Carbon Finance
AT THE WORLD BANK

STATE AND TRENDS OF THE carbon market 2011

Washington DC, June 2011

Carbon Finance
AT THE WORLD BANK

STATE AND TRENDS OF THE carbon market 2011

Environment Department

This report was prepared by a World Bank team comprising of
Nicholas Linacre, Alexandre Kossoy and Philippe Ambrosi,
with important contributions from Manelle Aït Sahlia, Veronique Bishop,
Benoît Bosquet, Christophe de Gouvello, Taisei Matsuki and Monali Ranade.

New Approach for the 2011 Report

With the goal of providing a comprehensive discussion of the issues that most affected the carbon market in 2010, the authors of last year's report have restructured *State and Trends of the Carbon Market* for 2011. The report still provides an overview of the size and reach of the carbon markets, as well as the evolution of the Kyoto flexibility mechanisms, and offers potential supply/demand scenarios for coming years. However, it no longer includes a detailed breakdown of carbon transactions, as in previous years. Instead, the report provides a more in-depth analytical discussion of the regulation and policy issues that will guide future carbon market development.

Section 1 photo credit: Jan Golinski / UNFCCC
Section 2 photo credit: Veer Incorporated
Section 3 photo credit: Veer Incorporated
Section 4 photo credit: Dreamstime LLC
Section 2 photo credit: Veer Incorporated
Design: Studio Grafik
Printing: Westland Printers

Acknowledgements

The report benefitted greatly from colleagues in the carbon market who provided their written contributions and perspectives: Olga Christyakova, Martin Lawless, and Damien Meadows.

We wish to extend our gratitude to those who offered their cooperation and insights during the elaboration of this report: Edwin Aalders, Schwan Badirou Gafari, Ellysar Baroudy, Jean-Jacques Barberis, François Beaurain, Luca Bertali, Agnès Biscaglia, Martina Bosi, Ana Bucher, Marcos Castro, Lance Coogan, Isabelle Curien, Keith Davis, Karen Degouve de Nuncques, Eduardo Dopazo, Jason Dunn, Saša Eichberger, Emmanuel Fages, Laura Fidao, Greger Flodin, James Foster, Javier Freire Coloma, Martin French, Pranab Ghosh, Matthew Gray, Pierre Guigon, Isabel Hagbrink, Katherine Hamilton, Henrik Hasselknippe, Carina Heimdal, Andrew Howard, Robert M. Hunt, Daigo Koga, Werner Kornexl, Ganna Korniyenko, Benoît Leguet, Gautier Le Maux, Mark Lewis, Zijun Li, Peter Lloyd, Thomas Marcello, Allison McManus, Rachel Mountain, Akiko Nishimae, John O'Brien, Klaus Oppermann, Molly Peters-Stanley, Vicky Pollard, Leila Pourarkin, Neeraj Prasad, Brice J. M. Quesnel, David Rapin, Heike Reichelt, Renaud Scardina, Kai-Uwe Barani Schmidt, Guido Schmidt-Traub, Chandra Shekhar Sinha, Trevor Sikorski, Milo Sjardin, Yvon Slingenberg, Sara Stahl, Andy Stone, Aurelien Tignol, Sarah Underwood, Laurent Valiergue, John Virgoe, Alessandro Vitelli, George Waldburg, Xueman Wang, Vikram Widge, Yevgen Yesyrkenov, Peter Zapfel, Ivan Zelenko, Elizabeth Zelljadt.

We would also like to thank all of those who took time to respond to the market survey. Without your responses the report would be less than it is. Finally, we want to thank the many market participants struggling to make a difference on a critical global issue.

The State and Trends of the Carbon Market 2011 received financial support from the CF-Assist Program, managed by the World Bank Institute (WBI).

List of Abbreviations and Acronyms

AAU	Assigned Amount Unit
AAUPA	AAU Purchase Agreement
AB 32	Global Warming Solutions Act of 2006 Assembly Bill 32
ACR	American Carbon Registry
ADB	Asian Development Bank
AfDB	African Development Bank
AMF	Autorité des Marchés Financiers
AWG-KP	Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol
AWG-LCA	Ad Hoc Working Group on Long-term Collaborative Action
CAPEX	Capital Expenditures
CARB	California Air Resources Board
CAR	Climate Action Reserve
CCP	central counterparties
CCS	Carbon Capture and Storage
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CFL	Compact Fluorescent Lamp
CFTC	Commodities Future Trading Commission
CH_4	Methane
CMM	Coal Mine Methane
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CPF	Carbon Partnership Facility
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
COP	Conference of the Parties
CPA	CDM Programme Activity
CPRS	Carbon Pollution Reduction Scheme
CP-1	First Commitment Period under the Kyoto Protocol
CRE	Commission de régulation de l'énergie
CRT	Climate Reserve Tonne
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board of the CDM
EBRD	European Bank for Reconstruction and Development
EC	European Commission
ECX	European Climate Exchange
EE	Energy Efficiency
EIT	Economy in Transition
EITE	Emission-intensive, Trade-exposed
ER	Emission Reduction
ERPA	Emission Reduction Purchase Agreement
ERU	Emission Reduction Unit
ESC	Energy Savings Certificate
ESS	Energy Savings Scheme
ETS	Emissions Trading Scheme
EU	European Union
EUA	European Union Allowance
EU ETS	European Union Emissions Trading Scheme
EURIBOR	Euro Interbank Offered Rate
FSB	Financial Stability Board
GDP	Gross Domestic Product
GGAS	New South Wales Greenhouse Gas Reduction Scheme
GHG	Greenhouse Gas
GIS	Green Investment Scheme
HFC	Hydrochlorofluorocarbon
IFC	International Finance Corporation
IEA	International Energy Agency
IFI	International Financial Institution
IFRS	International Financial Reporting Standard
IMF	International Monetary Fund
IRR	Internal Rate of Return
J-VETS	Japan-Voluntary Emissions Trading Scheme
JI	Joint Implementation
JISC	Joint Implementation Supervisory Committee
KM	Kyoto Mechanism
LBFR	Law on Banking and Financial Regulation
LDC	Least Developed Country
LEDS	Low Emission Development Strategies
lCER	Long-term Certified Emission Reduction
LFG	Landfill Gas
LoA	Letter of Approval
LRET	Large-scale Renewable Energy Target
LULUCF	Land Use, Land Use Change and Forestry
MAD	Market Abuse Directive
MCCF	Multilateral Carbon Credit Fund
MDB	Multilateral Development Bank
MiFiD	Markets in Financial Instruments Directive
MOP	Meeting of the Parties
MRET	Mandatory Renewable Energy Target
MRV	Measurement, Reporting and Verification
NAMA	Nationally Appropriate Mitigation Action
NCCP	National Climate Change Policy
NDRC	National Development and Reform Commission
N_2O	Nitrous Oxide
NAP	National Allocation Plan
NPV	Net Present Value
NZ ETS	New Zealand Emissions Trading Scheme
NZU	New Zealand Unit
OECD	Organization for Economic Co-operation and Development
OTC	Over-the-Counter
pCER	Primary Certified Emission Reduction
PDD	Project Design Document
PFC	Perfluorocarbon
PIN	Project Idea Note
PMR	Partnership for Market Readiness
PoA	CDM Programme of Activities

POI	Proof of Identity
PP	Project Participant
R&D	Research and Development
RE	Renewable Energy
REC	Renewable Energy Certificate
REDD	Reducing Emissions from Deforestation and Forest Degradation
REDD+	Extends REDD by including sustainable forest management, conservation of forests, and enhancement of carbon sinks.
REMIT	Regulation on Energy Markets Integrity and Transparency
RET	Renewable Energy Target
RGGI	Regional Greenhouse Gas Initiative
RMU	Removal Unit
sCER	Secondary Certified Emission Reduction
SCF	Strategic Climate Fund
SEI	Sustainable Energy Initiative
SF_6	Sulfur Hexafluoride
SME	Small and Medium-size Enterprise
SRES	Small-scale Renewable Energy Scheme
tCO_2	Ton of Carbon Dioxide
tCO_2e	Ton of Carbon Dioxide Equivalent
tCER	Temporary Certified Emission Reduction
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value-added Tax
VCS	Voluntary Carbon Standard
VCU	Verified Carbon Units
VER	Verified Emission Reduction
WB	World Bank
WCI	Western Climate Initiative
WTI	West Texas Intermediate
WTO	World Trade Organization

Contents

Boxes

Figures

Tables

Overview

HOW LONG CAN A MARKET BE IN TRANSITION?

After five consecutive years of robust growth, the total value of the global carbon market stalled at $142 billion (see Figure 1).[1,2] Suffering from the lack of post-2012 regulatory clarity, the value of the primary Clean Development Mechanism (CDM) market fell by double-digits for the third year in a row, ending lower than it was in 2005, the first year of the Kyoto Protocol. The Assigned Amount Unit (AAU) market, which grew in 2009 with strong sovereign support, shrank as well in 2010. Finally, the market that had grown most in 2009—allowances under the U.S. Regional Greenhouse Gas Initiative (RGGI)—saw that year's gains erased in 2010.

As these segments declined, the dominance of the European Union Allowances (EUAs) market became more pronounced than ever. EUAs accounted for 84 percent of global carbon market value in 2010. With the value of the secondary CDM transactions taken into account, the share of the carbon market primarily driven by the EU Emissions Trading Scheme (EU ETS) rose to 97 percent, dwarfing the remaining segments of the market (see Table 1).

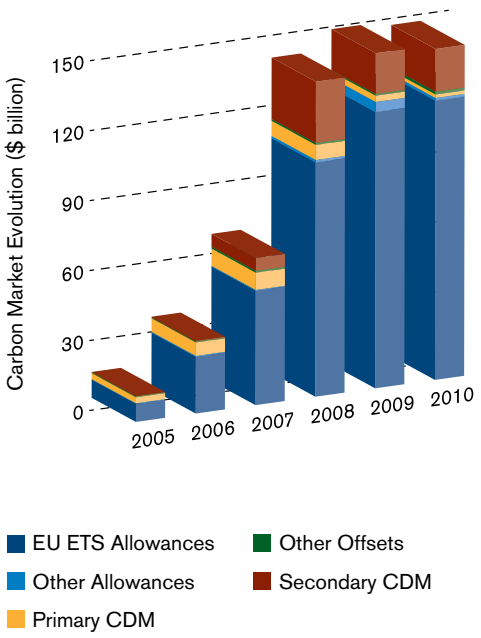


Figure 1. Carbon Market at a Glance, Market Values, 2004–10

Sources: World Bank, Thomson Reuters Point Carbon, Bloomberg New Energy Finance, and Ecosystem Marketplace

Table 1. Carbon Market at a Glance, Market Values, 2004–10

Carbon Market Evolution, values ($ billion), 2004–10						
	EU ETS Allowances	Other Allowances	Primary CDM	Secondary CDM	Other Offsets	Total
2005	7.9	0.1	2.6	0.2	0.3	11.0
2006	24.4	0.3	5.8	0.4	0.3	31.2
2007	49.1	0.3	7.4	5.5	0.8	63.0
2008	100.5	1.0	6.5	26.3	0.8	135.1
2009	118.5	4.3	2.7	17.5	0.7	143.7
2010	119.8	1.1	1.5	18.3	1.2	141.9

Sources: World Bank, Thomson Reuters Point Carbon, Bloomberg New Energy Finance and Ecosystem Marketplace
Note: Numbers may not add up due to rounding.

1. For details on the methodology refer to the Methodology Section at the end of the report.
2. Still, carbon volumes traded contracted by over 10 percent during the same period as prices declined in some markets.

The global carbon market stagnated even as the global economy stabilized and began a tentative recovery in 2010. The carbon market growth halted at a particularly inopportune time: 2010 proved to be the hottest on record,[3] while emission levels continued their seemingly inexorable rise.[4] In the end, however, the year may be remembered most for the political opportunities that arose, yet were ultimately failed to materialize.

In the United States, there was not enough support to pass federal cap-and-trade legislation. The Japanese Basic Act on Global Warming, which passed in the Diet's lower house, was halted when the government lost control of the upper house a few months later. Australia's Senate failed to pass the Carbon Pollution Reduction Scheme and Australia's government subsequently chose to freeze its plans for a domestic cap-and-trade scheme. Even the year's rare good news, namely the Republic of Korea's adoption of the Framework Act on Low Carbon Green Growth, turned sour when the government, facing internal opposition, decided in early 2011 to delay the implementation of its cap-and-trade scheme until 2015.

At the global regulatory level, in mid-2010 the CDM Executive Board temporarily halted issuance of Certified Emission Reductions (CERs) from hydrofluorocarbon (HFC-23) projects over baseline concerns. As concerns revealed not to be substantiated, issuance resumed at the end of the year. Nonetheless, the European Commission soon thereafter proposed qualitative restriction in the EU ETS of carbon offsets related to CDM industrial gas projects. The proposal was adopted by the European Member States, which in January 2011 confirmed the ban of CERs from HFC and nitrous oxide (N_2O) adipic acid projects starting, in 2013.

Some of the most notable events in 2010 and early 2011 were unfortunately related to framework loopholes and criminal activities directed against the EU ETS. In addition to the "carousel" value-added tax (VAT) fraud that surfaced in 2009,[5] the last 18 months witnessed the sale of recycled CERs, phishing attempts on Germany's national registries and a series of subsequent cyber-thefts that undermined the European market,[6] highlighting security shortcomings and increasing the urgency of stakeholders' pleas to strengthen infrastructure.

Nevertheless, there were a few reasons for guarded optimism in 2010. Europe started to craft its roadmap for moving toward a competitive low-carbon economy in 2050. Also, while the Copenhagen climate summit in 2009 failed to meet expectations, progress was achieved during the Conference of the Parties in Cancun last December. Such progress was welcomed by the market and helped to restore some confidence in UN negotiations on climate change. Still, as Parties continue their deliberations,[7] much remains to be done. Differences among major emitters regarding domestic priorities, approaches and ambition will need to be resolved before a robust and sustainable international agreement can emerge.

While the international regulatory environment remains uncertain, national and local initiatives have noticeably picked up and may offer the potential to collectively overcome the international regulatory gap. The most prominent of these initiatives is California's cap-and-trade scheme, which is expected to begin operating in 2012. Other low-carbon initiatives, including domestic emission reduction targets, clean energy certificate programs, voluntary and pre-compliance domestic offset trading programs, and carbon exchanges, have gained increasing traction in developing economies such as Brazil, China, India, and Mexico. These initiatives signal that, one way or another, solutions that address the climate challenge will emerge.

---

3. 2010 ranked as the warmest year on record, together with 2005 and 1998, World Meteorological Organization (WMO) (http://www.wmo.int/pages/mediacentre/press_releases/pr_906_en.html). 2010 tied with 2005 as the warmest year of the global surface temperature record, beginning in 1880, The U.S. National Oceanic and Atmospheric Administration (NOAA) (http://www.noaanews.noaa.gov/stories2011/20110112_globalstats.html).
4. 2010 ended with CO_2 emission concentrations of 389.68 ppm, NOAA, January 7, 2011.
5. Some of the issues evidenced in 2009 were explained in detail in the State and Trends 2010 report: http://siteresources.worldbank.org/INTCARBONFINANCE/Resources/State_and_Trends_of_the_Carbon_Market_2010_low_res.pdf Access date 15 April 2011.
6. Over 3 million European Union [emission] allowances (EUAs) were reported stolen from at least 5 European national registries from November 2010 until January 2011. As a consequence, the transfer of allowances has been temporarily suspended in the European registries and the spot-trade of carbon assets was frozen for several days early 2011 (http://ec.europa.eu/clima/news/index_en.htm).
7. Under the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol and the Ad Hoc Working Group on Long-term Cooperative Action under the Convention.

Introduction

This report covers many of the issues facing the carbon market today. The Overview provides highlights from the report and information on the size of the carbon market. The body of the report covers international developments (Section 1), domestic policies (Section 2), risk and regulation of markets (Section 3), carbon and climate finance (Section 4), and market outlook (Section 5).

The international developments section briefly discusses the positive outcomes for carbon markets and climate finance resulting from the Cancun Conference. International developments have important implications for market confidence and hence vital private capital investment. The report includes the results from a market sentiment survey conducted by the World Bank's Carbon Finance Unit. The results show that, despite well-documented short-term uncertainty surrounding the carbon market, respondents to are optimistic about the possibility of a binding agreement in the longer term. This section of the report also establishes the broad parameters used in the projection scenarios developed in the market outlook.

The report provides a summary of some national and regional mitigation measures being implemented, including important Nationally Appropriate Mitigation Actions (NAMAs) from some major emitters. The information in this section supports the increasingly common perspective among market participants of the emergence of a fragmented but workable carbon market that could further evolve through linking and acceptance of similar levels of ambition.

An issue related to domestic and regional mitigation policies is the considerable activity currently surrounding carbon market risk and regulatory development. This section provides details on many issues faced by policy makers, regulators, and market participants. Considerable change occurred during 2010 and is expected to continue over 2011. There is convergence on regulatory approaches as more European countries move toward robust and transparent regulation of the carbon market to ensure market and public confidence. This includes a re-evaluation of such long-held principles as universal participation.

While Sections 1–3 summarize the geopolitical and regulatory environment affecting the carbon market, Section 4 on carbon and climate finance provides a more detailed analysis of the impacts of these factors on current Kyoto primary market prices, volumes, and market behavior. This part of the report also briefly discusses climate finance and new emerging asset classes such as REDD plus. Finally, in Section 5, the report brings all this information together in the market outlook, which discusses the supply and demand balance going forward.


COP16/CMP6/MÉXICO2010

SECTION 1


EXECUTIVE SECRETARY
PRESIDENT
DEPUTY
EXECUTIVE SECRET

International Developments–Cancun Conference and the Post-2012 Environment

THE DISAPPOINTMENT resulting from the United Nations Climate Change Conference in Copenhagen in 2009 was replaced by the renewed optimism of the Cancun Conference in 2010, which restored some market confidence in the United Nations Framework Convention on Climate Change (UNFCCC) process. At the Cancun Conference, countries agreed to keep average global temperature warming below 2°C in comparison to preindustrial levels. They also agreed to review the adequacy of this commitment with the possibility of moving to a 1.5°C target as new scientific evidence on impacts becomes available.[8]

The Cancun Conference resulted in a number of other positive outcomes for carbon markets and climate finance:[9] the decision to establish the Green Climate Fund; the continuation of the Kyoto mechanisms, including important improvements and reforms to the Clean Development Mechanism (CDM); the inclusion of reduced deforestation through REDD and REDD plus (REDD+); and the formal recognition of developing countries' pledges of Nationally Appropriate Mitigation Actions, which are aimed at achieving a deviation in their GHG emissions compared to business-as-usual trends by 2020.

The best case analysis from the 2010 United Nations Environment Programme (UNEP) Emissions Gap Report estimates that developed and developing country pledges are 60 percent of what is needed by 2020 to place the world onto a trajectory that will keep global temperature rises to less than 2°C in comparison to preindustrial levels.[10] The International Energy Agency (IEA 2010) also estimates that the 2°C goal will only be achievable with a dramatic scaling-up effort,[11] particularly from major emitters.

> "Developed and developing country pledges are 60 percent of what is needed by 2020 to place the world onto a trajectory that will keep global temperature rises to less than 2°C"

This section focuses on key elements of the Cancun Agreements and current market sentiment.

8. http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_kp.pdf Access date 28 Feb 2011.
9. The United Nations Climate Change Conference took place in Cancun, Mexico, from 29 November to 10 December 2010. It encompassed the sixteenth Conference of the Parties (COP) and the sixth Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP).
10. UNEP 2010. Emissions Gap Report. "Are the Copenhagen Accord Pledges Sufficient to Limit Global Warming to 2°C or 1.5°C? A Preliminary Assessment." http://www.unep.org/publications/ebooks/emissionsgapreport/ Access date 9 March 2011.
11. IEA 2010. World Energy Outlook. http://www.worldenergyoutlook.org/ Access date 29 March 2011.

"Emissions trading and the project-based mechanisms under the Kyoto Protocol will continue to be available to Annex I Parties as means to meet their quantified emission limitation and reduction objectives, but the future of the Kyoto Protocol itself remains unresolved."

1.1 IMPROVEMENTS TO THE CLEAN DEVELOPMENT MECHANISM AND CONTINUING SUPPORT FOR MARKET MECHANISMS

The major area of improvement and reform of the CDM is arguably the introduction of standardized baselines and monitoring methodologies. These decisions are aimed at maintaining environmental integrity, but reducing transaction costs, enhancing transparency and predictability, and facilitating access to underrepresented project types and regions.[12]

Such decisions that seek to improve the access of under-represented regions in the CDM are particularly important in the face of the EU's decision to restrict CERs from CDM projects registered after December 31, 2012 to those generated by projects located in least developed countries (LDCs). A significant change is needed in order to be able to scale up the virtual absence of LDC projects from the CDM pipeline (for further details see Section 4.1).

Emissions trading and the project-based mechanisms under the Kyoto Protocol will continue to be available to Annex I Parties as means to meet their quantified emission limitation and reduction objectives,[13] but the future of the Kyoto Protocol itself remains unresolved. Additionally the Cancun Conference under the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA) negotiation track agreed to consider the establishment of one or more market-based mechanisms to enhance the cost-effectiveness of mitigation actions by Parties.[14]

These changes are not yet providing the regulatory predictability the market is seeking. Clarity is still urgently needed on the post-2012 international climate change regime and on countries' plans to use market-based mechanisms to meet domestic GHG objectives. As highlighted in Box 1, the European Union is seeking to provide such clarity.

12. COP 16. Decision -/CMP.6. " Further guidance relating to the clean development mechanism." http://unfccc.int/files/meetings/cop_16/conference_documents/application/pdf/20101204_cop16_cmp_guidance_cdm.pdf Access date 4 Feb 2011.
13. Outcome of the work of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its fifteenth session http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_kp.pdf Access date 28 Feb 2011.
14. http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2 Access date 29 April 2011.

BOX 1. The European Union's Approach to International Credits

The strategic importance of a broad and deep international carbon market

The EU is by far the biggest buyer of emission reduction credits[15] from third countries, providing for continued financial flows and technology transfer to developing countries, also after 2012 even in the absence of the certainty that should come from a new international agreement to effectively tackle climate change. If designed properly and underpinned by robust targets, the international carbon market can play a major role in global abatement efforts, and create increasing financial flows to support mitigation activities in developing countries.

Design limitations of the CDM

To make this happen, we need to improve our existing tools and create new, advanced and scaled-up market mechanisms. Despite its successes, as a project-based system—and one that in practice covers so far a limited number of project types—the CDM is simply not designed to drive the structural transformation of industry in developing countries that the transition to a low-carbon economy requires. By definition, offset mechanisms such as the CDM cannot reduce global emissions in net terms—yet this is what is needed if we are to keep global warming below 2°C.

Need for a move to sectoral crediting mechanisms

That is why the EU and other Parties are advocating the creation of new and more ambitious sectoral mechanisms that make it possible to tap into far greater emissions-saving potentials and provide more revenue for financing reductions in developing countries. Because only actions that go beyond a previously defined threshold or target are credited, this would ensure net benefits to the atmosphere.

Sectoral mechanisms and the CDM could co-exist but the CDM should increasingly focus on less developed countries, where it should continue to target low cost options for saving emissions. For the major emerging economies in the developing world, the CDM should gradually be replaced by new sectoral mechanisms.

Provisions in the climate and energy package

Several provisions of the EU's domestic climate legislation provide the tools to incentivise a move away from the CDM and towards sectoral mechanisms. The EU ETS and Effort Sharing Decision foresee that after 2012, even without an international agreement, these instruments can provide a market for CERs from new projects in Least Developed Countries. In addition, CERs from existing projects in other countries can continue to be used. The EU's standards on HFC-23 and adipic N_2O credits, which have been discussed extensively and will apply from 2013, create more space for other CDM credits and can promote a shift to credits from bilateral or multilateral agreements. The EU is interested in engaging with our partners to set up such pilots so that the experience gained can inform the international negotiations. Participation in the initiatives such as the Partnership for Market Readiness can facilitate the designing of robust pilots and finding interested partners.

EU's vision for the international carbon market

Europe's vision for the international carbon market remains to link up the EU ETS with other compatible emission trading systems around the world and to develop robust sectoral mechanisms. We see an eventual network of links between cap and trade systems as forming the backbone of an expanded and strengthened international carbon market. In this perspective, sectoral crediting is a necessary step beyond the CDM's project-based approach.

Kindly provided by Damien Meadows, Head of Unit, International Carbon Market, Aviation and Maritime, DG Climate Action European Commission.

15. Project-based emission reductions are commonly referred to as credits, offset credits or offsets.

1.2 CLIMATE FINANCE AND THE ESTABLISHMENT OF THE GREEN CLIMATE FUND

The Cancun Agreements formalized the commitment made by developed countries in Copenhagen to mobilize $100 billion a year by 2020 to address the mitigation and adaptation needs of developing countries. Importantly, the Cancun Conference decided to establish a "Green Climate Fund." It is envisioned that the Fund will manage a portion of these additional resources.

The sources of funding are not yet clear. It is expected, however, that a portion of the $100 billion will come from private sources, which may be mobilized through carbon markets.[16] Carbon finance and other financial instruments will be important for leveraging these funds to scale up the financing of mitigation and adaptation activities. Policy makers will need to ensure that market-based capacity is maintained in both the public and private sectors to ensure mobilization of the pledged climate finance.

