

THE EU EMISSIONS TRADING SCHEME AS A DRIVER FOR FUTURE CARBON MARKETS

A CEPS TASK FORCE REPORT

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This report is based on discussions in the CEPS Task Force on the carbon market after Copenhagen. The Task Force met several times over a concentrated period from July 2010 to June 2011. Participants included senior executives from a broad range of industry and representatives from business associations and non-governmental environmental organisations. A list of members and invited guests and speakers appears in the appendix.

The members of the Task Force engaged in extensive debates over the course of several meetings and submitted comments on earlier drafts of this report. Its contents reflect the general tone and direction of the discussion, but its recommendations do not necessarily represent a full common position agreed by all members of the Task Force, nor do they necessarily represent the views of the institutions to which the members belong.

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PREFACE

The EU Emissions Trading Scheme (ETS) has been up and running since 2005. It has helped the EU stay on track towards the Kyoto Protocol targets in 2008–12, set at -8% of greenhouse gas (GHG) emissions below 1990 levels for the EU-15 countries and with individual commitments for 10 of the 12 new member states. The performance of the ETS sector will remain crucial to the EU's progress in meeting its current target of 20% emission reductions by 2020 below 1990 levels and will be even more so should the EU decide to raise the level of ambition further. Most importantly, in the roadmap for moving to a low-carbon economy by 2050, the EU ETS is noted as one of the main tools to achieve ambitious targets for GHG reductions at the European level. The EU ETS has also proved its ability to incentivise emission reductions beyond its direct scope: it has linked up with three countries in the European Economic Area, and expanded to the aviation sector; it has also created the largest demand for credits from the Clean Development Mechanism and from joint implementation, favouring emission reductions in both third countries and non-ETS sectors in Europe.

While the ETS has solved teething problems in the first two phases and improved its performance, it has been suggested that the ETS has made some positive impacts on abatement activities but not enough on innovation and low-carbon technology deployment at the levels required for the EU's long-term goal of keeping the temperature increase below 2°C above pre-industrial levels. On some occasions, the scheme has also been subject to debate on the pricing level, especially during economic downturns and subsequent decreases in demands for emission allowances.

Against this background, CEPS brought together a Task Force composed of representatives of industries, business, research and non-governmental organisations who generously offered their expertise and time. The members were aware of different views and positions among themselves, but were willing to work together to share knowledge and understanding. While each member of the Task Force endorses the general

content of the report, this does not necessarily mean that all members have agreed on every sentence in the report, including key messages and recommendations.

It has been a real pleasure and privilege to chair the CEPS Task Force and to engage a broad range of stakeholders in extensive and lively discussions with a view to providing key messages and recommendations to those involved in designing and operating carbon markets. The discussions were rich and at times intense, reflecting the diversity of views of the scheme's stakeholders, but also the interest of those stakeholders in improving the system. During the meetings, the members had ample opportunity to discuss important issues with officials from the EU institutions, governments and international organisations, which enabled the Task Force to closely follow current EU policy discussions, to provide timely input into the process, and to derive key messages and recommendations. The interim results of the Task Force in the form of ten key messages were presented at a CEPS side-event for the Cancún climate change conference (COP16) in 2010, and the final results in this report were communicated to the Danish EU presidency.

I believe that the Task Force has made a constructive contribution to the ongoing discussion on the EU ETS in the broad context of carbon markets. The main challenge is how the EU could use the ETS as a driver for the development of future carbon markets, especially by enhancing its price signal. This report stresses the importance of aligning any additional decisions on the ETS with the EU's long-term goal to build a low-carbon economy.

I would like to thank the members of the Task Force for their active participation in meetings and their excellent contributions to the messages and recommendations of this report. My most sincere thanks also go to the rapporteurs of the Task Force, Noriko Fujiwara and Anton Georgiev, for their active collaboration and involvement in all stages of the Task Force.

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EXECUTIVE SUMMARY

The Cancún Agreements acknowledged scientific understanding that deep cuts are required in global greenhouse gas (GHG) emissions to hold the increase in the global average temperature to below 2°C above pre-industrial levels and that Parties to the UN Framework Convention on Climate Change (UNFCCC) should take urgent action to meet this long-term goal. The agreements took note of quantified economy-wide targets for emission reductions to be implemented by Annex I Parties and urged developed countries to increase the ambition of their economy-wide targets for GHG emission reductions. At the 17th Conference of the Parties (COP17), Parties to the UNFCCC decided to consider the establishment of one or more market-based mechanisms to enhance the cost-effectiveness of and to promote mitigation actions, which should be built upon existing mechanisms, including those established under the Kyoto Protocol.

The COP17 in Durban resulted in historic decisions that could improve certainty about the prospect for a comprehensive global agreement that will engage all parties and likely enter into force in 2020 at the earliest. The conference led to the launch of a negotiating process under a new Ad Hoc Working Group on the Durban Platform for Enhanced Action, to develop a protocol, another legal instrument or “an agreed outcome with legal force”¹ under the UNFCCC applicable to all parties. The Working Group is tasked with completing it no later than 2015, to enable it to be adopted at COP21 in 2015, and come into effect and be implemented from 2020.² The Durban conference also agreed that the

¹ See the Decision adopted (CP.17), “Establishment of an Ad Hoc Working Group on the Durban Platform for Enhanced Action” on the UNFCCC website (http://unfccc.int/files/meetings/durban_nov_2011/decisions/application/pdf/cop17_durbanplatform.pdf).

² Ibid.

second commitment period (CP2) would be set under the Kyoto Protocol³ and it succeeded in operationalising the key elements of the Cancún Agreements, such as the Green Climate Fund and the technology mechanism.

In an attempt to meet their collective commitments, the EU and other developed countries started providing fast-start finance in 2010-12, intended for balanced allocation between climate mitigation and adaptation measures in developing countries. The Green Climate Fund has been set up in the context of an agreement on mobilising annual financial flows leading up to 2020 to address the latter countries' needs. In finding sources of finance, great emphasis has been placed on the potential engagement of the private sector in mobilising financial flows on a large scale to assist developing countries to combat climate change, yet the Parties remain short of addressing in a concrete manner how public finance could leverage private investments or how carbon markets could attract direct investments in the relevant sectors. Future flexible mechanisms, such as sectoral crediting, sectoral trading and the crediting of nationally appropriate mitigation actions (NAMAs) are tools that may capture untapped potential for mitigation in advanced developing countries and fill some of the gap between the level of finance required and the level of finance available.

The primary function of carbon markets for compliance buyers is the discovery of the carbon price at which mitigation can be undertaken in the most cost-effective way. Carbon markets, if well designed, can discover the cheapest and most effective abatement path to reach a certain emission reduction target. The EU Emissions Trading Scheme (ETS) seeks "to promote reductions of greenhouse gas emissions in a cost-effective and economically efficient manner" (preamble (1) of the ETS Directive (2009/29/EC)).⁴ International offsets or credits from the Clean

³ The CP2 will begin on 1 January 2013 and end on either 31 December 2017 or 31 December 2020, to be decided at the next session. See the Decision, "Outcome of the work of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its sixteenth session" on the UNFCCC website (http://unfccc.int/files/meetings/durban_nov_2011/decisions/application/pdf/awgkp_outcome.pdf).

⁴ See European Parliament and Council of the European Union (2009a).

Development Mechanism (CDM) or joint implementation (JI) – both created through the Kyoto Protocol – can be used by compliant entities under the EU ETS to cover some of their emissions, thereby lowering overall compliance costs. While their continuation in CP2 is secured, their future beyond 2020 is uncertain and will depend on the level of Parties' commitments on the one hand, and the development of new, national trading schemes and new mechanisms under the international framework on the other.

The ability of the EU ETS to send a price signal that is robust enough to trigger long-term investments will be crucial in the implementation of the roadmap for moving to a low-carbon economy in 2050, if endorsed, and possible amendment to the 2020 emission reduction target, both of which presume an increasing role of domestic mitigation actions within the EU. Increasing scarcity, while upholding and further improving the predictability of rule-making, would make the EU ETS a more forceful driver of innovation and technology deployment for transition to a low-carbon economy in Phase III and beyond.

This report focuses on the purposes and potential outcomes of the EU ETS, and its prospects for improving the cost-effectiveness of mitigation actions by expanding its scope to new sectors, linking with flexible mechanisms and enhancing the long-term price signal. The report addresses carbon finance along with technology deployment and innovation as possible achievements that may be expected from the ETS, but does not look into each area further. The linking of the EU ETS to planned cap-and-trade schemes in other industrialised and developing countries is outside the scope of this report.

Key messages

Purposes and possible achievements of carbon markets

The primary purpose of carbon markets is to reduce greenhouse gas emissions in a cost-efficient way. Carbon markets can also finance mitigation and adaptation actions and provide support for technology deployment and innovation.

- 1) Carbon markets, with appropriate short- and long-term targets, are a reliable and cost-efficient way to meet requirements for GHG emission reductions.**

Carbon markets could play a critical role in promoting investment in mitigation actions, as part of an attempt to keep the global temperature increase within 2°C above pre-industrial levels. Carbon markets have already played a role in reducing GHG emissions, and through a “share of proceeds”⁵ of the CDM, have assisted in financing adaptation. At present there are two major carbon markets: the EU ETS and the international Kyoto Protocol markets, including the CDM/JI markets that are creating, respectively, certified emission reductions (CERs) and emission reduction units (ERUs). The EU ETS has so far driven demand for CERs and ERUs, far ahead of demand by governments or other domestic, emission trading schemes (e.g. New Zealand).

The EU ETS is a cap-and-trade scheme: it results in GHG emission reductions compared with a business-as-usual scenario by setting a cap on overall emissions in the sectors covered and distributing emission allowances to each entity, which is then entitled to trade the allocated quantity. The EU ETS allows for a limited use of international offsets from the Kyoto Protocol markets. The performance of the ETS sector in mitigation is important for the EU’s ability to meet its current target of 20% GHG emission reductions by 2020 compared with a 1990 baseline and will be instrumental in meeting any increases in the level of reductions.

