- Equity based approach

He said that in order to avoid distortions in the internal market and to ensure compliance with the EU cap, a harmonised approach would be necessary and appropriate. National ETS caps can be based on a common approach in the framework of an EU cap. A flat rate reduction differentiated by ETS sectors where EU benchmarks could be applied would deliver the caps. Assuming certain reduction targets, the caps for the traded and non-traded sectors would be defined.

Mr Matthes concluded that if MS were to take on separate commitments under the international regime, national caps are very likely. However, an EU-wide common approach differentiated by ETS activities would be necessary, appropriate and feasible. Analysis showed that sufficiently robust and precise criteria for national caps based on EU-wide methodology could be formulated.

According to Mr ***Christian Egenhofer*** (CEPS), cap-setting and allocation under the current EU ETS has been a highly decentralized negotiation process, characterized by the principle of subsidiarity, industry preferences and reflecting the material differences of Member States. It entails costs, which occurred due to a number of various reasons.

With a view to avoiding distortions on the internal market and preserving environmental effectiveness at the macro level, cap setting could either be done through emission projections or an emissions coefficient applied to MS, sectors and installations. At the micro level, allocation would be laid down by EU rules and implemented by the Commission, or, as currently, by Member States.

Against this background, he identified two options with the EU ETS sector treated as if it were a Member State:

- Cap-setting and allocation applied by EU based on agreed methodology;
- Cap-setting by EU and allocation by Member States with variations concerning the treatment of new entrants.

Mr Egenhofer concluded by saying that

- agreeing on "objective" methodology for emissions projections is doable
- agreeing on an "objective" emissions co-efficient (e.g. benchmark) for MS, sector, installation is the challenge
- principal distortions are due to EU-based burden-sharing agreement (better BSA needed for Member States or for ETS sector)
- A key consideration is the application of a Community co-efficient (or benchmark) for cap-setting (politically feasible if combined with special pleading).

Mr ***Stefan Moser*** (European Commission) considered the advantages and drawbacks of upfront or NAP-based cap setting. He noted that upfront cap setting would lead to a modification of the current system and would mean that the distribution of the reduction burden between the EU ETS-sectors and the non-EU ETS sectors would be dealt with in a harmonised manner across Member States. This could be achieved through separate national caps or an EU-wide cap.

While a number of advantages would emerge from an up-front cap-setting, one consequence of an up-front cap-setting would be less flexibility and margin of discretion for Member State authorities to differ allocations from those in other Member States.

Mr Moser concluded that more harmonisation of cap-setting procedures can reduce regulatory uncertainty and can improve simplicity, fairness and predictability for both operators and the market. A more harmonised approach can reduce distortions of competition and of the internal market as well as volatility of allowance prices.

Ms ***Kate Hampton*** (ECIS) presented the perspectives from the financial market's point of view. While business would not need complete certainty, it would need confidence in the predictability of policy, which from the business point of view means de-politicisation. In the current system, she considers that too much political/policy risk exists.

The national allocation process provides an additional and unnecessary layer of policy uncertainty and should therefore be removed. An EU-wide system of auctioning and benchmarking should support the EU-wide cap to be set out to 2020, with additional visibility

to 2030 as soon as possible.According to Ms Hampton, the cap should be based on a formula that is a function of the EU 20% and 30% targets. Such a cap would be simple and transparent and would provide greatest predictability. It should be committed to, even before an international agreement is reached, so that businesses can make their own risk assessment of the caps. Optimally, the formula would be included in the Directive. As a minimum, the cap should be a reduction by the trading sector that is proportional to its emissions. However, marginal abatement cost (MAC) analysis suggests that the trading sector should go deeper.

Discussion

In the debate, the Chairman highlighted the need to de-politicise the EU ETS. None of the stakeholders present questioned the need for further harmonisation of cap setting. Almost all stakeholders supported a more harmonised cap-setting approach, thus illustrating a very broad consensus to improve cap setting. Some Member States considered harmonisation closely associated with a level playing field, while other stakeholders pointed to the international dimension of the EU ETS. In their view, more harmonisation would fit well in the international discussion on sector approaches and could convey a signal to bring in developing countries. Furthermore, the goal of compatibility between the EU ETS and the international level in technical terms was stressed, in order to internationally recognise emission reductions achieved by the EU ETS.

Albeit not against more harmonisation, some Member States consider it important to take into account specific national circumstances, such as the level of economic development, impact on economic growth, but also how the energy intensive or export dependent industry would be affected. For these reasons, in their view harmonisation should enable a certain degree of flexibility.

Representatives of several Member States, power generators, carbon traders and NGOs advocated an EU-wide cap for a number of reasons: it is considered best to deliver in terms of clarity of targets, a harmonised level of ambition and future scarcity of allowances. It could best ensure a level playing field and would take away the discretion of Member States resulting in adverse and distorting effects. Representatives of the carbon trading sector and NGOs argued it would also lead to a higher level of transparency, which would make the EU ETS more comprehensible to the outside world and underpin the political leadership of the EU.

Issues raised in the context of an EU-wide cap concerned the determination of such a cap, its impact on sector caps and economic development and growth.

Conclusions

Following the debate, the Chairman concluded 5 points:

- There is a unanimous call for improved cap setting. In terms of environmental effectiveness, NAP1 did not deliver and NAP2 required firm intervention by the Commission. A systematic approach is now needed, also in the light of the international dimension, for the sake of which the EU has to be able to explain in clear terms how cap-setting works.

- There is a general, very strong message calling for more harmonisation, if not a centralized EU cap. This raises questions on how to do it including considering the EU ETS as if it

were a separate Member State. Cap setting has to be in line with the firm decision of the Heads of State and Governments to reduce overall greenhouse gas emissions by at least 20% by 2020, increasing to 30% under certain conditions.

- There is a need for strong separation between cap setting and allocation to keep the process politically and technically manageable.

- There is a strong call for transparency for both cap setting and allocation. A level playing field and the recognition of regional circumstances and the diversity of the EU emerge as the principles and criteria to be applied for cap setting. Both may appear from further detailed work on sector allocation processes.

- There is a very strong call on predictability meaning the 3rd trading period to last at least until 2020. All stakeholders called on longer periods, no one spoke in favour of a 5-year period.

Agenda item 2: Increased predictability

Presentations

Mr ***Franzjosef Schafhausen*** (Germany) made a presentation on increased predictability. In his view, predictability would be assured by:

- determining the rules and formula for cap-setting up-front in the ETS directive;

- linking the total ETS cap to the 20/30% target and the result of the burden sharing process;

- establishing indicative targets for the time beyond 2020;

- determining clear and harmonised allocation rules for all sectors as well as incumbents and new entrants in the Directive. In his presentation on "Increased Predictability in Emissions Trading", Mr ***Owen Wilson*** (Eurelectric) proposed that in order to increase predictability, the revision of the Directive should focus on:

- Stability in rules determining the ETS cap;

- Stability in rules determining the allocation trajectory;

- Well-signalled changes in the methodology of allocation;

- Either no provisions on companies' use of JI/CDM, or, provisions linked to targets;

- Well-signalled direction on energy R&D and technology support schemes;

- Known conditions/principles for linkage to other schemes;

- Well-signalled changes in percentage auctioning, coordination of auctioning;

- Opportunity to comment on future developments.

Mr ***Mark C. Lewis*** (Deutsche Bank) presented ideas on improving the predictability of the scheme. He concluded that medium-term compliance periods within a long-term emissions trajectory is the rational policy for the following reasons:

A long-term cap set only for 30-40 years in the future would greatly reduce the incentive to change behaviour in the short term, as economic agents would hope for improved technology later in the period, or find other excuses to delay adaptation

However, having a long-term trajectory (30-40 years) for the carbon cap with shorter-term compliance periods (8-10 years each) should ensure that the behaviour of the agents covered by the scheme take the long-term trajectory into account from the outset of the first compliance period

Discussion

The debate confirmed that a stable framework of rules and principles on cap-setting, the split between the trading and non-trading sector and the trajectory would be the most important elements for increased predictability. These elements have also to be seen against the background of the international regime, to which the EU ETS should fit, however, without being dependent upon this. Representatives of Member States and the research community highlighted the role of allocation methods for the length of trading periods, also in terms of the carbon price signal. A representative of the power generation industry suggested that a predictability period should be envisaged, which is longer than the allocation and compliance period, but shorter than the cap period.

In the view of the research Community, a 5-year trading period could be justified only because of the uncertainties of the international regime, while others considered a 8-year period not too long and often too short in the light of the lead time for investments. 10 years might be a reasonable timeframe for representatives of the carbon trading sector.

Some industry representatives took the view that banking and borrowing of allowances would enable there to be short trading periods, but would also provide some flexibility to introduce new technologies. Representatives from the carbon trading sector raised concerns about borrowing across compliance periods, while representatives from the financial sector and NGOs are against borrowing, as this would detract from the purpose of having shorter compliance periods.

Conclusions

Following the debate, the Chairman concluded two points:

- On the basis of the arguments put forward, there seem to be a consensus emerging to align with the period on which a firm political decision has been taken, i.e. the 3rd trading period to run from 2013 to 2020. The debate has confirmed the importance of having a longer perspective, for which a political orientation indicating a reduction target of 60 to 80% by 2050 is becoming clearer.

- Stable and reliable rules of the game are very important and for this reason, a too frequent revision of the EU ETS, e.g. in 2014/15 should not be envisaged. There are, however two caveats in this respect: first, the revision of the international regime, which could lead to

more ambitious targets, and second, linkage with other emission trading regimes, which will have to be based on an explicit decision-making process.

Agenda item 3: Allocation methodologies

Presentations

Mr ***David Harrison*** (NERA) presented an overview of allocation methodologies and principles. He identified environmental integrity, efficiency and distributional effects as major evaluation criteria. Harmonisation should be pursued in line with the following principles:

- Harmonisation is more important where non-harmonisation increases compliance costs or inefficiencies

- Non-harmonised new entrant allocations raise efficiency concerns

- Non-harmonised auction shares and incumbent allocations affect efficiency less, and may result in possible distortion of the internal market

- Some non-harmonised parameters give rise to "prisoners' dilemma" and Member States may find it difficult to change unilaterally and thus should prefer harmonisation.

On behalf of IFIEC Europe, Mr ***Vianney Schyns*** (IFIEC Europe) presented ideas on "Improving allocation – Performance based allocation is feasible…". From his point of view, auctioning would raise serious concerns with respect to competitiveness, leakage and recycling of revenues and would not be appropriate to solve the problem of windfall profits in the electricity industry.

However, benchmarking may offer a solution, as with suitable benchmark formula, it would bring about the same incentive for low carbon technologies as auctioning. In his view, the incentive derived from benchmarks to reduce emissions would be independent of the exact value of the benchmark in a certain year. Finally, performance-based benchmarking would provide incentives along the whole product chain and would also accelerate transition to a global trading scheme.

Mr ***Alistair Steel*** (EuroChlor) presented energy issues on behalf of EuroChlor. Due to electricity accounting for more than 50% of full production costs in the chlor industry, compensation for the energy intensive industry in the form of free-of-charge allowances taken from electricity generators must in his view be accepted as a legitimate concept. Benchmarking, however, is acceptable to the chlor industry while auctioning is not, but if it was to be adopted, the revenue arising should be recycled.

On behalf of CEFIC, Mr ***Peter Botschek*** presented "Solutions for an improved ETS", which in his view, are mainly necessary to ensure competitiveness of the chemical industry. He proposed the targeted introduction of performance-based allocation through benchmarks to large emitting, homogenous processes, linking allocation to production and excluding small emitters from the EU ETS.

Auctioning would exacerbate the problem presented, although theoretically auctioning of allowances would be an ideal way of allowance allocation if applied world-wide. Recycling of auctioning revenues could lead to additional administrative procedures and costs, while a

level playing field could not be ensured if there were different practices in different Member States.

Mr ***Yves de Lespinay*** from the European Lime Association presented a "Global Lime Carbon Allocation Model" for the post 2012 carbon allocation based on the development of benchmarks. While work on the model is currently ongoing, a draft of it should be available in September 2007 and the full model by the end of 2007.

According to Mr ***Jean-Marie Chandelle*** (CEMBUREAU), criteria for benchmarking in the European cement industry should be performance based on historical specific emissions. While opposed to auctioning, revenues gained from auctioning should be used to reward the best performance. Mr Chandelle also presented a global sectoral approach for CO2 reduction in the cement industry. He concluded that the concept can be integrated in the logic of national or regional schemes, and allows a worldwide vision in the cement sector and a progressive evolution of non-constrained developing countries into a common scheme.

Mr ***Marco Mensink*** (CEPI) presented views on improving allocation of the EU pulp and paper industry. He stressed that the large number of installations, the large variety between installations and large number of smaller installations would create a challenge to implement benchmarks in the pulp and paper sector. Current benchmarks in member states (NL, BE, AU, Germany) are not fit yet to be brought directly to the EU level.

Mr Mensink advocated a combination of benchmarks and grandfathering for various reasons. Auctioning would only give limited possibilities of recycling revenues and without return of revenues, auctioning of credits would take away the funds needed to make technical progress and directly influence global competitiveness.

Mr ***Guy Tackels*** (CPIV) made a presentation on the allocation method in the glass industry. In order to improve the allocation method, fine-tuning by glass sub-sectors would be absolutely necessary and free allocation would be essential (on the basis of world-wide competition). Auctioning should be avoided. The allocation method must take into account unforeseeable production growth and the wide diversity of the Glass industry. A sector-related method and benchmarking is worth considering, but admittedly quite complicated. For this reason, auditing can be used as a safety net. A harmonised European benchmark is required.

Mr ***Kevin Farrell*** (CERAME-UNIE) presented "Key positions of the European Ceramics Industry on ETS and allocation methods". Under certain conditions, benchmarking could be applied to the ceramic industry. In Mr Farrell's view, auctioning is not adapted to the ceramics industry and should be avoided, as it is perceived as favouring carbon price volatility and is very likely to deter new investments in the ceramics sector. However, should auctioning occur, the revenues from it shall be recycled to those industries that have no possibility to pass on cost increases. Ms ***Annette Loske*** (IFIEC Europe) made a presentation on "Improving Allocation – Performance based allocation and activity rate: what is the choice?" She commented that the EU ETS in its current form has raised fundamental challenges, such as the power price effect and identified several problems with respect to relying on forecast data. According to Ms Loske, these issues would be solved through relying on actual production data, which would eliminate the disadvantages of the present rules (uncompetitive high electricity prices, exporting and increasing emissions, hindering competitive strategies, discriminating new entrants), but would realize advantages of a market-based instrument, i.e. providing for cost efficiency, setting the right incentives for efficiency improvements, guarantee of total cap.

Discussion

The debate identified a number of requirements to be met by benchmarks: they must be simple and strictly limited in terms of numbers of benchmarks. Some Member States anticipated a risk of difficult political discussions when it comes to defining benchmarks, while NGOs underlined the need of a transparent benchmark setting process which identified the single best least CO2 intensive method of production to facilitate possible linking with other international emissions trading systems. In the view of NGOs, the case for benchmarking was dependent to a large extent on their exposure to international competition and their inability to pass on costs to customers.

On request of the Chairman, representatives of industry confirmed that for the steel sector about five benchmarks, one or two for the cement sector and about 20 benchmarks for the chemical sector would in their view be required.

With respect to performance-based benchmarks, representatives of NGOs and the research community took the view that they may introduce relative emissions targets instead of absolute ones and also partly eliminate or distort the carbon price signal. Without a carbon price signal, the cost-efficiency of the system would be jeopardized.

Representatives from a number of Member States, the carbon trading sector and the gas industry assigned only a supplementary role to benchmarking. For most of them, the starting point for allocation should be auctioning, as this would solve a lot of allocation problems. Generally, the burden of proof why not to auction should lie with the industry concerned. Benchmarking may only be appropriate, where it is proven that allowance costs could not be passed through and where international competition necessitates a certain level of free allocation.

The role of the carbon price signal in terms of the emissions reduction objectives to be achieved had been highlighted. A 20 – 30% emissions reduction objective for the overall economy is likely to involve a substitution effect. Auctioning could best ensure the carbon price signal required, since benchmarking and auctioning do not provide the same incentives unless, for example, a fuel switch signal were maintained in benchmarks.

Some representatives from the industry pointed out that only a decreasing share of inefficient production would bring about reductions of emissions and advocated an absolute cap for the sector and intensity targets for individual installations, which should be subject to ex-post adjustments or ex-ante benchmarks based on real production.

In the view of many stakeholders including many Member States, the carbon trading sector and NGOs, performance-based benchmarks and ex-post adjustments would run contrary to predictability and would turn out to be disastrous for the EU ETS. The same would go for other instruments such as price caps.