The Fund will be governed by the Green Climate Board, comprising 24 members as well as alternate members, with an equal number of members from developing and developed country Parties. The World Bank will serve as the interim trustee of the Green Climate Fund, subject to a review three years after operationalization of the Fund. An independent secretariat will support the operations of the Fund.[17]

The Green Climate Fund will be designed by a Transitional Committee in accordance with the terms of reference. The Transitional Committee comprises 40 members, with 15 members from developed country Parties and 25 members from developing country Parties, with members having the necessary experience and skills, notably in the area of finance and climate change.[18]

1.3 RECOGNITION OF DEVELOPING COUNTRY CONTRIBUTIONS TO MITIGATION AND A BETTER REPRESENTATION OF FORESTRY-RELATED ACTIVITIES

The Cancun Conference formally recognized developing countries' Nationally Appropriate Mitigation Actions (NAMAs), which were pledged after the Copenhagen Conference. In the context of sustainable development, developing countries agreed to undertake NAMAs aimed at reducing emissions relative to business-as-usual emissions in 2020—contingent upon the provision of finance, technology, and capacity building provided by developed countries.[19] A registry is to be established under the UNFCCC to record NAMAs seeking international support and to facilitate matching of finance, technology, and capacity-building support to these actions.[20]

At the time of writing, 45 countries have registered a wide range of mitigation actions with the UNFCCC. These actions range from broad enunciated targets with varying form—absolute reductions on business-as-usual (BAU) or intensity limits—with varying base years[21,22] to detailed programs of activities with and without quantified GHG emission reductions.[23,24]

The particularity of NAMAs, especially those seeking support from international sources, is a need for

16. Final Report of the UN High-Level Advisory Group on Climate Change Financing. 2010. http://www.un.org/wcm/content/site/climatechange/pages/financeadvisorygroup/pid/13300 Access date 29 March 2009.
17. http://unfccc.int/cancun_agreements/green_climate_fund/items/5869.php Access date 29 April 2011.
18. http://unfccc.int/files/na/application/pdf/07a01-1.pdf Access date 29 April 2011.
19. List of Nationally Appropriate Mitigation Actions of Developing Country Parties. http://unfccc.int/meetings/cop_15/copenhagen_accord/items/5265.php Access date 8 April 2011.
20. COP 16. 2010. Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention. http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_lca.pdf Access date 28 Feb 2011.
21. Mexico aims at reducing its GHG emissions up to 30 percent with respect to the business as usual scenario by 2020. http://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/mexicocphaccord_app2.pdf Access date 8 April 2011.
22. India will endeavor to reduce the emissions intensity of its GDP by 20-25 percent by 2020 in comparison to the 2005 level. http://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/indiacphaccord_app2.pdf Access date 8 April 2011.
23. Brazil has a range of quantified emissions reductions from different activities. http://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/brazilcphaccord_app2.pdf Access date 07 April 2011.
24. Ethiopia quantifies many reduction actions in terms of power generation potential http://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/ethiopiacphaccord_app2.pdf Access date 08 April.

monitoring, reporting, and verification (MRV) capacity. Clear boundaries and tracking will be necessary to avoid overlapping and double counting support for NAMAs.

The Cancun Conference recognized the much broader contribution of forest-related activities in efforts to limit climate change. Specific recognition was given to the reduction of deforestation and degradation through such initiatives as REDD and REDD+. This means that forests will be included in any future agreement with the possibility of generating international credits from these activities.[25]

Measurement of forest carbon will occur at the national level, thus enabling programmatic approaches. This measure is expected to encourage greater geographic diversification (for further details see Section 4.4).

1.4 BEYOND CANCUN —MARKET PERCEPTIONS

Developing countries are united in their support for a second commitment period of the Kyoto Protocol, as a critical element of the international community's fight against climate change. Among the developed countries, the European Union continues to support the multilateral framework through the UNFCCC[26] and the Kyoto Protocol, but some countries have expressed opposition to the extension of the Kyoto Protocol in which only some countries are obligated to reduce emissions.[27] The uncertain future of the international negotiations affects market perceptions. Participants partly deal with this uncertainty through scenario analysis.

The New Zealand government, as part of the current review of the New Zealand Emissions Trading Scheme (NZ ETS), has identified three broad scenarios for the evolving near-term international framework. The scenarios include the following: (1) a continuation of the current multilateral framework with legally binding limits on emissions; (2) a nonbinding multilateral accord; and (3) no multilateral framework in the short-term.[28]

As scenario development is important for market participants, the World Bank's Carbon Finance Unit surveyed them on five questions regarding the success of an international agreement post-2012:

1. How confident are you that there will be a new legally binding multilateral framework, similar to the current Kyoto Protocol, with legally binding commitments to reduce emissions, underpinned by relatively strong multilateral rules and institutions?
2. How confident are you that there will be a new political multilateral accord, building on the Copenhagen Accord and Cancun Agreements, under which countries make voluntary political commitments, supported by at least some multilateral rules and institutions, but without legal force?
3. How likely do you think it is that there will be no multilateral framework or accord in the near term? Countries continue to negotiate, but in the interim, action is mainly driven at a national level or through other international links.
4. Do you think a comprehensive agreement under the auspices of the UNFCCC is fundamental for countries to address the climate change agenda?
5. Are there other scenarios, apart from those listed above, which should be considered?

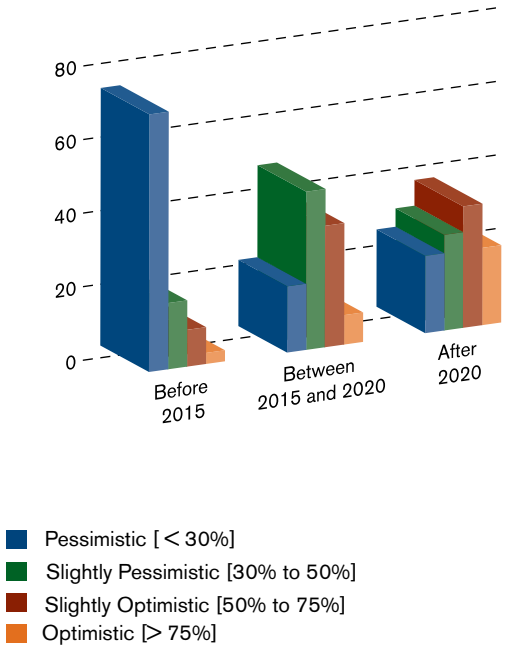
Survey respondents were not optimistic that a binding international agreement could be achieved in the short term. However, they were optimistic about the possibility of a binding agreement in the longer term (see Figure 2). Respondents believed that a nonbinding multilateral accord is more likely in the short term.[29]

The majority of respondents also believed that there will be a short-term hiatus in the international

25. COP 16. 2010. Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention. http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_lca.pdf Access date 4 Feb 2011.
26. EC Communication. 2010. "International climate policy post-Copenhagen: Acting now to reinvigorate global action on climate change." http://ec.europa.eu/clima/documentation/finance/docs/com_2010_86.pdf Access date 19 March 2011.
27. For example, Japan. See Ministry of Foreign Affairs of Japan. "Japan's Basic Position at COP16 as well as on the Kyoto Protocol." http://www.mofa.go.jp/announce/media/2010/12/1203.html Access date 19 March 2011.
28. New Zealand Emissions Trading Scheme Review 2011. http://www.climatechange.govt.nz/emissions-trading-scheme/ets-review-2011/issues-statement.pdf Access date 19 March 2011.
29. The survey did not test respondents' views on the relative likelihood of a binding agreement compared to the multilateral accord.

Figure 2. Respondents Views on a Future Multilateral Framework

How confident are you that there will be a new legally-binding multilateral framework, similar to the current Kyoto Protocol, with legally-binding commitments to reduce emissions, underpinned by relatively strong multilateral rules and institutions?



framework, with countries continuing to negotiate, and that the absence of international framework should not impede countries from continuing to act. Several respondents suggested that bilateral mechanisms may provide an alternative model.

> "Market-based instruments can play a vital role in helping meet ambitious GHG emission reduction objectives by incentivizing the deployment of private capital."

1.5 CONCLUSIONS

The international situation remains complex and the direction for the international negotiations may both surprise and disappoint as the world continues the arduous process of moving forward on an international framework for combating climate change. As highlighted in the report by the High-Level Advisory Group on Climate Change Financing established by the UN Secretary-General, market-based instruments can play a vital role in helping meet ambitious GHG objectives by incentivizing the deployment of private capital, but countries need to provide the market with regulatory confidence in the post-2012 environment.[30]

30. Final Report of the UN High-Level Advisory Group on Climate Change Financing. 2010. http://www.un.org/wcm/content/site/climatechange/pages/financeadvisorygroup/pid/13300 Access date 29 March 2011.


SECTION 2

Domestic Policy Developments –A Story of Fragmentation

THIS SECTION SUMMARIZES SOME OF THE POLICY INITIATIVES around the world, with an in-depth examination of the EU ETS, which is the international driving force of carbon markets. The information in this section supports the increasingly common perspective among market participants of the emergence of a fragmented but workable international carbon market that could further evolve through linking and acceptance of similar levels of ambition. The list of countries is not exhaustive. It illustrates the diversity of approaches and measures being either considered or implemented in several countries.

To drive emission reductions, countries are adopting a range of domestic policies that fall under one of the following categories: cap-and-trade schemes, baseline and credit mechanism, renewable energy and energy efficiency certificates, carbon taxes, subsidies, and emission standards. In many cases, multiple policy approaches are being used that may be complementary and sometimes contradictory, and which often have different costs and benefits accruing at different times and geographical scales. It is important in the overall design of mitigation policies that policy makers consider the interaction between similar and different—market and non-market—policy measures at different jurisdictional levels.

For example, the current discussion in the EU on the set-aside of EUAs results from the interaction of energy efficiency measures and the EU ETS. The introduction in the United Kingdom of a Carbon Price Floor[31] provides another example were some market analysts argue that the price floor may offer limited benefits due to interactions with the EU ETS.[32] The interaction between individual voluntary actions and Australia's now shelved Carbon Pollution Reduction Scheme (CPRS) also shows the need for careful design.[33] Finally, some academic work argues that multiple policies such as cap-and-trade and renewable energy policies will not necessarily create additional environmental benefits.[34]

---

31. As announced in the U.K. 2011 Budget from April 1, 2013, the United Kingdom will introduce a carbon price floor for the power sector. The floor, which in reality constitutes a tax floor rather than a price floor, will start at around £16 per ton of carbon dioxide (tCO_2) and follow a linear path to target £30/tCO_2 in 2020 (both in 2009 prices). The carbon price support rates in 2013–14 will be equivalent to £4.94/tCO_2. Indicative rates for 2014–15 and 2015–16 are £7.28/tCO_2 and £9.86/tCO_2 respectively. http://www.hm-treasury.gov.uk/consult_carbon_price_support.htm Access date 4 April 2011.
32. Point Carbon. Carbon Market Daily March 25. "UK carbon floor could distort EUA price."
33. The shelved Australian CPRS provides an example of voluntary action interacting with a cap-and-trade scheme. http://www.climatechange.gov.au/government/initiatives/cprs/cprs-progress/voluntary-action.aspx Access date 27 April 2011. The situation is more complicated when AAUs are considered, as the countries initial assigned amount must also be reduced to preserve the effects of the voluntary action on global reductions.
34. See Fischer C., and L. Preonas. 2010. "Combining Policies for Renewable Energy," Resources for the Future. Fischer and Preonas argue that in the presence of a binding emissions cap, additional renewable policies do not affect emissions. Their effects on the ETS should be recognized. Policies that expand renewables make it easier to meet the cap, driving down allowance prices to the benefit of the relatively dirty sources and to the detriment of the relatively clean nonrenewable sources. http://www.rff.org/documents/RFF-DP-10-19.pdf Access date 2 April 2011.

2.1 ANNEX I COUNTRIES

Australia—Preparing to Price Carbon

During 2010, the Australian government announced plans for a carbon price mechanism with a three-to-five-year annually increasing fixed-price period that will transition into an emissions trading scheme. The government will start pricing carbon on July 1, 2012, subject to negotiating an agreement with a majority in both houses of Parliament and passing legislation this year.[35]

With support from the Greens and Independents, the government should be able to pass the legislation in both houses of Parliament as a result of the incoming senate in July 2011. The legislation would need to pass during the spring Parliamentary sittings (August–November 2011) to avoid being delayed until the autumn Parliamentary sittings (February–March 2012).

Australia is also developing a domestic offsets scheme known as the Carbon Farming Initiative (CFI),[36] which aims to provide new economic opportunities to farmers, forest growers, and landholders and to help the environment by reducing carbon pollution. Some offsets may be allowed during the fixed-price period.[37]

At the national level, the Renewable Energy Target (RET) scheme remains the main market-based mechanism in use to achieve emission reductions.

During 2010, the Australian Parliament passed legislation to separate the RET into two parts, with the new scheme commencing on January 1, 2011. The RET was separated into the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES).[38]

Splitting the RET scheme was in response to industry pressure to reform the scheme after a collapse in prices of certificates resulting from a flood of Renewable Energy Certificates (RECs) from small-scale projects. It is reported that the generation of RECs was partly due to the interaction of state and federal renewable energy incentives and the RET scheme.[39,40]

The Australian government also closed several emission reduction programs in 2010, including the Home Insulation Program, which was terminated because of safety concerns,[41] and the Green Loans program.[42]

At the state level, various initiatives are in place, including the New South Wales Greenhouse Gas Reduction Scheme (GGAS), which commenced on January 1, 2003. It is one of the first mandatory greenhouse gas emissions trading schemes in the world. GGAS aims to reduce greenhouse gas emissions associated with the production and use of electricity. It achieves this by using project-based activities to offset the production of greenhouse gas emissions (see Table 2 for further details on state climate change policies in Australia).

Canada—Provinces Forging Ahead

At the federal level, Canada is taking a sectoral approach to GHG emissions, largely focusing on obtaining reductions from the transport sector. Canada has aligned its international commitment with that made by the United States and plans to reduce total greenhouse gas emissions by 17 percent from 2005 levels by 2020. The target is inscribed in the Copenhagen Accord.

---

35. http://www.pm.gov.au/press-office/climate-change-framework-announced Access date 24 Feb 2011.
36. http://www.climatechange.gov.au/government/initiatives/carbon-farming-initative.aspx Access date 21 February 2011.
37. http://www.garnautreview.org.au/update-2011/update-papers/up6-carbon-pricing-and-reducing-australias-emissions.pdf Access date 22 March 2011.
38. http://www.climatechange.gov.au/government/initiatives/renewable-target.aspx Access date 07 April 2011.
39. "Price Hit Put Wind Power Projects in Limbo." Herald Sun. http://www.heraldsun.com.au/ipad/price-hit-puts-wind-projects-in-limbo/story-fn6bfmgc-1225976910971 Access date 29 April 2011.
40. "Renewable Energy Target Needs a Rethink." The Australian. http://www.theaustralian.com.au/business/industry-sectors/renewable-energy-target-needs-a-rethink/story-e6frg976-1225785558866 Access date 29 April 2011.
41. http://www.climatechange.gov.au/government/programs-and-rebates/hisp.aspx Access date 03 February 2011.
42. http://www.climatechange.gov.au/government/programs-and-rebates/green-loans.aspx Access date 03 February 2011.

Table 2. Current State Climate Change Policies in Australia

Policy	Jurisdiction	Comment
Solar Feed-in Tariffs	Victoria, South Australia, Queensland, Australian Capital Territory, New South Wales, Northern Territory, Western Australia	State-based incentives for small-scale solar.
Greenhouse Gas Reduction Scheme GGAS[43]	New South Wales	One of the first mandatory greenhouse gas emissions trading schemes in the world.
Greenhouse Gas Reduction Scheme GGAS[44]	Australian Capital Territory	The ACT Government introduced a Greenhouse Gas Reduction Scheme that commenced on January 1, 2005. It mirrors the NSW Greenhouse Gas Reduction Scheme (GGAS).
State Energy Efficiency Schemes.	Victoria, South Australia, New South Wales	Multiple schemes with similar objectives.

Table 3. Current Province Climate Change Policies in Canada

Policy	Jurisdiction	Details
Greenhouse Gas Reduction (Cap and Trade) Act 2008[45]	British Columbia	British Columbia is the first province in Canada to introduce an act allowing a cap-and-trade scheme. The proposed scheme enables British Columbia to link to the emissions trading schemes being developed with other jurisdictions.
Greenhouse Gas Reduction (Cap and Trade) Act 2008[46]	Ontario	The amendment enables Ontario to have a cap-and-trade emissions trading scheme, and to link to the emissions trading schemes being developed with other jurisdictions.
Cap-and-Trade Consultation (March 2011)[47]	Manitoba	Manitoba plans to move forward with legislation enabling the creation of a cap-and-trade scheme to reduce greenhouse gas emissions, subject to public consultations.
Act to amend the Environment Quality Act and other legislative provisions in relation to climate change[48]	Quebec	The amendment enables Quebec to have a cap-and-trade emissions trading scheme, and to link to the emissions trading schemes being developed with other jurisdictions.
Climate Change and Emissions Management Act[49]	Alberta	Covers facilities with GHG emissions greater than 100,000 tons. Requires emissions intensity reductions of 12 percent.
Management and Reduction of Greenhouse Gases Act[50]	Saskatchewan	Covers facilities with GHG emissions greater than 50,000 tons. Requires emission reductions from a baseline by 2 percent per year from 2010 to 2019.

On September 1, 2010, Canada released final Renewable Fuel Regulations that requires an average renewable fuel content of 5 percent in gasoline, which will come into effect starting December 15, 2010. On June 23, 2010, the government of Canada announced that it is committed to introducing tough new regulations on coal-fired electricity generation that will have a significant impact on reducing emissions from the electricity sector.[51]

Various initiatives are in place at the Canadian province level. For further details see Table 3.

43. http://www.greenhousegas.nsw.gov.au/ Access date 03 February 2011.
44. http://www.greenhousegas.nsw.gov.au/act_scheme.asp Access date 07 April 2011.
45. http://www.leg.bc.ca/38th4th/3rd_read/gov18-3.htm Access date 16 March 2011.
46. http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_090452_e.htm Access date 17 March 2011.
47. http://www.gov.mb.ca/conservation/climate/capandtradeconsultation.html Access date 17 March 2011.
48. http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=5&file=2009C33A.PDF Access date 17 March 2011.
49. http://www.qp.alberta.ca/570.cfm?frm_isbn=9780779740956&search_by=link Access date 17 March 2011.
50. http://www.environment.gov.sk.ca/Default.aspx?DN=9192fbe8-23fe-4077-ac7d-30b7b269bdbf Access date 17 March 2011.
51. http://www.climatechange.gc.ca/default.asp?lang=En&n=4FE85A4C-1 Access date 17 March 2011.

Europe—A Year of Consolidation and a Roadmap for 2050

During 2010, the EU ETS continued to be the world's most important market mechanism for reducing GHG emissions. The EU ETS operates in 30 countries (the 27 EU Member States plus Iceland, Liechtenstein, and Norway) and is expected to reduce total emissions by 21 percent in 2020 compared to 2005 levels. The year-on-year declines in GHG emissions experienced by installations in 2008 and 2009 now appear to be over, with GHG emissions rising by 3.3 percent—a rebound due to the end of the economic downturn in 2010. When accounting for new entrants, the overall year-on-year increase is 3.5 percent.[52,53]

Europe continues the task of transitioning to a low-carbon society by 2050. The European Commission (EC) is looking beyond the 2020 objectives and is establishing a plan to meet the long-term target of reducing domestic emissions by 80 to 95 percent by mid-century—Europe's Roadmap for 2050. During the year, there was speculation that Europe would move to reduce GHG emissions by 30 percent by 2020 compared to 1990 levels. The EC has since reaffirmed that the EU ambition is to achieve a 20 percent reduction by 2020 on 1990 levels.[54]

From 2013, the revised EU ETS Directive provides for:[55]

- A centralized EU-wide cap on emission allowances, which will reduce each year by 1.74 percent of the average annual level of the Phase II cap. The cap will deliver an overall reduction of 21 percent below 2005 verified emissions by 2020.
- The cap for the year 2013 has been determined at 2,039,152,882 allowances, that is just under 2.04 billion allowances.[56] This is not the final 2013 cap.[57]
- There will be an increase in auctioning levels—at least 50 percent of allowances will be auctioned from 2013, compared to about 3 percent in Phase II. This will improve the economic efficiency of the EU ETS. In most EU Member States, there will be 100 percent auctioning for the power sector.
- Access to project offsets under the Kyoto Protocol from outside the EU will be limited to no more than 50 percent of the reductions required in the EU ETS. This is a reduction from Phase II. It means a much larger share of emission reductions will happen within the EU borders.
- Twelve percent of the total allowances auctioned will be redistributed to Member States with lower gross domestic product (GDP) in the interests of solidarity. These are mostly the newer eastern Member States.
- EU Member States propose to spend at least half of the revenues from auctioning to tackle climate change both in the EU and in developing countries.
- Due to international competitiveness and leakage concerns, industrial sectors will be allocated allowances for free on the basis of product benchmarks. The benchmarks will be set on the basis of the average of the top 10 percent most greenhouse gas–efficient installations in the EU. Sectors deemed at significant risk of relocating production outside of the EU because of the carbon price—carbon leakage—will receive 100 percent of the benchmarked allocation for free. Sectors not deemed at significant risk of carbon

52. On April 5, 2011, the EC published updated data for a perimeter corresponding to 94.4 percent of 2009 volumes: the 10,500 plants reporting in both years (out of 12,802 listed in CITL, 82 percent) emitted 1,833 Mt in 2010 compared to 1,775 Mt in 2009, resulting in a 3.3 percent increase in emissions. Source: SG orbeo Carbon Specials, April 7, 2011, Société Générale.
53. http://ec.europa.eu/clima/documentation/ets/registries_en.htm Access date 4 April 2011.
54. http://ec.europa.eu/clima/documentation/roadmap/docs/com_2011_112_en.pdf Access date 24 March 2011.
55. EU ETS Phase III (2013-20) http://www.decc.gov.uk/eu_ets/phase_iii/phase_iii.aspx Access date 07 April 2011.
56. The EU ETS cap is the total amount of emission allowances to be issued for a given year under the EU Emissions Trading System (EU ETS). The total number of allowances, that is, the "cap," determines the maximum amount of emissions possible under the EU ETS. The cap will decrease each year by 1.74 percent of the average annual total quantity of allowances issued by the Member States in 2008–12. This annual reduction will continue beyond 2020, but it may be subject to revision not later than 2025. http://ec.europa.eu/clima/policies/ets/cap_en.htm Access date 07 April 2011.
57. The 2013 cap that has been released so far is not the final 2013 cap. It is the Phase II scope provisional cap and does not account for the cap for aviation and new sectors and gases entering the ETS from 2013. Deutsche Bank estimates that the 2013 cap for the Phase II scope should be worth 1,966 Mt. Counting the 1.3 Mt cap for opt-ins and the 106.9 Mt 2013 cap for new sectors and gases, Deutsche Bank estimates the 2013 cap should be worth 2,074 Mt, not accounting for aviation. From Curien I., and M. C. Lewis. 2011. "May You Live in Interesting Times ..." Market Update from Deutsche Bank.

Table 4. EU ETS Phase II Auctions[58]

Member State	Average Annual Quantity to Be Auctioned	Comments
Germany	40 million (about 9 percent)	Auctions from January 2010 are held weekly–spot auctions on Tuesday and futures auctions on Wednesday–at the European Energy Exchange (EEX).[59] During 2008 and 2009 a banking group, on behalf of the German government, sold allowances at the market price at the relevant exchanges.
United Kingdom	17 million (7 percent)	An auction schedule with dates and volumes for future auctions, up to November 2011, is available on the U.K. Debt Management Office.[60] As of January 2010, a noncompetitive bidding facility has also been put in place.[61]
Netherlands	3.2 million (3.7 percent)	The first auction of 4 million allowances was carried out by the Dutch State Treasury Agency and took place on April 15, 2010.[62] On October 27 and November 18, 2010, two further auctions of 2 million allowances each were held by Climex.[63] The Dutch authorities have not yet decided the details of the auctioning of the remaining allowances (some 8 million).
Austria	400,000 (1.3 percent)	For 2009–12, two auctions per year are foreseen.[64]
Ireland	557,065 (0.5 percent)	Ireland sold 185,000 allowances in January 2009, and the same number again in February 2010. The remainder for the 2008–12 period is also likely to be sold instead of auctioned.
Hungary	2.7 million (2 percent)	Frequency and scope are not yet decided.

leakage will receive 80 percent of their benchmarked allocation for free in 2013, declining to 30 percent in 2020 and 0 percent in 2027.
- Up to 300 million allowances from the new entrants' reserve of the EU ETS will be used to support the demonstration of carbon capture and storage (CCS) and innovative renewable technologies.
- Member States may exclude small emitters and hospitals so as to reduce regulatory burden.