2) Carbon markets could be an effective way of channelling and scaling up private investments, and facilitating public funding.

To meet the goal of mobilising \$100 billion per year by 2020, both public funding and private investments need to be significantly boosted. If the level of carbon constraint on the private sector through a domestic measure is not stringent enough, there will be greater pressure for the public funding of carbon abatement measures. And vice versa, if public funding is not sufficiently available on the side of

⁵ The Kyoto Protocol requires that a share of the proceeds from CDM project activities be used to cover administrative expenses as well as to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation (Art. 12(8)). See “Share of Proceeds” on the CDM Rulebook website of Baker & McKenzie’s Global Environmental Markets Practice (<http://cdmrulebook.org/369>).

the ‘donor countries’, it is ever more important for private finance to be channelled towards less wealthy economies for mitigation. The private sector is expected to provide a considerable share of long-term, international climate finance. Private investments are expected to complement public funding in scaling up the financial flows and investment in climate actions in developing countries.

Yet regulations, including those for carbon markets, need clear policy objectives to stimulate private investments. Some of the auctioning revenues under the EU ETS could contribute to climate finance, but their disbursement will remain in the hands of EU member states as a consequence of the legislative agreement. Equally important, private investments cannot be regarded as a cure for all of the climate finance challenge. For example, because of a lack of visibility after the end of the first commitment period (CP1) of the Kyoto Protocol and before the entry into force of the new global agreement, at present there is no significant demand for international credits or offsets, which hinders or delays investments in low-carbon projects.

The making of future carbon markets

Future carbon markets will be expected to build on existing market-based mechanisms (such as the CDM and JI) plus domestic/regional trading schemes.

3) A carbon market needs to function well and work cost-effectively.

Carbon markets have grown rapidly over the last ten years. The EU ETS faces opportunities and challenges in three main areas: linking to other market mechanisms, cap-setting and allocation, and technology and innovation. The scope of the EU ETS was broadened and enhanced with the inclusion of five countries in 2007, with domestic aviation as well as international aviation into and out of the EU as of 2012, and with its acceptance of international offsets or credits subject to a use limit as of 2005.

4) Until a global agreement comes into force, the demand for international offsets will be determined by domestic or regional legislation.

It is important to look at how the carbon market can be legally grounded in UN decisions or domestic legislation (or both). International climate-mitigation obligations are grounded in UN

decisions. The EU ETS was inspired by the Kyoto Protocol but is designed to function independently. Uncertainty in implementing domestic legislation would undermine the supply of offsets or credits and the related demand.

5) A comprehensive international agreement needs to be underpinned by flexible mechanisms and their links with regional or domestic schemes for emissions trading.

Provided there is an appropriate national framework, future flexible mechanisms (e.g. sectoral crediting, sectoral trading and NAMA crediting) could offer a means to expand the coverage of GHG emission targets beyond individual projects and scale up financial flows and investments. Notably, however, the crediting undertaken through the REDD-plus⁶ programme is still considered a challenge by many policy-makers owing to difficulties with permanence, monitoring and verification.

6) A more coordinated approach to the treatment of offsets will advance the integration of carbon markets.

In the absence of an international agreement, acceptance of the same commodities in international offsets could catalyse a global carbon market through indirect linking among different domestic schemes. Specific areas that require coordination include the treatment of international offsets or credits, e.g. CERs and ERUs.

The ways forward for the EU ETS

The EU ETS can potentially spur investments towards a low-carbon economy by enhancing the long-term price signal.

7) Domestic or regional legislation, or ideally a comprehensive international agreement, is needed to bring long-term predictability to carbon markets.

⁶ REDD stands for Reducing Emissions from Deforestation and Forest Degradation. REDD-plus includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks. See "About REDD+" on the UN-REDD Programme website (<http://www.un-redd.org/AboutREDD/tabid/582/Default.aspx>).

Regulatory uncertainty or arbitrariness is a major concern for the private sector. In the absence of an international agreement, domestic legislation addressing a cap-and-trade scheme and especially the long-term cap trajectory can bring some predictability to the market.

8) At present, the short-term volatility of the carbon price and the lack of a long-term price signal have limited the scale of investment.

Market participants are aware that carbon has a long-term value despite short-term price volatility. The projected price on the long-term horizon is even more important than the current price, especially for influencing investment decisions. The development of the EU ETS has started to have an impact on investment in the power and industry sectors. Ad hoc and short-term fixes need to be avoided in domestic and regional cap-and-trade schemes.

One option to stimulate investment in mitigation activities would be to set a clear long-term trajectory and embed it into EU legislation, e.g. by defining targets for 2030, 2040 and 2050.

Another option would be to tighten the EU-wide cap of the EU ETS from 2020. The European Commission could examine the adequacy of the cap in terms of its alignment with the long-term GHG emission targets endorsed by the EU, and if necessary adjust the cap.

A third option to stimulate investment would be to tighten the ETS Phase III cap by setting aside some amount of allowances. This set-aside option would cause scarcity and support the carbon price only if market participants believe that it entails a permanent removal of allowances. On the other hand, this option risks falling under the heading of ad hoc and short-term fixes, which could undermine predictability and support for the scheme.

9) It is important to ensure the integrity and consistency of EU legislation that supports the EU's climate change objectives.

The EU ETS plays a strong role in promoting renewable energy and energy efficiency measures. A carbon market and an energy market need to be made coherent and linked with one another. There are overlaps and there could be competing outcomes among the rules in EU legislation, e.g. the proposed energy efficiency Directive and the EU ETS Directive.

Recommendations

While international negotiations at the COP17 in Durban have set a timeline for developing a comprehensive global agreement, there will be a gap between the end of CP1 of the Kyoto Protocol in 2012 and the entry into force of a new global agreement (in 2020 at the earliest), during which many of the major emitting economies are likely to adopt emission reduction commitments. During this period, the EU and a few other Parties will have legally-binding commitments. The EU has considered a set of unilateral actions ranging from the roadmap towards a low-carbon economy in 2050 to a possible amendment of the 2020 GHG emission target and adjustments to the designs of the EU ETS Phase III. Against this background, this CEPS Task Force has formulated the following recommendations.

Purposes and outcomes of carbon markets

- 1) The EU should endeavour to maintain and improve the cost-effectiveness of the EU ETS in mitigation actions.
- 2) The European Commission and member states should launch a direct consultation process with the private sector on what the latter could contribute to climate finance, and in particular on the possible achievements of carbon markets in finance and investments.

The making of future carbon markets

- 3) The EU should continue to expand carbon markets by exploring the inclusion of new sectors (e.g. maritime) into the ETS, providing incentives for new CDM projects whose credits would be eligible for compliance with the EU ETS Phase III, supporting the groundwork for such new mechanisms as sectoral crediting and domestic offsets, and establishing bilateral agreements with third countries.

The early conclusion of bilateral agreements with developing countries is crucial in encouraging the active engagement of the private sector, although this is probably not sufficient to mobilise the levels of finance needed.

The provision on domestic offsets requires further clarification for implementation and the active involvement of the private sector, i.e. rules to operationalise Art. 24(a) of the EU ETS Directive.

- 4) In the absence of a comprehensive global agreement, carbon markets should be gradually expanded through continued use of existing tools. Examples include CERs/ERUs (Art. 11(a), ETS Directive), implementing bilateral agreements with third countries on crediting emission reduction activities (Art. 11(a)(5)) or linking with other, mandatory cap-and-trade schemes (Art. 25).
- 5) The EU should develop a time frame for the availability of the mechanism options to provide better predictability.
- 6) The EU could also move forward in implementing capacity-building programmes and pilot projects to examine the feasibility of sectoral crediting or trading.
- 7) The EU should ensure sufficient fungibility of different mechanisms. Fungibility in this context means that different credits issued in different schemes are (partially) compatible to secure sufficient liquidity. It would be important to ensure fungibility between the existing and new mechanisms, especially if the emerging mechanism options are designed in a bottom-up manner. Lack of coordination among the design elements of the respective mechanisms leads to a lack of fungibility between credits or allowances. The challenge would be to ensure fungibility as well as environmental integrity, for example through enhancing measurement and verification or using conservative defaults.

The ways forward for the EU ETS

- 8) Additional decisions on the EU ETS contemplated by the European Commission or member states should not be ad hoc or piecemeal, as that would undermine predictability.
- 9) To increase predictability, the European Commission and member states should consider launching a process of consultation with stakeholders to minimise ad hoc approaches in favour of approaches that have been envisaged in the ETS Directive.

INTRODUCTION & BACKGROUND

The Cancún Agreements recognise the scientific view that a global average temperature increase should be kept below 2°C above pre-industrial levels. To limit the temperature increase to 2°C, the European Council endorsed the EU objective of reducing greenhouse gas (GHG) emissions by 80-95% below 1990 levels by 2050, as part of necessary reductions by developed countries according to the Intergovernmental Panel on Climate Change (European Commission, 2011a). The EU and member states remain committed to GHG emission targets as agreed in the energy and climate change package, cutting at least 20% unilaterally and up to 30% if other developed countries come on board.⁷

The EU accounts for around 14% of global GHG emissions and this share has been declining over the years.⁸ Considering that emissions trading is a cost-effective way to reduce GHG emissions, the EU views the Emissions Trading Scheme (ETS) as the flagship of its climate policies. The EU ETS is the first cross-border, large-scale system to cap and trade GHG emissions from over 11,500 installations in the European power and industry sectors,⁹ joined by aviation in 2012. A number of studies provide evidence that the EU ETS has led to a significant amount of GHG emission reductions in each of the first three years in Phase I (2005–07), based on an observed emissions-intensity improvement above historical trends. CEPS' own calculations, which extend these estimates to 2008 and 2009, show even greater intensity improvements in Phase II than those realised in Phase I (Egenhofer et al., 2011). Other studies reviewed by CEPS present evidence of abatement based on case study analysis and interviews, and

⁷ See Decision 1/CP.16, "The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention" in UNFCCC (2011a).