Representatives of the oil and gas industry took the view that internationally competing oil companies should continue to receive the bulk of their allocations free of charge until there is a worldwide carbon valuation and expressed a clear preference for a top-down process allocating allowances for free on the basis of historic emissions. Representatives of the oil industry were opposed to auctioning, but could consider some elements of benchmarking. They also requested to take into account the so-called “Oil Refining Paradox”, which implies

that efforts required by law and undertaken to produce cleaner products for customers with a view to reducing their emissions may result in greater CO2 emissions inside the refineries.

In the view of industry representatives, compensation requests from the industry, as presented by Mr Steel, are justified. Some Member States did not exclude that part of the auction revenues should be recycled back to the energy intensive industry.

For some industry representatives, the proposal to give indirect allowances to power producers or direct allowances to consumers with a view to making up for increased electricity costs is an option that should be considered.

Conclusions

The chairman concluded the debate by highlighting five points:

- There is no agreement among stakeholders on the preferred allocation method. The merits and drawbacks of the various allocation methods have been presented and discussed, but the split of views remains.

- With respect to allocation through benchmarking, it became clear that a lot of work remains to be done and that this approach is complicated and demanding. This is also clear to the industrial sectors, partly due to their work carried out in the past, partly due to anticipation of forthcoming work. The Commission does not want to discourage the industrial sectors from developing good benchmarks, but does not want to engage into another Sevilla process on BAT (best available techniques) with all its promises and limits. For this reason, the various sector associations are requested to sort out amongst themselves which benchmarks could be applicable and thus provide important input to the process conducted by the Commission.

- With respect to benchmarking, there are serious concerns about predictability to the market, i.e. the certainty required by investors. The debate has demonstrated that the more one goes into details, the more complicated the issues become. The Commission invites all industrial sectors to look into benchmarking, but wants to make clear that ex-post benchmarks are not compatible with the way the EU ETS is set up. For the sake of a well functioning market, ex-ante benchmarks would represent a minimum requirement, while frequent and/or regular ex-post interventions are excluded.

- There is also a matter of confidentiality, which emerges from the need to have reliable production data and other inputs when it comes to defining benchmarks. Experience showed that acquiring these data is in practice very difficult due to well-justified reasons of confidentiality and competition. The industry is requested to reflect further on these issues, since performance based benchmarks require that sort of input as a condition *sine qua non*.

- The international dimension of emissions trading requires simplicity of allocation, in order to promote linking with other emissions trading systems. If auctioning is not the preferred approach, it would be very important to present factual proof of how international competitiveness of the European industry is affected, in order to allow the Commission to take the matter of international competitiveness into account when it comes to proposing allocation methods. The issue of recycling of revenues from auctioning would also be an important aspect to consider.

Agenda item 4: Carbon price signals, allocation methodologies and international aspects including electricity prices

Presentations

On behalf of WWF, Mr ***Stefan Singer*** presented "The economic and ecological impact of different allocation methodologies – grandfathering, benchmarking, auctioning". Mr Singer identified a need for a single EU-wide cap that is aligned to 30% + greenhouse gas reduction limits by 2020. He advocated a cap level for 2020 with a percentage of periodic 5 years decrease to be set in the directive as well as starting the debate on 2030, 2040, 2050 EU ETS cap level.

WWF recommends that all permits should be auctioned as there is no other equally transparent, equitable and non-distorting method of allocation. With respect to auction revenues WWF recommends that the distribution of all money generated is transparent and publicly accountable and used for climate protection. A substantive part of money should be invested in developing nations to facilitate technology transfer, European export industries and lead to an increased uptake of clean carbon solutions.

Mr ***Jos Sijm*** (ECN) made a presentation on "The impact of the EU ETS on electricity prices: experiences from the past and expectations for the future". According to his findings, the main price drivers on 2005 forward markets, in the case of gas fired power generation were fuel and carbon costs, while for coal-fired plants only carbon costs were identified. In Mr Sijm's view, carbon pass through is not a problem, but an intended effect. On the other hand, he noted that although overstated generally by energy-intensive industries, it is an issue for some sectors. Carbon pass through and windfall profits would continue in the future, although the impact in the long run will be mitigated by induced additional investments in generation capacity. In this respect, he stressed that however, free allocations undermine the incentive structure towards carbon reducing investments. A shift of free allocation to auctioning will have a beneficial impact on carbon reducing investments, reduce (windfall) profits of fossil generators, but most likely not have a (significant) impact on cost pass-through or windfall profits of non-fossil generators.

Mr ***Simon Baker*** (Eurometaux) made a presentation on "The impact of the EU ETS on electricity prices – perspective from non-ferrous metal producers operating in Europe". As for the observed CO2 pass-through into power prices, Mr Baker explained that including the opportunity cost of CO2 in pricing decisions is fully consistent with economic theory. Non-ferrous metal producers need long-term predictable cost-based power supply arrangements. Uncertainty on the future tightness of the carbon constraint, allowance allocations and methodologies makes pricing long-term power supply agreements very difficult. Consequently power generators are either unwilling to enter into long-term sales arrangements or will look to push the CO2 price risk to the consumer. Non-ferrous metals are globally traded commodities; producers cannot pass-through local cost increases such as the incorporation of the CO2 cost into power prices in Europe.

As a consequence, shielding measures from the pass-through effect of CO2 into power prices would be required, otherwise trade-exposed energy intensive industries in Europe such as primary aluminium production will close and be replaced elsewhere with no overall environmental benefit.

Mr Baker proposed that long-term power sales to trade exposed energy intensive industries should be entitled to an equivalent free allocation of allowances. In Mr Baker's view, such an approach does not affect fundamentals of the scheme nor monitoring and reporting and would remove CO2 indirect effects in power prices.

In his presentation on "Impacts on electricity prices of emissions trading", Mr ***Bill Kyte*** (Eurelectric) stated that changes in electricity prices would not be a consequence of emissions trading, but of implementation of the Kyoto Protocol. As the trading scheme is the cheapest way to implement Kyoto, it means that any price changes will be the lowest necessary. He pointed to electricity price increases starting already in 2002, while the EU ETS came into effect in 2005. Real prices, however, were, according to Mr Kyte, still lower in 2006 than they were in 1990, while a threefold increase in taxes from 4.2% in 1995 to 13.2% in 2006 contributed considerably to the power price rise.

He also argued that electricity prices in the US even rose more than in Europe (before taxes) compared to 1995. Also fossil fuel prices went up more sharply than power prices with oil price increases amounting to 186% (1995 – 2006), gas prices to 133% and coal to 34%. The same would go for the metals and chemicals sectors with aluminium up 60% compared to 1997, steel a little bit less than 60% and copper around 20% (yearly average, based on $-prices), while in the chemical sector ethylene, ammonia and methanol show price increases between 40 and 140%.

As regards the impact of non-EU competition on the ETS sectors, he referred to a Climate Strategies study conducted on behalf of DEFRA, which for most ETS sectors did not reveal any significant value at stake, even in the scenario where no allowances were allocated for free.

In his conclusions, Mr Kyte underlined that the objective of the EU ETS is to deliver carbon reductions at the least cost and the impact of the EU ETS on competitivity has been over-hyped. Key principles for allocation could be equity between installations, predictability and harmonization.

Ms ***Sophie Dupressoir*** (ETUC) presented the viewpoint of European Trade Unions on "Allocation of carbon permits, competitiveness and employment". She outlined that for energy intensive industries (EII), there is a threat of relocation and there might be the risk to head towards a 'lose-lose' situation made up of the loss of European industrial basis and the loss of potential of emissions reduction. The industries concerned would not account for more than about 1 percent of EU employment. A study conducted on behalf of ETUC showed that, in most cases, the sectors are not putting enough effort into R&D.

The level of auctioning should depend on the level of exposure to international competition, while the risk of relocation could be minimised by a border adjustment mechanism. She concluded that there should be as much as possible harmonisation in the EU ETS. It should also be backed up by stronger and public R&D funds to bring the necessary technology breakthrough. The transparency of the allocation process is considered crucial, even if auctioning and benchmarking are applied.

Mr ***Christoph Grobbel*** (McKinsey & Company) made a presentation on competitive effects. Power plants are generally profiting from EU ETS, but to a different extent: while nuclear power does not face any cost but revenue increases, revenue increases of lignite, hard coal and

old gas fired power plants would mainly depend on free allowances, as not all cost increases could be passed through (merit order).

While revenue increases in the refining sector under free allocation clearly outweigh cost increases, cost and revenue increases in the steel and cement sector would just level out each other. All of these sectors, with the exception of EAF steel, however would depend on free allowances. The aluminium sector faces pressure also with free allowances, since there are no revenue increases but only increasing costs.

In summarising the lessons learnt, he concluded that competitiveness issues should be addressed. This could either be done through a cross border taxation scheme or production based allocation with benchmarking or auctioning with redistribution of the proceedings. In the event of a global sector agreement, the issue would be resolved, too. The allocation mechanism would determine the "pricing-in" of CO2 allowance value.

For the steel industry, Mr ***Paul Brooks*** (Eurofer) presented "A Proposal for A Sector Approach". Taking the view that the current EU ETS does not deliver a global reduction in CO2 emissions and will not help achieving a reduction of CO2 emissions by 30% by 2020, he proposed an alternative ETS based on a baseline and credit system. He described its main characteristics – a mandatory scheme for the steel sector, including direct and indirect emissions on the basis of a baseline. The system would offer a clear incentive to invest in improvements and provides major advantages, such as quantified emission reduction performance, real reward for innovation, avoiding delocalisation of emissions, no barrier to growth, and it has a real potential to become global.

Mr ***Richard Baron*** (IEA) made a presentation on the economic role of carbon price signals emerging from the EU ETS. It is to internalise the social cost of CO_2 and to optimise choices on that basis. In electricity, the carbon price signal is working. Emissions trading is a cost-minimising policy instrument and would determine the appropriate carbon price. Asking whether the same environmental outcome could be delivered at lower cost, he confirmed that this would be possible on condition that incentives to lower emissions are unequivocal, and uncertainty can be lowered through commitment periods and increased visibility to investors.

With respect to CO2 and competitiveness with outside the EU, the priority should be to seek least-cost reductions through emissions trading. In order to improve the ability of the scheme to deliver a CO2 price as low as it could be, the review should bring about new rules to lower uncertainty.

According to Mr Baron, the market base of our economies makes CO_2 pricing a central coordination tool, yet other policy instruments are needed to overcome market barriers and distribution issues must be addressed.

Discussion

In the debate, NGOs highlighted that with respect to international competitiveness, some presentations have shown that cost issues are not as serious as claimed and requested data on industry's exposure to international competition. While some Member States took the view that, where justified, concerns about competitiveness must be addressed by means of a compensation mechanism including reinforced work on border tax adjustments, reference was also made to studies showing that a high level of auctioning would be possible for energy intensive industries without impacting on leakage.

Representatives of the carbon trading sector took the view that leakage is often confused with the impact of globalisation. With respect to a proposal presented, they stressed that Europe would give the wrong signals if it were to have industrial sectors leave the EU ETS.

Auction revenues should be used to help other countries invest in clean technologies or export credits. NGOs suggested that auctioning could reduce the costs for the society in comparison to taxes.

Some industry representatives questioned some of the figures shown in some presentations and pointed out they would not apply to energy intensive industries. They also had doubts whether the results of a recent study published by DG Competition have been taken into account with respect to market distortions.

Conclusions

In summing up the debate, the Chairman identified three points:

- The economic impact of the EU ETS is there and has created price effects throughout the economy.

- As regards international competitiveness, there are direct and indirect impacts. Factual evidence on these impacts will be needed and it is important that this evidence is made clear. The EU ETS will be reviewed, however, without compromising its environmental strength and integrity. It is also a matter of fact that globalisation is ongoing.

- In the event that negative impacts from international competition can be established, there may be different ways to deal with them:

    - differentiated allocation of allowances

    - different allocation method, e.g. between the power and the industrial sectors

    - The baseline and credit system, presented by Eurofer, however, would not be compatible with the EU ETS.

    - Border tax adjustments or similar compensation mechanisms might be considered, when it comes to compensation.

Agenda item 5: Options for benchmarking

Presentations

Mr ***Mariano Morazzo*** and Mr ***Fabio Romani*** (Italy) presented "Benchmarking – methodology for allocation". They presented a general definition of benchmarking, as well as the use of benchmarks (BMs) for allocation, where they could be used for both cap setting and distribution. Benchmarking entails a number of advantages, such as transparency, an incentive in favour of low carbon products and technologies and it can account for growth and market share of the installation concerned. As a drawback, the need for quality data on processes and products was mentioned.

The definition of products to be taken into account may be a trade-off between simplicity and equal treatment. Too many BMs reflecting different technologies or products would only deliver small advantages compared to grandfathering.

Mr Morazzo concluded that there are issues to be overcome and technical options to be assessed, such as outsourcing, data consistency and confidentiality, installation and process boundaries, products and technologies, fuel (in)dependent BMs etc. On the other hand, benchmarks represent a flexible policy tool that could bring environmental and economic benefits.

Mr ***Tomas Velghe*** (Belgium) presented the role of benchmarking in the EU ETS. His presentation primarily focused the distribution of EU ETS emissions among Annex I-activities, the role of benchmarking in determining sectoral caps and the role of benchmarking in individual allocation methodologies. When it comes to the role of benchmarking in determining sector caps, the EU commitment to at least a 20% reduction has to be translated in an EU ETS and non-EU ETS cap. This should happen following combination of a "grandfathering" and "equity based" approach made at EU-level.

As regards the role of benchmarking in individual allocation methodologies, a strong (non-fuel specific) benchmark should be used for all fossil-fuel fired power plants in the electricity sector. The rest of the allowances within this sectoral cap could be auctioned or set up as EU-wide reserve.

In some specific industrial sectors, existing benchmarks are being developed. Mr Velghe advocated applying EU-wide benchmarks in these sectors for the sake of a level playing field. As for smaller sectors, Mr Velghe did not exclude BMs, but considered them to be too diverse.

Mr ***Paul van Slobbe*** (Netherlands) made a presentation on "Benchmarking and NAP-III". Since allocation should be fair, Mr van Slobbe excluded grandfathering and advocated auctioning as the best method with benchmarks as a supplement if politically required. Simplicity and predictability should be key starting points as criteria for benchmarks. EU allocation norms should be set for existing plants and for new entrants, but only major products/processes covering approximately 80% of emissions with the balance leaving to Member States or excluding them from the scheme (Pareto concept).

He proposed to launch a pilot project with clearly defined objectives and features, which should be finished in October 2007 and should provide input to the review of the EU ETS. Summarizing his presentation, Mr van Slobbe highlighted that setting the total ETS cap is an autonomous process; allocation should be done by auctioning and, where necessary benchmarks; the real small emitters should be excluded; EU benchmarks for the major few should be developed and kept simple; smaller emitters should be left to discretion of MS; a pilot project should be started with MS taking the initiative.

Discussion

The debate revealed a considerable number of arguments for and against using benchmarks for allocation.

Several Member States were open to support benchmarks, but acknowledged their complexity, also involving the risk of over-allocation to efficient installations. Others

highlighted that local circumstances should be taken into account as well as the structure of the power sector and political considerations. Representatives of energy intensive industry advocated considering benchmarks, as the impact of auctioning on customers of the power generation sector has to be taken into account. On the other hand, NGOs highlighted the risk of distortions arising from the implementation of benchmarks, which may result in 27 rather than one benchmark in one sector. This could not only have protectionist effects, but would also send the wrong signals. Contrary to benchmarking, auctioning would sort out a number of problems (see below) without creating additional costs compared to the current pass-through situation. Representatives from the academic research community proposed that revenues from auctioning be used to support innovation in sectors exposed to international competition.

Some Member States showed some sympathy for the Dutch proposal to have EU-wide benchmarks only for the key sectors and considered it a matter of the industry concerned to come forward with appropriate benchmarks. While other Member States identified EU cap setting as a prerequisite for EU-wide benchmarks, which might be based on historic rather than projected data, experience of some Member States advised to refrain fully from production figures, as it failed to work. Some industry representatives said that fuel switching, e.g. from coal to gas, as a means to reduce emissions might not always be possible and, since the process side would not allow any reduction at all, emissions reductions might not be possible. One Member State asked for considering whether a benchmark with a correction factor for grandfathering allocation could be explored. A representative of the energy intensive industry announced that the European lime industry is investigating to go for an EU-wide benchmark taking into account the technical potential of reducing emissions.