During 2010 and early 2011, the allowance auction (primary issuance) market (see Section 3.3) continued to develop, with Germany and the United Kingdom auctioning allowances. Access to Kyoto Protocol project offsets (namely CDM and JI) were further limited with constraints on project types (see Section 4.1).[65] The EU ETS continued to be plagued by market irregularities—the EU has addressed these issues through a series of directives and proposed measures (see Section 3.4).[66] Further activity occurred on coverage with airlines expected to join the EU ETS in 2012.[67] Member States continued to develop complementary measures to comply with the "Effort Sharing Decision" that places an annual binding GHG emission targets on sectors not covered by the EU ETS for the period 2013–20.[68]

58. Auction details for EU ETS Phase II. http://ec.europa.eu/clima/policies/ets/auctioning_second_en.htm Access date 07 April 2011.
59. European Energy Exchange (EEX). http://www.eex.com/en/EEX/Products%20%26%20Fees/Emission_Rights/EUA%20Primary%20Market%20Auction Access date 07 April 2011.
60. U.K. Debt Management Office EU Emissions Trading Scheme Web site. http://www.dmo.gov.uk/index.aspx?page=ETS/AuctionInfo Access date 07 April 2011.
61. http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/tackling_clima/emissions/eu_ets/euets_phase_ii/auctioning/noncompbidding/noncompbidding.aspx Access date 07 April 2011.
62. http://www.dsta.nl/english/Subjects/Carbon_auctions Access date 07 April 2011.
63. http://www.climex.com/government-auctions.aspx Access date 07 April 2011.
64. Austrian National Registry. http://www.emissionshandelsregister.at/emission_trading/auction/index.html Access date 07 April 2011.
65. In taking this action, the EC identified the high proportion of CDM credits generated by the small number of industrial gas projects that, the EC argues, favor a limited number of advanced developing countries and do not encourage geographic diversification. http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/56 Access date 4 Feb 2011.
66. The details are discussed in the section on "How Market Participants Transact–Risk and Regulation."
67. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:008:0003:0021:EN:PDF Access date 22 March 2011.
68. http://ec.europa.eu/clima/policies/effort/framework_en.htm Access date 22 March 2011.

Auctioning

Table 4 illustrates the auctioning of some EU allowances. During Phase II (2008–12) the majority of allowances continued to be allocated for free. However, when Phase III starts in 2013, about half of the allowances are expected to be auctioned. On November 11, 2010, the EU Commission formally adopted the EU Auctioning Regulation. This is an EU-wide regulation that determines how some 1 billion allowances will be auctioned each year during Phase III.

The regulation provides for a common platform that all Member States can use, but Member States may also opt out from the common platform. To host their own platforms, Member States had to submit a notification to the Commission by February 18, 2011, which would then be proposed to and voted on by the Climate Change Committee.[69]

The European Commission proposes to auction 120 million allowances in 2012, ahead of the start of Phase III. The volume of early auctions is to be determined by means of an amendment to the EU ETS Auctioning Regulation. It is expected that almost 60 percent of the total allowances auctioned in Phase III will enter the market via the common platform.

The procurement of both the common auction platform and the single auction monitor that will oversee auctions on all auction platforms is ongoing.[70] Germany, Poland, and the United Kingdom have informed the Commission that they intend to opt out of the planned common platform for auctioning emission allowances for Phase III of the EU ETS. Each will instead appoint its own auction platform.

Aviation

Direct emissions from aviation account for about 3 percent of the EU's total GHG emissions, with the majority of these emissions from international flights, for example, flights between two Member States or between a Member State and a non-EU country.[71] Aviation emissions are growing rapidly, however, so the EU plans to cover emissions from all domestic and international flights that arrive at or depart from an EU airport.

The expansion of coverage will translate into approximately 200 million of additional allowances annually. Of this number, 82 percent of the allowances will be freely allocated to aircraft operators and 15 percent will be auctioned. The remaining 3 percent will be allocated to a special new entrant's reserve (see Table 5 for a summary).[72]

The move to include aviation in the EU ETS is not without controversy with airlines in both China and the United States opposing the inclusion of their emissions in the EU ETS. The Air Transport Association of America (ATA)—acting on behalf of American Airlines, Continental, and United Airlines—is challenging the EU directive in the courts.[73] News reports also suggest that the China Air Transport Association (Cata) has threatened retaliatory measures if Chinese airlines are required to participate in the EU ETS, with Cata—acting on behalf of three Chinese airlines—joining the ATA's existing legal challenge to the EU directive.[74]

The EC Directive on Aviation has provisions for exempting non-EU based airlines from the EU ETS where similar measures are in place.[75]

---

69. U.K. Department of Energy and Climate Change. The EU Emissions Trading System: Preparing for Phase III (and implementation of Phase II). http://www.decc.gov.uk/assets/decc/what%20we%20do/global%20climate%20change%20and%20energy/tackling%20climate%20change/emissions%20trading/eu_ets/phase%20iii/1016-euets-preparing-phase-III.pdf Access date 07 April 2011.
70. The first auctions of EUAs will take place at the latest in 2013. No firm date is fixed yet, as the volume of any "early auctions" before 2013 remains to be decided. The first auctions of European Union Aviation Allowances (EUAAs) will take place in 2012, which is the year when aircraft operators come under the EU ETS. http://ec.europa.eu/clima/faq/ets/auctioning_third_en.htm Access date 07 April 2011.
71. http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/11/139 Access date 24 March 2011.
72. http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/tackling_clima/emissions/eu_ets/aviation/aviation.aspx Access date 23 March 2011.
73. http://www.airlines.org/News/Releases/Pages/news_5-27-10.aspx Access date 22 March 2011.
74. http://www.pointcarbon.com/news/1.1522877 Access date 31 March 2011.
75. 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. Where a third country adopts measures for reducing the climate change impact of flights departing from that country which land in the Community, the Commission, after consulting with that third country, and with Member States shall consider options available in order to provide for optimal interaction between the Community scheme and that country's measures. Where necessary, the Commission may adopt amendments to provide for flights arriving from the third country concerned to be excluded from the aviation activities in the EU ETS. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:008:0003:0021:EN:PDF Access date 07 April 2011.

Table 5. Aviation Directive Summary

Issue	Comment
Timing	2012: Inclusion of all flights arriving at and departing from EU airports
Level of emissions cap	2012: 97 percent of average 2004–06 emissions 2013: 95 percent of 2004–06 emissions
Auctioning	2012: 15 percent auctioning 2013: The volume to be auctioned over 2013–20 is already set to 15 percent per year, but may be revised.
Free allocation criteria	Great circle distance plus 95 km (fixed). Operators may choose to apply (i) actual weight, (ii) standard weight, or (iii) default passenger weight of 100 kg.
Special reserve	Creation of a reserve for new entrants and fast-growing airlines from within the cap. Three percent of the total capped allowances for that phase. Allocated to new operators and those whose activity data shows an increase of more than 18 percent per annum.
A new type of allowances not backed anymore with AAUs will be created in 2012 to be allocated/auctioned to airline operators. Access to Certified Emission Reductions (CERs) and Emission Reduction Units (ERUs)	Open trading scheme, but with the removal of the clause that allows convertibility between Assigned Amounts Units (AAUs) and EU Allowance Units (EUAs)[76] 2012: 15 percent access to CERs and ERUs 2012+: to be confirmed as part of ETS review negotiations
Notable exemptions. A full list is available on the European Commission Web site	Weight – certified 5.7t maximum take-off mass threshold Heads of State exemption restricted to non-EU Exemption for Public Service Obligations where they are either on specific routes between outermost regions or where capacity offered does not exceed 30,000 seats per year Activity threshold exemption for commercial air operators who operate at a frequency lower than 243 flights per period into, out of, or within the EU for three consecutive four-month periods, or with an emissions threshold of less than 10,000 tCO_2 a year

Effort Sharing

The "Effort Sharing Decision" establishes annual binding GHG emission targets for Member States for emissions not included in the EU ETS for the 2013–20 period. It is the responsibility of Member States to define and implement policies and measures to limit emissions of non-EU ETS covered sectors under the Effort Sharing Decision. As a result EU Member States are likely to implement complementary measures in such areas as transport, buildings, agriculture, and waste (see Table 6).[77]

The level of effort varies between EU Member States depending on their relative wealth (GDP/capita). At the EU level, this will deliver an approximate 10 percent reduction of emissions from the uncovered sectors in 2020 compared with 2005 levels. The effort-sharing targets vary by EU Member State, with the greatest decreases being required for Denmark, Ireland, and Luxembourg, and with the greatest increases allowed in Bulgaria, Latvia, and Romania.[78] Cost-control measures include allowing Member States to transfer part of their annual emission allocation to other EU Member States as well as the use of credits from Joint Implementation (JI) and CDM.

76. Pers Comm. cdc climat. EUAs can be used for compliance by airline operators, whereas allowances from the Aviation Trading Scheme (ATS) cannot be used for compliance in the EU ETS.
77. 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. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0136:0148:EN:PDF Access date 23 March 2011.
78. http://ec.europa.eu/clima/documentation/effort/docs/targets2020.pdf Access date 4 April 2011.

Table 6. Some Examples of U.K. Complementary Measures

Measure	Comment
Vehicle Emissions Tax[79]	Vehicle tax based on emissions measured in grams per kilometer (g/km) driven.
Climate Change Levy[80]	The levy is chargeable on the industrial and commercial supply of taxable commodities for lighting, heating and power by consumers in the following sectors of business: industry, commerce, agriculture, public administration, and other services.
Renewable Energy Feed-in Tariffs[81]	Incentivizes small-scale (less than 5 MW), low-carbon electricity generation.
Renewable Heat Incentive[82]	Incentivizes generation of heat from renewable sources at all scales (expected launch June 2011).

Member States that have to reduce their non-ETS emissions, or are allowed to increase them by up to 5 percent of 2005 emissions, may use an additional 1 percent of CDM and JI credits. These credits can come only from CDM projects in least developed countries and small-island developing states; they are nonbankable and nontransferable, and they are available only to Member States meeting at least one of the following four conditions:[83]

- The overall cost of the package for the Member State concerned is higher than or equal to 0.7 percent of GDP according to the EC's impact assessment.
- A cost increase of at least 0.1 percent of GDP, according to the EC's impact assessment, as a result of setting targets on the basis of the GDP per capita instead of the basis of cost-efficiency.
- More than 50 percent of the Member State's total emissions covered by the Effort Sharing Decision are transport-related.
- The Member States' renewable energy target is in excess of 30 percent.

Further details on the EU ETS can be found in Sections 3, 4, and 5.

Japan—Reviewing the Target

In March 2010, the government of Japan introduced the "Basic Act on Global Warming Countermeasures." The ETS component of the Basic Act has met with strong opposition, which has strengthened with rising concerns about costs to the economy and a lack of extensive consultations with industry groups.

The government of Japan considers the ETS component an important policy measure for Japan to achieve its announced target of reducing GHG emissions by 25 percent by 2020 compared to 1990 levels. This reduction is premised on the establishment of a fair and effective international agreement covering all major economies.

In the absence of such an agreement, it appears unlikely that Japan will make a unilateral 25 percent cut. As a consequence of these factors, the Diet has deferred discussion of the ETS component of the Basic Act. The current state of policy is summarized in Table 7.

Despite the deferral of the ETS, other components of the Basic Act (introducing a carbon tax and establishing a feed-in tariff for all renewable energy sources) may pass in 2011. These measures are expected to be needed for Japan to meet its yet undecided unilateral emission reduction goal.

The passage of these measures through the Diet is also supported by Japan's energy plan. The measures introduce an anti-global warming tax on oil, coal, and natural gas, as well as a feed-in tariff that supports the goal of increasing domestic energy generation from renewable sources of up to 10 percent of total primary energy supply by 2020.

The Japanese government also views access to international offsets as an important contribution to Japanese emission reduction efforts. As an agreement on the post-2012 regime has yet to be achieved, it is currently unclear how Japan will access offset markets;

79. http://www.vcacarfueldata.org.uk/ Access date 03 February 2011.
80. An introduction to the U.K.'s Climate Change Levy (CCL). http://customs.hmrc.gov.uk/ Access date 4 February 2011.
81. http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/feedin_tariff/feedin_tariff.aspx Access date 4 February 2011.
82. A summary of the U.K.'s Renewable Heat Incentive (RHI) Scheme. http://www.decc.gov.uk/renewable_heat/incentive.aspx Access 4 Feb 2011.
83. From Questions and Answers on the Effort Sharing Decision. http://ec.europa.eu/clima/faq/effort/index_en.htm Access date 4 April 2011.

Table 7. Current Climate Change Policies in Japan

Policy	Jurisdiction	Details
Emissions Trading Scheme (deferred)	Japan	On March 12, 2010, the government of Japan proposed the "Basic Act on Global Warming Countermeasures," an overall climate change policy framework that includes introducing an ETS.
Feed-in Tariffs	Japan	Feed-in tariff for all renewable energy sources with the goal of increasing domestic energy generation from renewable sources to 10 percent of total primary energy supply by 2020.
Anti-global Warming Measure Tax	Japan	Anti-global warming tax is proposed as add-on to existing taxes covering wide range of fuels, of which rates are proportional to CO2 emission.
Voluntary Experimental Integrated ETS	715 organizations	715 organizations had applied to participate, of which 521 supplied targets (as of July 2009).The trial scheme aims to bring together several existing initiatives, such as the Keidanren Voluntary Action Plan, plans for a domestic offsets scheme, and the Japan-Voluntary Emissions Trading Scheme (J-VETS), which targets smaller emitters.
Tokyo Emissions Trading Scheme (Cap-and-Trade)	Tokyo	The Tokyo metropolitan area launched its own mandatory cap-and-trade scheme on April 1, 2010, which targets office and commercial buildings (including universities) and factories. The scheme covers approximately 1,400 installations and 1 percent of the country's emissions.
Saitama Prefecture Trading Scheme (Cap-and-Trade)	Saitama Prefecture	Starting April 1, 2011, Saitama, the fifth largest prefecture in Japan, will become the second Japanese prefecture to implement a mandatory emissions trading scheme. Saitama and Tokyo signed a pact to link their cap-and-trade schemes in the future.

it may develop a bilateral offset scheme.[84] The recent earthquake and tsunami and associated nuclear safety concerns may cause the Japanese government to reconsider its energy plans and climate change policies (for more details see Section 5.1.1).

New Zealand—Under Review

In November 2002, the New Zealand Parliament passed the Climate Change Reponses Act 2002.[85] The act was subsequently amended in September 2008, introducing the greenhouse gas Emissions Trading Scheme (NZ ETS), which retrospectively covers forestry from January 2008. In November 2008, the newly elected government suspended, except for forestry operations, the NZ ETS, and launched a review of the country's climate change policy. A further amended scheme came into existence in November 2009.[86]

During 2010, the NZ ETS was expanded to cover fuels and industry. In early 2011, a review of the NZ ETS commenced, as required by Climate Change Response Act 2002. The review seeks to highlight whether the ETS is functioning efficiently and effectively. Recommendations from the review process will be forwarded to the Minister for Climate Change by September 2011.The scope of the review includes the following: coverage of agriculture, allocation mechanisms for New Zealand Units (NZUs), whether or not to keep the fixed-price cap of NZ$25 and the one-for-two obligation for emitters, and whether synthetic greenhouse gases should be included in the ETS. The review also examines the impact of the ETS on investment and operational decisions.[87]

Over the past year, the New Zealand market for NZUs has remained relatively flat. The market has traded between NZ$17 (€9.34) and NZ$22 (€12.1) and tends to follow the CER price at around a 10 to 15 percent discount, which reflects the fact that NZUs are subject to a price cap of NZ$25 and cannot be sold to companies participating in the EU ETS.

Demand in the NZ ETS mainly stems from local utilities, local industry, and fuel companies, with a few transactions from government buyers. In terms

84. "Japan confirms bilateral offsets support." Point Carbon http://www.pointcarbon.com/news/1.1466069 Access date 15 April 2011.
85. http://www.legislation.govt.nz/act/public/2002/0040/latest/DLM158584.html Access date 17 March 2011.
86. http://www.legislation.govt.nz/act/public/2009/0057/latest/DLM2381636.html Access date 15 April 2011.
87. http://www.climatechange.govt.nz/emissions-trading-scheme/ets-review-2011/issues-statement.pdf Access date 19 March 2011.

of supply, however, it appears that a large percentage of the allocations of NZUs are not coming to market as fast as envisioned, thus increasing the market price. An expected surplus of supply for NZUs has so far failed to materialize.[88]

Russian Federation—The Bear Awakes

Russia, as part of the Copenhagen accord, has committed to reductions of between 15 and 25 percent on 1990 levels by 2020. These reductions are predicated on the inclusion of forestry in Russia's efforts to meet its anthropogenic emission reductions and its success in imposing binding obligations on major emitters.[89] Russia also continues to be active in the JI market through the generation of Emission Reduction Units (ERUs). For further details see Section 4.1.2.

United States and North America —It is all about California

Uncertainty in U.S. climate policy continues as new legislators and administrators at the U.S. state and federal levels reevaluate previous climate policy positions, affecting market sentiment and investment decisions. There appears to be bipartisan congressional support for a two-year suspension of the EPA's authority to regulate GHG emissions under the Clean Air Act (CAA).[90]

In the President's address on the State of the Union 2011, a Federal Clean Energy Standard was made an aspiration for the new Congress. Early reports suggest possible Senate support for a Clean Energy Standard that includes coal carbon capture and storage (CCS), natural gas, nuclear energy, and renewable energy sources such as wind, geothermal, and solar.[91] At this time, House support is unclear.[92]

This means that approaches centered on California will drive the carbon market landscape in the United States and North America for the foreseeable future (see Table 9 for a summary of state and regional climate change policies).

California

California continues to champion market-based measures in the United States through the Global Warming Solutions Act of 2006 Assembly Bill 32 (AB 32). AB 32 requires California to cut greenhouse gas emissions to 1990 levels by 2020. It also identifies a cap-and-trade program as one of the strategies the state will employ to reduce GHG emissions. As part of the public consultation process on the proposed cap-and-trade plan, the California Air Resources Board (CARB) held a rule-making meeting in December 2010 and approved resolution 10–24 outlining elements of the program. The regulation is not expected to be finalized until fall 2011 (September–November).

As a cost-control measure, AB 32 allows entities covered by the scheme to purchase and use offsets for compliance purposes, but volumes are limited to 8 percent of annual emissions. Offsets will come from a domestic offsets program with the possibility of importing international forest offsets (see Section 4.4.1.1).[93] California also has a strong renewable energy mandate and a requirement that the carbon content of the state's vehicle fuels be cut by 10 percent by 2020.[94]

During 2010, opponents of AB 32 supported Proposition 23 with the aim of suspending AB 32. The Proposition 23 was defeated, but a related California ballot, Proposition 26, was passed. Proposition 26 requires certain state and local fees be approved by a two-thirds vote. Fees include those that address adverse impacts on society or the environment caused by the fee-payer's business. Proposition 26 expands the definition of a tax under California law and some legal opinion speculates that it may affect the implementation of AB 32.[95] Nonetheless, advice from the State Attorney General's office argues that Proposition

88. This section benefited from a Pers. Comm., with John O'Brien, Carbon Market Solution.
89. http://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/russiacphaccord_app1engl.pdf Access date 10 April 2011.
90. There is a House bill to amend the Clean Air Act to prohibit the Administrator of the Environmental Protection Agency from promulgating any regulation concerning, taking action relating to, or taking into consideration the emission of a greenhouse gas to address climate change, and for other purposes. http://www.gpo.gov/fdsys/pkg/BILLS-112hr910rfs/pdf/BILLS-112hr910rfs.pdf Access date 15 April 2011.
91. http://www.reuters.com/article/2011/01/31/us-usa-bingaman-nuclear-idUSTRE70U64Z20110131 Access date 17 March 2011.
92. http://upton.house.gov/News/DocumentSingle.aspx?DocumentID=229488 Access date 17 March 2011.
93. http://www.arb.ca.gov/newsrel/newsrelease.php?id=170 Access date 11 March 2011.
94. http://www.arb.ca.gov/cc/ab32/ab32.htm Access date 4 Feb 2011.
95. http://cdn.law.ucla.edu/SiteCollectionDocuments/EnvironmentalLaw/PayingforPollution.pdf Access date 11 Feb 2011.

BOX 2. North American Offset Prices

North American Offset Prices: 2010–11

In 2010, the expectations of the North American carbon market refocused from federal legislation to California's cap-and-trade. Between January and July, prices for offset credits in the United States were driven by the signals from federal legislation of whether the credit was likely to be eligible for an anticipated federal cap-and-trade program. Between August and October, the market was mostly illiquid, but in November it was reawakened by the release of California's cap-and-trade regulation.

The Climate Reserve Tonnes (CRTs) issued by the Climate Action Reserve (CAR) were the first choice for sourcing early action credits in the federal bills that came through the 111th Congress, including the Waxman-Markey climate bill that passed the House of Representatives in the summer of 2010. Average prices lingered from January 2010 to July 2010 at $5.90/t for national forestry vintage 2009 CRTs, at $3.50/t for landfill gas vintage 2009 CRTs, and at $4.20/t for V11-12 CRT forwards from ozone depleting substance (ODS) projects.

However, CRTs from forestry projects located in California went for an average of $6.90/t and held steady throughout the year to be knocked down to an average of $5.50/t for a brief time in October on the back of fears that Proposition 23 could have prevented the California cap-and-trade program from moving forward. The California forestry CRTs carried a premium over other project types as those were thought to be most likely to be eligible in a then looming California cap-and-trade scheme.

Various iterations of federal legislation did not give the Verified Carbon Units (VCUs) from the Verified Carbon Standard (VCS) as much hope for early action acceptance as for CRTs. As a result, the average VCU price was at $2.40/t from January through July, dropping to an average of $1.50/t for the remainder of the year as the market lost confidence in federal legislation.

As Proposition 23 was voted down in November and the market gained confidence in the California cap-and-trade scheme, the price for CRTs from U.S. forestry, livestock methane, and ODS projects converged into one "CARB eligible CRT" price at an average of $7.00/t, jumping approximately 40% by January to an average of $9.75/t. In February and March 2011, on the back of the court case of "Association of Irritated Residents v CARB" and market's concern with the invalidation of CRT prices were once again down by approximately 17% to average of $8.10/t. CARB eligible CRT prices are expected to stay at this level until further developments in the court case.

Will there be enough supply for California's cap-and-trade?

In December 2010, CARB approved four U.S. based project types–urban forestry, forestry, livestock methane, and ODS–to generate offsets for California's cap-and-trade system. In order to ensure supply of offsets at the start of the program in 2012, the legislation allows early supply of CRTs from the above listed project types with vintages 2005–14, as long as the project started prior to 2012. Offsets from jurisdictions under the Western Climate Initiative may also be accepted, but Certified Emission Reductions (CERs) from the Clean Development Mechanism (CDM) are not eligible.

CARB's regulations suggest a cumulative demand of 233 million tonnes of offsets from 2012 to 2020, or 8.7% of the total cap. To forecast supply, Thomson Reuters Point Carbon included projections from four project types CARB has approved. The projections also included REDD supply from Acre, Brazil and Chiapas, Mexico, and from U.S. based agricultural sequestration (cropland management and nutrient management), protocols for which CARB is likely to consider next for inclusion. The supply estimates show that there will not be enough offsets to meet the maximum theoretical demand in any of the scheme's 3 phases, resulting in a cumulative offset shortage of 68Mt, as shown in Table 8.

Years	Supply (Mt)	Demand (Mt)	Shortage (Mt)
2012–14	38	42	(4)
2015–17	52	100	(48)
2018–20	75	91	(16)

Table 8. Offset Supply and Demand Forecast for California's Cap-and-trade

Source: Thomson Reuter's Point Carbon's Carbon Market Analyst, A price forecast for California: Gauging Uncertainty, February 2011.

Kindly provided by Olga N. Chistyakova, Senior Analyst, Point Carbon

Table 9. Current U.S. State and Regional Climate Change Policy in North America

Policy	Jurisdiction	Details
AB 32 Cap-and-Trade[96]	California	Cap-and-trade scheme to start in 2012.
AB 32 Renewable Electricity Standard[97]	California	Regulation requiring a 33 percent renewable energy target by 2020.
Renewable Portfolio Standards[98]	Various U.S. states	A renewable portfolio standard is a state policy that requires electricity providers to obtain a minimum percentage of their power from renewable energy resources by a certain date.
Midwestern Greenhouse Gas Reduction Accord[99] (MGGRA)	Six midwestern states and one Canadian province	MGGRA appears no longer functional with cap-and-trade off the agenda. The Midwestern Governors Association is now primary focused on energy efficiency, renewable electricity, and advanced coal with carbon capture, as well as on bioeconomy and transportation.
Regional Greenhouse Gas Initiative (RGGI)[100]	10 northeastern and mid-Atlantic states	Cap-and-trade program reducing CO2 (only) emissions from the power sector 10 percent by 2018.
Western Climate Initiative (WCI)[101]	Western and midwestern U.S. states, and some Canadian provinces	Currently it appears that California, British Columbia, Quebec, and Ontario may be ready for trading in the WCI from 2012.

26 is not applicable to AB 32.[102] Some market analysts consulted by the authors share the same view.

At the time of writing, a long-standing legal action brought by the Association of Irritated Residents against the CARB has been successful. The Superior Court of California ruled that CARB failed to properly consider alternatives to the cap-and-trade program contained in AB 32.[103] Media reports suggest that this ruling has the potential to delay the start date of the cap-and-trade program.[104]

Western Climate Initiative

California is the leading member of the Western Climate Initiative (WCI), which aims to reduce regional GHG emissions to 15 percent below 2005 levels by 2020.[105] However, the future of WCI appears to be restricted to the West Coast of the United States and several Canadian provinces.