⁸ D. Meadows, presentation at the CEPS Task Force meeting on 15 September 2010.

⁹ Ibid.

suggest that investment has taken place in energy efficiency and in large-scale coal power generation, i.e. where the payback is fast or carbon-intensity is high, which may point to the importance of longer-term price expectations (Egenhofer et al., 2011).

Today carbon markets mainly consist of the EU ETS and the Kyoto Protocol market.¹⁰ The EU ETS is at present the core of the ‘global carbon market’. According to an annual World Bank report on carbon markets, the growth of carbon markets has been driven by the EU ETS as the dominant source of demand for certified emission reductions (CERs): the share of EU allowances (EUAs) accounted for 84% of the value of the global carbon market in 2010 (Linacre et al., 2011). The so-called ‘Linking Directive’ (2004/101/EC) allows the ETS-covered installations to use credits from the Clean Development Mechanism (CDM) and joint implementation (JI) for compliance purposes. In addition, EU member states have purchased CERs to meet their respective Kyoto Protocol targets. Access to credits or offsets may not only maximise the economic efficiency of carbon markets but also provide price stability over a period of time.

Established under the Kyoto Protocol (Art. 12), the CDM assists Annex I Parties in achieving compliance with their emission reduction commitments. In the long-term all countries, including advanced developing countries, need to take greater action to reduce GHG emissions. In parallel with UN negotiations, several of the advanced developing countries, such as China and India, have stepped up concrete plans and measures for mitigation actions (e.g. five-year plans and domestic schemes for emissions trading).

The Parties to the UN Framework Convention on Climate Change (UNFCCC) have been discussing the creation of new market-based mechanisms (e.g. sectoral crediting, sectoral trading, the crediting of

¹⁰ The Kyoto Protocol envisages three “market-based mechanisms”: joint implementation (Art. 6), the Clean Development Mechanism (Art. 12) and international emissions trading (Art. 17). The term “flexible mechanism” is also widely used to indicate these mechanisms and has been used in this report. See “The Mechanisms under the Kyoto Protocol: Emissions Trading, the Clean Development Mechanism and Joint Implementation” on the UNFCCC website (http://unfccc.int/kyoto_protocol/mechanisms/items/1673.php).

nationally appropriate mitigation actions (NAMAs) or the REDD¹¹ plus¹² programme; see also section 3.2.3) as well as an extension of the existing project mechanisms (e.g. the CDM). It will take some time to put new mechanisms in place and develop the monitoring capacity as well as the institutional/administrative structure.

The biggest challenge at present, however, is the delay in reaching a global agreement that assigns ambitious targets to major emitting countries and quantifies the demand in the carbon market. While the Parties agreed on setting the second commitment period (CP2) of the Kyoto Protocol, demand for CERs will be limited to those that decided to take on binding commitments for quantitative emission reductions, i.e. the EU and countries of the European Economic Area. There will be a gap between the end of the first commitment period (CP1) of the Kyoto Protocol in 2012 and the entry into force of a new global agreement (in 2020 at the earliest) in which many of the major emitting economies are likely to adopt emission reduction commitments.

With remaining uncertainty about the level of real ambition and the legal form of a forthcoming multilateral framework for climate change, along with the likelihood of needing to bridge an extended period of low demand, some Annex I Parties have strengthened domestic measures or started developing bilateral mechanisms. Among the political challenges are whether Parties will scale up national or bilateral mitigation actions ahead of the forthcoming multilateral framework to be established by the UN or whether they can consider any alternative multilateral route for a transition period.

There is a strong role for the EU in today's fragmented carbon market, which is made up of different mechanisms setting different prices for carbon. Future flexible mechanisms are likely to be established for diverse purposes and for the varying capacities of host countries. One size does not fit all. These separate markets can be linked through common commodities

¹¹ REDD refers to Reducing Deforestation and Forest Degradation in Developing Countries.

¹² REDD-plus includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks; see "About REDD+" on the UN-REDD Programme website (<http://www.un-redd.org/AboutREDD/tabid/582/Default.aspx>).

if not through common mechanism designs. In this scenario, it is crucial to ensure the environmental integrity of the overall system by monitoring and tracking the generation and movement of commodities.

This report is structured as follows. Chapter 1 identifies the purposes and possible achievements of carbon markets. Chapter 2 focuses on the balance between demand and supply in the EU ETS. Chapter 3 explores ways to facilitate transition from the CDM to new market-based mechanisms, highlighting the potential of sectoral approaches in key emitting sectors. Chapter 4 discusses recent EU initiatives to move towards future flexible mechanisms and expand the ETS sector. Chapter 5 looks at ways to improve the predictability associated with a carbon price in the EU ETS. The report closes the discussion with concluding remarks. It is written in non-technical language for a wide range of stakeholders.

This report addresses carbon finance along with technology deployment and innovation as potential achievements that may be expected from the ETS but does not look into each area further. The report mainly envisages the possibility for the ETS to be primarily linked with flexible mechanisms rather than with other mandatory cap-and-trade schemes as originally foreseen in Art. 25 of the ETS Directive (2009/29/EC). Examples of planned cap-and-trade schemes in other industrialised and developing countries are outside the scope of this report.

1. PURPOSES AND POSSIBLE ACHIEVEMENTS OF CARBON MARKETS

The primary purpose of carbon markets for compliance buyers is to discover the carbon price at which mitigation can take place in a more cost-efficient way. Carbon markets may also lead to achievements in financing climate actions and in supporting technology deployment and innovation for transition to a low-carbon economy. This chapter discusses how carbon markets could contribute to cost-effective mitigation in the context of the EU ETS and also lead to positive achievements in i) channelling private investments as well as public funding to developing countries and EU member states for climate actions, and ii) driving clean-technology deployment and innovation.

1.1 Carbon markets as a cost-effective mitigation tool

The ETS is considered the most cost-effective and flexible tool for mitigation, giving rise to greater reduction potential. The EU ETS has already resulted in GHG emission reductions under a cap: CEPS' own calculations seem to confirm what has already been found in relation to Phase I, that the ETS led to abatement in the period 2006–09 (Convery et al., 2010), as measured in a CO₂ emissions-intensity improvement (Egenhofer et al., 2011). Significant regulatory changes for Phase III aimed at enhancing the stability of rules will start to pay off. These changes include a longer trading period, early cap-setting and in principle a move towards full auctioning in the electricity sector and more gradually in industry sectors.¹³

Carbon markets can reduce compliance costs for the EU in meeting its current target of a 20% cut in GHG emissions from 1990 levels by 2020 and

¹³ Limited auctioning has been implemented in the electricity and industrial sectors, i.e. at least 5% in Phase I and 10% in Phase II. In aviation, the share of auctioning is 15% for 2012–20.

any greater level of reductions. To date, the European Commission has considered options for moving beyond 20% up to 30% in the target for GHG emission reductions leading up to 2020 (European Commission, 2010a). It has assessed the risk of carbon leakage at the EU level (European Commission, 2010a and 2010b) and the costs and benefits at the member state level (European Commission, 2012). The Commission has put forward an assessment that a 30% target can be achieved cost-effectively, given the full implementation of the Energy Efficiency Action Plan and access to offset credits (European Commission, 2011a; see also European Commission, 2012).

Under the current 20% target, the ETS sector (originally electricity and industry, joined by aviation in 2012) must achieve a 21% cut below 2005–07 levels by 2020 while the non-ETS sectors must yield a 14% cut below 2005 levels. Recent modelling results (PRIMES and GAINS) suggest that a 25% GHG domestic-reduction scenario would lead to 26% of domestic reductions in ETS sectors compared with 2005 (European Commission, 2012).

1.2 Carbon markets as financing instruments to assist developing countries as well as EU member states

1.2.1 *Developing countries*

Carbon markets are expected to play an important role in scaling up climate finance. A robust carbon market could be an important source of long-term finance to assist mitigation and adaptation actions in developing countries. The questions are how markets can be used to generate finance and how much can be expected. Much of the amount of long-term finance pledged collectively by developed countries, \$100 billion (annually by 2020),¹⁴ is meant to be leveraged inter alia through carbon markets, but what this means in practice is unclear.

¹⁴ See Decision 1/CP.16, “The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention” in UNFCCC (2011a).

The expected contribution of carbon markets to climate finance requires ambitious actions in developed countries and a shift from the traditional CDM to a programme of activities (PoAs)¹⁵ and/or to such future flexible mechanisms as sectoral crediting or trading mechanisms in advanced developing countries and their key emitting sectors (see section 3.2). The estimated investment in registered projects that have requested issuance or have CERs issued amounted to over \$81 billion by mid-2011, of which \$63 billion was invested in China (UNFCCC, 2011c). The current CDM does not appear to be capable of generating sufficient or bigger financial flows in order to reach the goal of \$100 billion per year. Future flexible mechanisms could be used to fund part of the required amount.

Other innovative sources include the issuance of bonds earmarked to finance climate actions in developing countries (e.g. green funds and bonds, NAMA bonds) and a levy on emissions from international aviation and maritime.¹⁶ Green NAMA bonds could leverage public finance for low-carbon policies and investments in developing countries and create credible private financing, for instance involving a host developing country, project investors, international financial institutions¹⁷ or individual Annex 1 countries for guarantee, and an international green bond board.¹⁸

¹⁵ A PoA is a voluntary action coordinated by a public or private entity to implement a policy, measure or stated goal, which leads to GHG emission reductions or removals that are additional. See “What is a Programme of Activities”, on the CDM Rulebook website of Baker & McKenzie’s Global Environmental Markets Practice (<http://cdmrulebook.org/452>).