From the point of view of representatives from the academic research community, benchmarks could only be the 2nd or 3rd best solution, since any updating component of benchmarks would create a major distortion of the price signal to the market, while the yardstick should be a non-distorted price signal. Such distortions could also be expected, if a fuel-specific benchmark was to be applied. Output based benchmarks in the 3rd trading period would increase inefficient production in the 2nd trading period.

According to the Commission, state aid issues may be raised, if rewarding best performers would mean to allocate more allowances than they need. While some Member States argued that this could only be avoided by using benchmarks based on BAT (best available technology), other Member States took the view that granting more allowances to more efficient performers should not be seen as constituting state aid. In their view, this should be clarified in the Directive. In the view of industry representatives, there should not be any prohibited state aid involved as long as there is an environmental counterpart. The system should not only stimulate BAT, but improving BAT. For this reason, it would be counterproductive, if best performers receive fewer allowances. The yardstick for allocation should be the incentive to invest. Industry representatives also pointed out that amortized assets are usually the cash cow of the industry, since they incur only variable costs, but they are very often very old and thus inefficient compared to new installations. In the case of non-amortized installations, too few allowances would turn them into stranded assets. This could only be avoided by setting very long-term, i.e. 25-30 years, benchmarks.

The Commission noted that performance-based standards require a solution of the confidentiality problem, which would arise when setting the benchmark. The problem would not only occur vis-à-vis the authorities, but even more among the companies of one specific sector. Representatives from the industry suggested that this problem could be solved through

outsourcing, if the rules were clearly laid down and if the "how" was solved. According to the experience of some Member States actually applying benchmarks, the confidentiality problem is still pending. It has also been highlighted that disclosure of allocation data would inevitably reveal production data, and thus underline the confidentiality problem. Representatives from the energy intensive industry set out that much information would already be available from publications in the framework of EMAS and others. In the case of ex-ante benchmarks, the matter of confidentiality would not create any problem, as it would only matter for the shareholder market. According to one Member State, 80% of production figures are already available, while the Commission underlined that data gathering would create a lot of work for Member States. Representatives of the energy intensive industry drew attention to the fact that for example data published by the IEA do not necessarily match between countries and categories or sectors, as used by the CITL. It would be important to ensure that IEA and CITL data were in line.

Some Member States and a Commission representative considered simplicity and transparency of benchmarks to be key to convince other countries, such as the G8 plus five to link up with the EU ETS, while a energy intensive industry representative took the view that simplicity is not always easy to achieve and might not always be appropriate for a benchmark. Other industry representatives stressed that EU benchmarks must be kept simple, not least for linking purposes. In addition, they suggested that, for the sake of a global carbon market, global benchmarks should be developed, since the US and Australia would develop an ETS based on performance standards. Against this background and referring to current developments in the US, NGOs strongly advocated auctioning as the only credible allocation methodology.

Doubts were raised concerning the feasibility of benchmarks when it comes to linking the EU ETS with China, on the basis that neither side could be expected to accept a more ambitious or stringent benchmark than their own. Representatives from the industry took the view that this consideration should not be a matter of concern now, because such a system would still be 10 to 15 years away and that China is always using brand-new technology anyway.

The Commission raised the issue whether performance based benchmarks, which are to provide more flexibility would still require a reserve. Some industry representatives took the view that a reserve for growth would always be needed, in order to take into account the growth of the whole economy.

Several Member States supported the idea of a pilot as proposed by the Netherlands. One Member State raised doubts whether refineries would be the most promising sector for the pilot and suggested that aluminium and steel would represent good starting points. A representative of the energy intensive industry announced that the lime industry would volunteer for the pilot subject to decision of the relevant industry board.

Conclusions

The chairman summarised the debate by highlighting five points:

- The presentations have shown that there could be a role for BMs in overall cap setting and allocation. In determining an EU-wide cap , this could take into account EU sector caps, for which BMs could be extremely useful, in order to minimise potential competitive distortions.

- Full auctioning would mean that there is no need for BM and vice versa. 100% auctioning would also mean that there are no state aid concerns. A strong conclusion is emerging from the debate: both auctioning and BM need a clear long-term perspective, in order to be efficient from an environmental point of view.

- There are a number of different definitions for BMs, such as technical standards, norms, BAT or correction factor of grandfathering. It is useful to have many different definitions, as it might be difficult to have a one-size-fits-all approach employed. There seems to be agreement that a BM should be EU-wide, and if possible, should have a global dimension. There must also be only a limited number of benchmarks with a limited number of installations. While simplicity would be very important, there is caveat meaning that this principle comes under pressure, if one goes into the details.

- Problems to overcome with respect to BMs are

    - the data requirements, which may be extensive and challenging, but not impossible to overcome, although the debate highlighted a new problem accruing from the incompatibility of international data basis, which would bring about an additional layer of complexity.

    - the confidentiality issue, where some stakeholders take the view that one could be transparent on matters, but does not necessarily have to be on data, while other think one cannot hide them as the credibility of the BM would be at stake. While there may be ways to overcome the problem by involving a third party, the issue remains a delicate one requiring a balance to be made.

    - punishing those lagging behind is right, but might be politically difficult to achieve.

    There is also a need to minimise interference of the public sector by, e.g., ex-post adjustment, which would de-stabilise the market and runs counter the set-up of the EU ETS. All in all, BMs entail considerable problems, which however are not impossible to overcome.

- A pilot exercise would be welcomed by the Commission, since it would allow taking stock of the experience of Member States, but it should be done with an EU-wide, if possible global dimension in mind. It could be done by a small group of experts in the framework of the Climate Change Committee, where a case could be selected to provide insights for the Commission when elaborating its legislative proposal. Input of the industrial sector would be welcome.

Agenda item 6: Options for Auctioning

Presentations

Mr ***Kjell Olav Kristiansen*** (PointCarbon) made a presentation on „Auctions – new market dynamics“. He concluded that

- There must be clear objectives behind EU/MS auction strategy addressing the issues of market power, price regulation etc;

- It is important to understand market behaviour and timing considerations
- Carbon exchanges/energy trading platforms should be used for auctioning (routines, software, clearing routines etc at hand)
- The number of ”auction houses” and frequency of auctions should be limited
- A uniform price auction appears to be a simple and most common approach
- There should be low barriers to participation, in order to keep transaction costs as low as possible.

Mr ***Karsten Neuhoff*** (University of Cambridge) presented design options for auctioning under a single EU-wide cap or national caps. He concluded that

- A simple auction design would win participants and for this reason, a sealed bid, uniform, frequent auction design, commissioned to institution with existing operations is likely to be best. Open issues in this respect would be whether the distribution across auctions would be uniform.
- Harmonisation of auctions would be simple but effective. They could be simplicity and thus facilitates participation and avoid lock in. The possibility to commissioning auctions to one institution should be jointly considered.

Mr ***Andrei Marcu*** (IETA) presented IETA’s views on auctioning. He presented arguments in favour and against auctions and identified a number of requirements of auctions such as transparency and simplicity of auctions, recycling the bulk of proceeds, a long-term regulatory predictability, periodic and coordinated auctions without causing large distributive effects, harmonised design and gradual implementation of auctions and the need for new investment.

He concluded that recycling of revenues should not be used to introduce new market distortions, but should be used to remove existing ones. If auctions are introduced, it must be introduced gradually, taking into account the level of development, especially scope, of the global GHG markets and concerns over competition.

Ms ***Gyorgyi Gurban*** (Hungary) presented the Hungarian experience with auctioning in the 1st period. In Hungary, allowances are considered an asset of the Hungarian national treasury, which is very different in other Member States. For this reason, harmonising the legal nature of allowances across the EU has been recommended. The Ministry of Finance has been nominated to be in overall charge and contracted a company, in order to implement an electronic auction. The whole process turned out to be very long, but the system worked well in overall terms. It was decided to use the revenues up to a certain level for climate adaptation and mitigation measures. Ms Gurban recommended to set up rules at EU level on how the revenues should be used, at least in order to make sure that they do not run counter the whole system.

Mr ***Ken Macken*** (Environmental Protection Agency, Ireland) presented the experience on “Auctioning Greenhouse Gas Allowances” in Ireland. For NAP1 the Irish Government had directed EPA to auction up to 1% of allowances to defray the costs of administering the emissions trading scheme. Two auctions took place, the first in January/February, the second

in December 2006. Mr Macken identified a number of lessons learned from auction 1, from which auction 2 in December benefited:

- Electronic transfer of deposits and matching to account holders was not as straightforward as Irish authorities had been led to believe – the full data string did not appear on their on-screen bank account.

- Time-lines for electronic funds transfer were generally very fast – two days would appear to be sufficient. Hence settlement time-lines could have been shorter than the five days in the 1st auction.

- Refunds to unsuccessful bidders was straightforward for those in the eurozone, but slower for those outside the eurozone as authorities needed to ascertain if the return account was a euro account or a national currency account.

- Vulnerability of auction if market dipped during settlement period. The deposit of €3,000 was insufficient to ensure payment of accounts and was increased to €15.000 in the 2nd auction

Mr ***Tomas Wyns*** (CAN-e) made a presentation on allocation methods post 2012, which in his view have to be auctioning and an EU-wide cap. He strongly advocated full auctioning as single allocation method post 2012 on the following grounds:

- Transparency: auctioning would not need any complicated formulas, historical data, benchmarks etc;

- Auctioning would convey a clear CO2 price signal;

- Auctioning would provide a better incentive for price internalisation and hence promote investment in energy efficient, renewable technologies, which, according to Mr Wyns, will be needed anyway, bearing in mind reductions needs by 2050 in the order of up to 80%.

- Auctioning would eliminate windfall profits and intra EU distortion of competition and would provide a solution for new entrant and closure issues.

His final conclusion was that auctioning is, in principle, the best method to allocate allowances.

Discussion

In the debate, a number of Member States clearly spoke out in favour of auctioning, some of them advocating full auctioning from 2013 onwards. Representatives of the industry were opposed to auctioning before a global agreement was reached, as the effect of auctions would in their view represent a variable and unpredictable tax on business, would accelerate further slipping behind in terms of EU R&D expenditure compared to the US and Japan and would affect investment decisions and the ability to invest by reducing the profitability of investments within the EU energy intensive industry relative to investments outside the EU. Renewable energy generators argued that auctioning would remove investments from dirty industry and shift them to clean industry, thus providing the right investment signal. They also stressed that auctioning would remove market distortions and align with the "polluter-pays-principle".

Stakeholders had differing views on the extent to which harmonisation of auctions should be pursued or would be necessary. According to representatives from the academic research community, empirical evidence does not prove large differences of auctions in terms of results/outcomes. While industry representatives underlined the importance of harmonising auctioning across the EU, some Member State representatives spoke out against harmonisation of auctioning rules in favour of minimum standards in the form of Commission guidance. Representatives of the carbon trading sector took the view that much experience is already available from auctions in other sectors, but considered it necessary to discuss the right way how auctions would be phased in. It has also been highlighted that, in terms of coordination and timing, early announcements would be needed. The 2nd trading period would also allow time to coordinate and identify appropriate solutions including identification of a third body to implement the auctions on behalf of Member States. Some representatives of the industry shared this view. Representatives of the energy intensive industry pointed to the Irish example using small auctioning slots, which could work, but had doubts, whether such an approach would be feasible at EU level.

They also raised doubts whether free access to auctions can be guaranteed to all including small emitters. According to some Member States, this should not be a big issue, since secondary markets would be open to all and the market would offer relevant services. Representatives of NGOs also took the view that small companies would have plenty of opportunities to buy allowances, while representatives from the academic research community pointed out that a uniform price approach implied all are paying the same amount and would therefore be rather simple also for small parties. In addition, frequent auctions would make it difficult to exercise market power and would render the market less vulnerable to price shocks. Representatives of the gas industry underlined that the auction design, such as the frequency of auctions must be well known at the beginning of the period, as auctions have to be designed to supplement secondary markets, in order to enable them to underwrite investment decisions.

While representative of the energy intensive industry took the view that auctions would result in higher electricity prices, representatives of the carbon trading sector were convinced that auctioning would not lead to rising allowance prices, since the costs of allowances are already passed through. In this respect, representatives from the academic research community underlined that free allocation would inevitably lead to a distortion of the price signal and in the longer term to higher CO2 prices and thus higher electricity prices.

With respect to the use of auction revenues, several Member States representatives were of the view that the decision on their use should taken by Finance Ministers, most of them however did not exclude that at least a part of these proceedings should be spent for environmental purposes, for example through creation of a climate fund, if there were justified needs. One Member State asked for a study of the Commission whether recycling of revenues to the energy intensive industry would constitute state aid, while industry representatives argued that the use of auction revenues must not be left to the discretionary actions of Member States, but should be used for R&D measures with a view to helping the industry affected by international competition or for promoting technology transfer to developing countries. The argument that revenues must not disappear without any benefit for the environment was also strongly supported by representatives from the carbon trading sector, who pointed out that the ETS has been set up in order to address environmental concerns, but not to raise revenue. In their view, the EU ETS would be undermined, if revenues were not used for environmental purposes.

Conclusions

In his conclusions, the Chairman raised three points:

- There is a lot of support for auctioning because of its merits in terms of transparency, delivering a clear price signal, avoiding windfall profits and others. The merits have to be balanced against the concerns relating to international competitiveness, however, this would not apply to all sectors, but only those which can adequately demonstrate that they are exposed to international competition or which cannot pass through their costs. The bottom line with respect to both benchmarking and auctioning, however, is that there should not be any new distortions or that the risk of new distortions should be minimised.

- Problems raised in the debate from a policy perspective concern the potential creation of market power and the requirement not to bring about any instability, which would both speak out in favour of frequent auctions. The timing of auctions is important, as is the gradual nature of their introduction. Predictability also plays an essential role with a view to avoiding upsetting the secondary market. Another crucial issue is how to guarantee access to all market participants including the small ones. Auctioning would also bring about a new EU dimension, i.e. the matter of using revenues, which could be implemented nationally. There is scepticism about decentralised handling of auctions, as this may lead to new distortions. Unproductive conditions arising from 27 different auctioning systems have to be avoided.

- A solution on how to use revenues is technically possible, but is politically less straightforward. While some maintain that the use of revenues should be fully open for national treasuries to decide, others stressed that new distortions must be avoided. Thus, it represents a new issue to look at. There have been many suggestions how to use auctioning revenues including measures to reduce greenhouse gas emissions, to promote new technologies and R&D, to reduce corporate taxes or to introduce them to the EU budget, from where it would be recycled to Member States. There is also a strong EU dimension with respect to state aid.

Agenda item 7: Possible options for allocation under the EU ETS post 2012

Agenda item 8: New entrants

Agenda item 9: Closure of installations

Agenda item 10: Monitoring and reporting

Presentations

Mr ***Daniel Radov*** (NERA) presented options for allocation under the EU ETS post 2012. He then presented options to harmonise allocation matters taking as a starting point the currently existing situation. The options identified included maximum, moderate and low harmonization. In a preliminary evaluation of these allocation options, Mr Radov arrived at the following conclusions:

- Environmental integrity refers to certainty of a EU-wide cap and the risk of leakage. The proposed options improve on status quo in terms of cap, some are more designed to prevent leakage than others.

- Efficiency of trading scheme refers to the ability to achieve emissions reductions at least cost. Key negative factors are allocation to new entrants, differentiation of new entrant benchmarks, and updating—but keeping in mind real-world complications would be important.

- Administrative costs and feasibility depend primarily on data requirements, sensitivity of data, and number of independent Member State allocation approaches. Recent production data may be sensitive.

- Fairness is difficult to quantify or judge objectively. Is it "more fair" to allocate the same to all, or more to those facing competition, or to those producing more, or to those innovating the most, etc.?

As for the matter of new entrants, Mr ***Hans Henrik Lindboe*** (Denmark) presented preliminary results of a study on "Impact of suboptimal design features in the EU ETS – Allocation in the electricity market". He outlined the impact on the electricity spot market dispatch demonstrating that the merit order of electricity supply is affected by CO2 costs rendering gas more competitive than coal. A similar effect could be observed with respect to the long-run marginal costs of electricity generation, which are decisive for investment decisions. As a consequence, wind power would be as competitive as gas, but more competitive than coal. In an optimal design, the impact of emissions trading on the electricity spot market would ensure efficient CO2 reduction and provide incentives to invest in low carbon technologies.

He then outlined the project, the goal of which was to assess the impact of free allocation to new entrants in the EU ETS. The overall outcome of the two scenarios examined under the study showed that free allocations to new entrants would distort the market. Overall economic welfare losses in the area researched would amount to more than € 15bn at a price of €30/tCO2 amounting to 25% of investment.