On June 30, 2010, Arizona withdrew from the WCI's planned January 2012 implementation of a regional cap-and-trade emissions trading scheme, citing the economic downturn.[106] Continued participation by Utah is also uncertain; its legislature passed a resolution to withdraw from the WCI.[107] Some news reports suggest that Montana is also having trouble with cap-and-trade and may be unlikely to have legislation in place before WCI's proposed start in January 2012.[108] Cap-and-trade also appears in doubt in New Mexico, with the state executive terminating the employment of all members of the Environmental Improvement Board that passed cap-and-trade regulations.[109]

96. http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm Access date 07 February 2011.
97. http://www.arb.ca.gov/energy/res/res.htm Access date 07 February 2011.
98. http://apps1.eere.energy.gov/states/maps/renewable_portfolio_states.cfm Access date 07 February 2011.
99. http://www.midwesterngovernors.org/Energy.htm Access date 08 February 2011.
100. http://www.rggi.org/home Access date 07 February 2011.
101. http://www.westernclimateinitiative.org/ Access date 07 February 2011.
102. Response from California Air Resources Board Chairman to a floor question at the IETA Carbon Forum, 14-15 March 2011, Washington, DC. http://www.ietacarbonforum.com/2011/.
103. http://webaccess.sftc.org/Scripts/Magic94/mgrqispi94.dll?APPNAME=IJS&PRGNAME=ROA22&ARGUMENTS=-ACPF09509562 Access date 24 March.
104. http://www.pointcarbon.com/research/marketsoverview/1.1520265 Access date 29 March 2011.
105. http://www.westernclimateinitiative.org/ Access date 12 March 2011.
106. http://www.azsos.gov/aar/2010/31/governor.pdf Access date 11 March 2011.
107. http://le.utah.gov/~2010/bills/hbillenr/HJR021.pdf Access date 12 Feb 2011.
108. http://billingsgazette.com/news/state-and-regional/montana/article d2433252-9c10-11df-958a-001cc4c002e0.html Access date 12 March 2011.
109. http://www.governor.state.nm.us/uploads/FileLinks/20e5f2e740f34a2297a940e2bacdfcce/010411_02.pdf Access date 18 March 2011.

Washington and Oregon are expected to join California in emissions trading through the WCI, but they will not be ready for trading in 2012.[110]

At the level of Canadian provinces, British Columbia, Ontario, and Quebec have passed cap-and-trade legislation; they are positioned to join California in early regional emissions trading through the WCI. Manitoba does not yet have the legislative authority it needs to join in emissions trading through the WCI. Alberta and Saskatchewan are both taking individual actions—outside the WCI—to limit GHG emissions.

Regional Greenhouse Gas Initiative

The other major regional initiative operating in the United States is the Regional Greenhouse Gas Initiative (RGGI). It is a mandatory cap-and-trade CO_2-only-reduction program covering ten northeastern and mid-Atlantic states that aims to reduce CO_2 emissions from the power sector by 10 percent by 2018.[111] RGGI continues to have overallocation problems. The cap exceeded emissions by about 50 percent in 2009. Although at lower levels (about 15 percent), overallocation is expected until 2018 (see Figure 3).[112] In addition, the lack of momentum at federal level fully offset in 2010 the growth of this market segment in the previous year, which had strongly benefited from the expectation of an imminent federal legislation.

The future of RGGI is unclear. The New Hampshire legislature recently passed House Bill 519, which repeals the state's participation in RGGI.[113] Media analysis suggests that the New Hampshire legislature has enough votes to enact the bill into law should the governor veto it.[114] There is speculation that the success of Bill 519 will cause other states to consider withdrawing from RGGI and possibly delay any review of the cap.[115]

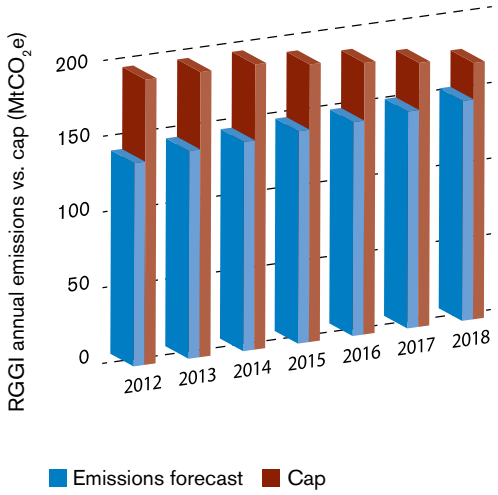


Figure 3. RGGI Forecast Emissions

Source: Thomson Reuters Point Carbon

2.2 NON-ANNEX I COUNTRIES

Brazil—Making Commitments

On December 29, 2009, the Brazilian Parliament adopted Law 12.187. The law establishes the National Climate Change Policy (NCCP) of Brazil and sets a voluntary national greenhouse gas reduction target of between 36.1 and 38.9 percent of projected emissions by 2020. On October 26, 2010, the government published an executive summary of the sectoral mitigation plans to implement its voluntary commitment.[116]

110. http://www.pointcarbon.com/polopoly_fs/1.1512601!Carbon%202011_web.pdf Access date 17 March 2011.
111. http://www.rggi.org/home Access date 12 March 2011.
112. http://www.pointcarbon.com/research/northamerica/rggi/ Access date 17 March 2011.
113. http://www.gencourt.state.nh.us/bill_Status/results.aspx?lsr=475&sortoption=&txtsessionyear=2011&txtbillnumber=hb519 Access date 17 March 2011.
114. http://www.boston.com/news/local/new_hampshire/articles/2010/11/03/nh_gop_tally_5_sen_almost_300_house_seats/ Access date 17 March 2011.
115. RGGI market view - http://www.pointcarbon.com/research/northamerica/rggi/ Access date 17 March 2011.
116. Beyond official and voluntary commitments, a number of studies have investigated the potential of emissions reductions in Brazil in coming decades:
    - Brazil Low Carbon Study argues that Brazilian emissions in 2030 could be up to 36 percent below 2008 estimated emissions levels and would require an average incremental investment of $18.5 billion per year and an average volume of incentive of $21billion per year to turn the low-carbon options attractive. de Gouvello et al., World Bank, 2010 http://go.worldbank.org/53EVFQYOG0 Access date 6 April 2011.
    - An inventory of low-carbon projects opportunities, contracted by BMF, the São Paulo stock exchange, which pre-identified more than 18,000 potential low-carbon investment to implement systematically 61 different kinds of technologies, corresponding to cumulative emissions reduction potential of 455 $MtCO_2e$ per year.

Among other instruments, the NCCP law considers in article 9 the creation of a Brazilian Emission Reductions Market (BERM) to achieve the voluntary emission reduction target. It will be operationalized by Brazilian stock exchanges and the Securities Commission.

As a signatory of the Copenhagen Accord, Brazil detailed this voluntary commitment in an official communication on NAMAs to the UNFCCC Secretariat as follows:

- LULUCF: reducing deforestation in the Amazon Region and the Cerrado (minus 668 $MtCO_2e$/year in 2020); degraded pastures recovery (minus 83 to 104 $MtCO_2e$/year in 2020); reduction of livestock emissions (minus 22 $MtCO_2e$/year in 2020); zero tillage (minus 20 $MtCO_2e$/year in 2020); biological fixing of N2 (minus 16 to 22 $MtCO_2e$/year in 2020).
- Energy: energy efficiency measures (minus 12 to 15 $MtCO_2e$/year in 2020); use of bio-fuels (minus 28 to 60 $MtCO_2e$/year in 2020); increase of hydropower generation (minus 79 to 99 $MtCO_2e$/year in 2020).
- Industry: substitution of native forest–based charcoal by planted forest–based charcoal in the steel industry (minus 12 to 15 $MtCO_2e$/year in 2020).

China—Going Green

In recognition of its changing economic and geopolitical role, China released in March 2011 its 12th Five-Year Plan of National Economic and Social Development. It sets a carbon-intensity reduction target (CO_2 emissions per unit GDP) of 17 percent and aims to cut energy intensity[117] by 16 percent by 2015. These targets are consistent with the 40 to 45 percent reduction in carbon intensity from 2005 levels that was first announced at the Copenhagen Conference and reaffirmed at the Cancun Conference.[118,119]

These policy choices are driven by China's need to reduce emissions to avoid the negative impacts of climate change on its population, to promote energy security, and to reduce emissions of health-threatening pollutants such as sulfur dioxide (SO_2), nitrous oxides (NO_X), and particulates. As part of the 12th Five-Year Plan China will increase forest cover by 12.5 million hectares by 2015, improve GHG emissions and energy monitoring systems, promote energy efficiency in industrial plants and buildings, support the expansion of public rail transport infrastructure, and continue the development of nonfossil fuel energy sources.[120]

China continues to support emissions trading and Kyoto Protocol flexibility mechanisms, and has established a number of environment and energy exchanges to provide infrastructure for trading in CERs and Voluntary Emission Reductions (VERs). As of December 2010 the National Development and Reform Commission (NDRC) had approved approximately 2,850 Clean Development Mechanism (CDM) projects.

Of these projects more than 1,000 have been successfully registered at the CDM Executive Board. China has contributed 42 percent of the overall number of globally registered CDM projects, with expected annual certified emission reductions of about 240 $MtCO_2e$, or 62 percent of total global emission reductions from the CDM. Table 10 outlines the current trading market and products covered.

China may introduce an emissions trading scheme in six regions in 2013 and this may be expanded to a national scheme by 2015.[121]

India—Setting Itself a Target

India's per capita CO_2 emissions are expected to grow from 1.1 ton in 2001 to 3–5 tons in 2030.[122] In 2008, India launched the National Action Plan on Climate Change, which involves the establishment

117. CO_2 emissions per unit of GDP.
118. http://www.theclimategroup.org/_assets/files/China-Five-Year-Plan-EXECUTIVE-SUMMARY.pdf Access date 17 March 2011.
119. http://www.wri.org/stories/2011/03/how-does-chinas-12th-five-year-plan-address-energy-and-environment Access date 18 March 2011.
120. http://pdf.wri.org/testimony/seligsohn_testimony_energy_and_commerce_2011-04-04.pdf Access date 10 April 2011.
121. The Panda Standard is a quality standard for Chinese voluntary emission reduction projects within agriculture and forestry. The standard is being developed by the China Beijing Environmental Exchange (CBEEX) and Paris-based carbon exchange Bluenext. The first deal of Panda Standard credit–China's pilot domestic carbon standard–was announced on March 29, 2011. A major market participant purchased 16,800 t at $9.14 per ton. The project is the Bamboo reforestation developed under the AFD-FFEM Yunnan Rural Project.
122. India's GHG Emissions Profile: Results of Five Climate Modeling Studies, Ministry of Environment & Forest.

Table 10. Current Trading Platforms in China[123]

	China Beijing Environment Exchange (CBEEX)	Tianjin Climate Exchange (TCX)	Shanghai Environment Energy Exchange (SEEE)
Web site	http://www.cbeex.com.cn	http://www.chinatcx.com.cn	http://www.cneeex.com
Location	Beijing	Tianjin	Shanghai
Date of Establishment	08/05/2008	09/25/2008	08/05/2008
Shareholders	-China Beijing Equity Exchange (CBEX, 40 percent) -CNOOC New Energy Investment Co., Ltd. (20 percent) -China Guodian Corp. (20 percent) -China Everbright Investment Management Corp. (20 percent)	-National Petroleum Corporation Assets Management Co. (CNPCAM, 53 percent), -Tianjin Property Rights Exchange (TPRE, 22 percent), -Chicago Climate Exchange (CCX, 25 percent).	Sole owner: Shanghai United Assets and Equity Exchange (SUAEE)
Common Functions	Information and service center for CDM projects Environmental property rights trading, mainly SO_2 and COD Energy Management/Performance contract and green technologies transfers Domestic VERs transactions		
Key Focus Activities	Panda Standard: China's pilot domestic carbon standard–first project announced in Cancun[124]	Chinese companies joint action of voluntary emission reduction	Voluntary emission reduction platform for the World Expo
	China Carbon Neutral Alliance	Pilot intensity-cap trading scheme on heat suppliers of residential buildings (no further announcement as of March 2011)	China voluntary reduction standard (still nothing as of March 2011)

of eight programs—known as missions—on solar technology, energy efficiency, sustainable habitat, water, Himalayan ecosystem, green India, agriculture, and strategic knowledge.

The solar mission, approved in 2009, is expected to enable setting up of 200 MW of off-grid solar power and cover 7 million square meters with solar collectors in its first phase from 2010–13. It has set a voluntary target of 20,000 MW by 2022.

The energy efficiency mission, approved in 2010, is expected to achieve total avoided capacity addition of 19,598 MW, representing fuel savings of around 23 million tons per year and greenhouse gas emission reductions of 98.55 million tons per year, over the next four years. This mission includes a market-based mechanism—the Perform Achieve and Trade—to enhance cost effectiveness of meeting energy efficiency improvement targets in energy-intensive large industries and facilities. The energy saving certificates generated can be traded.

Approved in 2010, the mission on sustainable habitats aims to make cities sustainable by improving energy efficiency in buildings and solid waste management, and encouraging a shift to public transport.

In 2011, India submitted its voluntary emission reduction objective under the Copenhagen Accord, a voluntary target of reducing emissions intensity of its GDP by 20–25 percent by 2020 in comparison to the 2005 level.

Mexico—Looking for Options

Mexico has submitted three National Communications to the UNFCCC. The First National Communication (1997) established the national greenhouse gas inventory and reported

123. Personal communication from Bluenext. http://www.bluenext.eu/.
124. Point Carbon, based on comment from the NRDC, reports that China wants to launch markets in Beijing, Chongqing, Guangdong, Hubei, Shanghai, and Tianjin in 2013, National Development and Reform Commission (NDRC). Carbon Market Daily. 11 April 2011.

the first studies on Mexico's vulnerability to climate change. Mexico is currently preparing its Fourth National Communication. Recognizing the multisectoral challenges posed by climate change, in April 2005 Mexico established the Comisión Intersecretarial de Cambio Climático (CICC) (Intersecretarial Commission on Climate Change). The CICC's key mandates include formulating and coordinating national climate change strategies and incorporating them into sectoral programs. The CICC contains several working groups, including groups on mitigation and adaptation. Associated with the CICC is an advisory board on climate change, which creates a link between the CICC, the scientific community, and civil society.[125]

A voluntary program for GHG accounting and reporting (Program GEI) covered 98 companies in 2009 accounting for 21 percent of national emissions. In the next two years the coverage will be expanded to 80 percent of national emissions. Sectoral crediting is expected to complement CDM.

Republic of Korea—Two Steps Forward One Step Back

During 2010, the Republic of Korea enacted its Framework Act on Low Carbon, Green Growth.[126] This act establishes a legal framework for setting GHG and energy reduction targets and provides for GHG emissions reporting. It also establishes the right to implement a cap-and-trade scheme for the purposes of reducing GHG emissions and sets up fuel use and GHG emission standards for automobiles. The act has met resistance from industry groups concerned about the cost implications of cap-and-trade policies.[127]

Consequently, the implementation of the cap-and-trade scheme originally planned for commencement in 2013 has been postponed until 2015.[128] Regardless, the Republic of Korea is continuing with its GHG Target Management System, which will require companies to meet energy-saving and greenhouse gas reduction targets. The system is believed to cap GHG emissions for 1,564 sites that collectively emit more than 442 $MtCO_2e$ a year.[129]

South Africa—Committed to Reducing Emissions

South Africa, as part of the Copenhagen accord, has made a non-binding commitment to reduce GHG emission by 34 percent below its business-as-usual emissions trajectory by 2020. South Africa further plans to reduce emissions by 42 percent below its business-as-usual emissions trajectory by 2025. This commitment is contingent on financing, technology, and capacity-building support.[130]

It has been reported that South Africa is contemplating the introduction of a carbon tax as a policy measure to support its emission reduction target, rather than a cap-and-trade scheme. South Africa's actions toward low-carbon growth will become more visible in 2011, as the country will host the next Conference of the Parties of the Kyoto Protocol, to be held in Durban in December 2011.

2.3 LINKING EMISSIONS TRADING SCHEMES

Linking emissions trading schemes is a complex issue that has attracted attention because of the potential for reducing costs and enhancing market liquidity.[131] Different forms of linking are available, including the following:

- Direct linking. This involves the mutual recognition of allowances in each emissions trading scheme being linked and would involve trading allowances between the schemes (import and export).
- Indirect linking. This involves linking through a mutually recognized standard unit. Most trading schemes indirectly link though CERs.

Linking issues typically cover compatibility in the level of effort or ambition; use of offsets; monitoring,

125. World Bank, Low-Carbon Development for Mexico. 2010.
126. http://www.moleg.go.kr/english/korLawEng;jsessionid=2XVAoj0GR5al5jBzbf231tBLR5sfblXWqUKrdjsnkPDpRoPPZWg4k7g10127dywk?pstSeq=52136 Access date 22 March 2011.
127. http://af.reuters.com/article/metalsNews/idAFL3E7CO0CK20110124 Access date 22 March 2011.
128. http://www.pointcarbon.com/news/1.1519474 Access date 22 March 2011.
129. http://af.reuters.com/article/metalsNews/idAFL3E7CO0CK20110124 Access date 22 March 2011.
130. http://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/southafricacphaccord_app2.pdf Access date 26 April 2011.
131. http://www.oecd-ilibrary.org/environment/towards-global-carbon-pricing_5km975t0cfr8-en Access date 22 March 2011.

reporting and verification (MRV) standards;[132] and price caps. For example, the proposed U.S. Waxman-Markey bill (H.R. 2454: Sec 728)[133] outlines provisions for linking between the U.S. and foreign climate change schemes run by national or supra-national governments. The criteria include the following:

- The foreign scheme imposes a mandatory absolute tonnage limit on greenhouse gas emissions (that is, cap-and-trade)
- The foreign scheme is at least as stringent as that in the United States (that is, equivalent effort)
- The foreign scheme has comparable monitoring, compliance, and enforcement (that is, similar MRV standards)
- The foreign scheme has similar quality of offsets and restrictions on the use of offsets

The now shelved Australian Carbon Pollution Reduction Scheme (CPRS) contained price cap provisions and allowance export limitations, which were imposed partially because of the price cap. The rationale was if the international price moved above Australia's price cap, Australian allowances would be exported and entities with compliance obligations would access the price cap.[134] This has two impacts: (1) abatement will be less than otherwise would have occurred without the price cap, and (2) auction revenues will be lower than otherwise would have occurred without the price cap.

Indirect linking through an offset scheme, such as the CDM, can provide an important cost containment mechanism for developed countries with high cost abatement and offset import potential. The creation of low-cost offsets through a scheme, such as REDD+, offers import countries considerable opportunities for cost-effective abatement. The cost-containment opportunities justify the considerable work needed to develop offset schemes.[135]

2.4 CONCLUSIONS

The national and regional mitigation measures discussed in the preceding section support the increasingly common perspective among market participants of the emergence of a fragmented carbon market.[136] Some participants expressed the belief that having several regulatory systems could be a positive feature of fragmented markets, citing the benefits of fast (and flexible) local approval processes, high-degree of adaptability to specific needs, and potentially, large local acceptability and increased level of engagement. The sentiment survey presented in Section 1.4 supports the perspective that market participants view this as a workable situation while the carbon market further evolves and matures through linking and acceptance of similar levels of ambition.

The rate at which this will occur will depend on many factors. In particular, it will depend on each country's willingness to work on and accept the fungibility of allowances from other national or supra-national schemes, which will be a consequence of compatibility in effort or ambition; use of offsets; monitoring, reporting and verification (MRV) standards; and absence of price caps. Without fungible assets and open schemes, the fragmentation of the carbon market will persist and the hoped for long-term carbon pricing signal—desired by some market participants—will not be achieved.

Countries continue to adopt a range of policy measures to drive emission reductions. It is important in the overall design of mitigation policies for policy makers to consider the interaction between different—market and non-market—policy measures. A great deal can be learned from countries that have direct experience of these potentially complex interactions.

---

132. Linking separate schemes requires robust and transparent monitoring, reporting and verification (MRV) to ensure the environmental integrity of the different schemes and to build the trust needed among participants. Ideally uniform or at least compatible standards for MRV should be collectively adopted.
133. http://thomas.loc.gov/cgi-bin/query/z?c111:H.R.2454: Access date 23 March 2011.
134. http://www.climatechange.gov.au/publications/cprs/white-paper/~/media/publications/white-paper/V1011Chapter-pdf.ashx Access date 23 March 2011.
135. The cost-saving potential for developed countries of well-functioning crediting mechanisms appears to be very large. Even limited use of offsets would nearly halve mitigation costs; cost savings would be largest for carbon-intensive economies. However, one open issue is whether these gains can be fully reaped in reality, given that direct linking and the use of crediting mechanisms both raise complex system design and implementation issues. The analysis shows, however, that the potential gains to be reaped are so large that substantial efforts in this domain are warranted. http://www.oecd-ilibrary.org/environment/towards-global-carbon-pricing_5km975t0cfr8-en Access date 12 April 2011.
136. "Costs and financing of climate change policies: Negotiating a post-Kyoto regime requires the redefinition of the financial engagement of the different actors." http://www.cdcclimat.com/IMG/pdf/16_Climat_Sphere_EN_Copenhagen_last_stop.pdf Access date 29 April 2011.


SECTION
3

How Market Participants Transact –Risk and Regulation

THE ECONOMIC MALAISE resulting from the global financial crisis and the perceived excess risk taking in global financial centers have led many to question the effectiveness of market mechanisms. Yet, carbon markets can be one of the most important policy tools for cost-effectively reducing GHG emissions. However, obtaining political support from a skeptical public for market-based solutions in a period of economic slowdown is becoming ever more difficult. Robust and transparent regulations of these markets are vital for ensuring market and public confidence, which in turn supports the market's ability to deliver cost-effective emission reductions. This section discusses the changing regulatory landscape, important regulatory approaches being used to control risk, and future regulatory developments.

3.1 THE CHANGING REGULATORY LANDSCAPE–THE IMPACT OF FINANCIAL MARKET REFORMS

The recent and extensive turmoil in global financial markets has resulted in financial market regulatory reforms. At the international level, the G20 have promoted financial market regulatory reform through the Financial Stability Board (FSB)[137] and the Basel Committee.[138]

> "Robust and transparent regulations of these markets are vital for ensuring market and public confidence, which in turn supports the market's ability to deliver cost-effective emission reductions."

At the domestic level, countries have initiated major financial market regulatory reforms; some examples include the United States' Dodd–Frank Wall Street Reform and Consumer Protection Act,[139] the British government's reforms to financial regulation,[140] and the French government's Law on Banking and Financial Regulation (LBFR).[141] Against this background, the U.S. Commodities Future Trading Commission (CFTC) released a report on carbon market oversight.[142] And after recent carbon market irregularities in the European Union (see Box 3), the European Commission has taken steps to improve the functioning of the EU Emissions Trading Scheme.

137. http://www.financialstabilityboard.org/index.htm Access date 25 Feb 2011.
138. http://www.bis.org/bcbs/ Access date 25 Feb 2011.
139. http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h4173enr.txt.pdf Access date 22 Feb 2011.
140. http://www.hm-treasury.gov.uk/consult_financial_regulation.htm Access date 22 Feb 2011.
141. http://www.legifrance.gouv.fr/rechTexte.do?reprise=true&page=1 Access date 22 Feb 2011.
142. http://www.cftc.gov/ucm/groups/public/@swaps/documents/file/dfstudy_carbon_011811.pdf Access date 15 March 2011.

BOX 3. Brief History of Carbon Market Fraud in the EU ETS

- January 2011–Discovery of an EU ETS-wide theft of €45 million worth of EU allowances leads to the closure of national carbon registries, the suspension of spot trade, and the implementation of an EU-wide upgrade of registry security.
- November 2010–Incident of unauthorized access to EU ETS registry accounts in Romania results in the theft of 1.6 million EUAs.
- November 2010–German Registry closes due to Trojan virus Nimkey.
- March 2010–Hungary sells CERs that had already been surrendered to it under the EU's emissions trading scheme. In response, the EU amends the registry regulations to prevent CER recycling.
- September 2009–European Commission proposes measures for a consistent response to deal with VAT or carousel fraud detected in the market in 2009–10.
- January 2009–The widespread phishing attacks on users of EU ETS registries prompts the EU to revise Internet security guidelines.

The EU Commission reform initiatives include a communication on carbon market oversight, which aims to ensure that the EU Emissions Trading Scheme (ETS) is sufficiently protected from insider dealing and market manipulation.[143] The ETS operations will be centralized into a single European Union registry, which will be operated by the Commission. It will replace all EU ETS registries currently hosted in Member States. The Commission proposed using a consistent reverse charge mechanism for VAT as a response to carousel fraud in certain sectors.[144] In addition, some EU Member States, most notably France, have implemented or are considering domestic carbon market regulatory reforms.

The new French LBFR is important because it offers a carbon market regulatory reform model for both other EU Member States and countries outside the EU who may be considering establishing emissions trading schemes. The LBFR, based on recommendations in the Prada review,[145] provides for oversight of the carbon market and its operators through two regulators, Autorité des Marchés Financiers (AMF) and Commission de régulation de l'énergie (CRE).[146] AMF and CRE have signed a memorandum of understanding on the exchange of information, control, and supervision of markets in greenhouse gas emission allowances, electricity, natural gas, and their derivatives.[147] The memorandum of understanding is one of the LBRF's applications and it defines cooperation between AMF and CRE.

Under the memorandum of understanding, AMF is responsible for overseeing the operation of the market in allowances and their derivatives and CRE is responsible for supervision of transactions carried out in allowances by energy market participants. CRE is also responsible for analyzing the behavior of allowances in relation to the economic and technical factors underpinning energy markets. The memorandum of understanding anticipates provisions in the draft European Regulation on Energy Markets Integrity and Transparency (REMIT).[148]

An additional factor behind France's carbon market regulatory reforms appears to be the EU Auctioning Regulation, which requires that any auction platform must be a regulated market.[149] At the time of writing, Bluenext[150]—the major spot market—was in the process of becoming a regulated market for the purposes of participating in auctions. To date, most allowance auction markets have appointed independent observers, as the markets have not been regulated. The EC continues this practice in the EU Auctioning Regulation.