¹⁶ The Task Force did not particularly focus on the proposed levy on emissions from international aviation and maritime. For details about this proposal, see European Commission (2010c) or IMF (2011).

¹⁷ For example, the World Bank has been issuing Green Bonds. See “World Bank Green Bonds” on the World Bank Treasury website (<http://treasury.worldbank.org/cmd/htm/WorldBankGreenBonds.html>).

¹⁸ H. Derwent, “How to make new tools work in the carbon market”, presentation at the CEPS Task Force meeting on 15 September 2010 (<http://www.ceps.eu/files/HenryDerwentCEPSSept2010.pdf>).

In addition, there will likely be an international mechanism rewarding avoided deforestation and forest degradation: REDD-plus (see section 3.2.3). There are three types of finance needs in REDD-plus: capacity building/readiness, upfront investment and compensation for emission reductions (O'Sullivan et al., 2010).¹⁹ Financing REDD-plus requires some progress in addressing potential donors' concerns about carbon leakage as well as the measurement, reporting and verification (MRV) of reductions. The engagement of the private sector in REDD-plus will involve risks and opportunities. There are four kinds of risks: international policy risk in REDD-plus, eligibility risk in REDD-plus, government implementation risk and market risk. Tools to reduce various risks include guarantees by state or development banks, private insurance, securitisation and rain forest bonds (O'Sullivan et al., 2010).²⁰

1.2.2 *EU member states*

Potential revenues from the sale of surplus AAUs (assigned amount units) are currently limited to CP1 and are very insecure, depending on the price agreed in bilateral deals. If an EU member state is primarily motivated to sell AAUs for additional revenues, one proposal under consideration is to enable the EU's cohesion fund to support spending programmes that were initially dependent on the sale of AAUs and can be extended beyond 2012. Such a proposal could be negotiated as part of the next phase of the EU budget for 2014–20. The proposed total budget for the cohesion fund for 2014–20 is €68.7 billion, to support projects in member states with a per-capita gross national income of less than 90% of the EU average (European Commission, 2012).

The replacement of surplus AAUs by the cohesion fund as a source of funding for climate change programmes would mean exchanging virtual revenues with secure and viable EU funding. Those revenues are virtual as well as insecure in the sense that CP2 AAUs are not yet agreed and even CP1 AAUs can only be monetised when a seller reaches a deal with a potential buyer on the price. The option of replacing surplus AAUs with the cohesion fund could result in more emission reductions at lower costs

¹⁹ See also M. von Unger, presentation at the CEPS Task Force meeting on 15 September 2010 (<http://www.ceps.eu/files/vonUngerREDD.pdf>).

²⁰ Ibid.

in new member states, thereby supporting a move beyond a 20% cut in GHG emissions. There is an open question, however, about the absorptive capacity of recipient member states.

For these member states the replacement of surplus AAUs by improved access to the cohesion fund comes on top of auctioning revenues, including those resulting from the redistribution of auctioning rights in the ETS Phase III to take into account variance in income per capita and growth prospects. Moreover, depending on the design, the proposal for setting aside a portion of allowances to be auctioned could have further distributional impacts on member states' auctioning revenues in favour of low-income countries. The European Commission's analysis estimates that the transfer resulting from the redistribution of auctioning rights to the lower-income member states would increase by €5.4 billion in 2020 without reducing the net value of the revenues of higher-income member states (European Commission, 2012). A higher carbon price expected from a set-aside would result in higher revenues.

Lastly, while the decision on how to use revenues from the sale of AAUs depends on a host country's discretion or its contractual obligations with buyers, the decision on how to spend auctioning revenues is conditioned by EU law. Under Art. 10(3) of the ETS Directive (European Parliament and Council of the European Union, 2009a), member states can determine the use of revenues from the auctioning of allowances and are expected to earmark at least 50% of the revenues for policies or measures focusing on GHG emission reductions, renewable energy sources, avoiding deforestation, assistance to developing countries or other purposes for climate change.

1.3 Carbon markets as a driver of innovation and technology deployment for transition to a low-carbon economy in the EU

A significant scale of decarbonisation is required to achieve an 80% reduction in overall European CO₂ emissions from 1990 levels by 2050 – from 4.0 Gt to 0.8 Gt.²¹ By sector, power generation²² needs to be

²¹ AREVA, presentation at the CEPS Task Force meeting on 27 October 2010, sourced from IEA-WEO (2009), Bain hypotheses.

²² Power generation refers to electricity plants, heat plants and combined heat and power plants. Ibid.

decarbonised by 90% to meet the 80% overall target, and the transportation, building and heating industries will need to be electrified.²³

Looking ahead towards 2030 and then 2050, renewables will represent a larger share of the EU-27 electricity mix: 16% in 2007, 44% in 2030 in the IEA 450 ppm Scenario and 55% in 2050 in the OECD/IEA Blue Map.²⁴ Currently, some low-carbon technologies – such as photovoltaic cells and carbon capture and storage – are available but have not achieved an economy of scale.

Decarbonisation of the electricity sector requires a shift to a capital-intensive mix, adding to the investment challenge. Technologies for low-carbon power generation are significantly more capital-intensive. EU decarbonisation objectives will trigger significant capital expenditures in the coming years. There is a 30% gap between the level of investment required and the investment capabilities of EU utilities by 2020: €938 billion is required and €653 billion is available.²⁵

The carbon market alone would not be able to make technologies for low-carbon power generation commercially available within a given time frame. To date, although some studies have found results of some abatement in Phase I, there is little empirical evidence that the EU ETS has had an impact on stimulating innovation and technology deployment, possibly owing to the short time span in which the EU ETS has been operating so far.

CO₂ prices remain largely uncertain until 2020 and beyond, leading to wide variance in price projections and causing difficulties in the investment environment. Forecasts for the demand and supply balance until 2020, which determines the carbon price, are compared in the next chapter.

To provide an incentive for a move beyond 20% in GHG emission reductions, the EU has designed several tools to finance early investment in low-carbon technologies, for example encouraging member states to use a share of auctioning revenues (Art. 10(b), ETS Directive) and the new

²³ Transportation only includes fuel combustion, not fuel production. *Ibid.*

²⁴ *Ibid.*, sourced from IEA (2010).

²⁵ *Ibid.*, sourced from Citi Investment Research and Analysis, and KPMG, *Powering ahead: 2010 – An outlook for renewable energy M&A*, KPMG, London, 2010.

entrant reserve (Art. 10(a)(8), ETS Directive). On the other hand, critics argue that regulators should not pick winners but leave the market to decide; this argument applies to various measures, such as reserves of allowances in domestic cap-and-trade schemes (as noted above) and in the CDM and other financing mechanisms.

2. THE BALANCE BETWEEN DEMAND AND SUPPLY IN THE EU ETS

At present there are two major carbon markets: the EU ETS (see “Introduction & background” in this report for its share) and the international market set-up under the Kyoto Protocol, including the markets for CERs and emissions reduction units (ERUs). There are other markets, such as voluntary ones, whose share remains small. Several carbon markets set several prices.

Given the current co-existence of multiple markets, a global carbon market could be built up through the indirect linking of existing carbon markets among commodities. Linking could increase liquidity, reduce volatility and provide opportunities for low-cost abatement. In the current fragmented markets, there are two possibilities for the way forward. In national or regional carbon markets with different carbon prices (e.g. domestic cap-and-trade schemes), the main questions are i) why a single carbon price has not emerged and ii) how the establishment of a carbon price can be facilitated. In market pockets – albeit not deep – with a global carbon price (e.g. CER), a limit in the scope of activities to the level of projects leads to a limit in economic efficiency (Armand, 2011). There are other factors that might have impeded the development of the Kyoto Protocol market, including the lack of visibility about subsequent commitment periods.

Based on the above understanding, this chapter examines the performance of carbon markets in terms of the demand and supply balance in the EU ETS in 2012–20. There are two supply issues: uncertainty about the future treatment of surplus AAUs and associated ERUs, and the oversupply of EU emission allowances (EUAs).

2.1 Surplus AAUs and associated ERUs

An annual World Bank report on the carbon market anticipated that up to 2012 buyers would be able to meet their demands mainly through the cumulative supply of carbon credits generated under the flexible mechanisms (e.g. CERs and ERUs) as well as AAUs (Linacre et al., 2011). Entering into the last year of CP1 of the Kyoto Protocol and foreseeing the EU's qualitative restrictions on CDM/JI project types due to start from 2013 (see chapter 4), the issuance of CERs increased in 2011 and will continue to do so throughout 2012 (see Figure 1). In addition, Russia and Ukraine finally started issuing a significant amount of ERUs in 2011.²⁶

Surplus AAUs are available in both new member states and third countries like Russia and Ukraine, currently dominant suppliers.²⁷ Although the EU ETS Directive does not directly accept AAUs, there is a risk of indirectly importing AAUs in the form of ERUs, especially those originating in JI Track 1.²⁸ Under JI, ERUs are converted from AAUs.