Ms ***Ann Gardiner*** (Ecofys) presented a "Definition of new entrant" and identified four harmonization options. She concluded that there are strong arguments in favor of harmonizing new entrant rules, which should be linked to overall decisions on harmonization of future phases of ETS. An EU rule book could begin harmonization and could set out the long term approach. In the long term, a total remove of NER and closure rules could be considered.

Subsequently, Ms ***Ann Gardiner*** (Ecofys) presented options for harmonisation of closure rules. She identified the same options as for new entrants, which have to be informed by worked examples of real closure and transfer, a route map for long-term future and an approach to international competition.

Discussion

With respect to the presentation on harmonisation of allocation, some Member States suggested that the study should also include practical examples how various harmonization options would work out for Member States. Other Member States may prefer a mixture of the three options presented.

Representatives of several Member States, the carbon trading sector, NGOs, industry representatives and the research community taking the floor agreed on the need for more harmonised new entrants reserve (NER) most likely at EU level. In the view of most of them,

there would not be a need for a NER for the power sector, which should be allocated through auctioning. However, in the event that there is no full auctioning, almost all stakeholders advocated applying the same approach to incumbents and new entrants, for example, based on high performing benchmarks.

According to representatives from the academic research community, the need for consistency between allocation, the NER and closure rules has to be respected. Free allocation to new entrants could have the potential to distort between different fuels and undermine the incentive to move to low carbon production. This observation was also confirmed by the study presented by Denmark, as pointed out by one Member State.

The short debate on closure also highlighted the need for harmonisation in line with the approach taken on the NER. However, while some stakeholders, such as NGOs, advocated cancelling allowances after closure, in order to promote an increasing stock turnover, others, such as representatives from the energy intensive industry argued that if allocations from installations closing down are taken away, inefficient plants would run longer.

Representatives of the energy intensive industry suggested that the impact assessment of the Commission should show the impact of the different options on Member States and sectors. The Chairman reassured participants of the meeting that the Commission would do as much as possible, but would not promise perfectionism, as there are too many design elements.

Conclusions

The chairman drew the following conclusions from the debate:

- There is strong evidence that considerable welfare losses would emerge from non-optimal design options, as has also been demonstrated by the Danish study on new entrants. The matter is not the degree of harmonisation, but how the best results can be achieved in terms of environmental, economic and administrative efficiency.

- The nature of a NER will need to follow the overall allocation methodology: if full auctioning is pursued, there will not be a NER. In the case of BMs, the same rules should apply to new entrants and in the case of an EU-wide cap, there must be a EU-wide NER.

- There is a strong appeal that NER and closure would be the same issue, as they go hand in hand. The timing issue would be very important in this respect. The discussion has demonstrated that the better the allocation methodology, the less worries would occur on closure rules, as they are perceived as a failure of allocation methods.

Agenda item 11: Concluding Remarks by the Chair

The Chair thanked all participants for their contributions to a very helpful and thorough outcome of the meeting and drew their attention to the final ECCP review meeting scheduled for 14 and 15 June.

Final Report of the 4th meeting

of the ECCP working group on emissions trading

on the review of the EU ETS

on

Linking with emissions trading schemes of third countries

14 – 15 June 2007

Management Centre Europe, Rue de l'Aqueduc 118, 1050 Brussels

Agenda item 0: Welcome and introduction

The Chairman, Mr Jos Delbeke (European Commission) welcomed participants.

Agenda item 1-2: A parliamentarian view and introducing to linking

Mr ***Anders Wijkman*** (European Parliament) shared insights of his parliamentarian work relating to tackling climate change and commented on key important issues for the development of a global carbon market. He highlighted in particular that the global carbon market needed to be established step-by-step by everyone working together on this project taking due account of the experience that exists already in developing the EU ETS. In particular he stressed that for linking emissions trading schemes the schemes must be relatively similar, have mandatory caps and have robust monitoring and verification rules. Furthermore, he noted that it is necessary to address the issue of costs abatement in an equitable manner. On a more general note rules that limit the use of Kyoto credits, such as the supplementarity rule, would be important for the European Parliament and should be retained in the further review process. CCS should be considered in the further review process. He advocated that action was needed to avoid deforestation in developing countries but was not sure that the EU emissions trading system was the instrument for this.

In his presentation, Mr ***Simon Marr*** (COM) set out a general overview of the opportunities and challenges for linking emissions trading schemes. For linking emissions trading schemes lessons from the EU ETS Phase I should be taken into account. This includes keeping any emissions trading scheme environmentally effective by keeping a simple design, having a robust data basis for allocation as well as robust and stringent monitoring and compliance provisions in place and avoiding governmental interference in the market.

Mr ***Eric Haites*** (Margaree Consultants) gave an overview of the different types of linking and stressed that environmental effectiveness of linking emissions trading schemes can be reduced by various factors, including weak enforcement, a price cap, lower standards for offset credits, different rules on borrowing and banking. He highlighted that schemes' rules should converge and once they are linked it is important that the link is sustained, in particular by conducting comparable changes to the schemes, if necessary.

Agenda item 3: Evolving emissions trading concepts in other parts of the world and their potential for linking with the EU ETS

Ms ***Vicky Arroyo*** (Pew Centre) filled the audience in on the various state and regional programs underway in the US, as well as various federal legislation proposals and their implications on linking. She explained that whilst linkages were being considered in the development of these programs, they were never a top priority and linkage provisions were often less detailed than other aspects of bills. In some cases, explicit restrictions on linking were even in place. However, she stressed that although linking might not be a priority initially, it could nevertheless be brought in at a later stage. In any case, communication would be important.

Mr ***Toru Morutomi*** (Kyoto School of Government & Graduate School of Economics) outlined both the significance and limitations of the Japanese Voluntary Emissions Trading System by pointing out that whilst it allowed for the establishment of an institutional foundation for future full-scale mandatory ETS and the development of guidelines for monitoring and reporting, an emissions control system and electronic registry system, it was not positioned as an official policy instrument in Japan's climate change policy and not compatible with the polluter-pays principle.

Mr ***Leif Ervik*** (Finnish Ministry for Economics) gave a presentation on ETS Partnerships and explained that Joint ECS systems had the potential to play a dominant role in the fight against climate change and that up to 90% of all GHG could be covered. The same carbon price in all countries and sectors was a good basis efficient climate policy since it allows for as many countries as possible to join. At the same time, he emphasised that it was the Cap and only the Cap, which determines the actual effect on the climate. Thus it is vital that any system should have an appropriate level of scarcity.

Discussion (part 1)

The debate showed that it is still early to be discussing the issue of full-fledged linking. There is no precedent to follow in this case, which makes the determining of details more challenging. A number of stakeholders addressed the environmental effectiveness argument, as well as the economic benefit of linking emissions trading systems. While representatives of the carbon trading sector were in favour of full market effectiveness through depoliticising of cap setting, representatives from the energy intensive industry welcomed the possibility of cost effective reductions through investment in JI/CDM projects which was described as a form of linking in its own right and a certain degree of flexibility when linking the EU ETS with other schemes.

Agenda item 4: Compliance and Enforcement Issues in Relation to Expansion of the EU ETS Key elements for linking the EU ETS with third countries' emissions trading schemes (part 1)

In her presentation, Ms ***Barbara Buchner*** (IEA) set out the economic perspective of linking and identified where differences in design of different emissions trading schemes affect results of linking. She noted the importance to distinguish between design differences of different emissions trading schemes and resulting accounting problems and the issue of linking itself. She highlighted that one needs to look at cost-abatement opportunity measures in the different schemes, if schemes should be linked. According to her the basic economic advantages of linking is to reduce overall compliance costs and reduce volatility of the market price of allowances. However, the extent of the reduction potential depends on the comparability of the design features of different schemed. To this end key design features include comparable tradable units, stringent monitoring, compliance and accounting rules to

avoid double counting. Coverage of the scheme should be as precise and complete as possible, also as a means to ease competitive concerns. She concluded that it is possible to link systems even with very different design features by way of proper accounting methodologies or the use of a gateway which could, however, diminish the economic benefits achieved by lining.

Mr ***Jeroen Kruijd*** (PWC) emphasised the importance of building trust in emissions reporting. In order to build trust, one would need to ensure transparency, accountability and integrity with what he calls "a global emissions compliance language". He suggested that at least four elements be in place: A new, global institutional framework with local mirroring in which the public parties organise private markets; well developed, transparent and aligned compliance processes; a four-tier model for monitoring, reporting, verification and compliance standards and enhanced use for enabling technologies.

Ms ***M.J. Mace*** (FIELD) discussed the legal issues on linking emissions trading schemes by analysing both legal and organisational issues which might arise from linking the EU ETS with other trading schemes. She concluded that different kinds of agreements would be needed in order to link with different partners and on different levels. Moreover, the time frame would be decisive in determining the structure of the agreement and one would have to bear the differences in ambition and design elements of a scheme in mind, since these might increase the complexity of the linking agreement. According to her the EU legislative framework could be amended to give the needed flexibility.

In his presentation, Mr ***Albert de Haan*** (ECX) demonstrated what linking the EU ETS with other trading schemes could mean for the carbon market. A true carbon price could only be achieved in a liquid market and linking would only strengthen the EU's leading role. However, Mr Haan emphasized that linking would only make sense if schemes were harmonised in order to enable trading. In his opinion, CERs could play the role of a global currency, but regulatory support with regards to ITL and eligibility criteria, for example, would be needed in order for it to function properly. In conclusion, Mr de Haan also noted the EU ETS's positive image within the US.

Ms ***Jill Duggan*** (DEFRA, UK) gave an overview of the UK thinking on linking emissions trading schemes and also noted the importance for the international cooperation of linking. She stressed the proliferation of different emerging emissions trading schemes also in countries that have not ratified the Kyoto Protocol and suggested that in order to be able to link with such schemes the Directive should be amended to ensure confidence and environmental credibility in the system by ensuring scarcity and economic efficiency. In addition, she noted the need for a mechanism to assess whether a system is appropriate to link with, taking into account the need for either a bilateral linking or multilateral linking arrangement. Moreover, she advised that the review process should take into account how third parties look at trading in order to render linkages with the EU ETS more feasible.

Ms ***Helle Juhler-Kristoffersen*** (BUSINESSEUROPE) stressed that getting the right price for Greenhouse Gas (GHG) emissions is what industry needs, because this is the foundation of a cost effective climate change policy. Therefore global expansion of the GHG market is necessary. According to her, linkage is a means to expand the global GHG market and create a level playing field for companies. BUSINESSEUROPE is therefore interested in expanding the market for GHG. But it is the expectation that regional trading schemes will be very different from the EU ETS on numerous areas. Therefore JI and CDM credits will be the short and medium term way of linking the regional schemes. At present, it is therefore imperative to

improve the JI and CDM system. A number of barriers need to be removed.. One barrier according to BUSINESSEUROPE is the restrictions on companies' access to JI and CDM credits.

Mr ***Jean-Marie Chandelle*** (Alliance of Energy Intensive Industries) emphasised that the future scheme should both capitalise on EU experience and lead to cost-effective CO2 reduction, whilst preserving and ensuring competitiveness of EU Energy Intensive Industries. He also noted some criteria, which should followed: It should be open and avoid leakage of EU production, provide long-term predictability and safety for investments, allow for economic growth and meet society's needs, allow for specific reduction objectives by making use of technological potential, be a driver for cost-efficient solutions and innovation and be compatible with JI/CDM schemes and abstain from setting limits on these.

Mr ***Sanjeev Kumar*** (WWF) stressed the importance to first make the EU ETS work before any linking can happen and the fact that linking must not undermine the environmental effectiveness of the EU ETS and moreover, the ambitious long term CO2 reduction targets of the EU as have been concluded in this year's Council energy package. To this end he stressed that as a prerequisite to linking the EU ETS with any third emissions trading scheme there is a need for a similar level of CO2 reduction commitment.

Discussion (part 2)

In the debate, stakeholders stressed the role of JI and CDM for creating links in the common carbon market. Some industry representatives and some member states placed emphasis on JI and CDM credits maintaining value after 2012, no matter what follows the Kyoto-protocol. If greater certainty is not given, in their view JI and CDM activities will slow down. Emphasis was put on the importance of linking schemes that are mature enough and have proved their stability, and the compatibility with the continued acceptance of JI/CDM credits. In addition, stakeholders stressed that when linking the EU ETS with third country schemes, instruments need to be found to ensure a level of flexibility. Some Member States explicitly asked what kind of policy instruments would be needed in the future to deal with possible linkages to other international schemes. The question was also posed what role the EU institutions would play on a global stage.

Concluding Remarks by the Chair

Following the debate, the chairman drew the following conclusions:

- With regards to the openness of the EU ETS, it was vital to ensure the transparency of and trust in the CDM. This was in place as an instrument under the Kyoto Protocol, and provisions would be required for appropriate recognition in the next phase to provide investors and stakeholders with a greater degree of security and predictability in case no Kyoto successor agreement were yet concluded.

- It is important to have internal harmonisation of the EU ETS as wide as possible as a step towards having external linking happen.

- However, this should not delay long-term efforts towards future linking of trading systems. An element of caution should be preserved and a pilot period of reflection could be wise for any third emissions trading scheme before linking it with the EU ETS. For the same reason, against the background of the proliferation of various systems some flexibility is

needed for linking the EU ETS with such systems. Working together along with harmonisation efforts at this stage will certainly simplify the process of linking at a later stage. Cost effectiveness will be an important driver towards the eventual linking of systems.

- Winners and losers should not be determined at this stage in the process. It is less a question of Member States than it is one of companies, and one must bear in mind that boundaries between the winners and the losers are often indeterminable.

- Simplification of compatible building blocks, such as common standards to build up for monitoring, verification and compliance in general can be crucial for linking and reassurance of each others' systems.

- Building trust in linking is crucial in order to guarantee the functioning of the system at a later stage. Ensuring that the right key design elements of any linked emissions trading scheme, in particular as regards cap-setting and appropriate provisions on offsets, are in place and that these are compatible with the EU ETS will guarantee greater confidence in linking.

Agenda Item 6: linking the EU ETS to the flexible mechanisms (JI and CDM) of the Kyoto Protocol – opportunities and pitfalls

The morning session started off with a presentation by Mr ***Thomas Bernheim*** (COM) who outlined briefly the current rules and procedures for use of JI/CDM by installations falling under the EU ETS, and pointed out opportunities and challenges they bring along. The presentation set out some questions for the debate with stakeholders, raising the issues of dealing with uncertainty in the status of JI/CDM after 2012, the potential future broadening of the scope of flexible mechanisms to include sectoral and policy CDM and what quantitative and qualitative restrictions could be needed in order to safeguard the environmental credibility of the project mechanisms in the context of a global carbon market.

In his presentation on the status of development of JI and CDM markets, Mr ***Joergen Fenhann*** (UNEP Risoe centre) gave an overview of the market in carbon credits generated by project mechanisms, with a country and sectoral breakdown of projects. He also discussed the implications of track I JI, which according to his research constitutes 61% of the 170 JI projects.

Mr ***Pedro Barata*** (Centre for Clean Air Policy) presented the concept of broadening the scope of flexible mechanisms by introducing extended CDM (programmatic, sectoral and policy) and sectoral no-loose targets. Each has certain merits but also generate problems of their own that need to be addressed. Specific methodological issues concern the setting of baselines and the availability of appropriate data. Also the additionality checks would in some cases remain problematic, even with use of sectoral baselines. Finally the institutional set-up of the CDM (Executive Board) may have to be changed to accommodate for the new types of offset mechanisms. As a way forward, he emphasized the need for more pilot projects in various sectors and regions to be developed to learn about the difficulties and opportunities of setting baselines and determining additionality.

Ms ***Kate Hampton*** (ECIS) emphasized the need for CDM to be seen as a tool to both reduce compliance costs (especially for exposed sectors) and to stimulate actions in developing countries. The review needed to address the continuation of fungibility after 2012 for projects

initiated before 2012 and more visibility should be given on banking for CERs/ERUs under the ETS. She emphasized there was a need to go beyond offsetting in developing countries and develop mechanisms to help finance sector-wide policies (e.g. sectoral and policy CDM). She acknowledged the potential dichotomy between cheap reduction credits and the need for Europe to change technologies. One point of criticism related to the financial additionality checks for CDM which in her view hindered the bringing to the market of many negative-cost energy efficiency projects. In her final recommendations, she recommended that in reaching an international agreement according to which the EU commits to a 30% reduction target, such an agreement should include sectoral crediting and policy co-financing.