143. http://ec.europa.eu/clima/news/docs/communication_en.pdf Access date 22 Feb 2011.
144. http://ec.europa.eu/taxation_customs/resources/documents/common/legislation/proposals/taxation/com(2009)511_en.pdf Access date 22 Feb 2011.
145. http://www.minefe.gouv.fr/services/rap10/100419rap-prada.pdf Access date 22 Feb 2011.
146. http://www.amf-france.org/documents/general/9794_1.pdf Access date 22 Feb 2011.
147. http://www.amf-france.org/documents/general/9767_1.pdf Access date 22 Feb 2011.
148. http://ec.europa.eu/energy/gas_electricity/markets/doc/com_2010_0726_en.pdf Access date 22 Feb 2011.
149. http://ec.europa.eu/clima/documentation/ets/auctioning_third_en.htm Access date 22 Feb 2011.
150. Jointly controlled by CDC Climat–a subsidiary of French long-term investor Caisse des Dépôts–and NYSE Blue

BOX 4. A Point of View on the EU ETS

The Carbon Market in Crisis?–Recognition, Resolve and Optimism.

For many, 2010 has been a year of considerable disruption and controversy in the carbon markets.

The CDM continues to suffer from registration and issuance delays due to complex procedures and capacity constraints. JI continues to be challenged by inefficient domestic bureaucracy and varying political support. There have been sovereign suspensions under the Kyoto Protocol and alleged misappropriation of AAU sale revenues. The EU-ETS has suffered from alleged VAT fraud, money laundering and theft leading to registry suspensions and a dramatic loss of confidence and liquidity in the spot markets. International negotiations are stalled on the critical issue of binding commitments.

However, the carbon markets are far from unique in their troubles. In the 1990's several emerging economies suffered serious setbacks with stock market losses and currency devaluations. Many have since recovered. The recent "credit crunch" led to the near paralysis of EU and US money markets requiring significant injections of government liquidity. Major financial institutions failed and stock markets suffered significant losses, though some recovery has since occurred. The credit markets remain challenged by economic difficulties in Greece, Ireland and Portugal.

The credit crunch exposed the $50bil+ Madoff fraud. Theft, fraud and money laundering are serious concerns in all markets. Regulators and market participants are perpetually challenged to develop safeguards ahead of criminal activity. Advancing technology creates its own issues. In 2010 the Dow Jones temporarily lost $1trillion in a "flash crash" driven by high speed automated trading. "Fat fingers" have led to disruptions in numerous electronically traded markets.

Yet there is no clamour to abandon free market mechanisms in finance and commerce. Rather, a gritty resolve from regulators and market participants to continue improving these markets. Indeed, free market principles are increasingly widely embraced. So it should be with the carbon markets, whose present challenges are small by comparison. Whilst not the only tool in the fight against climate change - and every available tool should be deployed - the carbon markets continue to be the most efficient available mechanism for wholesale delivery of penalties for emissions and rewards for reductions.

Despite the flaws in the carbon markets, many of which are being resolved, there have been real achievements. The CDM & JI have reduced over 600MtCO2e of emissions and may achieve 3.3 billion tCO_2e by end 2020. The EU-ETS is demonstrably encouraging coal-to-gas switching, renewable energy investment and industrial energy efficiency. Phase 3 auction revenues will help finance CCS. Regional schemes are being implemented in New Zealand and California with further schemes under discussion in Australia, South Korea, Japan and China. The importance of REDD is gaining widespread international support.

Most importantly, there is now an established international market that penalises emissions and rewards reductions via prices that respond in real time to a changing world.

Thus recognition of flaws in the carbon markets should be balanced by resolve to improve and expand these markets - and outweighed by optimism in the potential of the carbon markets to deliver significant emissions reductions and to drive the transition to a global low carbon economy.

Kindly provided by Martin Lawless, Managing Director and Global Head of Deutsche Bank's carbon markets business.

The suite of regulatory reforms at the EU and Member State levels will over time lead to a more robust, transparent, and fair market. Many of the challenges encountered in the continuing development of the EU ETS offer invaluable lessons for other countries considering emissions trading.

3.2 OVER-THE-COUNTER MARKET—REGULATION IS COMING DOWN THE PIKE

The theft of EUAs and lack of clarity over legal ownership across the Member States of the EU is leading to renewed interest in over-the-counter (OTC) spot markets. Depending on the jurisdiction, stolen allowances purchased in good faith from a trusted source may not confer ownership and, hence, usability.[151] Some market participants view OTC transactions with known counterparties as an effective way to manage counterparty credit risk. VAT fraud has also encouraged market participants into the OTC spot market as a way to avoid being inadvertently implicated in carousel fraud.

Some market participants argued for a harmonization of rules for dealing with ownership of stolen allowances, favoring the approaches taken in certain Member States. Given the urgency of the situation harmonization may not be practical, but a solution is needed to restore confidence in the exchange-traded market. In the absence of a practical solution, more participants are likely to look toward OTC spot markets as a way to control this type of counterparty risk.

As interest has increased in the OTC spot market, there is pressure to move away from the use of the noncleared OTC derivatives market. Transactions in the OTC derivatives market represent approximately 15 percent of derivatives transactions. The European Commission has proposed that standard OTC derivative contracts be cleared through central counterparties (CCPs).[152] The aim is to reduce counterparty credit risk[153] and improve transparency. Some market participants expressed concerns over the ability to embed optionality in standardized contracts and the impact standardization will have on developing the tailored OTC derivatives market.

3.3 PRIMARY ISSUANCE MARKET—EMISSION ALLOWANCE AUCTIONS

The move away from administrative allocations to competitive auctions for emissions allowances is a significant policy change affecting carbon markets. Auctioning provides a mechanism that both efficiently allocates allowances and raises revenue. Starting in 2013, the EU ETS will enter Phase III of its implementation (currently it is in Phase II), stimulating further development of the primary issuance market. The market is expected to grow from around 3 percent of allowances auctioned during Phase II to at least 50 percent of allowances auctioned during Phase III.

Many EU Member States will auction 100 percent of allowances for the power sector in Phase III of the EU ETS. As Germany, Poland, and the United Kingdom intend to opt out of the planned common auction platform,[154] there will be four separate primary markets for emissions allowances that may offer arbitrage opportunities.

Although the move to auctioning is theoretically sound, there are practical considerations. Measures need be in place to prevent carbon leakage for sectors that are assessed at significant risk.[155] Permit auctions also raise the possibility of including transport in the EU ETS without any loss of revenue. This was the approach taken in the shelved Australian Carbon Pollution Reduction Scheme (CPRS) where the fuel excise tax was to reduce under the scheme.

In the current financial environment, concern focuses on the ability of liable entities to obtain financing for allowances or to purchase allowances out of working capital. Governments have attempted to address these issues with a range of policy initiatives, including the

151. http://www.ieta.org/assets/PositionPapers/ietaletter_registrysuspension20012011final.pdf Access date 23 Feb 2011.
152. http://ec.europa.eu/internal_market/financial-markets/derivatives/index_en.htm Access date 23 Feb 2011.
153. The risk that one party to the contract defaults.
154. http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/tackling_clima/emissions/eu_ets/phase_iii/phase_iii.aspx Access date 13 March 2011.
155. It may be argued even in the absence of auctioning that compensation should be made to sectors at risk of carbon leakage. The EU sectors at significant risk will receive 100 percent of the benchmarked allocation for free and, depending on where the facility is located, may receive further assistance for increased electricity costs.

auctioning of futures contracts and deferred payment arrangements.[156] These approaches are not ideal, as they reduce liquidity in allowance futures markets. The move to auctioning has also encouraged work on emissions auction design and many approaches are being proposed or are in operation across the globe. The predominant current approach is the single-round, sealed-bid, uniform price auction.[157] Other significant issues include limits on who can participate and the collateral needed to participate in auctions.

3.4 SECONDARY MARKETS—CONTROLLING RISK AND ENSURING TRANSPARENCY AND ACCOUNTABILITY

From a policy perspective, the desire to encourage broad market participation and facilitate easy access to the carbon market must be balanced by the need to control such risks as the potential for tax evasion and money laundering. The issue of managing the risks associated with components of the carbon market infrastructure is broad. It encompasses the operations of the registry, liability reporting system, auction platform, settlement system, and secondary market integration. Management of risk is critical for maintaining market integrity.[158]

3.4.1 Proof of Identity

Given the potential for market abuses in the carbon market, various law enforcement agencies have taken an active interest in the development of the market. Governments and corporate entities use proof of identity (POI) to control risk. Proof of identity aims to ensure that you know with whom you are dealing.

Adequate proof of identity is a prerequisite for participation in primary and secondary markets and for establishing registry accounts. Variations have occurred in POI requirements across the EU ETS, with countries implementing a variety of regimes. It is thought that weak POI regimes in some countries may have contributed to the VAT fraud that occurred in the EU ETS. For example, Denmark moved to restrict registry access to permanent residents in October 2010 to combat VAT fraud and other crimes.[159]

Tightening of POI regimes may have implications for individuals or corporations from developing countries wishing to participate in existing carbon markets. The problem is complex, but not new. How does an agency in a particular country verify the bona fide credentials of another country's citizens or corporations? The authors believe that the goal of ensuring access can be achieved without compromising market integrity. Multilateral development banks and other international institutions could potentially play a role in developing the market infrastructure that can both support access and control risk.

3.4.2 Operational Risk Management—Registries

The January 2011 theft of approximately 3.1 million EUAs from national registries in Europe has reignited controversy around the carbon market's effectiveness as a policy tool for emission reductions and led to the temporary suspension of spot markets. As with other Web-based financial systems, EU ETS registries are vulnerable to phishing attacks and other malicious activities, such as hacking and denial of service attacks. In response to the theft, the EU took decisive action and closed EU ETS registries pending the implementation of minimum-security arrangements. However, the resulting market disruption underscores the need for a comprehensive approach to the issue.

The proposed European Commission solution—centralizing the ETS operations into a single European Union registry—has much merit. The European Commission will operate the single European Union registry, which will replace all EU ETS registries currently hosted in EU Member States.[160] The European Commission will take on the registry operational risks from Member States,

156. http://www.climatechange.gov.au/publications/cprs/white-paper/~/media/publications/white-paper/V1009Chapter-pdf.ashx Access date 02/11/2011.
157. In this type of auction, the auctioneer announces the number of allowances to be sold and bidders submit sealed bids that indicated the number of allowances desired at each price. Allowances are allocated to bidders based on the price paid by the lowest successful bidder and only the auctioneer has information about the demand curves from auction participants.
158. Barclays Capital paper titled "€5 Billion and Counting."
159. http://www.pointcarbon.com/news/1.1493597
160. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0063:0087:en:PDF Access date 22 Feb 2011.

but the Member States will remain in control of the administration of the POI regime.

This situation creates an opportunity for developing a consistent POI regime across EU Member States as a way to minimize the risk of continued jurisdictional shopping by criminals. This does not imply that the same POI regime will occur in each EU Member State, but that an equivalently robust POI regime will exist in each Member State. It may make sense for registry participation rules to be consistent with auction participation rules, and there is some speculation from market participants that this will be the case.[161]

An associated issue is access controls over government holdings of Assigned Amount Units (AAUs) and Certified Emission Reductions (CERs). It seems likely that these access rights will remain under the control of the respective Member States. In this situation, the move to the single European Union registry is an opportunity to bring access controls in line with current banking practices by strengthening account access, audit, and notification processes.

3.4.3 Market Oversight Issues

This section covers market oversight issues such as money laundering, insider dealings, and fraud prevention. Much work has been undertaken in the EC to ensure the integrity of the carbon market.

Money laundering refers to transactions that are undertaken to hide the true sources of the money. Usually the money involved is earned from illegal sources and is laundered to give the appearance of coming from a legitimate source.[162] The detection of laundering and enforcement of the law normally involves several agencies, including tax authorities, police, and surveillance apparatus. A speculation and concern of carbon market participants is that money laundering exists in the market.[163]

This speculation is based on the ease of transfer of allowances between registry accounts held in different countries, while avoiding mandatory reporting requirements, because no threshold reporting limits are triggered. However, at the time of writing the authors are unaware of any substantiated cases of money laundering. The EC plans to address money laundering and other issues as part of a wide-ranging review of the market oversight framework of the EU ETS.[164]

The EU's existing Market Abuse Directive[165] (MAD) applies to emission allowance derivatives and covers insider dealing and market manipulation. MAD does not currently apply to the spot allowance market in the majority of EU Member States because allowances are not defined as financial instruments.

According to the Prada review, many EU Member States have not resolved the legal status of allowances. However, the Markets in Financial Instruments Directive (MiFID) has harmonized the part of the allowance derivatives market regarded as financial instruments.[166] The EC review of the market oversight framework will examine the need to better protect the scheme from insider dealing and market manipulation.

The EU has proposed a reverse charge mechanism to deal with VAT fraud[167] and, at the time of writing, several EU Member States have adopted the mechanism or an equivalent to address the problem. However, market participants continue to express concern that VAT fraud exists in the market as not all EU Member States have adopted the proposed reverse charge mechanism or an equivalent.

Continued VAT fraud is problematic for many market participants wishing to protect their organization's brands and reputation. It is likely that VAT fraud will be removed from the EU emissions trading scheme when all EU Member States adopt the proposed reverse charge or equivalent mechanism.

---

161. The EC auction regulations will ensure the integrity of the auctions by establishing minimum requirements for adequate customers through diligence checks. Eligibility to apply for admission to the auctions will be given to easily identifiable, well-defined categories of participants, notably operators of stationary installations and aircraft operators covered by the emissions trading scheme, as well as regulated financial entities, such as investment firms and credit institutions.
162. http://www.irs.gov/compliance/enforcement/article/0,,id=112999,00.html
163. Barclays Capital has raised the prospect of widespread money laundering in a paper titled "€5 Billion and Counting."
164. http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/10/697&format=HTML Access date 25 Feb 2011.
165. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:096:0016:0025:EN:PDF Access date 25 Feb 2011.
166. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2004L0039:20060428:EN:PDF Access date 25 Feb 2011.
167. http://ec.europa.eu/taxation_customs/resources/documents/common/legislation/proposals/taxation/com(2009)511_en.pdf Access date 22 Feb 2011.

It will be important to ensure harmonization of approaches and practices to prevent a recurrence of VAT fraud as other countries outside the EU Emissions Trading Scheme start to participate in emissions trading. Currently nine operational registries are outside the EU ETS,[168] with more planned.

3.4.4 Taxation and Accounting Treatments

The taxation treatment of allowances varies by jurisdiction. Allowances purchased for investment purposes will generally be treated differently from allowances purchased for EU ETS compliance purposes. For compliance purposes nine EU Member States treat allowances as commodities for taxation purposes and allow an immediate deduction of the purchase price.

The remaining 18 countries treat allowances as intangible assets with five countries allowing firms to depreciate the assets over their expected lifetime.[169] These approaches are equivalent when allowance are purchased and used for compliance purposes within the same tax year. When banking is involved, however, there may be some advantages in immediate deductibility.

Currently no International Financial Reporting Standard (IFRS) exists for accounting of allowance and permits.[170] The accounting treatment is fragmented across jurisdictions and between entities, and some entities treat free allowances as zero value and do not include them on their balance sheets.

Some entities may continue to apply the withdrawn International Financial Reporting Interpretations Committee (IFRIC) 3 standard as an accounting policy. The most common approach recognizes freely allocated allowances at zero value, with obligations/liabilities recognized at the carrying value of allowances already allocated (which may be zero) or purchased, with the balance, if applicable, valued at the prevailing market price.[171]

3.5 CONCLUSIONS

Universal participation—the idea that the market should be directly open to all who want to participate—has promoted open access to the carbon market. Yet, while universal participation encourages constituencies supportive of action on climate change, few schemes come close to its ideal. The principle does not readily fit with the practical reality of building a robust, well-functioning market. An informal consensus appears to be developing among regulators to limit participation to identifiable categories of participants, such as scheme participants and financial intermediaries.

168. http://unfccc.int/kyoto_protocol/registry_systems/registry_websites/items/4067.php Access Date 24 Feb 2011.
169. This section made use of a study by Copenhagen Economics for the European Union. The report is available at http://ec.europa.eu/taxation_customs/common/publications/studies/index_en.htm Access Date 24 Feb 2011.
170. http://www.ifrs.org/Current+Projects/IASB+Projects/Emission+Trading+Schemes/Emissions+Trading+Schemes.htm Access Date 15 March 2011.
171. http://www.pwc.co.uk/eng/publications/trouble_entry_accounting_revisited.html Access Date 15 March 2011.


SECTION
4

Carbon and Climate Finance

MITIGATING THE WORST IMPACTS OF CLIMATE CHANGE requires substantial investment.[172] Much of the growth in both emissions and energy use will come from developing countries. Mitigation costs in developing countries consistent with keeping average global temperature warming below 2˚C in comparison to preindustrial levels could reach $139–175 billion per year by 2030. Delaying action increases costs, as the world locks itself into high-carbon trajectories while stabilization options progressively disappear.

The World Energy Outlook 2010 estimates that within one year the global cost of keeping average global temperature warming below 2˚C in comparison to preindustrial levels has increased by $1 trillion over 2010–30 (or $50 billion p.a.).[173] The scale and the amounts of financing needed means that private capital flows will be vital to the transition to a low-carbon future.[174] Therefore, the global community must continue to support mechanisms that mobilize private capital in support of emission reductions in developing countries.

This section provides information on project-based offsets mechanisms (Kyoto Markets), climate finance, and new asset classes.

> "The current uncertainties surrounding a post-2012 international agreement have left Europe alone to absorb the supply of project-based CERs in the post-2012 environment."

4.1 KYOTO MARKET—A POST-2012 FACING LOW DEMAND AND LOW SUPPLY

The Cancun Conference delivered positive decisions to improve the CDM (see Section 1.1). In addition, the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) has tried to clarify some of the considerations related to a possible gap between the first and subsequent commitment periods.[175] Nevertheless, the current uncertainties surrounding a post-2012 international agreement have left Europe alone to absorb the supply of project-based CERs in the post-2012 environment.

Even within Europe, demand for CERs post-2012 will be restricted. The recovery of the European economy after 2009 has been slow. There is a broad consensus among market participants that Phase II of the EU ETS will be considerably long (for example, EU installations' cap will be higher than their overall emissions), leading many installations

172. Stern Review on the Economics of Climate Change. Ch 9:232. The global cost of reducing total GHG emissions to three-quarters of current levels (consistent with 550ppm CO_2e stabilization trajectory) is estimated at around $1 trillion in 2050 or 1 percent of GDP in that year, with a range of –1.0 percent to 3.5 percent depending on the assumptions made. http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm Access date 6 April 2011.
173. IEA 2011. World Energy Outlook. http://www.worldenergyoutlook.org/ Access date 29 March 2011.
174. http://www.un.org/wcm/content/site/climatechange/pages/financeadvisorygroup/pid/13300 Access date 29 March 2011.
175. UNFCCC. Legal Considerations relating to a possible gap between the first and subsequent commitment periods, July 2010.

to "bank" surplus allowances and offsets to be used in Phase III. The surplus to be brought over from Phase II together with the new Phase III allowances will reduce the needs for additional CERs in the first years of Phase III (2013–20).

"Unless additional non-EU demand emerges soon and the supply is boosted by meaningful CDM reforms, project developers will have very little, if any, real incentive to continue investing in new CDM projects."

As covered in the previous year's report, new usage rules and qualitative restrictions will apply in the EU ETS. CERs will no longer be de facto compliance assets for Phase III of the EU ETS. Installations will have to swap them into EUAs to comply with their obligations, adding another layer of complexity to the process. In addition, only compliance entities will be allowed to swap CERs into EUAs, leaving the financial institutions out of the process and consequently reducing overall liquidity for those assets in the market.

The supply will also be limited. Offsets issued from projects registered after 2012 will only be eligible to be swapped if sourced from a least developed country (LDC). However, limited emissions and major investment barriers will constrain the supply of eligible CERs from LDCs. To illustrate the level of magnitude of those constraints, the number of CERs issued from LDCs is about 16,000,[176] or 0.003 percent of the total 605 million CERs issued to date.[177]

In addition, the ban of offsets from hydrofluorocarbons (HFCs) and adipic acid N_2O projects from Phase III will limit even further the number of CERs eligible for compliance in the EU ETS. A large portion of the CERs currently being issued are from these project types—407 million out of the 605 million CERs issued to date (67 percent). The problem is further compounded because it takes on average about 670 days for project developers to get their projects registered[178] yet there are only 631 days left until December 31, 2012.[179] This strongly diminishes the hope that projects in the early stages of development will be able to get registered in time and generate EU ETS-eligible credits.

Unless additional non-EU demand emerges soon and the supply is boosted by meaningful CDM reforms, project developers will have very little, if any, real incentive to continue investing in new CDM projects. This will eventually lead to the already anticipated movement of resources—capital, capabilities, and personnel—to other markets.

4.1.1 CERs—What Did or Did Not Happen in 2010?

In 2010, the market volume and value of project-based transactions fell by almost 50 percent from the previous year, to reach a total value of approximately $1.5 billion. The two-digit annual decline in the size of the market in the last three consecutive years (12 percent in 2008, 59 percent in 2009, and 46 percent in 2010) led the primary CER (pCER) market to its record low value since the entry into force of the Kyoto Protocol in 2005.

Primary CER transactions, which used to represent a significant portion of the global carbon market in previous years (up to 23 percent of the market in 2005 and 19 percent in 2006), account for barely 1 percent of the global market today.

4.1.1.1 CER Supply and Demand Dynamics –A Smaller Market and a Buyer's Market

Since 2009, sovereign buyers who still had some residual emission reduction obligations, and have historically engaged in origination activities and promoted the project-based primary market, largely shifted their efforts toward the Assigned Amount Units (AAUs) market. This market offers predictable volumes, making it a suitable instrument for

176. Projects in Tanzania, Lao PDR and Bhutan.
177. UNEP Risoe, CDM/JI Pipeline Analysis and Database, May 1, 2011.
178. World Bank, UNEP Risoe, CDM/JI Pipeline Analysis and Database.
179. As of May 1, 2011.

compliance buyers to match and fine-tune demand to "land on the dime," which represents their final Kyoto obligations.

In addition, during 2010 the primary market was further negatively affected as some sovereign buyers increased purchases in the secondary CER (sCER) market, taking advantage of fast transactions, relatively inexpensive and simple contractual processes, and predictable volumes ensured through delivery guarantee.

Demand from the private sector has also considerably reduced, as lower overall GHG emissions led to a surplus of allowances and offsets in the EU ETS. A large number of financial institutions (that is, nonfinancially regulated traders and private banks), intermediaries, and aggregators preferred investing in existing—undervalued—portfolios rather than in new projects, and froze their origination activities. Other buyers either exited the market or were acquired by other firms in the past two to three years, which substantially reduced the primary market's liquidity.

Despite the overall decline in the pCER market and the exits of many participants, the market continues to limp along with mainly private sector buyers looking for cheap opportunities to purchase both pre- and post-2012 CERs. The still active private sector buyers include mainly utilities and financials. Potential aviation compliance buyers have shown an increased interest in precompliance, but this is yet to translate into significant demand.[180] In addition, some demand has come from a few multilaterals and governmental agencies winding up funds close to full subscription.

Utilities continue buying CERs since they are cheaper than EUAs for compliance purposes. Utilities and nonfinancially regulated traders have a cost advantage over private banks because they do not have to comply with the stringent and potentially expensive rules imposed by the Basel Accords.[181] On the other hand, the large commercial banks have continued to develop their portfolios of captive clients because of their strong reputations, attractive and flexible financial packages, and creditworthiness.

The pCER market is a buyer's market with minimal residual demand until 2012. Uncertain eligibility rules and the lack of traction for post-2012 have increased the bargaining power of active buyers. This imbalance has been reflected in Emission Reduction Purchase Agreement (ERPA) terms and conditions.

4.1.1.2 Emission Reduction Purchase Agreements –Tailored to Buyers

As reported last year, project registration prior to December 31, 2012, and EU ETS eligibility became standard clauses in the great majority of ERPAs. In addition, last year buyers involved in both origination and secondary trade reportedly secured even more stringent conditionality and guarantee clauses in their ERPAs. In the case assets prove not eligible at delivery, ERPA prices are reduced to the prevailing prices for these assets in the voluntary market.[182]

Option clauses also have become common in ERPAs. If the offsets transacted are not eligible at time of delivery or at the buyer's sole discretion, contractual purchase obligations may be converted into call options; in this case, the market liquidity is squeezed and no secondary trade occurs (that is, buyers can terminate the contracts without penalties, thus passing the entire delivery risk to the sellers). The results of the World Bank survey confirmed the trends. More than 80 percent of respondents confirmed restrictive clauses in their ERPAs, in addition to registration pre-2012 and eligibility under the EU ETS.

Some increase in the level of activity in the primary market was reported in early 2011. Some buyers, who had their origination activities dramatically reduced in 2009 and frozen in 2010, resumed some investment and sought new projects, motivated by the internal pressure to justify the maintenance of the personnel infrastructure created. It is also interesting to note that, at the same time that the overall uncertainty favors buyers, the few sellers who hold the most desirable pCER assets (that is, clean energy projects in advanced stage of development and projects in LDCs) have obtained favorable ERPA conditions and premium prices.

---

180. The aviation sector is to be included in the EU ETS in 2012. Please refer to Section 2.1 for further details.
181. The Basel Accords set up global regulatory standards on bank capital adequacy and liquidity designed to ensure that banks holds capital reserves appropriate to face the risk exposure in their lending and investment practices, safeguarding their solvency and overall economic stability. http://www.bis.org/press/p101201a.htm Access date 07 April 2011.
182. Some buyers have reported favoring CDM projects with CERs that are also compliant with voluntary standards, such as Gold Standard.