In Durban, although the Parties agreed to continue the Kyoto Protocol with subsequent commitment periods, they considered the extent to which Parties would be allowed to carry surplus CP1 AAUs over into

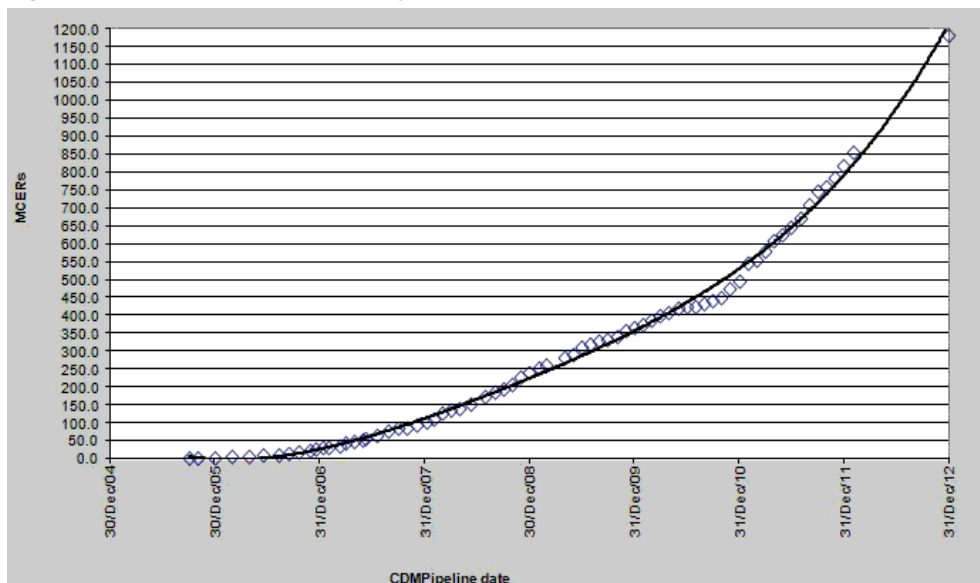
²⁶ For Russia, on the Russian Registry of Carbon Units website, compare the data reports on "Holding and transaction information on the Russian registry of carbon units" of 31 December 2010 (http://www.carbonunitsregistry.ru/reports/ENG-transactions_31_12_2010.pdf), 31 December 2011 (http://www.carbonunitsregistry.ru/reports/ENG-transactions_31_12_2011.pdf), and 7 February 2012 (<http://www.carbonunitsregistry.ru/reports/ENG-transactions.pdf>). For Ukraine, on the Ukrainian Registry of Carbon Units website, compare the data reported in these two datasets: "Holding and Transaction Information on the National Electronic Registry of Anthropogenic Emissions and Absorbption of Greenhouse Gases of Ukraine 31.12.2010" (<http://www.carbonunitsregistry.gov.ua/en/publication/content/855.htm>) and "Holding and Transaction Information on the National Electronic Registry of Anthropogenic Emissions and Absorbption of Greenhouse Gases of Ukraine 31.12.2011" (<http://www.carbonunitsregistry.gov.ua/en/publication/content/978.htm>).

²⁷ Ibid. As for other Annex 1 countries, see the national registry websites available at "Registry Websites" on the UNFCCC website (http://unfccc.int/kyoto_protocol/registry_systems/registry_websites/items/4067.php).

²⁸ Track 1 is supervised by the UNFCCC only at a macro level: the Parties must meet the eligibility criteria to participate in JI Track 1.

CP2.²⁹ Within the EU, during CP2 some member states will likely have surplus CP1 AAUs as well as CP2 AAUs, while others will likely have a shortage.

Figure 1. Accumulated issuance of CERs over time



Source: "CERs", UNEP RISOE Centre website (<http://cdmpipeline.org/cers.htm>).

2.2 The balance between demand and supply in 2012-20

The roadmap for moving to a low-carbon economy in 2050 assumes that the target of a 20% GHG emissions reduction can be met *domestically*, i.e. without access to international offsets, by 2020 and that a 25% cut can be achieved by full and effective implementation of the Energy Efficiency Action Plan, therein meeting the 20% energy efficiency target (European Commission, 2011a). According to the roadmap, only under the 30% scenario would there be additional demand for credits or offsets to be

²⁹ See "Options for addressing the surplus and carry-over of Kyoto units for the second and subsequent commitment periods of the Kyoto Protocol", presentation at the AWG-KP 6th session, 4th part, Durban, 6 December 2011, available on the UNFCCC website (http://unfccc.int/files/bodies/awg-kp/application/pdf/awgkp_16.4_chapter_1.pdf).

generated in non-Annex 1 countries in 2012–20. It is unclear, however, whether the offset or credit limit will be raised in proportion to the higher level of the EU’s ambition in GHG emission reductions.

Two independent analyses and the European Commission’s assessment lead to a similar conclusion on the balance between demand and supply in the EU ETS. Table 1 shows an EUA surplus of 566 million tonnes with no need for any abatement at all over Phase III of the ETS, according to Deutsche Bank forecasts, assuming an outright contraction in eurozone GDP in 2012. These forecasts do not expect that there will be a deficit at any time beyond 2012 either (Curien and Lewis, 2011). This is because the EUA surplus of 566 million tonnes leading up to 2020 would absorb the demand for years to come and the forecasts expect the continuing roll-out of renewable energy capacity and energy efficiency measures beyond 2020, despite the annual decline of the ETS cap at a linear rate of 1.74% from 2020 onwards (Curien and Lewis, 2011).

Table 1. Base-case scenario for the ETS residual abatement requirement, 2011–20 (Mt)

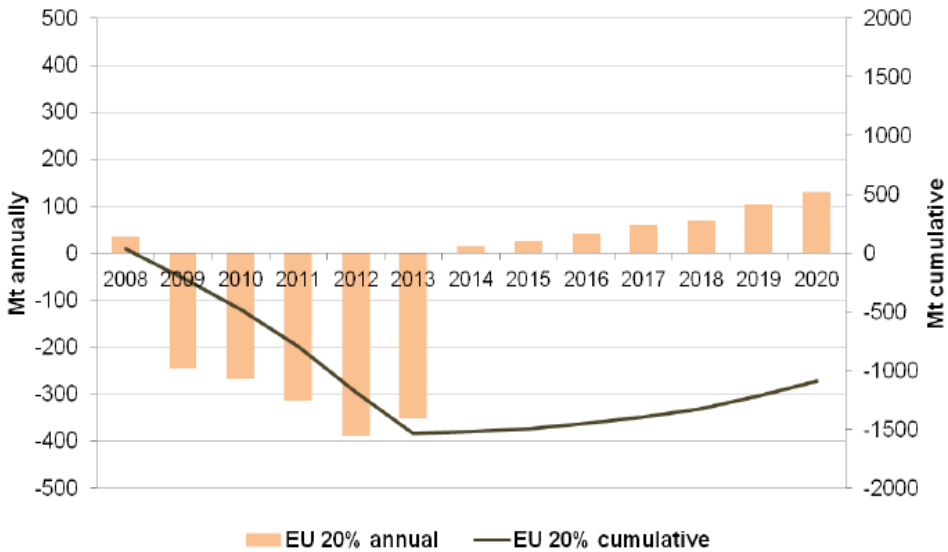
	Estimate
Total EUA cap over 2008–20	25,093
Total ETS emissions over 2008–20	25,747
Total EUA deficit over 2008–20	-655
Aviation net EUA demand	-390
ETS use of CERs/ERUs	1,610
Net EUA surplus	+566
Implied, annual, residual abatement requirement	+57*

* This calculation is the implied, annual residual abatement required over 2011–20. The residual abatement requirement refers to a net EUA deficit.

Source: Deutsche Bank (as of 29 November 2011), adapted from Figure 7, “Revised DB base-case scenario for ETS residual abatement requirement, 2011–20 (Mt)” as cited in Curien and Lewis (2011).

Figure 2 shows a Point Carbon projection that under the current 20% target, in Phases II and III (2008–20) of the ETS, the supply of allowances will likely exceed demand resulting in oversupply of about 1.3 Gt of EUA. Nevertheless, Point Carbon holds that at least two factors will prevent prices from going to zero: a “risk” of moving beyond 20% and the expectation of a future shortage beyond 2020, i.e. the annual decline of the ETS cap at the rate of 1.74% will continue forever.³⁰

Figure 2. EU ETS balance (2008-20)



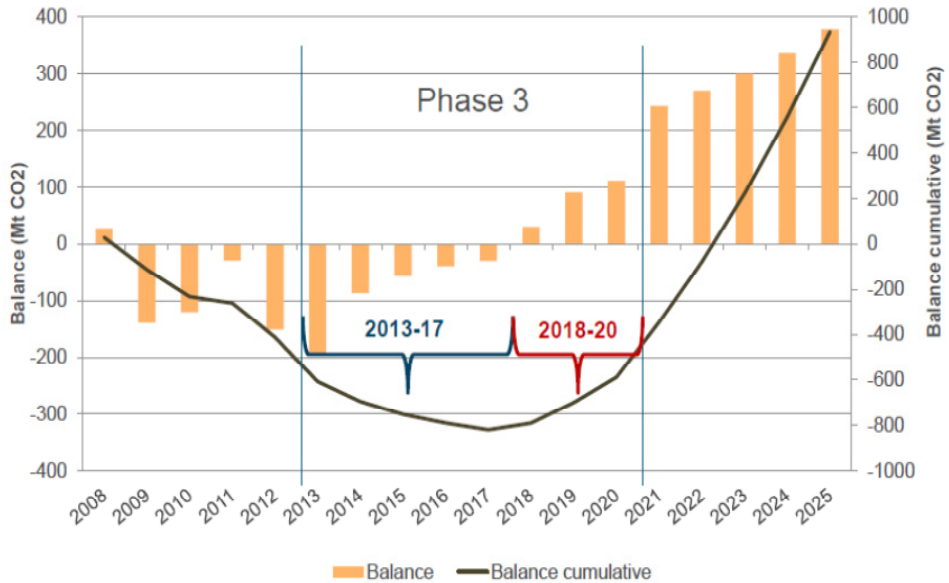
Source: Point Carbon (as of 13 January 2012), as cited in Schjølset (2012, p. 2).

Figure 3 illustrates another Point Carbon projection for annual and cumulative balances of the period the ETS in 2008–25. Even after the annual balance grows short in 2018, it is projected that in terms of the cumulative balance, the supply of allowances will likely exceed demand until 2020.³¹

³⁰ See Schjølset (2012), p. 2.

³¹ Ibid., p. 6.

Figure 3. Annual balances



Source: Point Carbon (as of 13 January 2012), as cited in Schjølset (2012, p. 6).

Lastly, the European Commission estimates (as of the end of January 2012) that a large surplus of banked allowances and unused, international emission-reduction credits in the ETS is now equivalent to 2.4 billion in allowances by 2020 (European Commission, 2012). The analysis notes the effect of this surplus on the EUA price for years to come, even considering the partial recovery in industrial production in 2010-11 and further projected economic growth leading up to 2020.