Agenda Item 7: Quantitative limits: pros and cons of caps and supplementarity requirements

The presentation by Mr ***Jürgen Salay*** (COM) focused on the provisions in the ETS Directive, delineating the use of JI and CDM credits within the Community scheme supplemental to domestic actions. He gave an overview of the expected use of flexible mechanisms within the ETS in the 2nd trading period (individual MS' limits on JI/CDM credit imports amounting to 10-15% of the total cap) and an analysis of the 22 NAPs assessed so far, which that imports of 1110 Mt in JI/CDM credits would be allowed in total (of which companies based in the EU-15 MS could use up to 928 Mt). He pointed out that this represents a theoretical maximum and it is not certain that these limits will be reached. He pointed out that at present MS can accept at their discretion the amount of JI/CDM credits up to the maximum level allowed under the Linking Directive. For internal market considerations there was a desire in the future to go for a more harmonised approach towards JI/CDM limit setting (for example, through a flat rate from start, triggers or differentiated limits depending on type of JI/CDM credits). An important political consideration for capping the access to JI/CDM was to ensure attractiveness for other systems to link to the EU ETS.

Mr ***Guy Turner*** (New Carbon Finance) made a quantitative contribution to the analysis of supplementarity in the use of CDM/JI credits within the ETS. He commented that supplementarity results in higher price signals in the EU ETS than might otherwise be the case, and that this higher price is needed especially in the long turn to steer capital investment into low carbon technologies. In the period until 2012, short-term possibilities for emission reductions included fuel switching, including renewables, but over time capital stocks could only be changed if a long term price prevailed well above what the CDM would induce in the ETS. This in itself justified the use of supplementarity requirements. He also suggested that the secondary market for CDM closely follows the trend in allowance prices (however staying below the allowance price as a result of additionality requirements). This has led to a strong increase in primary project developments by industry and in energy sector, offering cheaper alternatives. Additionality could result in price volatility as there always will be arbitrage between allowance and CERs. A final conclusion was that the use of low-cost external credits in the ETS can help reduce the costs of compliance but will not help investment in carbon reducing projects within the ETS.

Mr ***Owen Wilson*** (Eurelectric) presented an overview of the pros and cons of a cap on the use of JI/CDM within the Community trading scheme. Negative impacts according to him predominated, and were expressed through discouraging long term investments and creating instability in the market among others. He called for more certainty about the CDM in a post 2012. If supplementarity rules were to be retained, there would be a need for more transparent and harmonised rules throughout the EU. The fact that in the EU formula for supplementarity, a priority was given to government purchases was seen as discriminatory against companies.

There was no strong wish to link the EU ETS to other ETS if this would result in higher prices. Generally, industry was much keener on full use of (cheap) CDM rather than linking to other (more expensive) ETS systems.

In her presentation, Ms ***Vicki Arroyo*** (Pew Centre) noted that while there may be a general perception in other countries that the US was not willing to accept imports of CDM credits, CDM credits were however allowed in proposed US trading schemes. Some reservations were made concerning certain categories of credits. She acknowledged that the transfer to e.g. China of considerable amounts of money through the CDM was a political issue in the US. This was counterbalanced by the cost gains that would be generated by access to those cheaper credits. She questioned the use of land for offsets but proposed that they be replaced with best practices in farming and other similar schemes.

Ms ***Mahi Sidgeridou*** (Greenpeace) presented the views of NGOs on the use of CDM credits within the ETS. In her presentation, she underlined the lack of supplementarity and cases of bad quality of CDM projects. She made a case for an overhaul of the system based on the principles of environmental effectiveness on the grounds that the price impacts of a low cap should not go below the marginal green investment costs. More stringent caps would stimulate internal abatement in the EU, and were needed to achieve the 2050 abatement targets.

Agenda Item 8: Qualitative restrictions (gases, sectors and project types) on the use of offsets

Presentations

Mr ***Lambert Schneider*** (Öko Institut) outlined the range of problems encountered in assessing the additionality of projects. He commented that there was no objective way to confirm that a project would not have been implemented without CDM. As no benchmark approach had yet been submitted to the CDM EB that would demonstrate additionality, CDM EB relies on a barrier analysis, investment analysis and common practice analysis. Amongst others, renewable energy projects are not always additional. CERs have, moreover, only small impact on the projects' internal rate of return (IRR), sometimes amounting to just 1–3%. While for some categories of projects this could make a difference, for others (e.g. wind farms) this is almost negligible. His personal assessment was that up to 30-50% of CDM projects could not be viewed as being additional. One of the solutions he proposed to stem windfall profits from some categories of CDM projects would be to introduce benchmarks

Mr ***Damien Meadows*** (COM) in his presentation noted that Member States were allowed and not obliged to authorise their companies to use JI/CDM and that a harmonised agreement only existed on not using certain types of credits. He suggested that there could be a need for a more harmonised approach towards qualitative restrictions on the use of JI/CDM, perhaps by stating that companies "shall be" be allowed to use such credits, rather than "may be". This was illustrated with respect to the use of nuclear, temporary (or delayed emission) credits, which both raised issues of governments taking on liability. A common approach could be applied where there have been widespread criticisms, for example, as regards HFC and hydropower credits. Such harmonisation could be done in several ways, e.g. through co-ordinated Member State action not to use certain credits, specific provisions set down now through co-decision or a mechanism for EU-wide action to be taken. He ended with some considerations on the transition beyond 2012, highlighting the potential need for flexibility to take into account the evolution of commitments expected in the post-2012 agreement. In the

context where such an agreement were not yet in place, consideration was needed as to what credits should be used in the meantime, and by what process harmonised rights to use them could be granted. In respect of credits to which banking limitations under the Kyoto Protocol applied, he noted the need for provisions to avoid governments taken on liabilities. Finally, he queried whether there was merit in Community-level arrangements for authorising projects more broadly than allowed by the CDM.

Mr ***Andrei Marcu*** (IETA) pointed out that linking would lead to the emergence of larger (ultimately global) market, thus reducing costs of compliance and improving efficiency. GHG markets provide make or buy option. Not all countries are receptive to buying, notably the US is not enthusiastic on CDM, among others, resisting the idea of shipping capital offshore to deal with emissions and voicing concerns about environmental integrity of emissions trading as such. IETA agrees that actions against climate change should begin at home and offsets are temporary mechanisms as the goal is to introduce global emissions trading. He also advocated setting up supplementarity rules at the EU level and allowing a broader range of projects as CDM.

Mr ***Dieter Beisteiner,*** (Austria) presented experience of a member state in JI/CDM project approval and procedures. Austria is one of the EU MS with an experience of financially supporting projects that would generate emission reductions abroad through the use of flexible mechanisms.

On LULUCF, Mr ***Igino Emmer*** (Climate neutral group) made a presentation on forestation credits. In his view tCERs should be included, but lCERs could not be for various reasons. The LULUCF sector could contribute to 30-40% of efforts in GHG reductions necessary to achieve the +2°C target. He acknowledged that people perceive LULUCF projects as risky business, as they introduce temporary credits. There are also fears about swamping the market with very cheap credits. However these problems could be overcome.

Mr ***Tomas Wyns*** (CAN Europe) insisted one shouldn't compare CERs with allowances (as this amounts to comparing apples with pears). He warned for the negative credibility consequences of including sink projects in the CDM. Instead the EU ETS should only allow credits that respected the gold standard (energy efficiency and renewable projects). Finally he called for the EU ETS to take sustainable development criteria more seriously and develop screening mechanism for projects entering the EU ETS. This could be done by adding a positive list of criteria to the CITL, allowing for an automatic check on the CERs type and provenance before accepting to register them for compliance within the EU ETS.

In a concluding remark, *Mr* ***Jos Delbeke*** (chair) stated that without supplementarity provisions CDM supply would most likely outstrip demand, so that their price would tumble. This could start a political debate about whether the EU ETS is capable at all of fulfilling its role of driver for technological change within the EU and instead mainly creates flows of money and investment outside the EU.

Discussion

In the course of the ensuing debate, MS representatives expressed their views on topics covered in the course of presentations. Member States expressed support for the idea of expanding emissions trading into a global regime, while some emphasised that in the meantime offset projects could play an important role for at least further 10 years. It was also proposed to discount CDM projects from some countries after a certain level of supply was

reached. Some Member States supported including LULUCF credits in the ETS and discussing LULUCF at COP/MOP in Bali. It was said that the Commission should review the pros and cons of the project-based approach.

The Commission pointed out that double counting was also an issue influencing the environmental credibility of the system, thus the double counting guidelines will need to be maintained. In the current international situation, there is a large number of CERs on the market and the ETS should not be an engine for transferring reduction efforts abroad.

Ms Jill Duggan (UK) noted that to achieve a 50% emission reduction by 2050 declared by G-8 countries, the inflow of JI/CDM credits into the EU ETS must be limited. According to Mr Lambert Schneider, at current cap levels for JI/CDM in the period 2008-12, emissions from the MS could be higher than in 2005. An assumption is needed that emissions will not grow. In Germany, for example, new lignite plants are planned, as EU ETS at present is clearly insufficient to promote alternatives to new lignite plants.

The participants considered various options of integrating project mechanisms into emission trading so as to foster European reduction efforts and not jeopardise the market. An idea was floated in the course of discussion of using a Community-level procedure for approving projects within the EU to also assess credibility of inflowing project credits. A positive list of criteria for promoting clearly additional types of CERs was also proposed.

Some industry representatives argued that all effort should be put into improving the UN system, e.g. improving the approval procedures, rather than developing parallel systems, EU specific standards and procedures which could increase complexity and reduce transparency.

Wrap-up of the second day

Summarising the meeting, Mr ***Delbeke*** stressed five points:

- A wealth of information had been shared over the last two days. The current experience with CDM had been a success, with the engagement of developing countries. However, there had been concerns expressed that the size of the market could become so big (especially if there were extended CDM) that it may turn people against the CDM altogether. There were a number of flaws including, among other issues, doubts about the additionality of certain projects and the crowding-out effect of HFC projects which create problems of credibility that risked spilling over to the EU ETS. These need to be addressed.

- Participants shared the common objective of a long term global carbon market. Linking emission trading systems will require time, and can build on the CDM as an intermediate step. For an effective market, there needs to be balance between supply and demand, In Marrakesh, it had been expected that there would be wider demand, which would b e the case with the US on board. In the current situation, the CDM could lead to an imbalance for the EU which would need to be addressed.

- Ideally, the existing problems with the CDM will be remedied within the UNFCCC. This will involve developing benchmarks, and taking into account policy implementation. There is also a need to develop better criteria for showing additionality. Some stakeholders had called for a more fundamental rethink, while others said that we should look at the benefits

of CDM to EU companies including as a stimulus for innovation, and that this should be assessed empirically.

- If the problems identified with the CDM cannot be sufficiently well solved within the UNFCCC, then these problems would have to be addressed in the EU ETS. Views differed on quantity, where some said there should be no limit while others emphasised that quantitative provisions should be set at EU level. The issue of discounting was also raised. On quality, lists came back onto the table – both positive and negative. On nuclear, the Marrakesh Accords had so far been proving successful. There were outspoken views for and against the idea of an additional JI/CDM board and screening.

- There was broad consensus that provisions on the use of JI/CDM should be dealt with in a harmonised manner. In addition, it was noted that this would strengthen the EU's position internationally. Problems should aim to be corrected within the UNFCCC, with solutions implemented at EU level if not successful. There was wide support for an assurance to be introduced that companies would definitely be able to use JI/CDM credits in the next period, even if people disagreed on which types.

Annex 2:
Summary of stakeholder contributions submitted to the Commission

The Commission services have established a functional mailbox on the EU ETS review website (http://ec.europa.eu/environment/climat/emission/review_en.htm), in order to allow all interested parties to submit their view on the review of the EU ETS to the Commission. This document contains a summary of these views as well as a list of parties which have submitted their view.

Scope of the Directive

On issues related to the scope of the Directive, stakeholders share the opinion that more consistency is needed at the European level. The definition and inclusion of small installations, as well as the overall expansion of the EU ETS to include other gases and a range of other sectors and activities have been considered.

According to the energy intensive industry, **small installations** should be excluded from the EU ETS on the basis of sector thresholds. Simplified rules on MRV should be agreed on for small installations, in order to ease their administrative burden. Some argue in favour of an opt-out provision or that CO2 output per unit of turnover ought to be taken into account in such circumstances. In order to safeguard the functioning of the overall system and for the sake of efficiency, small emitters might be best served outside the EU ETS, where separate provisions should apply to them. It has been noted that the majority of non-district-heating providers are exempted under the small installations provision, which in turn has an impact on the competitiveness of more efficient district-heating installations. Small installations are also subject to different treatment in Member States.

Expansion of the EU ETS by including **additional gases and sectors** is favoured as long as it offers more opportunities for reducing emissions at a lower cost whilst stimulating innovation. Distortions in the market should, nevertheless, be avoided. Sectors ought to be notified within reasonable time, in order to safeguard investment decisions. In addition, these new sectors would have to face similar MRV standards so as not to disadvantage incumbents in other sectors, in which case unilateral inclusion by Member States might even be possible. Some are in favour of expansion on a case by case basis and they believe that further analysis is needed on this issue. Surface transport ought to be kept out of the EU ETS altogether. If shipping and aviation are included, the majority of reductions must take place within the sectors and not be avoided through the use of JI/CDM credits. Other measures might also be feasible in these sectors in the near future. Generally, doubts have been raised about the feasibility to include the transport sector within the EU ETS due to its specific features. The EU ETS should not be considered a panacea for everything; depending on the sector, other measures might be more effective. This may also be the case for sinks and LULUCF as well as domestic offset projects.

The inclusion of **Carbon Capture and Storage** technology is generally positively perceived. The technology ought to be incentivised, but should not lead to any distortion and not be made mandatory in any case. There is also a need for clear definitions and monitoring standards and guidelines. CCS should also be accredible through Kyoto flexible mechanisms when used elsewhere in the world and a regulatory approach should focus on developing permitting and assurance systems for selecting and managing storage sites. In some contributions to the debate, concern over the possible impact on the price of electricity was expressed.

The definition of **'combustion installation'** is of key importance and may be in need of further clarification. Strong calls for clarity on the issue also requested the use of more technical descriptions in future. It was suggested that for consistency and simplification purposes, the definition of "combustion plant" be based on that in the Directive on Large Combustion Plants (88/609/EEC as amended by 2001/80/EEC).

Further Harmonisation and Increased Predictability

Many stakeholders stressed the need for certainty beyond the current periods, which could be achieved by setting long term EU targets, providing further assurance that the EU ETS will continue to operate in the future or by way of rolling allocation periods. Certainty could be accomplished without extending allocation periods. As for **cap-setting** all options must be considered carefully, regardless whether at EU level or Member State level. The existing division of the burden, according to the burden sharing agreement thought to be inequitable. Each Member state should be considered on a case-by-case basis, taking the ability to reduce emissions based on GDP and other factors into account. An extension on the length of allocation periods would provide for more certainty, increase predictability and would better suit business cycles. The necessity of keeping within the timeframe of international agreements and providing enough flexibility for investment was acknowledged, and extending the allocation period beyond 10years was opposed. Some stakeholders would prefer EU wide sector allocation in the long-term and in the interim, national incumbent benchmarks should be applied. Others would prefer allocation rules and overall emission targets to be set at a minimum of 15-20 years along with 8-10 year trading periods including an EU wide cap with sectoral sub caps and harmonised allocation of allowances across the EU. More transparency and disclosure would ensure the stability of the system. Preserving a provision for the banking of allowances between periods would be favoured, since this would provide necessary safety valves. A central institution to be set up to deal with these issues has been suggested.

Some stakeholders proposed a hybrid top-down and bottom-up approach with regards to cap-setting. Generally, ambitious targets are needed and should be sought from the beginning. The EU wide cap should be set at up to 30% and indicative targets should be provided for 2030, 2050 and 2080.

Many stakeholders from the industry argue that allocation through **benchmarking** would be the best solution for large homogeneous processes. Where this is not possible, 'grandfathering' would be an option. In addition, the reduction potential and 'pass-through' ability of a sector ought to be taken into account in all allocation decisions. Performance-based allocation (e.g. through benchmarks) to large emitting, homogenous processes would also be an option. If linked to actual production, this also solves the problem of allocating to new entrants and closures. Benchmarks should be agreed on by the sector's respective organisations, as well as the European Commission. The allocation would also have to be under the responsibility of a separate authority. In any case, a high level of free allocation must be maintained in the future. From an industry point of view, the 'pass-through' of prices should be avoided at all costs and measures should be mitigated for energy intensive industries facing international competition. A framework is to be created for energy-intensive industry to fulfil their needs in the long-term at reliable prices. Favourable conditions and incentives for the development of long-term supply contracts, in line with EU and national competition law, would help ease the excess burden placed on these sectors. Some industries favour a 'baseline & credits', sector-based approach.