Finally, the lack of demand has also led to further market segmentation and the rise of niche markets that accentuate technology and regional preferences, reflect specific objectives of sellers and buyers, and favor commercial relationships built in previous years. Under this scenario, ERPAs are being tailored to address specific preferences and objectives, substantially increasing the lack of transparency of the primary market—a market that now resembles the earlier days of the Kyoto Protocol, when the level of information was sparse and inconsistent.

4.1.1.3 New Operational Dynamics –Prices and Behavior

Pre-2013

Despite the recovery of sCER prices vis-à-vis the previous year (that is, consistent with other energy related commodities), pCER prices did not follow the same pattern. With lower compliance needs, buyers were more selective and acquired safer assets. For these assets prices remained at the same level as the previous year (2009).

Fixed prices for pre-2013 pCERs averaged €8–10 across most regions and sectors. In cases where variable prices were negotiated, floor or fixed components were in the €7–8 range, while variable components—defined in terms of shared upside between buyers and sellers—commonly reached 90 percent of the spot CER prices, to be determined based on the prevailing price on the largest exchanges at the time of delivery.

Respondents to the World Bank survey who indicated interest in buying CP-1 HFC-23 offsets to be delivered after April 2013 reported prices lower than €6. The information clearly indicates that, since those offsets will no longer be valid for EU installations, governments with obligations under Kyoto become the sole buyers of those assets[183] and value them in the same price range of AAUs, which are equally acceptable Kyoto compliance assets.

Sovereign buyers have also been accessing sCERs from industrial gas projects to be delivered after April 2013 (and before the end of the "true up" period) at the same price range of AAUs, and thus, even cheaper than the prevailing price for EU ETS eligible pCERs for the same delivery dates. The negative spread—sCERs being cheaper than pCERs—between the secondary and the primary market prices in those specific offsets should further encourage sovereign buyers to seek those sources.

Post-2012

Post-2012 prices were reported to be in the €6–8 range, with €7–7.50 being the median prices—almost identical to those reported in 2009. Variable price formulas followed pre-2013 transactions, but discounts on upside sharing were reported to be slightly higher—up to 20 percent of the spot CERs at delivery. The discount on the variable price component increases relative to how high the fixed floor price is agreed upon (i.e., sellers' access to upside prices at delivery is reduced).

These prices are consistent with other publicly available information[184] and with the results of the World Bank survey. About 70 percent of the respondents confirmed either not buying post-2012 offsets or if they were, prices were in the €6–8 range. If a fully variable price were chosen, over 70 percent of respondents indicated prices would be between 60 to 80 percent of spot CERs prices.

In addition to the new contractual developments mentioned in Section 4.1.1.2, several players reported further safety provisions and changes in their modus operandi. The origination arms of private sector financials reported very low incentives to invest in post-2012 offsets because of concerns over the possibility of financial losses. This risk reportedly led shareholders to zero-value offsets to be delivered after 2012. In addition, capital reserve provisions under the Basel rules substantially reduce the return on equity (RoE) in those deals.

183. Although those assets may eventually be eligible to other ETS outside Europe, it is very unlikely that a relevant demand will be created given the precedent provided by the EU.

184. IDEAcarbon's pCER Index confirms our findings and shows that average post-2012 pCER prices varied within the narrow range of €6–8 throughout 2010 and early 2011 (that is, an approximate €1 discount over the pre-2013 pCERs transacted in early stages of development). Similarly, Thomson Reuters Point Carbon confirmed average prices for post-2012 pCERs to range between €7–7.5 in 2010 and early 2011.

Other financials, concerned about reputational risks and future liabilities, have reportedly removed carbon assets and projects from their spectrum of investment alternatives. Moreover, many froze carbon advisory services to both traditional and new clients seeking investment diversification and environmentally friendly investment alternatives. Similarly, some sovereign buyers have reported receiving clear instructions to refrain from any exposure to post-2012 offsets.

Finally, although specific limits in contractual obligations (e.g., maximum prices, volume contracted, length of contracts, and ERPA value) have been commonly used by buyers as a means to matching their budget allocations, corporate buyers reported much more stringent limits for post-2012 transactions. The stringency of those limits increased in ERPAs signed at fixed prices or in projects located in the most industrialized developing countries.

Although a few contracts up to 2020 were reported, buyers strongly preferred to sign ERPAs limited to the end of the project's first crediting period (that is, reducing the risks related to the obligatory renewal of the project's additionality) and early 2015 (that is, the expiration of the "true up" period for governments with obligations under the first commitment period of the Kyoto Protocol), whichever comes first.

Buyers—especially financials—strongly favored variable prices in the ERPAs, capped at the sCER price to limit their financial exposure. Some buyers have reported being allowed to sign fixed-price ERPAs in least developed countries only. In contrast, sellers indicated a preference for fixed-price contracts, at least for the initial years of their contracts. This practice allows them to seek finance or, at least, to forecast the extent of possible future revenue streams. This message was also conveyed by sellers dealing with Programmes of Activities (PoAs), especially when the implementing agency, commonly a financial institution or governmental agency, plays the role of the financier or guarantor of the projects undertaken by the program.

The current buyers' preference for variable prices and the sellers' preference for fixed prices is the opposite of what the market witnessed in 2006–08. In those days, sellers favored variable prices, as they desired potential upside gains and did not perceive any downside risk. During 2006–08, buyers preferred fixed prices to reduce their exposures to price spikes. The current reversal of the 2006–08 trend indicates that the downside risk is perceived as higher now, given the uncertainties in the post-2012 market.

However, the ERPA risk allocation between the parties may be more relevant than pricing. The eligibility and option clauses mentioned previously drain most of the predictability and security of fixed-price contracts (i.e., future flows of resources cannot be ensured until delivery). As a result, in ERPAs incorporating those clauses, front-loading mechanisms such as unsecured advance payments from buyers or commercial loans backed-up by future carbon revenues could not be found. On the other hand, those clauses have also allowed ERPAs to address both buyers' and sellers' concerns and objectives in either pricing approach chosen. Thus, both fixed- and variable-price contracts were observed.

4.1.2 ERUs—What Lies Ahead?

Many of the issues surrounding the development of the JI market are similar to the CDM and relate to the post-2012 uncertainties, but with additional complexities. Unless Parties adopt a COP decision not to do so, JI country governments or legal entities authorized by them might still be able to continue determining projects and verifying Emission Reduction Units (ERUs) unilaterally beyond 2012 under Track 1.

In fact, interested JI Parties may have no incentive to stop ERU issuance for post-2012 vintages. However, it is less clear whether the Joint Implementation Supervisory Committee (JISC) has a mandate to continue its activities under the Track 2 procedure after 2012. In that scenario, it is envisioned that buyers will require strong monitoring and auditing processes in place to ensure environmental integrity.

It is also unclear whether ERUs can be issued for emission reductions that occur after the end of the first commitment period and prior to another. The JISC raised these and other questions in its last annual report,[185] providing recommendations and

185. Annual report of the Joint Implementation Supervisory Committee of the Parties serving as the meeting of the Parties to the Kyoto Protocol, November 16, 2010, UNFCCC.

indicating areas of improvements for the JI process and a possible reorientation of the JISC's program. These recommendations include further improvement of the verification procedure, increasing the number of accredited independent entities, and enhancing the financial stability of the JISC.

In terms of the JI market, JISC recommendations include consolidating the two tracks into one single unified track for JI and allowing the issuance of the emission reductions for existing and new JI projects between January 1, 2013 and either the end of the "true-up" period or the entry into force of new commitments, whichever is sooner, by converting AAUs from the first commitment period.[186]

No significant changes were reported in the JI prices in 2010. As ERUs became tradable on exchange platforms in late 2010,[187] liquidity for those assets increased and consequently, the traditional pricing discount over sCERs reported in previous year diminished in 2010. Still, the much lower volumes of ERUs available in the market (vis-à-vis CER) kept the JI market in the hands of few players. Whereas some participants found JI a very attractive market for offsets in 2010—specifically the possibility to obtain retroactive offsets—other participants reported an unwillingness to accept the counterparty risk involved in ERU deals.

Sberbank, the State Savings Bank of Russia—the entity designated as the authorized entity to manage the selection of potential JI projects in Russia—confirmed the officially recommended price of €10 for the Russian tenders handled in 2010.[188] That price is at the high end of primary market prices, which is justifiable based on the credit-enhancement and (counterpart) risk-mitigation roles played by Sberbank in the process.

Deals have reportedly been signed at prices lower than the government's recommended €10 and more consistent with the prevailing primary market price range. This has resulted in at least one legal dispute between a buyer and seller,[189] and has raised concerns among certain buyers regarding the effectiveness of their ERPAs.[190]

To date, 199 of the 392 visible projects in the JI pipeline are referenced as Track 2 projects (that is, 51 percent of the total) and 28 (14 percent) out of them have been determined. Under Track 1, all 193 visible projects in the pipeline (49 percent of the total) have already been approved by their respective host countries. Russia is currently responsible for 113 visible projects, leaving the former leader, Ukraine, in second place with 70 projects.[191]

Although striking, the latest moves from Russia could not yet be reflected in the number of determined projects or in the volume of issued ERUs. Ukraine remains in the lead with 47 determined projects (versus 4 in Russia) and about 50 percent of the almost 30 million issued ERUs to date, followed by Russia with about a 15 percent share.

4.1.3 AAUs—Responding to the Lack of Demand

AAU prices in 2010 were reported to have substantially dropped from the €8–10 seen in 2009 to the €5–7 level as carbon buyers became less active. It was

186. "The JISC is of the view that the two-track approach to JI, as it is currently applied, is not sustainable and is hindering the success of the overall JI mechanism in a number of ways." Paragraph 125, page 41 of the JISC Annual report cited above.
187. On November 8, 2010, the Intercontinental Exchange (ICE) ECX announced the first cleared trade of EURs. The ERUs were traded at €12.20, a €0.06 discount over the equivalent CERs. About a month later, and after two piloting auctions in earlier months, Bluenext also introduced ERUs in the list of assets tradable in their platform.
188. In July 2010, the Ministry of Economic Development (MED) of Russia approved the results of the first Russian JI tender, managed by Sberbank. In the tender, 15 JI projects, which could earn up to 30 million ERUs, have been approved. A second tender was announced few months later with a deadline for applications in October 2010. In the second tender, 18 projects generating up to 29 million tons were granted with LoA. Ten of 18 projects have applied for LoA for the second time. A third JI project tender was announced by the Russian government and it is expected by mid-March 2011. Like the previous two, the third tender would likely be assigned a cap of 30 million ERUs. Source: Point Carbon communication to the authors.
189. The Arbitration Court of Perm turned down a claim from Halopolymer, which was seeking to breach a contract to sell ERUs to Natsource at €9, €1 below the government's "recommended" price, according to a document on the court Web site. Source: Point Carbon, Carbon Market Daily, April 20, 2011.
190. In a government newsletter, the Danish Energy Agency said it was withdrawing from investing in Russian emission reduction projects due to regulatory uncertainty and concerns it will be forced to pay at least €10 per offset credit, as the state-owned Sberbank refused to give guarantees that the offset credits it was seeking would be issued. Source: Point Carbon, CDM&JI Monitor, April 13, 2011.
191. http://www.cdmpipeline.org/publications/JiPipeline.xlsx Access date 1 March 2011.

noticed that private Japanese carbon buyers, such as utility companies, have kept their focus on AAUs due to the predictability of those assets. However, instead of pursuing those though direct purchases as in previous years, they started bidding for AAUs via brokers, such as Japanese trading houses.

The UNFCCC negotiation proposals spearheaded by the European Commission to ban or limit banking first commitment period AAUs under any new international agreement (or possibly as an arrangement internal to the EU) provided an incentive for countries to try and sell more AAUs during the first commitment period. This essentially turned the market into a buyer's market and suppressed AAU prices further.

More AAU sellers have entered the market but their behaviors have varied. For example, Latvia, which was one of the front-runners of the Green Investment Schemes (GIS), has opted to stop offering AAU sales because of the currently low AAU prices, while other countries, such as Estonia, the Czech Republic, and Poland, have actively sought to sell their AAUs, mainly to Japanese private firms. Countries such as Lithuania, Bulgaria, and those that had difficulties in the implementation of the GIS before, such as Ukraine and Slovakia, started preparations for new GIS transactions.

Although the number of AAU purchase agreements signed in 2010 grew compared to 2009, the volume of AAUs sold dropped, having spiked in 2009 because of the large GIS transaction in the Czech Republic and Ukraine. Seller countries have been requested to demonstrate the accountability and transparency of the AAU transaction via their GISs to attract AAU buyers. It should be noted that Russia, potentially the largest seller of AAUs, has not been able to enter the market, as the regulatory framework could not be prepared.

Japan kept its absolute dominant position among AAU buyers, although with smaller amounts. As Annex 1 countries get close to fully complying with their Kyoto obligations, governments reduce the pace of their purchases, and trading opportunities for private sector players decline in tandem. Still, the rapid decline in AAU prices resulted in a large spread between those assets and more expensive CERs, opening profitable swap opportunities for private sector Japanese firms. The reported issues regarding the misuse of AAU proceeds from Ukraine may have led the country to lose its position as leading seller in 2010. Estonia, with about 50 percent of market share, became the preferred source for AAU buyers in 2010, followed by Czech Republic and Poland.

> "GIS operations could, therefore, serve as additional testing ground for management, implementation, monitoring, and verification procedures for mitigation programs, similar to the ones foreseen under the PoA rules and procedures."

The last ten years have shown that the Kyoto flexibility mechanisms are often cumbersome. As a result, GIS operations typically bundle many subprojects coordinated by a single management entity and monitor and verify results on a sample basis.

These elements are similar to those that PoAs have to address. Although it is too early to draw conclusions, GIS operations could, therefore, serve as additional testing ground for management, implementation, monitoring, and verification procedures for mitigation programs, similar to the ones foreseen under the PoA rules and procedures.

In many cases, GIS operations also focus on proper and transparent financial management of the program, which is also important to consider in PoAs. Similarly, some elements of the GIS could be useful in planning and implementing Nationally Appropriate Mitigation Actions (NAMAs) in developing countries or provide insight into the development of new market-based instruments.

4.2 VOLUNTARY MARKETS

The voluntary markets remain a small, but important component of the overall carbon market. Voluntary action by environmentally conscious individuals and organizations continues to send an important message on the need for action. This message has been expressed through the rapid growth of the Voluntary markets (see Box 5).

BOX 5. Voluntary Markets

2010 was a record year for activity in the voluntary carbon markets (VCM). While the volumes in the VCM remain miniscule, less than 0.3 percent of the global carbon markets, overall transaction volumes increased 28 percent between 2009 and 2010 (see Table 11). The global economic crisis that dampened demand for voluntary climate action in 2009 gave way to market growth as buyers sought credits from projects that reduce emissions from deforestation and forest degradation (REDD).

The meteoric rise of REDD's market share (+500% from 2009)* can be attributed to formal international recognition for REDD and conservation-based REDD+ as critical for climate change mitigation as well as likely pre-compliance interest in the project type under California's emerging cap-and-trade program.

At the same time, REDD gained market standing on the platform of the first REDD project methodologies approved for use by the Verified Carbon Standard (VCS) and through forest-focused third-party standards like Brasil Mata Viva (BMV).

Not all project types witnessed such growth. Transactions of methane-based credits—which was the most popular project category in 2009—fell dramatically in 2010 as hope for national pre-compliance credits' value waned with failed US federal climate legislation.

However, the US maintained a slight lead (<1 $MtCO_2e$) over Latin America as the top project location due to landfill methane and the growing popularity of improved forest management (IFM) projects and the destruction of ozone depleting substances (ODS) under the Climate Action Reserve (CAR).

A huge shift in the marketplace was the demise of the CCX cap-and-trade program. Shortly after acquiring CCX operator Climate Exchange, IntercontinentalExchange (ICE) announced that CCX's severely over-allocated voluntary cap-and-trade program would conclude at the end of the program's Phase II in December 2010. In lieu of exchange trading, ICE will continue to operate the CCX program's project protocols and registry system in 2011–12.

Parallel to the collapse of exchange-traded volumes and prices, however, sellers began trading CCX credits off-exchange (bilaterally) to obtain higher prices. One such bilateral trade rocked the voluntary market in 2010, transacting 59 $MtCO_2e$ at \$0.02/tCO_2e. Even excluding this trade, CCX ranked among the top third-party standards in 2010—with some retailers packaging the low-priced credits (average \$0.2/tCO_2e) along with non-CO_2 environmental assets to obtain higher retail prices.

The voluntary markets have always seen a mix of "pure voluntary" offsetting and pre-compliance motivations. Last year, suppliers reported that the bulk of transactions, around 70 percent, were driven by purely voluntary intentions. A resurgence in value among purely voluntary standards like the Gold Standard (up 56% to \$55 million) and continued interest in "act local" project types like bike shares and composting illustrate ways the market continues to adapt (and grow) around its traditional customer base.

Table 11. Voluntary Market Prices and Volumes

	Average price ($/$tCO_2e$)		Volume ($MtCO_2e$)		Value (million $)	
	2009	2010	2009	2010	2009	2010
Chicago Climate Exchange (CFIs)	1.2	0.1	41.4	1.6	49.8	0.2
Voluntary over-the-counter market	6.5	5.8	55.4	125	357.8	393.5
Of which VCS	4.7	5.2	16.4	26.1	76.8	134.8
Of which CAR	7	5.8	14.6	13.4	101.9	78.2
Of which Gold Standard	11.1	11.4	3.2	4.8	35.2	54.7
Of which CCX bilateral	0.8	0.2	5.5	61.4	4.3	1.4

Source: Ecosystem Marketplace and Bloomberg New Energy Finance NOTE: preliminary findings, dated April 2010

*Survey respondents transacted 16.7 $MtCO_2e$ REDD offset credits in 2010, up from 2.8 $MtCO_2e$ in 2009.

Kindly provided by Hamilton et al from Ecosystem Market Place and Bloomberg New Energy Finance.

4.3 MOBILIZING LOW-CARBON INVESTMENT—BEYOND CARBON REVENUE STREAMS

The CDM has been an important catalyst of low-carbon investment in developing countries. By enhancing the overall financial viability of low-carbon projects in low-income countries, it leveraged other resources and catalyzed the shift of much larger amounts of (essentially private) financial and investment flows toward climate-smart development.

However, as we approach 2012, the prospect of revenues from the CDM shrinks, and CDM currently makes little difference in accessing financing. Because of the deep uncertainty surrounding the regulatory frameworks for mitigating GHG emissions post-2012, and the continued evolution of methodologies and other crediting rules, banks are unwilling to consider future flows from CERs in debt sizing.[192]

It is well known that developing countries face large investment barriers—the lower income countries in particular. Mobilizing low-carbon investment in emerging markets can be challenging. Investors in these countries typically face small-market size, weak business environments, high levels of perceived risk, relatively low competitiveness, and incomplete capital markets, so that sponsors are unable to secure debt with sufficient maturities to cover the higher up-front cost of low-carbon investment. These constraints are especially relevant in LDCs where European carbon markets are now looking to source post-2012 CERs.

This situation is further complicated by the fact that carbon offsets are normally paid upon delivery, only after the underlying project has been built and has become operational. This reduces the capacity of carbon offsets to meet capital investment needs. In addition, the very low incremental revenue streams provided by carbon offsets in many clean energy technologies—particularly in renewable energy projects—have limited the transformational impact of CDM. In many sectors, revenues from carbon credits have simply not been able to overcome the sectoral and regional investment barriers faced by many underlying projects.[193]

Lenders that had in earlier years been willing to account for prospective CDM cash flows in debt sizing are no longer willing to do so, given the fact that buyers typically do not take CER eligibility risk anymore. Moreover, on the supply side, as the post-2012 market refocuses towards LDCs, the potential projects and sponsors are considered less strong and less creditworthy. As a result, some market participants report that their CDM origination efforts are winding down. On the bright side, some market participants report increasing interest in the forestry sector, with financing potentially driven by voluntary carbon deals.

The relative decline in the importance of CDM has refocused attention on the value of additional revenues from carbon finance that enhances the overall financial viability of low-carbon projects. As performance-based payments, these revenues create a positive incentive for good management and operational practices that will sustain emission reductions over time.[194]

As the global credit crisis eased during 2010, low-carbon finance and investment recovered, growing by 30 percent to $243 billion.[195] Clean energy investment in the Asian region increased 33 percent to $82.8 billon. This is partly because of the rapid growth of private investment in China's clean energy sector, which increased by 39 percent to $54.4 billion. Many other developing countries fared less well: Brazil only achieved $7.6 billion and India $4.0 billion. Argentina ($743 million) and Mexico ($2.3 billion) were the fastest-growing markets, at 568 percent and 273 percent, respectively.

Climate financing is a priority area for the six major multilateral development banks (MDBs),[196] which are increasingly integrating climate into their support to client countries. The MDBs' country

192. UNEP 2009. Catalysing low-carbon growth in developing economies. http://www.unep.org/PDF/PressReleases/Public_financing_mechanisms_report.pdf Access date 08 April 2011.
193. Kossoy, A. 2010. "Managing Expectations," Trading Carbon, February 2010, Thomson Reuters Point Carbon.
194. Bosi, M. et al. 2010. "10 Years of Experience in Carbon Finance." Carbon Finance Unit, World Bank. http://siteresources.worldbank.org/INTCARBONFINANCE/Resources/10YearsofExperienceinCF_Exec_Summary.pdf Access date 29 April 2011.
195. The Pew Charitable Trusts. 2011. "Who's Winning the Global Clean Energy Race." http://www.pewenvironment.org/news-room/press-releases/global-clean-energy-investment-reached-record-243-billion-in-2010-329326 Access date 02 April 2011.
196. This discussion focuses on the five major MDBs collaborating on the CIFs: African Development Bank (AfDB), Asian Development Bank (ADB), European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB), Inter-American Development Bank (IADB), and the World Bank Group (WBG).

assistance strategies—jointly developed with client governments and other key stakeholders—increasingly address climate issues.MDB support has historically taken the form of investment funding, risk mitigation, and technical assistance (providing capacity-building and other policy, regulatory and institutional advice). In the past decade the MDBs have increasingly tailored specific instruments aimed at reducing barriers to low-carbon investment, including climate-specific funding instruments, risk mitigation instruments, and carbon funds and facilities.MDB funding for mitigation activities has risen from $5.4 billion in 2006 to $17 billion in 2009. This growth trend is expected to continue, with indicative financing of $20 billion in 2012.[197]

An important driver of the growth in MDB climate financing has been the Climate Investment Funds (CIF), which provide new and additional financing through the MDBs to support mitigation and adaptation at a significant scale. To date, donors have pledged $6.4 billion to the CIF, which is piloting efforts in 45 client countries. The CIF comprises two funds: the Clean Technology Fund (CTF) and the Strategic Climate Fund (SCF).[198] Further, several of the MDBs have developed specific initiatives targeting sustainable energy, which enables them to combine carbon finance—notably, purchasing post-2012 CERs—with underlying project finance:

- Asian Development Bank (ADB) Carbon Market Program[199]
- European Bank for Reconstruction and Development (EBRD) Sustainable Energy Initiative (SEI),[200] EBRD Post-2012 Fund, and EBRD Multilateral Carbon Credit Fund (MCCF)[201]
- European Investment Bank (EIB) Post 2012 Carbon Credit Fund[202]
- Inter-American Development Bank (IDB) Sustainable Energy and Climate Change Initiative (SECCI)[203]
- International Finance Corporation (IFC) Post-2012 Carbon Facility[204]
- World Bank Carbon Partnership Facility (CPF)[205]

Grant support has historically been channeled through donor-financed facilities, notably the Global Environment Facility (GEF), a range of bilateral funds, and the MDBs' own budgets.

Responding to growing interest from fixed-income investors looking to support climate activities with their investments, MDBs have issued "green bonds," which raise funding earmarked to low-carbon activities in client countries.[206] This builds on earlier experience with climate-themed bonds, such as the CER-linked "COOL" bonds[207] (a total of $31.5 million was raised through two bonds with coupons

197. United Nations High-Level Advisory Group on Climate Change Financing. Work Stream 4: Contributions from International Financial Institutions. http://www.un.org/wcm/content/site/climatechange/pages/financeadvisorygroup/pid/13300 Access date 08 April 2011.
198. Under the SCF, there are three targeted programs with total pledges of $1.8 billion in funding. The Forest Investment Program (FIP) is supporting REDD+ activities in eight pilot countries). The Scaling Up Renewable Energy Program in Low Income Countries (SREP) is supporting grid- and off-grid electricity, including renewable generation and the transmission and distribution grids needed to connect them, as well as household energy. A third SCF program, the Pilot Program for Climate Resilience (PPCR), is developing strategic investment programs supporting climate resilience. http://www.climateinvestmentfunds.org/cif/ Access date 08 April 2011.
199. The Asian Development Bank (ADB) carbon market program supports CDM projects through two carbon funds (the Asia Pacific Carbon Fund and Future Carbon Fund), a technical support facility, and a credit marketing facility. http://www.adb.org/Clean-Energy/CEFPF.asp Access date 5 April 2011.
200. http://www.ebrd.com/pages/homepage.shtml Access date 08 April 2011.
201. The Multilateral Carbon Credit Fund (MCCF) is a post-2012 fund jointly developed by the EBRD and EIB. http://www.ebrd.com/pages/sector/energyefficiency/sei/carbon/markets.shtml Access date 5 April 2011.
202. The Post 2012 Carbon Credit Fund focuses exclusively on purchasing CERs and ERUs generated after 2012, potentially up to 2020, with funding from the European Investment Bank, Caisse des Dépôts, Instituto de Crédito Oficial, KfW Bankengruppe, and Nordic Investment Bank. http://www.eib.org/projects/publications/post-2012-carbon-credit-fund.htm Access date 5 April 2011.
203. http://www.iadb.org/en/topics/climate-change/secci,1449.html Access date 27 April 2011.
204. IFC launched a Post-2012 Carbon Facility in February 2011 to forward purchase CERs from projects either directly financed by IFC or by local banks financed by IFC.
205. http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTCARBONFINANCE/0,,contentMDK:21871259~menuPK:5216275~pagePK:64168445~piPK:64168309~theSitePK:4125853,00.html.
206. Since the inaugural issue issued in 2008, the World Bank has raised about $2.3 billion via 39 World Bank Green Bonds issued in 15 currencies. http://treasury.worldbank.org/cmd/htm/WorldBankGreenBonds.html. Other MDBs, such as IFC, have also issued similar green bonds in 2010. For example IFC's four-year, fixed-rate bond raised $200 million. http://www.ifc.org/ifcext/media.nsf/Content/IFCGreenBond Access date 08 April 2011.
207. Cool Bonds are five-year AAA notes issued by the International Bank for Reconstruction and Development (IBRD) and linked to Certified Emission Reductions (CERs) set up under the Kyoto Protocol. http://siteresources.worldbank.org/CFPEXT/Resources/IF-for-Development-Solutions.pdf Access date 5 April 2011.

tied to CERs generated by specified GHG-reducing projects in China and Malaysia) and "Eco Notes"[208] linked to special equity indices that support clean energy or other eco-friendly sectors (approximately $390 million was raised through three euro-denoinated transactions). However, funds raised with the "COOL" bonds and "Eco Notes" were not earmarked for specific purposes.