In conclusion, despite some variance in assumptions, the timing of the assessments and the resulting figures, all three recent analyses conclude that under the current 20% target the supply of allowances in the ETS will likely exceed demand until 2020 and there will effectively be no need for further abatement in the EU to achieve this target.

3. FUTURE OPTIONS FOR FLEXIBLE MECHANISMS

The Kyoto Protocol set the basis for a global carbon market by establishing three flexible mechanisms: the CDM, joint implementation and emissions trading. There are a number of lessons learned from experiences with existing flexible mechanisms, especially the CDM (Fujiwara, 2009). These experiences led to a set of concrete recommendations for improvement in its operation, governance, accreditation, baseline and monitoring methodologies, additionality, standardised baselines, the registration of project activities, the issuance of CERs, the distribution of project activities and capacity-building.³²

Future flexible mechanisms currently under discussion, e.g. sectoral crediting, sectoral trading and NAMA crediting, could help to move towards enhanced global mitigation by requiring environmentally-ambitious baselines and expanding the coverage of activities from projects to key emitting sectors. This chapter gives an overview of the discussions underway on transition to new market-based mechanisms, followed by an analysis of the key design issues in sectoral approaches to market mechanisms, with reference to the electricity, industry and forestry sectors.

³² See the most recent decision taken in Durban on "Further guidance relating to the clean development mechanism" (not yet formally published but available online at http://unfccc.int/files/meetings/durban_nov_2011/decisions/application/pdf/cmp7_cdmguidance.pdf). See also Decision 3/CMP.6, "Further guidance relating to the clean development mechanism" (UNFCCC, 2011b) and Decision 2/CMP.5, taken in 2010, on "Further guidance relating to the clean development mechanism" <http://unfccc.int/resource/docs/2010/cmp6/eng/12a02.pdf>).

3.1 A transition to new market-based mechanisms

Parties to the UNFCCC have elaborated new options for market-based mechanisms, highlighting their views about the potential role these options might play in a comprehensive international agreement, the institutional set-up and the relationship between the options to the existing mechanisms. The likelihood of the new tools working in carbon markets requires trust in the UNFCCC's ability to produce new private-finance mechanisms and the political acceptability of the reduced guarantees of environmental integrity entailed by scaling up finance.³³ Then, a set of factors should be taken into account: demand for product(s), capacity on the supply side, potential borrowers, actions that will have an impact on the expected return, relevant public support and regulations, the process determining when and how to get paid for emissions reductions, risk-bearers, transaction costs and timing constraints, and alternative investments that are currently available.³⁴

3.2 Designing new tools: Sectoral approaches

3.2.1 *Conceptual/methodological issues*

There are currently three possible scenarios of sectoral approaches to market mechanisms being discussed (IETA, 2011). The first scenario is centralised coordination of mitigation and crediting, in which a sectoral coordinating body reports emissions to an international credit-issuing agency and receives international credits for distribution or sale from the agency. The body sets a creditable emissions reduction objective (a target) below the baseline (a baseline has to be established). The second scenario is a domestic, sectoral trading system. A government reports emissions to an international credit-issuing agency and receives international credits for distribution or sale from the agency. The government sets an emissions cap below the baseline that has been established. The third scenario is installation-level mitigation and crediting. An international agency issues credits directly to the installations covered.

³³ H. Derwent, presentation at a meeting of the CEPS Task Force, 15 September 2010 (<http://www.ceps.eu/files/HenryDerwentCEPSSept2010.pdf>).

³⁴ Ibid.

There will be variations in the designs of sectoral approaches, based on the following parameters: the sector suitable for crediting, the kind of target (absolute, intensity or non-GHG parameters), the kind of mechanism (crediting or trading) and the legal nature of the targets (binding or non-binding, commonly known as 'no-lose' targets).

Possible candidates for the sectoral coverage are large sectors with relatively few sources: electricity generation, heavy industry (e.g. cement, steel, aluminium) and forestry (i.e. REDD-plus), which should be measurable, reportable and verifiable. Boundary-setting for a sector or sub-sector is an important first step.

3.2.2 The potential of sectoral crediting: Examples of the electricity and cement sectors

A sectoral crediting mechanism rewards emissions reductions from a covered sector against a threshold below the business-as-usual scenario (to be defined) (see e.g. Fujiwara, 2009). Sectoral crediting can be regarded as a scaled-up option mainly targeted at advanced developing countries and a stepping-stone from the current CDM to the ultimate goal of establishing cap-and-trade schemes with tight caps. Key questions include how to motivate the private sector to engage in sectoral crediting, how to set the baseline and the threshold, and how to monitor. There is no guarantee that one producer or investor will receive its share of credits for abatement achieved beyond the agreed baseline, as another producer or investor can undermine the sector's overall performance. This requires a domestic policy framework to enable them to beat the sectoral baseline. Potential revenue from the sale of credits can be used to reward extra abatement efforts.

The electricity sector can be regarded as a promising candidate for sectoral crediting. The International Energy Agency (IEA) has studied the potential of the Chinese electricity sector for sectoral crediting.³⁵ It is not clear how the country's pledges to GHG emissions reductions will be translated into a baseline for the electricity sector. One challenge is to work out how a CO₂ price or a CO₂ revenue stream could affect investment choices. At present, end-users pay extra costs for low-carbon energy

³⁵ R. Baron, presentation at a meeting of the CEPS Task Force, 15 September 2010 (<http://www.ceps.eu/files/BaronCEPSSept2010.pdf>).

sources (e.g. renewable, nuclear and hydro) through grid rates. Coal-based prices are benchmarked and vary according to a local development stage.³⁶

The cement sector has been at the vanguard of transnational efforts on data collection and management through the Getting the Numbers Right project of the Cement Sustainability Initiative (CSI) of the World Business Council for Sustainable Development (WBCSD).³⁷ The share of developed countries in world cement production is declining, currently accounting for less than 10%, while the share of developing countries is rapidly increasing. The impact of the latter on global GHG emissions is also increasing, given that these countries do not have carbon constraints comparable to the EU ETS caps.³⁸ Carbon leakage will appear without a global price, for example driven by an intensity target, in the long term. Another issue associated with sectoral crediting is that someone has to pay for emissions reductions in developing countries. In theory, European producers would not pay for competitors but pass through the costs to consumers. Then it is not necessarily producers but taxpayers or customers who will have to pay. In practice, however, certain producers – especially those operating in sectors or products exposed to global competition – might not be able to pass through all or some of the costs.

3.2.3 *REDD-plus crediting*

Clear designs of future flexible mechanisms, including a financing mechanism for REDD-plus, are needed to enhance the investment climate and limit various risks. Designs for the REDD-plus market lead to two market options with some variations (O’Sullivan et al., 2010).³⁹ The first option assumes only sovereign participation in the international REDD-plus market. Environmental integrity is ensured through national reference levels and national-level MRV. Domestic implementation is de-linked from

³⁶ Ibid.

³⁷ See “Global Cement Database on CO₂ and Energy Information” on the website of the WBCSD Cement Sustainability Initiative (http://www.wbcscement.org/index.php?option=com_content&task=view&id=57&Itemid=118).

³⁸ R. van der Meer, comments at the CEPS Task Force meeting on 15 September 2010.

³⁹ See also M. von Unger, presentation at a meeting of the CEPS Task Force, 15 September 2010 (<http://www.ceps.eu/files/vonUngerREDD.pdf>).

international carbon markets and controlled by the national government. The second option presumes the international issuance of national credits with two variations, depending on whether sub-national credits are issued at the international or national level. These variations are comparable to the CDM approach (international issuance) and the JI approach (national issuance).

4. EU INITIATIVES: MOVING BEYOND THE CDM AND EXPANDING THE ETS SECTOR

Insofar as international negotiations have become an open-ended process, the EU has two alternative pathways: to set its own rules on both the demand and supply sides or to work within the UN or in other ways internationally to find an agreement. In the former case, the ETS Directive (European Parliament and Council of the European Union, 2009a) allows quantitative and qualitative restrictions on access to CERs and ERUs in Art. 11(a), the generation of new offsets or credits generated in least developed countries (LDCs) in Art. 11(a)(4), bilateral agreements with developing countries in Art. 11(a)(5) and domestic offset schemes in Art. 24(a). This chapter looks at each condition under which installations in the ETS sector could benefit from the continuous use of existing and new market-based mechanisms.

4.1 Restrictions on the CDM and JI

More restrictive rules on the recognition of CERs and ERUs in the ETS could limit the supply, which could possibly (under certain conditions) accelerate a transition towards future flexible mechanisms, such as a sectoral crediting mechanism.

Art. 11(a) of the ETS Directive (European Parliament and Council of the European Union, 2009a) sets out quantitative restrictions that vary from one member state to another but should not be less than 11% of the verified emission reductions in 2008–12. Use of CERs and ERUs will be extended from 2013 to 2020, to the extent that individual quotas were not used up during the period 2008–12. Qualitative restrictions mean that credits from certain kinds of projects cannot be used for compliance purposes as of the

date of restriction, which can come between six months to three years after the entry into force of a proposal by the Commission.⁴⁰

The EU ETS will accept credits issued in 2008–12, credits issued in 2013 or later from projects (or PoAs) registered in 2008–12 and credits from new projects in LDCs from 2013. Credits from specific kinds of projects may be subject to restrictions in the ETS from 1 January 2013 (Art. 11(a)(9), ETS Directive). Under the effort-sharing decision, EU member states will also be allowed to use credits, with imports capped at 3% of 2005 emissions.

As a first step, the EU approved the regulation banning CERs and ERUs generated from industrial gases (hydrofluorocarbons or HFCs) and nitrous oxide (N₂O) adipic acid in projects, starting from 1 January 2013 (European Commission, 2011c).⁴¹ There are two main reasons for which qualitative restrictions on the acceptance of CERs and ERUs have been introduced in the recent regulation.