As long as auctioning is not applied on a global scale, representatives from energy intensive industry are not in favour of **auctioning,** as it has a serious disadvantage in that it disadvantages processes with a high CO2 output per unit of profit ratio. This effect is increased where a sector is not able to pass on the cost to its customers. Price increases as a result of the EU ETS would certainly hinder European Economy and benefit foreign competitors. Auctioning should only be used in those sectors that are not under threat from imports or which have a high profit to emissions ratio. In some cases, a different approach between sectors may be possible but certain factors would have to be taken into account, such as the possibility of carbon leakage through auctioning, the inability of sectors to pass on costs to consumers and the removal of value, which might otherwise be invested in Research and Development. Where auctioning is applied, the revenue generated must be recycled for supporting R&D of adaptation and mitigation technology.

Other industry representatives are strongly in favour of auctioning. Where it is applied, there should be a common set of auctioning requirements including harmonised levels of auctioning across EU and, above all, clarity on the timeline towards full auctioning. Some Member State authorities believe that full auctioning would be possible from 2012 onwards for the energy sector and any other sectors not facing international competition. Other stakeholders argue that 100% auctioning gives a clear price signal, complies with the Polluter-pays principle and does not discriminate against certain sectors. The revenues generated could go to Member States' investments in 'clean carbon solutions' to prevent and mitigate actual and further environmental damage.

Harmonised rules and guidelines are needed on new entrants and closures and must be defined consistently throughout the EU. **New entrants** should be allocated simultaneously as incumbents in the same sector and receive a high level of allowances, since this would stimulate a move towards cleaner technologies and sets a clear signal. If the reserve of allowances is insufficient to cover new entrants, then the Member state must purchase CERs and ERUs to compensate. EU wide rules on **closures** should be further harmonised and the transfer of all allowances between an old and a new installation permitted. In case of a complete closure, the installation should be allowed to retain its allocation for the remainder of the phase. In contrast, some argue that new installations would not carry sunk costs of old installations if these were made to sell theirs off, thus enabling new entrants to purchase their allowances like incumbents. This would also make a new entrants reserve unnecessary.

Monitoring, Reporting, Verification and Enforcement

There is a need for more harmonisation on Monitoring and Reporting and approaches to compliance and enforcement between Member States, in order to ensure the integrity of the Scheme. At the same time, however, a balance between high standards and cost-effective solutions must be retained New methods of accreditation should be considered in order to speed up the process and increase the integrity of the verification system. Mutual recognition of verifiers accredited in other Member States, central accreditation and other existing methods developed by the European Co-operation for Accreditation (EA) are just some of the proposals which were brought forward during the assessment. In addition, guidance is needed for the verification process and for the enforcement of sanctions following non-compliance.

A plead has been made for more transparency and accurateness whilst, at the same time, lowering the burden, in particular for small emitters, and respecting confidentiality. Some have requested that an analysis on reporting standards be conducted across Member States and have argued against the need for a regulation, reiterating that a Directive is an appropriate

and sufficient legislative tool to deal with MRV rules. While some argue that more frequent reporting is not required since it will not significantly improve market information, others advocate it on the grounds of enhanced and improved transparency.

Many have spoken out for less bureaucracy in the third trading period with a view to providing for more clarity. Errors in the verified emissions data should also be rectified in the verified report. Some stakeholders point out that more regular onsite verification is essential for an effective monitoring of CO2 emissions and that this must be realised in future. Results gained through the verification process must then be linked back to the monitoring protocol and must relate to the GHG permit of the installation. An expert review regarding the implementation of the MRV rules must take place per annum in every Member State and the fines and enforcement process should become part of the Directive.

Linking and the use of JI/CDM

In the view of most stakeholders, linking the EU ETS to other emission trading systems is possible and desirable. However, some have warned that the price of carbon in both systems will be an issue for consideration, as well as compatibility of the systems in question. The scheme that, at the time of linking, had the higher abatement costs will profit more from it. Hence, there is a political element to linking, which must be taken into account. At the same time, access to Kyoto credits may offer a solution, since the allowances provide for a safety valve against high domestic abatement costs. For this reason, industrial stakeholders are in favour of unlimited access to JI/CDM project credits within the EU ETS. Energy intensive industry believe that JI/CDM credits should be recognised within the EU ETS on a 1/1 scale. In terms of linking the EU ETS with other schemes, they would like to see the EU ETS become part of a global ETS in order to avoid carbon leakage. In addition, sector approaches should be encouraged on a worldwide scale. Other industry representatives would like to see more project proposals approved in developing countries and would welcome further efforts to guarantee the continuation of JI/CDM projects beyond 2012 through recognition post 2012. In addition, the EU should consider community authorisation of JI/CDM projects, since this would shorten and reduce bureaucracy. However, they do not favour the development of a parallel EU body in addition to other UN bodies and demand more flexibility through harmonisation of JI/CDM use in all Member States, since limitations harm technology transfer.

In contrast, other sectors call for both a quantitative and qualitative limit on the use of ERUs and CERs. Quantity of external credits, which may be used by companies in a Member State, should be based on the difference between historical emissions - not projected emission - and the EU's post 2012 emission reduction targets. Aside from this, only 'CDM Gold standard' credits should be permissible under the EU ETS and neither LULUCF credits nor credits generated from the use of nuclear technology ought to be allowed in the EU ETS. In addition, they are firmly against domestic offsets and the use of JI from EU countries in the scheme. Linking, whilst favoured in principle, will need to be considered on a case-by-case basis.

List of stakeholders that have submitted contributions for the review process of the EU ETS

Abbreviation	Organisation
AFEP	Association Française des Entreprises Privées
	Alliance of the Energy Intensive Industries
BAF	British Abrasives Federation
BCA	British Cement Association
BusinessEurope	The Confederation of European Business
CAN-Europe	Climate Action Network Europe including WWF, Greenpeace and Friends of the Earth
CEFIC	European Chemical Industry Council
CEFS	Comité Européen des Fabricant de Sucre
CEMBUREAU	The European Cement Association
	CEMEX
CER	Community of European Railway and Infrastructure Companies
CIAA	Confédération des Industries Agro-Alimentaires de l'UE
	Climate Strategies
Danskenergi	Danish Energy Association
	Danish Ministry of Transport and Energy
	E.ON AG
EAA	European Aluminium Association
EDF	Electricité de France
EFET	European Federation of Energy Traders
EFIEES	European Federation of Intelligent Energy Efficiency Systems
EIC	The Environmental Industries Commission Ltd.
EPAGMA	European Peat and Growing Media Association
EpE	Entreprises pour l'Environnement
EURELECTRIC	Union of the Electricity Industry
EURIMA	European Insulation Manufacturers Association
EUROCHAMBRES	The Association of European Chambers of Commerce and Industry
Euro-Coop	European Association of Consumer Cooperatives
EUROFER	European Confederation of Iron and Steel Industries
Euroheat & Power	International Association representing the combined heat and power (CHP), district heating and cooling (DHC) sector in Europe and beyond

Abbreviation	Organisation
EUROPIA	European Petroleum Industry Association
EWEA	The European Wind Association
FEASTA	Foundation for the Economics of Sustainability
FEPA	Federation of European Producers of Abrasives
	Finnish Energy Industries
GRIAN	Greenhouse Ireland Action Network
	Iberdrola
ICC UK	International Chamber of Commerce UK
IETA	International Emissions Trading Association
	Norwegian Mission to EU Ministry of Environment
OFGEM	The Office of Gas and Electricity Markets
OGP	International Association of Oil and Gas Producers OGP Europe
	O-I Europe (Manufacturer of Glass Containers)
	Scottish and Southern Energy Group
SNAS	Syndicat national des abrasifs et super-abrasifs
SFM	Sustainable Forestry Management Ltd.
VCI	Verband der Chemischen Industrie
VDEW	Verband der Elektrizitätswirtschaft e.V.
VDS	Verband Deutscher Schleifmittelwerke
VöZ	Austrian Clay Brick and Roof Tile Industry
WWF	World Wide Fund For Nature

Annex 3: Description of the E3ME model

(Source:http://www.camecon.com/suite_economic_models/e3me/purpose_and_design.htm and http://www.camecon-e3memanual.com/cgi-bin/EPW_CGI)

E3ME: AN ENERGY-ENVIRONMENT-ECONOMY MODEL OF EUROPE

The E3ME model has been built by a European team under the EU JOULE/THERMIE programme as a framework for assessing energy-environment-economy issues and policies. The model has been used for general macro and sectoral economic analysis and for more focused analysis of policies relating to greenhouse gas mitigation, incentives for industrial energy efficiency and sustainable household consumption. Its pan-European coverage is appropriate for an increasingly integrated European market. E3ME provides an econometric one-model approach in which the detailed industry analysis is consistent with the macro analysis: in E3ME, the key indicators are modelled separately for each sector, and for each region, yielding the results for Europe as a whole.

- The E3ME model provides annual comprehensive forecasts to the year 2030:
    - for 27 European regions including the EU25 (as of 2006), Norway and Switzerland
    - for industry output, investment, prices, exports, imports, employment and intermediate demand at a 42-industry level including 16 service industries - for consumers' expenditure in 28 categories
    - For energy demand, split by 19 fuel uses of 12 fuels, and environmental emissions.
- Full macro top-down and industrial bottom-up simulation analysis of the economy, allowing industrial factors to influence the macro-economic picture
- An in-depth treatment of changes in the input-output structure of the economy over the forecast period to incorporate the effects of technological change, relative price movements and changes in the composition of each industry's output
- Dynamic multiplier analysis, illustrating the response of the main economic indicators, industrial outputs and prices to standard changes in the assumptions, eg changes in world oil prices, income taxes, government spending, and exchange rates
- Scenario analysis, across a range of greenhouse gas mitigation policies in Europe, including carbon taxes and permit trading

THE PURPOSE AND DESIGN OF E3ME

The Policy Analysis of Long-Term E3 Interactions

E3ME is intended to meet an expressed need of researchers and policy makers for a framework for analysing the long-term implications of Energy-Environment-Economy (E3) policies in Europe, especially those concerning R&D and environmental taxation and regulation. The model is also capable of addressing annual short-term and medium-term

economic effects as well as, more broadly, the long-term effects of such policies over the next 20 years, such as those from the supply side of the labour market.

Most conventional macroeconomic models which are operational in government describe short and medium-term economic consequences of policies but with a limited treatment of long-term effects, such as those from the supply side of the labour market, and this limits their ability to analyse long-term policies. In contrast, Computable General Equilibrium (CGE) models, have been widely used to analyse long-term E3 policies. CGE models specify explicit demand and supply relationships and enforce market clearing, and are therefore seen as desirable characterizations of long-term outcomes in which markets are assumed to be in equilibrium; for this reason they have been developed particularly in the US for the analysis of environmental regulation. However, CGE models are not generally estimated by time-series econometric methods and they have not typically been subjected to rigorous historical validation, either in terms of the values of the model's parameters or, more broadly, the underlying assumptions with respect to economic behaviour. They also typically tend to impose the dynamics of the model solution, and so cannot be used for historical validation of the overall model; the analysis of short- and medium-term impacts of policy changes, meanwhile, tends to arise from the assumptions inherent in the model. Their use in forecasting or scenario projections is therefore more limited. Therefore, CGE models are not necessarily the most appropriate vehicle for understanding the process of dynamic adjustments and structural change at the sectoral level.

E3ME combines the features of an annual short- and medium-term sectoral model estimated by formal econometric methods with the detail and some of the methods of the CGE models, providing analysis of the movement of the long-term outcomes for key E3 indicators in response to policy changes. It is essentially a dynamic simulation model of Europe estimated by econometric methods.

The Method: Long-Term Equations and Short-Term Dynamic Estimation

The econometric model, in contrast with some macroeconomic models currently in operation, has a complete specification of the long-term solution in the form of an estimated equation which has long-term restrictions imposed on its parameters. Economic theory, for example the recent theories of endogenous growth, informs the specification of the long-term equations and hence properties of the model; dynamic equations which embody these long-term properties are estimated by econometric methods to allow the model to provide forecasts. The method utilises developments in time-series econometrics, with the specification of dynamic relationships in terms of error correction models (ECM) which allow dynamic convergence to a long-term outcome. E3ME is therefore a relatively ambitious modelling project which expands the methodology of long-term modelling to incorporate developments both in economic theory and in applied econometrics, while at the same time maintaining flexibility and ensuring that the model is operational.

The Model and the Research Strategy

E3ME is a detailed model of 42 industrial sectors with the disaggregation of energy and environment industries, in which the energy-environment-economy interactions are central. The model is designed to be estimated and solved for 27 regions of Europe (the EU-25 member states in 2006 plus Norway and Switzerland). For the ten member states that joined the EU in 2004, shrinkage methods are applied to the raw data to estimate long-term parameters from relatively short data series (1993-2004).

This one-model approach is distinguished from the multi-model approach, which is a feature of earlier model-based research for the EU. In principle, linked models (such as the DRI or the HERMES-MIDAS system of models) could be estimated and solved consistently for all the economies involved. However, in practice, this often proves difficult, if not impossible, and considerable resources have to go into linking. Even if the consistency problem in linkage can be solved by successive iterative solutions of the component models, there remains a more basic problem with the multi-model approach if it attempts to combine macroeconomic models with detailed industry or energy models. This problem is that the system cannot adequately tackle the simulation of `bottom-up' policies. Normally these systems are first solved at the macroeconomic level, then the results for the macroeconomic variables are disaggregated by an industry model. However if the policy is directed at the detailed industry level (say, a tax on the carbon content of energy use), it is very difficult (without substantial intervention by the model operator) to ensure that the implicit results for macroeconomic variables from the industry model are consistent with the explicit results from the macro model. As an example, it is difficult to use a macro-industry two-model system to simulate the effect of exempting selective energy-intensive industries from the carbon/energy tax.

Comparative Advantages of E3ME

E3ME has the following advantages over many competing models:

- Model disaggregation: The detailed nature of the model allows the representation of fairly complex scenarios, especially those that are differentiated according to sector and to country. Similarly, the impact, of any policy measure can be represented in a detailed way.

- Econometric pedigree: The econometric grounding of the model makes it better able to represent and forecast performance in the short to medium run. It therefore provides information that allows for dynamic responses to changes in policy and that is closer to the time horizon of many policy makers than pure CGE models, which provide long-term equilibrium solutions.

- E3 linkages: E3ME is a hybrid model. An interaction (two-way feedback) between the economy, energy demand/supply and environmental emissions is an undoubted advantage over models that may either ignore the interaction completely or only assume a one-way causation. For example, the EU ETS includes a cap on CO2 emissions: the model can be used to solve for the CO2 allowance price, allowing for effects on electricity prices and demand, as well as on macroeconomic variables.

Summary of the Characteristics of E3ME

In summary, the characteristics of E3ME are such that the model is:

- elaborated at a European rather than at a national level, with the national economies being treated as regions of Europe

- dealing with energy, the environment, population and the economy in one modelling framework

- designed from the outset to address issues of central importance for economic, energy and environmental policy at the European level

- capable of providing short- and medium-term economic and industrial forecasts for business and government

- based on a system of dynamic equations estimated on annual data and calibrated to recent outcomes and short-term forecasts

- capable of analysing long-term structural change in energy demand and supply and in the economy

- focused on the contribution of research and development, and associated technological innovation, on the dynamics of growth and change.

THE THEORETICAL BACKGROUND TO E3ME

Economic activity undertaken by persons, households, firms and other groups has effects which transmit to other groups, sometimes after a lag, and the effects persist to include future generations, although many of the effects soon become so small as to be negligible. But there are many such groups, and the effects, both beneficial and damaging, accumulate in economic and physical stocks. The effects are transmitted through the environment, with externalities such as greenhouse gas emissions leading to global warming, through the economy and the price and money system via the markets for labour and commodities, and through the global transport and information networks. The markets mainly transmit effects through the level of activity creating demand for inputs of materials, fuels and labour, through wages and prices affecting incomes and through incomes in turn leading to further demands for goods and services. These interdependencies suggest that an E3 model should be comprehensive, including many linkages between different parts of the economic and energy systems.

These systems are characterised by economies and diseconomies of scale in both production and consumption, by markets with different degrees of competition, by the prevalence of institutional behaviour which may be maximisation, but perhaps the satisfaction of more restricted objectives, and by rapid and uneven changes in technology and consumer preferences, certainly within the time scale of greenhouse gas mitigation policy. Labour markets in particular may be characterised by long-term unemployment. An E3 model to represent these features must be flexible, capable of embodying a variety of behaviours and capable of simulating a dynamic system. The approach can be contrasted with that of general equilibrium models, which usually assume constant returns to scale, perfect competition in all markets, maximisation of social welfare measured by total discounted private consumption, no involuntary unemployment, and exogenous technical progress following a constant time trend (see Barker, 1998, for a discussion).