The Green Climate Fund (see Section 1.2) and the expansion of green lending through international financial institutions are important developments that will provide additional financial support for developing countries.

Looking forward, long-term carbon price signals are fundamental to deploy the currently not viable low-carbon technologies, as well as to develop new low-carbon technologies necessary to support the technological transformation to a low-carbon society. The low-carbon transition will be achieved through an appropriate mix of policy measures (such as domestic/national budget allocations), concessional finance, and overseas development assistance (ODA). Nonetheless, private sector resources and investments will be needed at a much larger scale than is available today in order to tackle the enormous infrastructure transformation that is required.

4.4 NEW ASSET CLASSES COMING TO THE MARKET

Many of the emission reduction opportunities are beyond CDM, notably in the REDD+ space. They do not have clear methodologies and are in sectors that may not be amenable to conventional financing. Organizing, financing, and implementing carbon projects in such sectors as low-tillage agriculture and sustainable land management will require developing new organizational and financing models. The following is a brief discussion of new developments in forest (REDD and REDD+), agriculture, and soils.

4.4.1 REDD and REDD+

A significant development was achieved at the Cancun Conference (COP 16). For the first time, the importance of stemming the loss of tropical forests for mitigating global climate change with financial support from the industrialized world was enshrined in an international agreement. The Kyoto Protocol's Clean Development Mechanism has only allowed incentive payments to be made for afforestation and reforestation in developing countries, and only at the level of projects. With COP 16 decision, entire jurisdictions (including countries themselves) could receive incentives, subject to verification that emissions have been reduced against a reference level.[209]

All developing country activities referred to as "REDD+" are now eligible for financial support. They are as follows:

- reducing emissions from deforestation (actions to diverge from the reference level by reducing the conversion of forest to nonforest);
- reducing emissions from forest degradation (diverging from the reference level by reducing the gradual loss of biomass because of activities under the canopy);
- conservation (continued good stewardship of forests);
- sustainable management of forests (reducing emissions through harvesting activities with lower impact); and
- enhancement of forest carbon stocks (enhanced sequestration, for example, through reforestation).

REDD+ activities will have to support and promote safeguards. In particular, the knowledge and rights of indigenous peoples and local communities must be respected. Indigenous peoples and local communities must be able to participate fully and effectively. In addition, the national forest governance structures must be transparent and effective, taking into account national legislation and sovereignty. REDD+ must not encourage the conversion of natural forests to plantations.

208. http://treasury.worldbank.org/ Access date 08 April 2011.
209. Cancun Decision (Ad Hoc Working Group on Long-term Cooperative Action): http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_lca.pdf, Sections III.C, and Annexes I and II. Access date 09 April 2011.

Emissions from forests will now have to be accounted at the national level, possibly starting at the subnational level as an interim measure. However, the principles or objectives of the Cancun decision will still need to be operationalized. The Subsidiary Body on Scientific and Technological Advice (SBSTA) is expected to develop modalities on the setting of Reference Emission Levels and the design of measurement, reporting, and verification systems (MRV) and to propose guidance on the establishment of information systems by developing countries to report on safeguards.

Even though the magnitude of finances required for REDD+ calls for the involvement of the private sector, the role of markets in mobilizing funding for REDD+ still needs to be discussed under the UNFCCC. It is clearly agreed that Phase l (national strategies and capacity building) and Phase ll (implementation of strategies and investment in demonstration activities) will be financed through additional public bilateral or existing multilateral assistance, such as under Norway's International Climate and Forest Initiative, the Forest Carbon Partnership Facility (FCPF), the REDD+ Partnership, or the UN-REDD Programme. What is left open is the type of support that should be provided for Phase lll (development of result-based activities that are fully measured, reported, and verified). The Ad Hoc Working Group on Long-term Cooperative Action (AWG-LCA) was mandated to explore options and will report to the Durban Conference (COP 17). It is likely that multiple channels will be proposed, recognizing the role of the private sector, including through carbon markets, in addition to government assistance.

4.4.1.1 California–REDD+ Offset Potential

The UNFCCC is not the only potential source of market creation for REDD+. The most advanced regulatory framework that could create demand for REDD+ is California's cap-and-trade system, which is expected to become operational on January 1, 2012. The system, which will be linked to other regional schemes within the United States and Canada, will allow offsets equal to 8 percent of total volume.

The most favored source of international offsets is REDD+. The eligibility criteria for REDD+ offsets to enter the California system (such as baseline, social, and environmental safeguards) are still to be defined, but it is likely that preference will be given to offsets produced by states that have signed memoranda of understanding with California (so far, Acre from Brazil and Chiapas from Mexico).

4.4.1.2 Voluntary Forestry Offsets

In the voluntary markets, a number of smaller REDD+ projects are being developed by private and public entities. Several standards are being applied, with the Verified Carbon Standard (VCS) becoming the main one. In Indonesia alone, more than 100 projects of different scales are under preparation.

In February 2011, the Kasigau Corridor REDD project in Kenya, developed by Wildlife Works, issued the first REDD carbon offsets under the VCS. The project issued 1.16 million offsets for the initial six-year monitoring period of its 30-year project life, representing 80 percent of the total 1.45 million tons of GHG emissions avoided during the period. The project deposited 290,066 "buffer credits"—or 20 percent of the net GHG benefit—to the VCS pooled buffer account, where they will be held to insure against the potential loss of offsets across all projects in the VCS AFOLU portfolio.

Prior to this issuance, Wildlife Works had successfully developed its own REDD+ methodology and had it approved by the VCS Program. Pursuant to a financing agreement between BNP Paribas and Wildlife Works, BNP Paribas has the option to purchase 1.25 million tons of these emission reductions over five years.

Going forward, a key challenge for the REDD+ projects and subnational programs will be to integrate them into the emerging national systems (in particular MRV), reference emission levels, and strategies. The integration of this increasing number of projects will demand two things: (1) high management capacity on the part of national governments and (2) an open and transparent approach in the way data and payments are handled to ensure that the system is credible and guarantee that local actors, including indigenous peoples and local communities, are appropriately involved. It is expected that the Carbon Fund of the Forest Carbon Partnership Facility (FCPF) will produce useful experience in this area.

4.4.2 Sustainable Land Management—Agricultural Soil Carbon

With nearly two times as much carbon in soil than in the atmosphere, small changes in the level of carbon in soils can drive large changes in atmospheric carbon concentrations. Sustainable land management projects that increase the carbon content of soils represent a "triple win" for society: development, climate change resilience, and climate change mitigation.

Healthy and fertile croplands increase the productivity of farms and the incomes of farming communities. In addition, cropland management techniques promote resilience to variations in climate, encouraging stability and food security. Finally, the sequestration of carbon in soils is a viable and quantifiable way to reduce atmospheric carbon. The sequestration of carbon in soils is currently a neglected part of the climate solution, yet it is important for mitigation, adaptation, and rural communities.

In 2010, a groundbreaking project in Kenya brought the potential for carbon sequestration in soils to the forefront of carbon finance. The Kenya Agricultural Carbon Project is the first project in Africa that sells carbon offsets from a sustainable land management project, improving the livelihoods of rural communities while tackling climate change.

Implemented by the Swedish NGO Vi Agroforestry, the project is located on over 40,000 hectares in the Nyanza Province and Western Province of Kenya. Smallholders and small-scale business entrepreneurs are trained in diverse cropland management techniques, including cover crops, crop rotation, compost management, and agroforestry. The farming practices both increase the yield of the land and sequester carbon in the soil.

The project is developing the Sustainable Agriculture Land Management Methodology under the VCS. The first validation was finalized in November 2010 by Scientific Certification Systems. The project is currently undergoing the second validation. The BioCarbon Fund is leading the methodological work, together with Vi Agroforestry. It will purchase 150,000 emission reductions up to 2016.

4.5 CONCLUSIONS

Long-term carbon price signals are fundamental for the deployment of the currently not viable low-carbon technologies, as well as for the development of new low-carbon technologies necessary to support transformation at scale. Well-developed policies and regulations, concessional finance, and ODA funding are all necessary in the overall climate finance package. However, harnessing private sector capital is vital for the transformation to a low-carbon society. Despite all uncertainties in the future market, the development of assets, including new categories, continues, thus confirming the belief that market instruments are still considered as an efficient way to mobilize private capital for financing climate action.

SECTION 5

Outlook - Demand and Supply Balance

DESPITE SIGNS OF ECONOMIC RECOVERY and rising emissions the demand outlook remains slim in the period to 2012. It is anticipated that buyers will mostly meet their needs through purchases of Assigned Amount Units (AAUs) and secondary Certified Emission Reductions (sCERs) (further details in Section 5.1). Beyond 2012 the outlook for the carbon market is complex and depends on the likely commitment of major emitters and the mechanisms adopted at the domestic and international levels to achieve these commitments. Therefore, the scenarios used in Section 5.2 have been developed from the market sentiment (Section 1.4) and specific country and regional initiatives (Section 2). There is a great deal of uncertainty associated with forecasting demand, as much depends on uncertain future frameworks for emission reductions.

5.1 DEMAND AND SUPPLY BALANCE THROUGH TO 2012

The following sections investigate demand for Kyoto assets, including demand from governments and private sector entities,[210] as well as supply under the three Kyoto Mechanisms. Residual demand for Kyoto assets continues to shrink, currently estimated at 136 $MtCO_2e$, virtually all from European governments. This is a 41 percent decrease from last year's estimate.

5.1.1 Sovereign Demand

Demand estimates for Kyoto assets from Annex B governments remain virtually unchanged over 2010. Sovereign gross demand for Kyoto assets is currently estimated at around 437 $MtCO_2e$ through 2012, with EU-15 accounting for 72 percent of the total, Japan 23 percent of the total, and all other Annex B governments 5 percent (Table 12).

> "Beyond 2012 the outlook for the carbon market is complex and depends on the likely commitment of major emitters and the mechanisms adopted at the domestic and international levels to achieve these commitments."

210. Those are entities covered by existing or anticipated domestic climate regulation, like the EU ETS or the NZ ETS, or participants to sectoral agreements, like the Keidanren Voluntary Action Plan in Japan. For the vast majority, they belong to the private sector; however, some public installations (like hospitals under the EU ETS) are also regulated.

Table 12. Supply and Demand in Perspective–Kyoto Market Balance, 2008–12

Potential Demand from Industrialized Countries ($MtCO_2e$)		Potential Supplies ($MtCO_2e$)		
Country or entity	Kyoto assets demand	Official target*		
EU	**1,065**	**Potential GIS**	**>1,500**	
Government (EU-15)	315	Ukraine	500–700	
Private sector (EU ETS)	750	Russian Federation	200	
		Czech Republic	120	
		Other EU-10	600	
Japan	**300**			
Government of Japan	100			
Japanese private sector	200			
Rest of Annex B	**27**	**CDM & JI**	**1,366**	**range: 1,238–1,487**
Government	22	CDM	1,152	1,024–1,287
Private sector	5	JI	214	200–250
TOTAL	**1,392**			
Government	437			
Private Sector	955			

*: These numbers correspond to the amounts of AAUs governments intend to sell. They are much lower than the whole amount of excess AAUs, now estimated at more than 10 billion tCO_2e over the first commitment period, with Russia accounting for half, Ukraine one-quarter, and Poland one-fifth.

Updated emissions projections that reflect the global economic downturn and recovery show that the EU-15, and the EU as a whole, continue to expect to collectively meet and overachieve their collective Kyoto target with current policies and measures in place.[211] However, it cannot be assumed that overachievement of the collective target will allow certain Member States to cover shortfalls from other Member States. Therefore some EU-15 members plan to use the Kyoto Protocol Flexibility Mechanisms to ensure that their individual Kyoto targets are met. As a result, demand for Kyoto assets could fall in the range of **300–330 $MtCO_2e$**, compared to the 465 $MtCO_2e$ initially estimated. So far about 270 million CERs and ERUs (nominal) as well as 54 million AAUs have been purchased.

Carbon markets are struggling to understand the implications of the deadly earthquake and tsunami that struck Japan's northeast, followed by the nuclear accident at the Fukushima nuclear complex. This natural disaster may lead Japan to use more carbon-intensive fossil fuels to compensate for the loss of nuclear capacity. As a result, it is expected that carbon- and energy-intensive reconstruction activities will increase the carbon-intensity of output in Japan, though this increase will likely be offset by subdued economic growth over the coming months.

Safety concerns around the globe may also result in a substantial reduction in nuclear power generation, increasing carbon emissions in other countries[212]and leaving analysts still to agree on the long-term consequences on the carbon markets from Japan's disasters. In this context, gross demand for Kyoto assets from the government of Japan is maintained at **100 $MtCO_2e$**, its initial public procurement goal. Over 2010, Japan purchased 4 $MtCO_2e$ of AAUs, bringing total acquisitions to 97.8 $MtCO_2e$ since the commencement of the buying program in 2006.[213]

211. "[W]ith the current policies and measures in place, average EU-15 GHG emissions over the full commitment period 2008–12 could reach a level of 10.4 percent below base-year levels." See European Environment Agency (2010). *Tracking progress towards Kyoto and 2020 targets in Europe*, p. 31.
212. On March 15, 2011, Germany decided to temporarily shut down 7 of its 17 nuclear power plants while a safety review is conducted. Their permanent phase-out could increase ETS emissions in the country by at least 250 Mt over 2011–20. The complete shutdown of all reactors could push emissions by 370Mt over the same period. Source: Deutsche Bank. "German Nuclear Policy: Debate Wide Open Again." *Carbon Emissions*, March 15, 2011.
213. As per http://www.meti.go.jp/english/press/2011/0401_06.html Access date 18 April 2011.

Gross demand from other Annex B governments could amount to **22 $MtCO_2e$**, mainly through Norway and Switzerland acquisition programs, of which a substantial part has been completed to date, possibly 25 $MtCO_2e$ for Norway (Nominal)[214] and nearing the 12 $MtCO_2e$ purchasing target for Switzerland (Nominal).[215] Australia and New Zealand continue to expect to meet their Kyoto obligations through domestic policy measures and carbon sinks.[216]

5.1.2 Private Sector Demand

Gross demand from private entities has been revised up 28 percent from last year, to **955 $MtCO_2e$**, with demand in the EU ETS accounting for 79 percent of the total. The main reason for this increase is the preferential surrender of CERs and ERUs (instead of EUAs) by EU ETS operators in response to the EC's qualitative restrictions on the eligibility of offsets in Phase III.

Analysts expect the EU ETS to be long over Phase II, with an overall surplus of about 1,280 $MtCO_2e$ to be banked, in the form of allowances, including remaining reserves and set-asides, and unused offsets.[217] It is also expected that some installations—primarily utilities and airlines, which enter the scheme in 2012—will be short. The power sector shows the largest compliance shortfall of all ETS-covered sectors, being short against free allowances by approximately 500 $MtCO_2e$ cumulative since 2008.[218]

Additional demand could come from generators that start to hedge their future exposure in Phase III as a result of tighter caps and increased auctioning. Depending on the schedule of anticipated sales or auctions of Phase III allowances, this hedging behavior is expected to induce some volatility in the EU ETS market during the transition from Phase II to Phase III. Changes in the generation mix, brought by shifts in Germany's nuclear energy policy or overheating in global energy prices for instance, could further push compliance demand from power sector installations. Airlines will face auctioning in their first year under the EU ETS, leading to an expected shortfall of about 50 $MtCO_2e$ against free allowances in 2012, to be filled by CERs and ERUs (up to 32 $MtCO_2e$), or Aviation EU Allowances (See Section 2.1).

So far EU ETS participants have contracted approximately 1.6 billion CERs and ERUs (nominal) with CERs from HFC and adipic acid projects amounting to about 25 percent of volumes. Due to the ban of CERs from HFC and adipic acid projects in Phase III, installations are likely to surrender offsets over and above their compliance shortfall and bank surplus allowances instead. In this context, estimates of CDM and JI use over Phase II average **750 $MtCO_2e$**, of which compliance needs may represent only a fraction.

Private sector companies in Japan have reportedly contracted more than 400 $MtCO_2e$ in CERs, ERUs, and AAUs that can be surrendered under the Keidanren Voluntary Action Plan, which should amply cover their estimated needs of **200 $MtCO_2e$**. There are estimates that the prolonged outage of nuclear capacity in Japan could create an additional demand of 60–70 $MtCO_2e$.[219] It remains to be seen, given the circumstances, to what extent private companies would be required to cover the gap or whether *force majeure* would be invoked.

Exploratory demand from installations covered under the NZ ETS,[220] the Swiss ETS and other initiatives under development such as California or

---

214. Norway is likely to meet its Kyoto target (+1 percent) solely through domestic policy and measures. The demand for KMs stems from its long-term commitment to carbon neutrality, including an overachievement of its Kyoto target by 10 percent.
215. This includes an extra 2 $MtCO_2e$ to account for delivery risk. All in all, around 7 million CERs and ERUs only (from 10 initially planned) could be required to bridge the Kyoto gap in Switzerland, factoring in policies and measures as well as carbon sinks.
216. See Department of Climate Change and Energy Efficiency (2010). *Australia's emissions projections*, and New Zealand's net position under the Kyoto Protocol (updated March 17, 2011) at http://www.mfe.govt.nz/issues/climate/greenhouse-gas-emissions/net-position/index.html Access date 18 April 2011.
217. Barclays Capital. *Monthly Carbon Standard*, April 11, 2011: long position over Phase II: 470 $MtCO_2e$, use of CERs and ERUs over Phase II: 700–900 $MtCO_2e$; Société Générale. *Carbon Specials*, April 7, 2011: long position over Phase II: 520 $MtCO_2e$, use of CERs and ERUs over Phase II: 780 $MtCO_2e$.
218. Based on verified emissions data for 2008 and 2009 and preliminary emissions data for 2010.
219. Barclays Capital. *Monthly Carbon Standard*, April 11, 2011: 60 $MtCO_2e$; Deutsche Bank. "Japan's Quake & The Implications for Commodities." *Commodities Special Report*, March 14, 2011: 70 $MtCO_2e$.
220. Though a significant number of participants expect to be short under the NZ-ETS (41 percent following Point Carbon (2011). *Carbon 2011)*, being in compliance should not be that much of an issue given the transitionary measures and the expected abundant supply of New Zealand Units, likely to be nearly double the domestic demand for units between 2008 and 2012. See *New Zealand Emissions Trading Scheme Review 2011*, op. cit., p. 17.

Australia, might be in excess of **5 $MtCO_2e$** depending on price levels and rules beyond 2012.

5.1.3 Supply Through to 2012

About **1,150 million CERs** are expected be issued pre-2013,[221] of which slightly more than half should be issued to HFC and adipic acid projects. Supply projections are up 12 percent on average since last year, reflecting both improved timelines for registration (most notably through Cancun's decision on start of the crediting period) as well as uninterrupted growth in the pipeline of CDM projects. At the same time, lead time to issuance continues to be a significant risk to pre-2013 supply. Potential bottlenecks and delays are possible as project developers rush to have verification processed on time for delivery of CERs valid for compliance with EU ETS Phase II obligations.

First, the COP/MOP decision in Cancun to move forward the starting date of the crediting period[222] has the potential to add three to six months worth of CERs (or the average time from request of registration to effective registration) to a project expected deliveries. Second, over the past 15 months (Jan. 10–Mar. 11), the inflow of projects entering the CDM pipeline averaged 112 new projects per month, the highest rate ever—perhaps reflecting the fact that project developers are rushing to get projects registered before 2013 in light of EU eligibility restrictions for Phase III.

Market analysts' project around **215 million ERUs** should to be issued through 2012. This is an increase over last year's estimate and is largely a result of Russian efforts to increase supply. Russia is projected to account for approximately 50 percent of ERUs issued through 2012 (see Section 4.1 for more details).

> "Estimated residual demand of 136 $MtCO_2e$ of Kyoto assets over the next two years, virtually all from European governments."

Sustained activity in the AAU market continues to encourage countries to market their GIS. For example, Slovakia is proactively trying to sell 27 million AAUs during 2011. Countries have announced intentions to sell over **1.5 billion AAUs** (see Table 12). Some of these AAUs may come from existing Green Investment Schemes. This supply is far larger than the anticipated demand. Uncertainties regarding the bankability of AAUs, which could play a decisive role in determining the commitment ambition of Parties under a future international climate change agreement, are likely to further reinforce the imbalance and affect market dynamics negatively.

5.1.4 Residual Demand—136 $MtCO_2e$

Expected gross use of Kyoto assets now stands at 1.39 billion tCO_2e over 2008–12 (up 14 percent from last year), with approximately 70 percent of demand coming from the private sector. The three Kyoto Flexibility Mechanisms will be required to meet the demand for Kyoto assets, which could increase if deliveries from CDM and JI are lower than anticipated, if the performance of domestic policies and measures disappoints, if carbon sinks have been overestimated, or if economic recovery is stronger than expected. Adjusting the approximate 2.4 billion CERs and ERUs contracted (nominal) for risk of underdelivery and accounting for AAU transactions as well as some secondary transactions by governments lead to an estimated residual demand of 136 $MtCO_2e$ of Kyoto assets over the next two years, virtually all from European governments (Table 13).

---

221. Barclays Capital. *Monthly Carbon Standard*, April 11, 2011: 1.14 billion CERs and 250 million ERUs over 2008–12; CDC Climat Research (2011). *Assessment of supply-demand balance for Kyoto offsets (CERs and ERUs) up to 2020.* Climate Brief #5: 1.12 billion CERs and 205 million ERUs over 2008–12 (Conservative estimate that does not account for new projects possibly entering the CDM pipeline after March 2011); Deutsche Bank: Personal communication: 1.29 billion CERs and 200 million ERUs over 2008–12 (Secured supply from the first crediting period of projects registered as of January 2011); Point Carbon, Carbon Program Manager (accessed April 14, 2011): 1.19 billion CERs and 202 million ERUs over 2008–12; Société Générale. *Carbon Drivers*, April 11, 2011: 1.02 billion CERs and 214 million ERUs over 2008–12.

222. The CDM Executive Board was requested to revise the procedures for registration to allow the effective registration date/start of crediting period "to be the date on which a complete request of registration has been submitted by the designated operational entity where the project activity has been registered automatically."

	Potential demand	Contracted CERs and ERUs		AAUs	Residual demand
	($MtCO_2e$)	nominal ($MtCO_2e$)	adjusted for performance ($MtCO_2e$)	($MtCO_2e$)	($MtCO_2e$)
EU	**1,065**	**1,868**	**883**	**54**	**129**
Government (EU-15)	315	270	132	54	129
Private sector (EU ETS)	750	1,598	751	0	0 (-1)
Japan	**300**	**372**	**180**	**191**	**3**
Government of Japan	100	34	21	76	3
Japanese private sector	200	338	159	115	0 (-74)
Rest of Annex B	**27**	**40**	**22**	**1**	**5**
Government	22	37	21	1	1
Private sector	5	3	1	0	4
Total	**1,392**	**2,280**	**1,085**	**245**	**136**
Government	437	341	174	130	133
Private sector	955	1,939	911	115	4

Table 13. Potential Demand, Contracted Supply, and Residual Demand, 2008–12

Note: Numbers may not add up due to rounding. A portion of the purchases attributed to the European private sector relates to portfolios of intermediaries that are available for secondary transactions. In addition to the volumes reported above, about 173 million tons (nominal) are contracted but not attributed, and are very likely in the hands of intermediaries. They could represent about 83 million tons also available for secondary transactions, with public or private entities.

CDM projects contracted in the next few months will be unlikely to deliver large volumes before 2013, and thus governments may have to purchase AAUs to cover their residual Kyoto shortfalls and underdelivery of CDM and JI. Governments may also wish to secure some volumes through secondary transactions, with the advantage of being able to choose the types of projects generating the CERs, as is already the case under a number of procurement programs. Approximately 300 million CERs are in the hands of intermediaries and could be available. The price and quality of assets will likely determine sovereign compliance strategy.