First, the costs of production incurred in some projects are so low that it brings economic rents to project developers. The low production cost itself should not be an issue in the market where the price is to be determined by the balance of demand and supply. The current pricing of offset credits does not necessarily reflect the balance between demand and supply but the eligibility of certain types of credits or projects that are subject to regulatory change. It is observed that there is already fragmentation in the carbon market with different trading units attracting different prices (see chapter 2).

The second reason for qualitative restrictions is concerned with whether chemical companies have inflated production because of carbon market revenues. If this were the case, the CDM would create perverse incentives for carbon leakage. This question should be addressed on a case-by-case basis. In practice, the CDM Executive Board investigated whether this had occurred for HFCs and found it had not.

⁴⁰ Such a proposal would have to be approved by member state representatives in the EU's Climate Change Committee and scrutinised by the European Parliament and Council.

⁴¹ This deadline has been extended, however, until 30 April 2013, for destruction of these industrial gases from existing projects.

Considering the continued recognition of CERs, one way to restrict the inflow of CERs arising from certain kinds of projects, such as F-gases, is to introduce a multiplier or a change to the UNFCCC's methodology.

There are some open regulatory issues concerning the EU ETS Phase III. The eligibility criteria of CERs will affect the available supply of offsets. The private sector is concerned with regulatory uncertainty or arbitrariness, such as the retroactive implementation of new rules. Regulatory uncertainty about CDM rules would undermine confidence among market operators and prevent them from investing in any new mechanisms.

The regulations on banning CERs and ERUs from projects on industrial gases take this concern into account. Any implementation of new rules on CDM or JI projects should not be retroactive, as this would challenge the credibility and the future of the carbon market. There is a need to preserve business continuity in order to give confidence to the participants in the private sector that have already invested in CDM or JI activities and have contributed to the success of the carbon market.

While additionality has rarely been contested for projects on industrial gases, it could remain an issue for JI Track 1 projects. A regulatory framework for JI Track 1 aimed at ensuring environmental integrity remains less certain than that for JI Track 2 or the CDM. It is possible that in Track 1 certain host countries do not have a robust measurement or verification system to ensure the quality of the ERUs to be issued, even though there seems to be some improvement in their capacity for measurement, reporting and verification.

4.2 Bilateral sectoral agreements

If no international agreements were concluded by the end of 2009, Art. 11(a)(5) of the ETS Directive enables operators to use credits from projects or other activities specified in bilateral agreements with third parties in order to comply with their obligations under the scheme. This provision, however, gives no clarity about the terms of reference for bilateral agreements. Among the political challenges are how the EU can best reconcile the need for flexibility, for example through bilateral agreements, with its commitment to a global comprehensive agreement, along with how the EU can enter regional/domestic offsetting schemes without being blamed for undermining the CDM. Responding to these challenges

requires consideration of whether a package of COP/CMP⁴² decisions or domestic legislation can drive the development of a global carbon market. While Parties could explore elaboration of new market-based mechanisms (including a sectoral mechanism) at UN negotiations, the EU could test the concept through demonstration or pilot projects in non-EU countries under bilateral agreements.

4.3 Domestic offsets

Art. 24(a) of the ETS Directive provides a way for EU member states to develop projects that can reduce GHG emissions in non-ETS sectors. JI projects in the JI pipeline hosted by EU member states show the potential for further emissions reductions. Yet to date little effort has been made to clarify detailed procedures to govern domestic offsets.

Just as the current JI operates under the constraints set for Parties under the Kyoto Protocol by the initial allocation of AAUs in CP1, domestic offset projects will operate under the constraints imposed on EU member states by the initial allocation of annual emissions (annual emissions allocations, AEAs) in 2013–20. To avoid double-counting between EUAs under the ETS and AEAs under the effort-sharing decision, boundary setting and the measurement of emissions from sub-sectors will become crucial, with special reference to the implementation of measures aimed at energy efficiency, fuel switching or heating in the electricity sector.

4.4 Aviation in the ETS

As of 2012, aviation activities are covered by the EU ETS (European Parliament and Council of the European Union, 2009c). ETS legislation covers all flights to and from EU airports. Exceptions include *de minimis* and third countries with equivalent measures. Emissions caps start with a 3% reduction in GHG emissions in 2012 below the average of the annual emissions from 2004, 2005 and 2006, followed by a 5% reduction in 2013–20. While the majority of allowances (85% in 2012 and 82% in 2013–20) will be allocated free of charge, 15% of allowances will be auctioned. The revenues from auctioning are earmarked for policy objectives, including sustainable transport. In 2013–20, 3% of allowances will be reserved for new or fast-growing operators.

⁴² CMP refers to the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol.

5. CARBON PRICING IN THE EU ETS

It is important to ensure the integrity and consistency of EU legislation that supports the EU's climate change objectives. A carbon market and an energy market have different characteristics: in the former, the long-term supply of allowances is capped, which is not the case for the latter. Nevertheless, the two markets need to be made more coherent and be linked with one another. The EU ETS has a strong role in promoting renewable energy and energy efficiency measures. There are overlaps and there could be competing outcomes among the rules in EU legislation, e.g. the proposed energy efficiency Directive (European Commission, 2011b) and the EU ETS Directive.

The EU ETS can potentially drive investments towards a low-carbon economy by enhancing the long-term price signal. At present, the short-term volatility of the carbon price and the lack of a long-term price signal have limited the scale of investments.

Recognising the specific nature of carbon markets, this chapter discusses carbon pricing of the EU ETS and associated predictability.

5.1 Increasing predictability

In principle, the carbon price is determined by the balance between demand and supply in the market. EU ETS legislation has brought predictability to the carbon market. ETS market participants are aware that carbon has a long-term value. Price stability in the short term itself is not a major issue: there was excess volatility in the EUA price in Phase I, generating uncertainty, but the price movement was rather moderate in Phase II. The projected price on the long-term horizon is even more important than the current price, especially for influencing transformative investment decisions. The development of the EU ETS has started to have an impact on investment in the power and industry sectors by setting mandatory EU-wide caps in Phase III, which allows the linear decline in annual caps to be extended, currently at 1.74% compared with the average

annual cap in 2008–12, beyond 2020. Ad hoc and short-term fixes need to be avoided in domestic or regional cap-and-trade schemes.

One way to stimulate investment in mitigation activities would be to set a clear long-term trajectory and embed it into EU legislation, e.g. by defining targets for 2030, 2040 and 2050. This could be undertaken in parallel with short-term adjustments.

Under the ETS Directive, price visibility in the current five-year period or even longer could be enhanced. The ETS emission caps need to be aligned with the long-term target for GHG emissions endorsed by the EU.

In this context, the second option would be to adjust the EU-wide cap of the EU ETS from 2020. Art. 9 of the ETS Directive envisages that the Commission will review the linear factor (1.74% compared with the average annual cap in 2008–12) and submit a proposal from 2020.

A third option to stimulate investment would be to reduce the overall amount of available allowances in the ETS under the EU-wide cap in Phase III, i.e. setting aside a certain quantity of the volume to be auctioned, a 'set-aside'. It has been claimed that reducing the amount of allowances through a set-aside could result in a shortage of supply against the existing cap, raise the EUA price and boost auctioning revenues. This claim has been questioned, however, on the grounds that the set-aside would generate scarcity and support the carbon price only if market participants believed that the decision will result in a permanent removal of allowances. It is not clear at this juncture if a revision of the EU ETS Directive is required to permanently remove these allowances from the market or if, by contrast, they could be restored at any time if the price goes up again or towards the end of Phase III, thereby putting prices back into a downward spiral. Even if market participants buy into this measure, the resulting higher prices could have negative impacts on compliance buyers, thereby increasing the pressure on measures reverting the effect of the set-aside. It should be also recalled that auctioning was originally intended to put a price on carbon and place it in the market, not to raise revenues for member states. Moreover, such extraordinary measures, if introduced on an ad hoc basis as a short-term fix, could reduce the predictability of the scheme, and undermine support for and trust in it.

Alongside carbon prices set by the current EU ETS and renewable obligations (European Parliament and Council of the European Union, 2009d), an additional incentive would be needed to induce the electricity sector to carry out a significant scale of decarbonisation. A long-term

incentive is the key. A domestic policy can provide extra regulatory certainty. For example, the UK proposal for a 'price floor'⁴³ will act as a tax, providing price support on top of the EU ETS and revenue to the government. It can offer greater predictability to investors. This proposal, however, has raised two specific concerns. One is a reservation about any form of intervention in markets, along with the principle of avoiding the existence of several different policies in the same area. Another is a defence against the possible impact of one member state's measures upon other member states under the EU-wide cap and the resulting risk of carbon leakage across member states. A recent study estimates that the UK price support will lead to the additional abatement of emissions in Phase III by the UK electricity sector, but under the current emissions caps for the EU ETS, this will reduce demand for EUAs, lower the EUA price and diminish EUA auction revenues for other member states (Sartor & Berghmans, 2011). While it is becoming clearer that an intergovernmental framework does not provide everything needed, the proposed UK price support could become a test case and a significant alternative. It is difficult to reach a consensus on EU-wide price support: a price floor for one member state could be a price ceiling for others.

⁴³ See "Carbon price floor" on the HM Treasury website (http://www.hm-treasury.gov.uk/consult_carbon_price_support.htm).

CONCLUDING REMARKS

Experiences in the EU ETS Phases I and II confirm that the cap-and-trade scheme is a cost-effective way to achieve the environmental objective, i.e. caps on GHG emissions in the ETS sector. In a transition to Phase III, EU policy-makers and stakeholders have discovered two possible achievements that may be expected from a carbon market. One is the creation of additional revenue streams to support climate actions, thereby scaling up both mitigation and climate finance. The other is the acceleration of technology deployment and the reward of innovation, leading to the phasing-in of low-carbon technologies faster than before. The first possible achievement, i.e. financing, has been tested and observed in CDM and JI projects. There are growing expectations that the EU ETS will lead to these achievements as well as fulfil its original purpose. This report acknowledges diversity in stakeholders' opinions about the emphasis on each element.