E3ME AS AN E3 MODEL

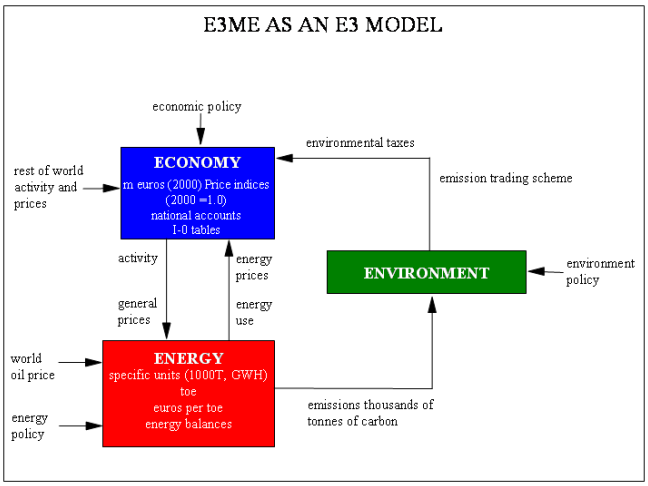
The model comprises:

- The accounting balances for commodities from input-output tables, for energy carriers from energy balances and for institutional incomes and expenditures from the national accounts

- Environmental emission flows

- 22 sets of time-series econometric equations , covering energy demand, the labour market, prices and the components of GDP, with two different disaggregate consumption specifications and optional transport equations.

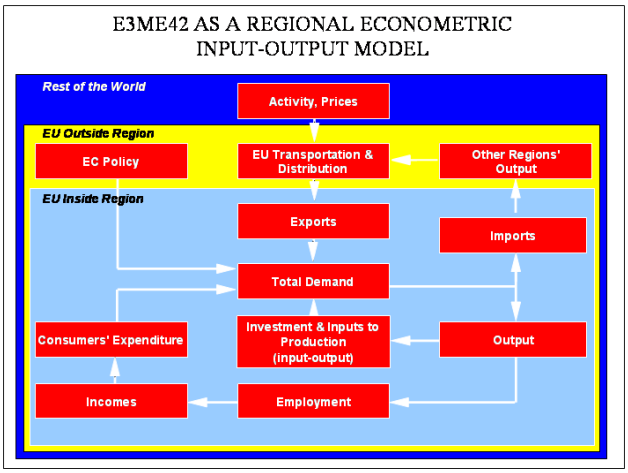
The chart: E3ME as an E3 model shows how the three components of the model - energy, environment and economy - fit together. Each component is shown in its own box and utilises its own units of account and sources of data. Each data set has been constructed by statistical offices to conform with accounting conventions. Exogenous factors coming from outside the modelling framework are shown as inputs into each component on the outside edge of the chart. For the EU economy, these factors are economic activity and prices in non-EU world areas (the world areas distinguished in the model are listed below in Chapter 5) and economic policy (including tax rates, growth in government expenditures, interest rates and exchange rates). For the energy system, the outside factors are the world oil prices and energy policy (including regulation of energy industries). For the environment component, exogenous factors include policies such as reduction in SO emissions from large combustion plants. The linkages between the components of the model are shown explicitly with arrows showing which values are transmitted between components.



The economy module provides measures of economic activity and general price levels to the energy module; the energy module provides emissions of the main air pollutants to the environment module, which in turn indicates damages to health and buildings (this effect is not yet included in the formal model). The energy module provides detailed price levels for energy carriers distinguished in the economy module and the overall price of energy as well as energy use in the economy.

E3ME AS A REGIONAL ECONOMETRIC INPUT-OUTPUT MODEL

The chart E3ME42 as a regional econometric input-output model shows how the economic module will be solved as an integrated EU regional model. Most of the economic variables shown in the chart are at a 42-industry level. The whole system is solved simultaneously for all industries and all 27 regions (although the software allows a single-region solution, with the other regions at base-projection values). The chart shows interactions at three spatial levels: the outermost area, encompassing the others, is the rest of the world; the next level is the European Union outside the region in question; and finally, there are the relationships within the region.



The chart shows three loops or circuits of economic interdependence, which are described in some detail below. These are the export loop , the output-investment loop and the income loop.

E3ME's export loop

The export loop runs from the EU transport and distribution network to the region's exports, then to total demand. The region's imports feed into other EU regions' exports and output and finally to these other regions' demand from the EU pool and back to the exports of the region in question. It should be noted that activity in the rest of the world is treated as exogenous and so E3ME will not produce this feedback effect from exports external to the EU. Likewise, if the model is being solved for just a single region the export loop will be broken and there will be no feedback effects.

The modelling of international trade is central to this relationship. The basic assumption is that, for most commodities, there is a European 'pool' into which each region supplies part of its production and from which each region satisfies part of its demands. This might be compared to national electricity supplies and demands: each power plant supplies to the national grid and each user draws power from the grid and it is not possible or necessary to link a particular supply to a particular demand.

The demand for a region's exports of a commodity is related to three factors:

- Domestic demand for the commodity in all the other EU regions, weighted by their economic distance from the region in question
- Activity in the main external EU export markets, as measured by GDP or industrial production
- Relative prices, including the effects of exchange rate changes.

Economic distance is measured by using a set of actual bilateral trade matrices for 1997 (although there are plans to introduce a time series covering the period 1993-2002) or by a special distance variable, normalised with a weight of 1 being given to activity in the home region. For the special measure of distance, the weights for the other regions are inversely proportional to the economic distances of the other regions from the exporting region. Regional imports are related to demand and relative prices by commodity and region. In

addition, measures of innovation (based on R&D) have been introduced into the trade equations to pick up an important long-term dynamic effect on economic development.

E3ME's output-investment loop

The output-investment loop includes industrial demand for goods and services and runs from total demand to output and then to investment and back to total demand. For each region, total demand for the gross output of goods and services is formed from industrial demand, consumers' expenditure, government demand, investment (fixed domestic capital formation and stockbuilding) and exports. These totals are divided between imports and domestic output depending on relative prices, levels of activity and utilisation of capacity. Industrial demand represents the inputs of goods and services from other industries required for current production, and is calculated using input-output coefficients. Input-output tables have been obtained from Eurostat, ONS and GTAP and used to give 2000 estimates for the 27 E3ME regions. The coefficients are calculated as inputs of commodities from whatever source, including imports, per unit of gross industrial output.

Forecast changes in output are important determinants of investment in the model. Investment in new equipment and new buildings is one of the ways that companies adjust to the new challenges introduced by energy and environmental policies, so the quality of the data and the way they are modelled is of great importance to E3ME. Regional investment by investing industry is determined in the model as intertemporal choices depending on capacity output and investment prices. When investment by user industry is determined, it is converted, using coefficients derived from input-output tables, into demands on the industries producing the investment goods and services, mainly engineering and construction. These demands then constitute one of the components of total demand.

Gross fixed investment, enhanced by R&D expenditure in constant prices, is accumulated to provide a measure of the technological capital stock. There are problems with the usual definition of the capital stock (see Scott, 1989), partly because there are no satisfactory data on economic scrapping. The accumulation measure is designed to get round the worst of these problems. E3ME42 makes the distinction between ICT and non-ICT investment to capture the effects of the new economy. Investment, both in ICT and non-ICT areas, is central to the determination of long-term growth and the model embodies a theory of endogenous growth which underlies the long-term behaviour of the trade and employment equations.

E3ME's income loop

In the income loop, industrial output generates employment and incomes, which leads to further consumers' expenditure, adding to total demand. Changes in output are used to determine changes in employment, along with changes in real wage costs, interest rates and energy costs. With wage rates explained by price levels and conditions in the labour market, the wage and salary payments by industry can be calculated from the industrial employment levels. These are some of the largest payments to the personal sector, but not the only ones. There are also payments of interest and dividends, and transfers from government in the form of state pensions, unemployment benefits and other social security benefits. Payments made by the personal sector include mortgage interest payments and personal income taxes. Personal disposable income is calculated from these accounts, and deflated by the consumer price index to give real personal disposable income.

Totals of consumer spending by region are derived from consumption functions estimated from time-series data (this is similar treatment to that of the HERMES model). These equations relate consumption to regional personal disposable income, a measure of wealth for the personal sector, inflation and interest rates. In the subsequent allocation of this spending by commodity, the approach makes the most of the disaggregated data on consumers' expenditure available by region from Eurostat. Again sets of equations have been estimated from time-series data relating the spending per capita to the national spending using the CBS version of consumption allocation system. The incorporation of this system into the solution is complex: the allocation system has been adapted to provide the long-run income and relative price parameters in a two-stage procedure, with a standardised co-integrating equation including demographic effects providing the dynamic solution. The substitution between categories as a result of changes in relative prices is achieved at the regional level.

INTRODUCTION TO ENERGY-ENVIRONMENT MODELLING IN E3ME

This section outlines how energy demand and prices are modelled in E3ME, and how this links into the economic modelling. This includes a discussion of top-down and bottom-up methodologies and how this is applied to E3ME, the Emissions submodel and finally feedback effects from the energy submodel to the economic model.

Top-Down and Bottom-Up approaches to E3 modelling and their use in E3ME

E3ME is intended to be an integrated top-down, bottom-up model of E3 interaction. In particular, a detailed engineering-based treatment is planned for the electricity supply industry (ESI), the demand for energy by the domestic sector, and transportation. The current version of the model is top-down, but it is important to be aware of the comparative strengths and weaknesses of the two approaches.

Top-down economic analyses and bottom-up engineering analyses of changes in the pattern of energy consumption possess distinct intellectual origins and distinct strengths and weaknesses (see chart: Comparison of top-down and bottom-up modelling methodology). Perhaps the most significant difference is in the treatment of capital and technology. In top-down models capital is usually treated as a homogeneous input, which is related to energy only insofar as it is assumed to possess a degree of substitutability with energy inputs in production. Technological change (ie qualitative change in the characteristics of capital) is usually represented as an exogenous trend, sometimes explicitly related to energy consumption, affecting the productivity of the homogeneous capital input. Conversely, in bottom-up models capital is given an explicit empirical content and is related to energy in a very specific way, either in terms of generating equipment, other energy-related capital, or public infrastructure. Technological change is represented as a menu of options presently available or soon-to-be available, which enjoy increasing market penetration.

COMPARISON OF TOP-DOWN AND BOTTOM-UP MODELLING METHODOLOGY

	Bottom-up	Top-down
Classifications employed	Engineering-based	Economics-based
Treatment of capital	Precise description of capital equipment	Homogeneous and abstract concept
Motive force	Discount rate employed by agents	Income and price elasticities
Perception of market	Market imperfections and barriers	Perfect markets
Potential efficiency improvements	Usually high-costless improvements	Usually low-constraint on economy

Similarly the mechanisms which represent the driving force in the respective analyses are very different. In economic models change is usually modelled using elasticities, such as substitution between factors, or price and income elasticities. In bottom-up modelling the determinant force is captured by the relationship between technological options and usually by some notion of the discount rate employed by economic agents (households, firms and the government). In some sense, the discount rate employed in bottom-up models is the mirror image of an elasticity employed in top-down models. Both factors will determine the extent to which agents react to changes in the conditions associated with the energy supply chain (see Barker, Ekins and Johnstone, 1995).

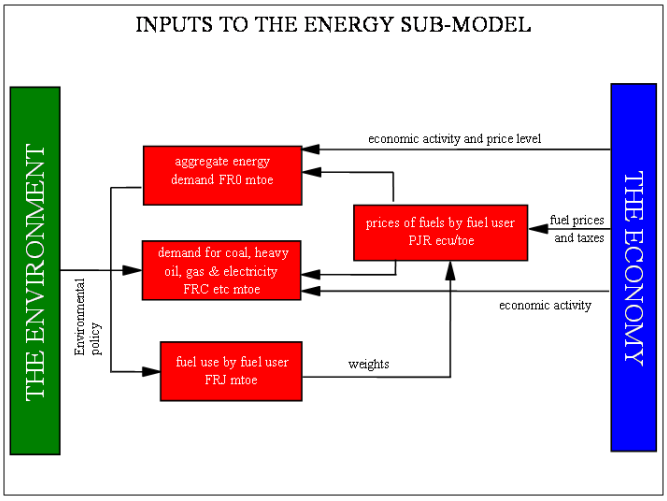
The two approaches also start from different conceptions of the nature of markets. Most top-down models, although not E3ME, do not admit to the possibility of market imperfections (eg imperfect competition). Most importantly, the existence of costless opportunities is often assumed away (except at the margin). Energy consumption (and thus carbon dioxide emissions) are a reflection of revealed preferences and thus any alternative technological scenarios which have not been taken up in the economy are left unexploited for sound economic reasons, such as agent uncertainty (with respect to supply and demand factors) or 'hidden' factors (such as disruption or management costs). Conversely, in bottom-up models the inability of the economy to reach a technologically efficient supply chain in terms of the provision of energy services is attributed to market imperfections (eg credit constraints, information asymmetries, transaction costs). The relationship between such imperfections and decision-making is, however, left unexplored.

As noted, both types of analysis possess important strengths, but both have weaknesses when used to address long-term issues. On the one hand in top-down models, the notion that an elasticity of substitution between capital and other factors (estimated on the basis of 30 years of data, or imposed on the basis of intuition or the requirements of functional form) can be used to make useful comments about the world over the next 50 or 100 years from now is suspect. Indeed, beyond a certain number of years it is the engineering characteristics of the 'back-stop' technology, and not the behavioural relations themselves, around which the carbon-energy-output relationship revolves. On the other hand the depiction of the long-run in bottom-up models as a menu of technological options is clearly unsatisfactory as well. At best, the technological options can be presented in chronological form (commercially available, in development stages, technologically feasible), coming on line progressively. By defining capital precisely the models cannot be made dynamic in a satisfactory manner unless the path of technological change is known, and as such are restricted in their relevance to short and medium-term analysis.

In addition, the characteristics of the two approaches limit the relevance of the respective analyses. For instance, top-down models are not able to analyse the effects of non-price based policies which affect the nature of the market itself and not just prices within the market. Institutions and regulations are (implicitly) not subject to change. Given the prevalence of imperfections in the market for energy services, such an omission is significant. Conversely, bottom-up models are not able to analyse the price effects of the introduction of the options enumerated, or associated feedback effects. For instance, an analysis which examines the technological options available to the electricity supply industry misses important feedback effects unless it examines the effects of such a programme on the construction industry which undertakes the conversion, on the energy sector which is faced with significant dislocation, and on those sectors which use electricity and other energy carriers intensively as inputs in production.

E3ME's Top-Down Energy Submodel

The energy submodel in E3ME42 is constructed, estimated and solved for 19 fuel users, 12 energy carriers (termed fuels for convenience below) and the 27 regions of E3ME. The chart Inputs to the energy sub-model shows the inputs from the economy and the environment into the components of the submodel and the chart Feedback from the energy sub-model shows the feedback from the submodel to the rest of the economy.



Aggregate energy demand, shown at the top of the first chart, is determined by a set of co-integrating equations, with the main explanatory variables being:

- Economic activity in each of the 19 fuel users
- Average energy prices by the fuel users relative to the overall price levels
- Technological variables, represented by R&D expenditure in key industries producing energy-using equipment and vehicles.

Fuel use equations are estimated for four fuels - coal, heavy oils, gas and electricity - with four sets of equations estimated for the fuel users in each region. These equations are intended to allow substitution between these energy carriers by users on the basis of relative prices, although overall fuel use and the technological variables are allowed to affect the choice. Since the substitution equations cover only 4 of the 12 fuels, the remaining fuels are

determined either as fixed ratios to aggregate energy use or are assumed to behave in an identical way as other, closely related fuels (e.g. other coal and hard coal, crude oil and heavy fuel oil, other gas and natural gas). The final set of fuels used must then be scaled to ensure that it adds up to the aggregate energy demand (for each fuel user and each region).

E3ME's Emission Submodel

The emissions submodel calculates air pollution generated from end-use of different fuels and from primary use of fuels in the energy industries themselves, particularly electricity generation. Provision is made for emissions to the atmosphere of CO2, SO2, NOX, CO, methane (CH4), Black smoke (PM10), volatile organic compounds (VOC), nuclear, lead, CFCs and the other four greenhouse gases N2O, HFC, PFC, SF6. This means that, where the data are available, the results will include:

- Effects on non-CO2 GHGs (especially those in the Kyoto Protocol - CH4, N2O, HFC, PFC, SF6)

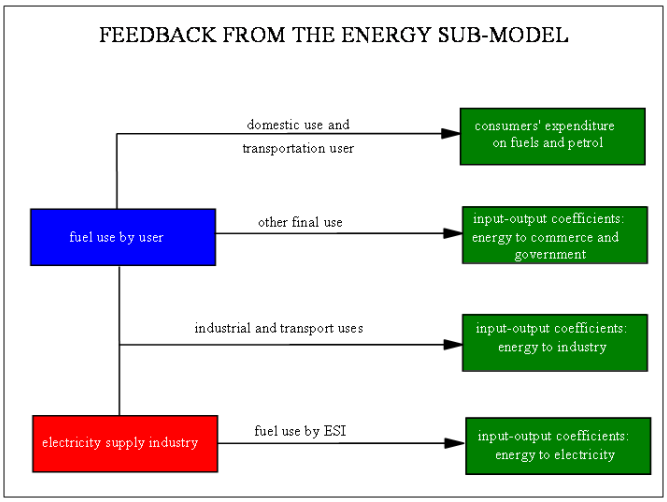
- Ancillary benefits relating to reduction in associated emissions eg PM10, SO2, NOx

The theory, data collection and parameter estimates are reported in Working Paper 9b (Bruvoll, Ellingsen and Rosendahl, 1999). This draws from the emission sources (ES) classification which is closely linked to the 19 fuel user groups in E3ME.

Emissions data for CO2 are available for fuel users of solid fuels, oil products and gas separately. The energy submodel estimates of fuel by fuel user are aggregated into these groups (solid, oil and gas) and emission coefficients (tonnes of carbon in CO2 emitted per toe) are calculated and stored. The coefficients are calculated for each year when data are available, then used at their last historical values to project future emissions. Other emission data are available at various levels of disaggregation from a number of sources and have been constructed carefully to ensure consistency.

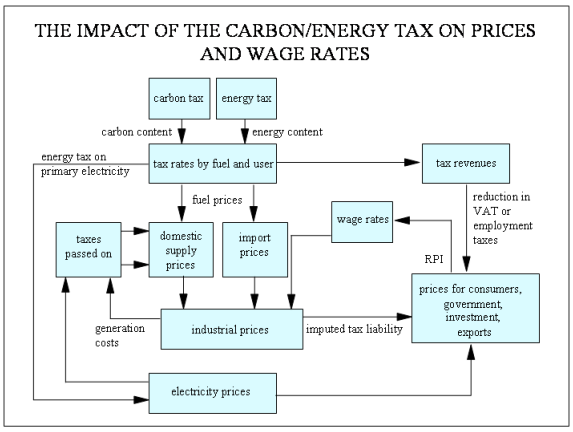
Feedback from E3ME's Energy submodel to the rest of the economy

The chart: Feedback from the energy sub-model shows the main feedbacks from the energy submodel to the rest of the economy. Changes in consumers' expenditures on fuels and petrol can be formed from changes in fuel use estimated in the energy submodel, although the levels are calibrated on historical time-series data. The model software provides an option for choosing either the consumers' expenditure equation solution, or the energy equation solution. Whichever option is chosen, total consumer demand in constant values matches the results of the aggregate consumption function with any residual held in the unallocated category of consumers' expenditure. The other feedbacks all affect industrial, including electricity, demand via changes in the input-output coefficients.



The Effects of a Carbon/Energy Tax in E3ME

One of the purposes of the model is to provide a consistent and coherent treatment of fiscal policy in relation to greenhouse gas emission. Some form of carbon/energy tax is an important component of such policy and E3ME is capable of exploring scenarios involving such a tax, as well as other fiscal and alternative means of reducing emissions. The chart: Impact of the carbon/energy tax on prices and wage rates shows how the tax affects prices and wage rates in the model. There are inevitably certain simplifying assumptions made in modelling a carbon/energy tax.



The first assumption is that the effects of the tax in the model are derived entirely through the impact of the tax on fuel prices, and through any use of the subsequent revenues from the tax in reducing other taxes. Other effects are not modelled. For example, if the introduction of such a tax caused the electricity industry to scrap coal-burning plant in advance of what might be expected from the relative price change induced by the tax, this effect would have to be imposed on the model results.

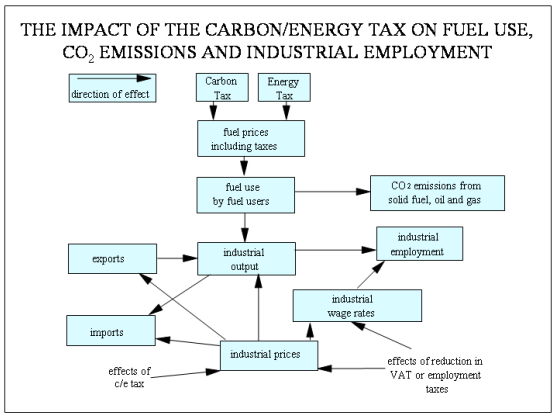
The two components of the tax are treated separately. The *carbon* component of the tax is given in real prices of the starting year as a rate in euros per tonne carbon (euros/tC) emitted in the form of CO2. The rate is then indexed on average consumer prices in each of the EU regions to give annual rates over the projection period. The carbon tax liability of all fuels is calculated on the basis of their CO2 emissions, and converted into euros per tonne oil equivalent (euros/toe) on the basis of the heat content of the fuels. The *energy* component of

the tax is expressed in terms of euros/toe directly and again the escalating rate is indexed to consumer prices in each region. A matrix of total energy tax rates (in euros/toe) in the form of additional excise duties on energy products by fuel user by fuel, can then be constructed for each region in each year. Tax revenues can be calculated from fuel use; the revenues will be reduced according to the fall in use, but will rise according to price inflation and any escalator in the tax rates.

The second assumption is that imports and domestic production of fuels will be taxed according to the carbon and energy content of the fuels, with exports exempt from the tax coverage. The treatment is assumed to correspond to that presently adopted by the authorities for excise duties imposed on hydrocarbon oils. It is assumed that industries and importers pay the tax, and that it is then passed on in the form of higher fuel prices paid by the fuel users. A further assumption is that industrial fuel users pass on all the extra costs implied by the tax in the form of higher prices for goods and services. The increase in final price will be a result of the direct and indirect carbon/energy content of each commodity distinguished in the model. If the revenues are used to reduce employer tax rates, then industrial employment costs will fall and these reductions in costs are also assumed to be passed on through the industrial system.

The net effect on industrial and import prices will eventually feed through to consumer prices and will affect relative consumption of goods and services depending on the carbon/energy content and on their price elasticities. The higher consumer prices will then lead to higher wage claims. The econometric evidence supports the theoretical presumption that all the tax is eventually paid by the final consumer and this condition is imposed in the long-term solution of the model.

The chart: Impact of the carbon/energy tax on fuel use, CO2 emissions and industrial employment shows the consequent effects of these price and wage rate changes. The changes in relative fuel prices as a result of the tax will change fuel use, depending on substitution elasticities. The fuel price increases will be passed on to more general increases in prices, which will cause substitution in consumers' expenditure, in exports and between imports and domestic production. These changes will feed back to fuel use. CO2 emissions are derived directly from the use of different fuels. If employment costs are reduced when tax revenues are recycled, then industrial employment will be stimulated directly, with a further indirect effect as labour-intensive goods and services gain in relative price competitiveness.



Annex 4: Table representing the outcome of screening of sectors emitting CO2 for inclusion in the EU ETS

Source	Gas	EU25 MtCO2eq (2003)1	Trend (annual %Δ 2010-2020)	Uncertainty	Data collection	Installation boundaries	Ability to identify operator	Verification	No and size of emitters	Complexity of MRV	Abatement availability	Abatement cost	Existing regulation/competition
Gypsum production	CO2	n.d.	Stable	L	+	+	+	+	Small / small	L	L	LM	Competition with materials already covered. Covered under broad interpretation
Rock wool production		n.d. & ~6	Stable	L	+	+	+	+	Small / average	ML	L	LM	NAP2 guidance specifies inclusion of rockwool
Petrochemicals		~66 & small	Slightly increasing in ST and stabilisation in the LT[126]	MH	+	0	+	+	Small / Large	ML	M	MH	Partly covered if >20MW combustion installation + NAP2 guidance specifies crackers and carbon black
Other chemicals		~66 & small	Slightly increasing in ST and stabilisation in the LT126	M	+	0	+	+	Large / Small–large	Very varied, dependent on process			Partly covered if >20MW combustion installation
Ammonia production		~15 & ~30	Slightly increasing in ST and stabilisation in the LT126	L	+	+	+	+	Small / large	L	MH	MH	Partly covered if >20MW combustion installation and broad intrepretation
Gas/Oil flaring		~4	Stable in ST; possible decrease in the LT	MH	0	+	+	0	Average / large	MH	H (but may not be accessible due to safety)	L to H depending on site	NAP2 guidance specifies inclusion of flaring

[126] Lack of individual sub-sector data, so trend reflects overall chemical sector.

Source	Gas	EU25 MtCO2eq (2003)1	Trend (annual %Δ 2010-2020)	Uncertainty	Data collection	Installation boundaries	Ability to identify operator	Verification	No and size of emitters	Complexity of MRV	Abatement availability	Abatement cost	Existing regulation/competition
Aluminium production		n.d ~8	Stable, possible decrease in LT126	L	+	+	+	+	Small / average	L	L	L	Partly covered if >20MW combustion installation. Secondary Al. covered under broad interpretation. Competition with materials already covered
Food and drink		~57	Slightly increasing in ST and stabilisation in LT[127]	L	-	0	+	0	Large / small to medium	L	H	LM	Partly covered depending on definition of combustion installation. Energy Services Directive
Waste incineration		~4	Stable	MH	+	+	+	+	Average / average	MH	M	LM	Waste Incineration Directive and IPPC

Source: Adapted from LETS (2006) and Ecofys (2006)

Note: [1] For CO_2 where only one figure is shown this relates to combustion emissions, where two sets are shown the latter relates to process emissions. Total 2003 EU25 GHG emissions (exc. LULUCF) are approximately 4990 $MtCO_2eq$ (EU27 ~ 5215 $MtCO_2eq$)

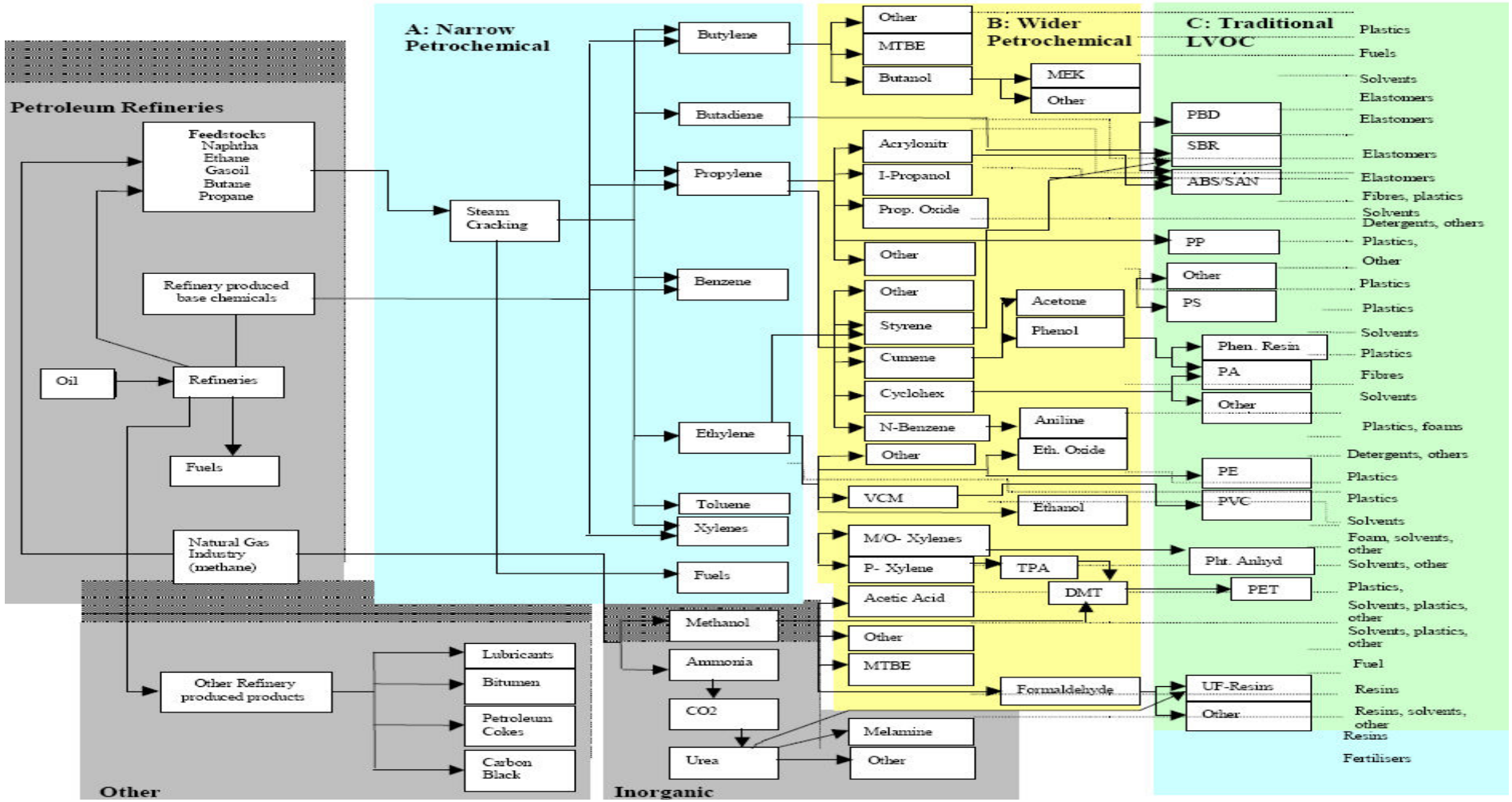
[127] Due to lack of sub-sector data, this trend reflects the overall trend in the secondary manufacturing sector.

Annex 5: Table representing the outcome of screening of sectors emitting non-CO2 GHG for inclusion in the EU ETS

Source	Gas	EU25 MtCO2eq (2003)1	Trend (annual %Δ 2010-2020)	Uncertainty	Data collection	Installation boundaries	Ability to identify operator	Verification	No and size of emitters	Complexity of MRV	Abatement availability	Abatement cost	Existing regulation/competition
Coal mining	CH4	~31	-1.4%	M	0	0	+	-	Small / large	M	H	M	
Natural gas distribution		~30	1.2%	Generally H, but individual source sectors could be M/L	0	0˜	-	0	Large / small	L	L	M	Partly covered (compressors)
Adipic and nitric acid	N2O	~53	0.1%	L	+	+	+	+	Small / point sources	LM	MH	L	IPPC
Aluminium production	PFCs	~4	-0.7%	L	+	+	+	+	Small / point sources	L	L	L	IPPC
Semiconductor manufacture		~1	4.5%	L	+	+	+	+	Small / point sources	L	LM	MH	F-Gas Regulation and Worldwide Voluntary Agreement
Magnesium foundries	SF6	~3	9.5%	L	+	+	+	+	Small / large	L	M	L	F-Gas Regulation

Source: Adapted from LETS (2006) and Ecofys (2006)

Note: [1] For CO_2 where only one figure is shown this relates to combustion emissions, where two sets are shown the latter relates to process emissions. Total 2003 EU25 GHG emissions (exc. LULUCF) are approximately 4990 $MtCO_2eq$ (EU27 ~ 5215 $MtCO_2eq$)



Annex 6: Overview of refineries and chemicals sector and potential sector boundaries

Source: ENTEC 2007b

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Annex 8: Abbreviations

AB	Accreditation Body
BAT	Best available technique
CA	Competent Authority
CER	Certified Emission Reduction Unit
DOP	Domestic offset project
EA	European Co-operation for Accreditation
ECCP	European Climate Change Programme
ER	Export ratio: the proportion of home production that is exported.
ERU	Emission reduction unit
EUT	Treaty of the European Union
GHG	Greenhouse gas emissions
IPR	Import Penetration Ratio: the proportion of home consumption that is made up of imports.
lCER	Long-term certified emission reduction
IMO	International Maritime Organization
IMPEL	European Union Network for the Implementation and Enforcement of Environmental Law
IPCC	Intergovernmental Panel for Climate Change
IPPC	Integrated pollution prevention and control
ISO	International Standardisation Organisation
LCP	Large Combustion Plant
LVOC	Large volume organic chemicals
MR	Monitoring and Reporting
MRG	Monitoring and Reporting Guidelines (pursuant to Article 14 of the ETS Directive)
MRV	Monitoring, Reporting and Verification
tCER	Temporary certified emission reduction
VER	Verified emission reductions