Insofar as multiple carbon markets exist side-by-side while loosely linked to one another, a global carbon market could be built up by indirect linking through commodities. For example, the EUA price is set for the EU ETS. Beyond the EU border, however, there remains the co-existence of several carbon markets setting several different prices. While the EUA remains valid until 2020 and beyond, the value of other trading units, such as CERs, ERUs and AAUs, depends essentially on the state of international negotiations.

The price of carbon is determined by the balance between demand and supply in the market. The EU and countries of the European Economic Area have decided to take on binding emission-reduction commitments during CP2 of the Kyoto Protocol, whereas a new global agreement that could engage all countries, including major emitting economies, will likely enter into force in 2020 at the earliest. Nevertheless, the EU's own demand for international credits and the ETS sector's demand for EUAs will be very limited leading up to 2020 unless the EU raises the level of ambition from the current 20% cut. In light of the current extent of oversupply, market analysts project that the supply of allowances in the ETS will likely exceed demand until 2020.

Uncertainty casts a shadow not only over the extent of future demand but also the capacity of existing and new mechanisms to deliver offsets or credits of high quality that meet the MRV requirements. What has emerged since Copenhagen is a set of *platforms* to build scaled-up mechanisms, such as sectoral crediting, upon experiences with the CDM and JI and to identify preconditions for these mechanisms to work on the ground. It is important to note that a common template for mechanism design will not likely apply to all sectors, in other words different designs will suit different sectors. The preconditions for making new mechanisms operational can be identified through the implementation of capacity-building programmes or pilot projects in potential host countries. These efforts take time and require the active engagement of the private sector – which has data, MRV skills, technology and know-how – in the early stage of designing mechanisms. *Platforms* can be bilateral or multilateral, but *future flexible mechanisms* need to be set up in a way that would not increase the fragmentation of carbon markets through a proliferation of bilateral or sectoral agreements.

The EU should ensure sufficient fungibility of different mechanisms. Fungibility in this context means that different credits issued in different schemes are (partially) compatible to secure sufficient liquidity. It would be important to ensure fungibility between the existing and new mechanisms, especially if the emerging mechanism options are designed in a bottom-up manner. A lack of coordination among the design elements of the respective mechanisms leads to a lack of fungibility between credits or allowances. The challenge would be to ensure fungibility as well as environmental integrity, for example through enhancing measurement and verification or using conservative defaults.

Still, if the EU continues to drive carbon markets until 2020, the readiness of future flexible mechanisms will likely have less impact on the EUA price than scarcity or liquidity in the EU ETS. The EU should endeavour to maintain and improve the cost-effectiveness of the EU ETS in mitigation actions. To date, concerns about the short-term volatility of the carbon price and the lack of a long-term price signal have hindered investments in low-carbon technologies. Additional decisions on the EU ETS contemplated by the European Commission or member states should not be ad hoc or piecemeal, as that would undermine predictability. The European Commission and member states should consider launching a process for consultation with stakeholders to minimise ad hoc approaches in favour of approaches that have been envisaged in the ETS Directive.

LIST OF ABBREVIATIONS AND TECHNICAL TERMS

AAU	Assigned amount unit (under Kyoto Protocol emissions trading)
AEA	Annual emission allocation
CDM	Clean Development Mechanism (under Art. 12 of the Kyoto Protocol)
CER	Certified emissions reduction (under the CDM)
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
COP	Conference of the Parties to the UNFCCC
CO ₂	Carbon dioxide
CP1 & 2	First and second commitment periods (under the Kyoto Protocol)
CSI	Cement Sustainability Initiative (under the auspices of the World Business Council for Sustainable Development)
ERU	Emissions reduction unit (under the JI)
ETS	Emissions Trading System/Scheme
EUA	EU emissions allowance
GDP	Gross domestic product
GHG	Greenhouse gas (the six gases covered by the Kyoto Protocol, CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs and SF ₆)
Gt	Gigatonne (billion metric tonnes)
HFCs	Hydrofluorcarbons
IEA	International Energy Agency
IETA	International Emissions Trading Association
JI	Joint implementation (under Art. 6 of the Kyoto Protocol)
LDCs	Least developed countries
MRV	Measurement, reporting and verification
Mt	Megatonne (million metric tonnes)
NAMA	Nationally appropriate mitigation action
OECD	Organisation for Economic Cooperation and Development
PFCs	Perfluorocarbons
REDD	Reducing Deforestation and Forest Degradation in Developing Countries (UN programme)
UNFCCC	United Nations Framework Convention on Climate Change
WBCSD	World Business Council for Sustainable Development

REFERENCES

- Armand, R. (2011), *Business in a fragmented carbon world: How to leverage existing instruments for fighting climate change*, Entreprises pour l'Environnement, Paris: Pearson Education France.
- Convery, F., C. de Perthuis and D. Ellerman (2010), *Pricing carbon*, Cambridge, MA: Cambridge University Press.
- Curien, I. and M. Lewis (2011), "EU emissions: What is the value of a political option?", Deutsche Bank AG/London, 29 November.
- Egenhofer, C., M. Alessi, A. Georgiev and N. Fujiwara (2011), *The EU emissions trading system and climate policy towards 2050: Real incentives to reduce emissions and drive innovation?*, CEPS Special Report, CEPS, Brussels.
- European Commission (2012), *Analysis of options beyond 20% GHG emission reductions: Member state results*, Commission Staff Working Paper, Brussels, provisional version published on 30 January.
- (2011a), Communication on a roadmap for moving to a competitive low carbon economy in 2050, COM(2011) 112 final, Brussels, 8 March.
- (2011b), *Proposal for a Directive of the European Parliament and of the Council on energy efficiency and repealing Directives 2004/8/EC and 2006/32/EC*, COM(2011) 370 final, Brussels, 22 June.
- (2011c), Commission Regulation (EU) No. 550/2011 of 7 June 2011 on determining, pursuant to Directive 2003/87/EC of the European Parliament and of the Council, certain restrictions applicable to the use of international credits from projects involving industrial gases, OJ L 149/1, 08.06.2011.
- (2010a), Communication on an analysis of options to move beyond 20% greenhouse gas emission reductions and assessing the risk of carbon leakage, COM(2010) 265 final, Brussels, 26 May.
- (2010b), *Analysis of options to move beyond 20% greenhouse gas emission reductions and assessing the risk of carbon leakage*, Commission Staff Working Document accompanying the Communication from the Commission to the European Parliament, the Council, the

- European Economic and Social Committee and the Committee of the Regions, SEC(2010) 650, Brussels, 26 May.
- (2010c), *Innovative financing at a global level*, SEC(2010) 409 final, Brussels, 1 April.
- European Parliament and Council of the European Union (2009a), Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community, OJ L 140/63, 05.06.2009.
- (2009b), Decision No. 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020, OJ L 140/136, 05.06.2009.
- (2009c), Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community, OJ L 8/3, 13.01.2009.
- (2009d), Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directive 2001/77/EC and 2003/30/EC, OJ L 140/16, 05.06.2009.
- (2004), Directive 2004/101/EC of the European Parliament and of the Council of 27 October 2004 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms, OJ L 338/18, 13.11.2004.
- Fujiwara, N. (2009), *Flexible mechanisms in support of a new climate change regime: The Clean Development Mechanism and beyond*, CEPS Task Force Report, CEPS, Brussels.
- International Emissions Trading Association (IETA) (2010), "Thinking through the design possibilities for a sectoral crediting mechanism: Three options to encourage discussion", Version 1, IETA, Geneva, 5 March.
- International Energy Agency (IEA) (2010), *Energy technology perspectives 2010*, IEA, Paris.

- International Monetary Fund (IMF) (2011), “Market-based instruments for international aviation and shipping as a source of climate finance”, background paper for the report to the G20 on “Mobilizing sources of climate finance”, prepared by staff of the International Monetary Fund and World Bank, Washington, D.C., November.
- Linacre, N., A. Kossoy and P. Ambrosi (2011), *State and trends of the carbon market 2011*, World Bank, Washington, D.C.
- Núñez Ferrer, J., C. Egenhofer and M. Alessi (2011), *The SET-Plan: From concept to successful implementation*, CEPS Task Force Report, CEPS, Brussels.
- O’Sullivan, R., C. Streck, T. Pearson, S. Brown and A. Gilbert (2010), *Engaging the private sector in the potential generation of carbon credits from REDD+: An analysis of issues*, Report to the UK Department for International Development (DFID), Climate Focus, Amsterdam.
- Point Carbon (2011), *Carbon Market Analyst*, Thomas Reuters Point Carbon, Oslo, 11 February.
- Sartor, O. and N. Berghmans (2011), “Carbon price flaw? The impact of the UK’s CO₂ price support on the EU ETS”, CDC Climat Climate Brief No. 6, CDC Climat, Paris, June.
- Schjølset, S. (2012), “The state of the EU ETS: Prices, regulatory uncertainty and international links”, presentation at the Europa meeting, Brussels, 13 January.
- UN Framework Convention on Climate Change (UNFCCC) (2011a), *Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010*, FCCC/CP/2010/7/Add. 1, UNFCCC, Bonn, 15 March.
- (2011b), *Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its sixth session, held in Cancun from 29 November to 10 December 2010*, FCCC/KP/CMP/2010/12/Add. 2, UNFCCC, Bonn, 15 March.
- (2011c), *Benefits of the Clean Development Mechanism*, UNFCCC, Bonn.
- (2010), *Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its fifth session, held in Copenhagen from 7 to 19 December 2009*, FCCC/KP/CMP/2009/21/Add. 1, UNFCCC, Bonn, 30 March.

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