5.2 WILL THERE BE ENOUGH EMISSION REDUCTIONS GENERATED IN DEVELOPING COUNTRIES AFTER 2012?

Estimating the future demand for emission reductions generated in developing countries remains a delicate and heroic exercise as many initiatives looking beyond 2012 are still at the proposal stage and will likely be influenced by the outcome of the ongoing negotiations. Key features of many of these proposals are not yet fully specified, with uncertainties as to the amount of credits that could be used to meet compliance obligations, eligible mechanisms or standards, and further qualitative restrictions (for example, on country of origin or technology). To deal with these uncertainties about the supply-demand balance in the carbon market over 2013–20, projections of supply are compared with estimates of demand for emission reductions derived from three scenarios, reflecting more or less ambitious collective action.

The three scenarios (detailed in Table 14) encompass: (1) enacted and proposed initiatives aligned with unconditional pledges under the Copenhagen Accord, (2) the full implementation of enacted and proposed initiatives aligned with higher pledges under the Copenhagen Accord, and (3) the introduction of domestic cap-and-trade schemes in most of Annex I countries to deliver on pledges at the higher end of commitments under the Copenhagen Accord.

These scenarios only look at the EU and other current OECD Annex B countries[223] and omit some Annex I countries, such as Belarus, Croatia, Kazakhstan, Monaco, Russia, Turkey, and Ukraine.

223. To the exception of Cyprus and Malta, as well as Liechtenstein, as they join the EU effort.

Some of the omitted countries have pledges under the Copenhagen Accord.[224] There are also some non-Annex I countries—such as Brazil, Chile, China, and the Republic of Korea—that are contemplating new market mechanisms, including emissions trading, which may, at some point, generate possible demand for (domestic) offsets. This demand is not considered here.

Depending on ambition of collective action, demand for emission reductions generated in developing countries could easily surpass 2 billion tCO_2e over 2013–20 (or twice as much as demand for KMs over 2008–12), possibly ramping up to 3 billion tCO_2e or more (see Table 14). Accounting for around 60 percent of total demand for scenarios 1 and 2, the EU Climate and Energy Package represents thus far the only substantial source of demand for offsets from non-Annex I countries beyond 2012. Other potential sources remain speculative at this stage.

Importantly, these estimates of demand correspond to the maximum theoretical demand, given expected shortfall and rules governing the use of offsets (qualitative and quantitative restrictions). In other words, they are not estimates of the actual use of offsets, which depends on availability and price (relative to other options, for example, AAUs or their successor, allowances from other schemes, price caps, and so on).

Table 14. Scenarios of Potential Demand for Offsets Generated in non-Annex I Countries 2013–20 ($MtCO_2e$)[225]

Country (group of)	Scenario 1: Enacted and proposed initiatives, unconditional pledges		Scenario 2: Enacted and proposed initiatives, higher pledges		Scenario 3: ETS in major Annex I countries, higher end of Copenhagen Accord pledges*
	Description	Potential demand ($MtCO_2e$)	Description	Potential demand ($MtCO_2e$)	Potential demand in 2020 ($MtCO_2e$)
EU, as well as Iceland, Liechtenstein and Norway	20 percent below 1990, with differentiation EU ETS and effort sharing	1,750†	30 percent below 1990, with differentiation EU ETS and effort sharing	2,550†	
New Zealand	NZ ETS: 10 percent below 1990	77	NZ ETS: 20 percent below 1990	106	
Australia	CPRS (2015): 5 percent below 2000	516	CPRS (2015): 15 percent below 2000	637	All countries deliver on Copenhagen Pledges resulting in aggregate reductions in Annex I GHG emissions of 17 percent below 1990 levels)
Japan	Between 25 and zero percent below 1990	≤539	25 percent below 1990	539	
Switzerland	20 percent below 1990, with ETS and other measures	28	30 percent below 1990, with ETS and other measures	55	
United States & Canada	No U.S. federal ETS, California and limited WCI, RGGI‡	12	No U.S. federal ETS, with full WCI (incl. California), RGGI‡	24	
TOTAL		**2,922**		**3,911**	**1,500–2,000**

*: Demand under Scenario 3 is only for year 2020, thus not comparable with the first two scenarios.
†: Already accounts for an inflow in the EU ETS of 750 million CERs and ERUs during Phase II.
‡: No significant demand is expected to come from RGGI.

224. No demand for carbon assets is expected from Russia and Ukraine (the two largest emitters from the countries listed above), as their pledges are above their baseline projection. See den Elzen, M. G. J. et al. 2010. *Evaluation of the Copenhagen Accord: Chances and risks for the 2°C climate goal*. Netherlands Environmental Assessment Agency (PBL), The Netherlands, and Ecofys, Germany.
225. For detailed assumptions see Appendix 1.

Also, this theoretical demand is not to be met systematically through CDM and JI, as there is political support in all major developed countries for the Cancun decision to establish new market mechanisms under the UNFCCC to "enhance the cost effectiveness of, and to promote, mitigation actions." For instance, Japan is preparing a bilateral offsetting mechanism with 15 pilot projects in nine countries that could co-exist along current Kyoto Mechanisms; EU is supporting sectoral approaches that could represent an increasing share of its demand for emission reductions; California may be open to international offsets from sectors and regions, including from REDD activities, which so far are outside the scope of the CDM.

Estimates of supply (Table 15) are forecasts for CDM and JI only. None of these projections assumes continuation of JI beyond CP-1. They do not include supply under new approaches or mechanisms, still under negotiation. While there appears to be keen interest by several developing countries to participate in such new mechanisms, it will take some time to discuss, elaborate, and agree upon a common set of rules and modalities, including baseline setting and MRV requirements.

In this context, a streamlined, cost-effective, and efficient CDM will still likely play a lasting role on the supply side (hence our focus). It could serve as a platform for those countries willing to transition toward new mechanisms, drawing on experience, achievements, and capacity built under the CDM. Alternatively, it could remain a central project-based mechanism, serving the low-carbon development priorities of those countries preferring not to transition to new mechanisms in the near future. After all, programmatic approaches such as the CDM Programme of Activities (PoA) are already helping scale up mitigation efforts.

About 2.5 billion offsets could be generated over 2013–20, or twice as much as expected supply from CDM and JI pre-2013. For the most part (50–70 percent), this supply is expected from projects registered before 2013, highlighting the strain of the lack of a predictable and scaled-up demand on new origination. HFC and

Table 15. Estimates of Potential Supply Under the CDM and JI up to 2020 ($MtCO_2e$)

	pre-2013	post-2012	Cumulative (up to 2020)
Point Carbon			
CDM-EU ETS eligible	1,186	1,875	3,061
CDM-other	6	409	415
ERU	202		202
TOTAL	**1,394**	**2,285**	**3,679**
Barclays			
CDM-EU ETS eligible	1,140	1,741	2,881
CDM-other		1,043	1,043
ERU	250		250
TOTAL	**1,390**	**2,784**	**4,174**
CDC Climat Research †			
CDM-EU ETS eligible	1,115	2,534	3,649
CDM-other		373	373
ERU	205		205
TOTAL	**1,320**	**2,907**	**4,227**
*Deutsche Bank**			
CDM-EU ETS eligible	1,287	939	2,226
CDM-other	2	437	439
ERU	200		200
TOTAL	**1,489**	**1,376**	**2,865**

† Conservative estimate that does not account for new projects possibly entering the CDM pipeline after March 2011, nor for possible renewal of crediting period for already registered projects.
*Secured supply from the first crediting period of projects registered as of January 2011.

N_2O credits to be banned from the EU ETS represent about one-third of 2013–20 supply. Given investment barriers, the share of supply from projects registered in LDCs post-2012 is likely to remain extremely limited, between 10 and 75 $MtCO_2e$ (depending on sources) or systematically less than 5 percent. Also important to note, two downward risks to these supply estimates are the possible rejection of application for crediting period renewal and the revision of baselines.

Available supply of EU ETS eligible offsets over 2013–20 may reach about 2 billion tCO_2e, comprising approximately 200 million tCO_2e remaining from pre-2013 and 1.8 billion tCO_2e generated post-2012 (almost entirely from projects registered before 2013). In addition, at least 500 $MtCO_2e$ of non-EU ETS eligible offsets (potentially up to 1 billion tCO_2e) could come online over 2013–20.[226] This could be sufficient to cover specific demand from EU ETS operators as well as demand from governments under the EU Climate and Energy Package (even under a tighter cap, in line with an EU 30 percent target).

The availability of a substantial and credible offset supply could increase the likelihood of cost-effectively achieving more ambitious emission reduction targets. Under full implementation of Scenario 1 (let alone Scenario 2 or 3), potential demand for international offsets over 2013–20 exceeds potential supplies, which have been so far heavily constrained. This could imply that price of offsets beyond 2012 could be sustained, with hopes that higher prices will stimulate supply and encourage financial innovation to turn future carbon revenues into upfront financing.

These preliminary estimates also underscore the need to scale up supply to avoid future imbalances in the carbon market. Supply can be scaled up by (i) strengthening capacity and making mechanisms more predictable and efficient; (ii) broadening the scope of the carbon market, looking at underserved sectors and project-types; and (iii) facilitating LDCs participation. For the latter to materialize, it is necessary to simplify the procedures for project approval and credit issuance (including for programmatic approaches to enable reaching micro-scale activities) and increase the eligibility of land-based agriculture (including remedy the current temporary crediting approach which penalizes forestry projects).

5.3 CONCLUSIONS

Beyond 2012, the main constraint to the carbon market is perhaps a lack of demand beyond current initiatives, with no further encouragement to build up a substantial and credible supply. For both developed and developing countries, this could be a missed opportunity to benefit from market instruments to mobilize resources and engage private sector in climate action. The use of market mechanisms can contribute to lower the cost of achieving sustainable goals, result in additional resources, and send a price signal to encourage less carbon-intensive lifestyles and investment decisions.

Financing needs for green growth and implementing low-emission development strategies are huge, in the hundreds of billions annually for developing countries alone. Mobilizing sufficient resources in a predictable and sustainable manner requires a combination of sources-both existing and innovative ones, both public and private. The Secretary-General's High-Level Advisory Group on Climate Change Financing (AGF) concluded that carbon markets can play a valuable role in the mobilization of $100 billion per year from 2020, in conformity with the pledges under the Copenhagen Accord. With predictable, long-term, and ambitious targets, financial flows through improved market mechanisms to developing countries could reach $30–50 billion a year by 2020, further committing an equivalent amount of foreign private investment to climate action. Predictability and ambition, ingenuity and reforms, capacity—all are needed to scale up carbon markets and maximize their transformational impact.

226. Some of these credits could become eligible, should the EU enter into bilateral agreements with non-LDC countries. So far no such bilateral agreement has been signed.

Methodology

The data used in this report was collected from a combination of sources, including a survey of market participants conducted by the World Bank's Carbon Finance Unit between March 21 to April 1, 2011; semi-structured interviews of selected market participants, policy makers, and regulators; and a desk study of major carbon-industry publications,[227] legislation, regulations, and media reports. The report has written contributions kindly provided by Ecosystem Marketplace and Bloomberg New Energy Finance (voluntary and pre-compliance activities), Thomson Reuters Point Carbon (California), European Commission (international markets), and Deutsche Bank (international markets).

The survey addressed selected market participants involved in several activities and representing the various sectors of the carbon market. The survey contained 26 questions and covered market sentiment and Kyoto Protocol flexibility mechanisms. The results of the survey were used to augment and corroborate information collected from the desk study and semi-structured interviews. Some of the results of the survey are provided in this report, in the appropriate sections.

Unless said otherwise, the symbol $ implies U.S. dollars.

The size of the global carbon market in 2010 has been derived from the growth rate between 2009 and 2010 of each market segment (for example, primary CER, other project-based markets, AAUs, EUAs, and other allowance markets) drawing on information obtained primarily from Thomson Reuters Point Carbon and Bloomberg New Energy Finance. The value of the voluntary transactions was obtained from data provided by Ecosystem Marketplace. Since the original information from Thomson Reuters Point Carbon and Bloomberg New Energy Finance was provided in euros, the impact of the $/euro exchange rate in the same period was eliminated and the US$-based results were applied to the values of each market segment, as calculated by the World Bank in 2009. When applicable, the unweighted average from the sources was used, although some adjustments were made as deemed appropriate.

Prices and values are primarily expressed in nominal $ per tCO_2e, unless indicated otherwise. An average annual exchange of €1 = $1.328 for 2010 was applied. The cutoff date for information is April 15, 2011. A ton (abbreviated as "t") refers to a metric ton (1,000 kg).

227. Including online sources such as Carbon Finance (www.carbon-financeonline.com), Joint Implementation Quarterly (www.jiqweb.org), PointCarbon (www.pointcarbon.com), as well as Carbon Positive (www.carbonpositive.net), CDC Climat Research (www.cdcclimat.com), the Climate_L list (www.iisd.ca), IDEAcarbon (www.ideacarbon.com), Ecosystem Marketplace (www.ecosystemmarketplace.com), the CDM and JI pipeline databases and analyses maintained by UNEP Risoe and IGES, and Web sites of market players (DNAs, DOEs, project developers and aggregators, exchanges and trading platforms, financial institutions and brokers, regulators, carbon purchasing funds and facilities, public procurement programs, and companies facing compliance obligations). One should also mention other resources, such as reports prepared by financial institutions, such as analyses by Barclays Capital, Deutsche Bank, and Société Générale, that have been made kindly available to the authors.

Appendix 1. Assumptions for Estimates of Potential Demand for Offsets from non-Annex I Countries

EU: Under the EU Climate and Energy Package, the EU commits to cut its GHG emissions by 20 percent below 1990 levels, possibly tightening to 30 percent depending on developments in climate negotiations. For the EU ETS, this translates into further tightening of the cap from an average 6 percent below 2005 levels over 2008–20 to 21 percent by 2020 (or more in the 30 percent scenario), with a corresponding shortfall of about 2,500 $MtCO_2e$ over 2013–20 in the 20 percent scenario (resp. 3,500 $MtCO_2e$ in the 30 percent scenario).[228]

The total amount of offsets that can be used over 2008–20 is estimated at 1,700 $MtCO_2e$ in the 20 percent scenario (2,200 $MtCO_2e$ in the 30 percent scenario). On aggregate, the amount of offsets that can be surrendered during Phase III corresponds to the difference between the overall amount allowed over Phases II and III jointly minus what has been already surrendered during Phase II. The following qualitative restrictions apply with regard to the use of CERs/ERUs against Phase III obligations:

- CERs from project activities targeting the destruction of HFC-23 and N_2O from adipic acid production are banned from the EU ETS. CP-1 offsets will still be allowed until the end of April 2013 against Phase II obligations.
- CP-1 offsets (including ERUs) from eligible project types can be banked and surrendered.
- Offsets generated post-2012 must come either from a project registered before end of 2012 or from a project based in an LDC if registered after 2013.

For non-ETS covered sectors, the Climate and Energy Package translates into cuts of 10 percent (or more) below 2005 levels by 2020. Offsets can be used to cover about one-third of the effort in the 20 percent scenario, estimated to represent about 800 $MtCO_2e$ over 2013–20. In the 30 percent scenario, offsets can in principle be used to cover half of the additional effort, leading to a total demand of about 1,100 $MtCO_2e$. No restriction applies so far to the use of offsets.

New Zealand: The NZ ETS continues to expand its coverage, with synthetic gases and waste joining in 2013 and agriculture in 2015. The cap of the scheme is set in line with the country international commitment—to reduce emissions by 10 percent below 1990 levels by 2020 or, if a comprehensive global agreement is reached, by 20 percent. This could translate into a shortfall of 75 to 105 million tons over 2013–20, accounting for a limited uptake of forestry.[229]

Australia: Following announcements earlier in 2011, Australia implements economy-wide carbon pricing for a period of three years, starting 2013, with a view to transitioning to an emissions trading scheme, similar in its design to the Carbon Pollution Reduction Scheme (CPRS). The cap is set in line with Australia's pledges under the Copenhagen Accord: 5 percent to 15 percent below 2000 levels by 2020, depending on climate negotiations. One assumes that 75–80 percent of the country's emissions are capped (that is, forestry and agriculture are excluded) and that unlimited use of offsets is allowed. Following recent projections by Australia, this could represent a cumulative shortfall over 2015–20 ranging from 520 to 640 $MtCO_2e$, depending on ambition.[230]

228. This includes also aviation. Source: Barclays Capital. *Monthly Carbon Standard*, April 11, 2011
229. Source: own calculation based on New Zealand Fifth National Communication.
230. Own calculation based on Department of Climate Change and Energy Efficiency (2010). *Australia's emissions projections.*

Japan: As plans for a mandatory ETS in Japan are delayed, one simply assumes here that offsets could be used up to 50 percent to fill the gap to the -25 percent conditional pledge. Accounting for sinks, this could correspond to a cumulative demand for offsets of 540 $MtCO_2e$ over 2013–20.[231]

Switzerland: As its main additional climate policies and measures, Switzerland implements an ETS similar in design to the EU ETS. This could result in a cumulative demand for offsets from covered entities over 2013–20 of 2.3 $MtCO_2e$ in the 20 percent scenario, reaching 4 $MtCO_2e$ in the 30 percent scenario. Another large source of demand for offsets stems from the obligation for producers and importers of fossil fuels to offset 25–30 percent of CO_2 emissions in the 20 percent scenario (gearing up to 40-45 percent in the 30 percent scenario). It is estimated that this measure could generate a demand of 25 to 50 $MtCO_2e$ of international offsets.[232]

Northern America: Demand of offsets under California's cap-and-trade scheme could total 233 $MtCO_2e$ over 2012–20 (see Section 2.1). Estimates of use for offsets from the full WCI are hardly slightly higher, at 235 $MtCO_2e$.[233] Importantly, however uncertain such estimates are, it is unclear which share of demand could be sourced internationally. For this exercise, it is set at 10 percent. Given abundant overallocation in RGGI, no demand for international offsets is expected over the decade from the scheme.

Higher end of Copenhagen Accord pledges: Estimates here are obtained from the Report of the Secretary-General's High-Level Advisory Group on Climate Change Financing (AGF). They correspond to the medium price scenario, based on the higher end of Accord pledges, which assumes that most Annex 1 countries introduce domestic cap-and-trade schemes and that government-to-government AAU trade occurs. Based on these assumptions, the potential demand for offsets in this scenario ranges between 1,500 and 2,000 $MtCO_2e$ in 2020.[234]

231. Assuming Japan's emissions grow in line with projections by the U.S. DoE Energy Information Administration's International Energy Outlook 2010 (High oil price case). Carbon sinks are maintained at 20 $MtCO_2e$ (that is, their planned use under the Kyoto Protocol), though they could decrease as indicated by http://unfccc.int/files/kyoto_protocol/application/pdf/awgkplulucfdatajapan051109.pdf.
232. Own calculation based on Switzerland Fifth National Communication.
233. Western Climate Initiative (2010). *Updated Economic Analysis of the WCI Regional Cap-and-Trade Program*
234. As per http://www.un.org/wcm/webdav/site/climatechange/shared/Documents/AGF_reports/Work_Stream_8_%20Carbon%20markets.pdf.

Glossary

Accredited Independent Entity (AIE): Accredited independent entities (AIEs) are independent auditors that assess whether a potential project meets all the eligibility requirements of the JI (determination) and whether the project has achieved greenhouse gas emission reductions (verification).

Additionality: A project activity is additional if anthropogenic GHG emissions are lower than those that would have occurred in the absence of the project activity.

Afforestation: The process of establishing and growing forests on bare or cultivated land, which has not been forested in recent history.

Annex I (Parties): The industrialized countries listed in Annex I to the UNFCCC were committed to return their greenhouse gas emissions to 1990 levels by 2000. They currently include Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and the United States, as well as the European Economic Community. All but Turkey are listed in Annex B.

Annex B (Parties): The 39 industrialized countries (including the European Economic Community) listed in Annex B to the Kyoto Protocol have committed to country-specific targets that collectively reduce their GHG emissions by at least 5.2 percent below 1990 levels on average over 2008–12.

Assigned Amount Unit (AAU): Annex I Parties are issued AAUs up to the level of their assigned amount, corresponding to the quantity of greenhouse gases they can release in accordance with the Kyoto Protocol (Art. 3), during the first commitment period of that protocol (2008–12). One AAU represents the right to emit one metric ton of carbon dioxide equivalent.

Banking or carry over: Compliance units under the various schemes to manage GHG emissions in existence may or may not be carried over from one commitment period to the next. Banking may encourage early action by mandated entities depending on their current situation and their anticipations of future carbon constraints. In addition banking brings market continuity. Banking between Phase I and Phase II of the EU ETS is not allowed but is allowed between Phase II and further Phases. Some restrictions on the amount of units that can be carried over may apply: for instance, EUAs may be banked with no restriction while the amount of CERs that can be carried over by a Kyoto Party is limited to 2.5 percent of the assigned amount of each Party.

Baseline: The emission of greenhouse gases that would occur without the policy intervention or project activity under consideration.

Biomass Fuel: Combustible fuel composed of a biological material, for example, wood or wood by-products, rice husks, or cow dung.

California Global Warming Solution Act AB32 (AB32): The passage of Assembly Bill 32 (California Global Warming Solution Act AB32) in August 2006 sets economy-wide GHG emissions targets as follows: Bring down emissions to 1990 levels by 2020 (considered to be at least a 25 percent reduction below business-as-usual) and to 80 percent of 1990 levels by 2050. Covering about 85 percent of GHG emissions, a cap and trade scheme (still under design) would be a major instrument, along with renewable energy standards, energy efficiency standards for buildings and appliances as well as vehicle emissions standards.

Cap and trade: Cap-and-trade schemes set a desired maximum ceiling for emissions (or cap) and let the market determine the price for keeping emissions

within that cap. To comply with their emission targets at least cost, regulated entities can either opt for internal abatement measures or acquire allowances or emission reductions in the carbon market, depending on the relative costs of these options.

Carbon Asset: The potential of greenhouse gas emission reductions that a project is able to generate and sell.

Carbon Finance: Resources provided to activities generating (or expected to generate) greenhouse gas (or carbon) emission reductions through the transaction of such emission reductions.

Carbon Dioxide Equivalent (CO_2e): The universal unit of measurement used to indicate the global warming potential of each of the six greenhouse gases regulated under the Kyoto Protocol. Carbon dioxide—a naturally occurring gas that is a by-product of burning fossil fuels and biomass, land-use changes, and other industrial processes—is the reference gas against which the other greenhouse gases are measured, using their global warming potential.

Certified Emission Reductions (CERs): A unit of greenhouse gas emission reductions issued pursuant to the Clean Development Mechanism of the Kyoto Protocol, and measured in metric tons of carbon dioxide equivalent. One CER represents a reduction in greenhouse gas emissions of one metric ton of carbon dioxide equivalent.

Chicago Climate Exchange (CCX): Members to the Chicago Climate Exchange make a voluntary but legally binding commitment to reduce GHG emissions. By the end of Phase I (December 2006), all Members will have reduced direct emissions 4 percent below a baseline period of 1998-2001. Phase II, which extends the CCX reduction program through 2010, will require all Members to ultimately reduce GHG emissions 6 percent below baseline. Among the members are companies from North America as well as municipalities or U.S. states or universities. As new regional initiatives began to take shape in the U.S., membership of the CCX grew from 127 members in January 2006 to 237 members by the end of the year while new participants expressed their interest in familiarizing themselves with emissions trading.

Clean Development Mechanism (CDM): The mechanism provided by Article 12 of the Kyoto Protocol, designed to assist developing countries in achieving sustainable development by allowing entities from Annex I Parties to participate in low-carbon projects and obtain CERs in return.

Climate Action Reserve (CAR): The Climate Action Reserve is a U.S.-based offsets program that establishes regulatory-quality standards for the development, quantification and verification of greenhouse gas (GHG) emission reduction projects in North America; issues carbon offset credits known as Climate Reserve Tonnes (CRT) generated from such projects; and tracks the transaction of credits over time in a transparent, publicly accessible system.

Community Independent Transaction Log (CITL): The Community Independent Transaction Log (CITL) conducts "supplementary checks" to those by the ITL for transactions involving registries of at least one EU Member State, such as the issuance, transfer, cancellation, retirement and banking of EUAs.

Conference of Parties (COP): The supreme body of the Convention. It currently meets once a year to review the Convention's progress. The word "conference" is not used here in the sense of "meeting" but rather of "association," which explains the seemingly redundant expression "fourth session of the Conference of the Parties."

Conference of the Parties serving as the Meeting of the Parties (CMP): The Convention's supreme body is the COP, which serves as the meeting of the Parties to the Kyoto Protocol. The sessions of the COP and the CMP are held during the same period to reduce costs and improve coordination between the Convention and the Protocol.

Crediting period: The crediting period is the duration of time during which a registered, determined or approved project can generate emission reductions. For CDM projects, the crediting period can be of either seven years (renewable twice) or ten years (non-renewable).

Designated Focal Point (DFP): Parties participating in the Joint Implementation (JI) mechanism are required to nominate a Designated Focal Point (DFP) for approving projects.

Designated National Authority (DNA): An office, ministry, or other official entity appointed by a Party to the Kyoto Protocol to review and give national approval to projects proposed under the Clean Development Mechanism.

Designated Operational Entities (DOEs): Designated operational entities are independent auditors that assess whether a potential project meets all the eligibility requirements of the CDM (validation) and whether the project has achieved greenhouse gas emission reductions (verification and certification).

Determination: Determination is the process of evaluation by an independent entity accredited by the host country (JI Track 1) or by the Joint Implementation Supervisory Committee (JI Track 2) of whether a project and the ensuing reductions of anthropogenic emissions by sources or enhancements of anthropogenic removals by sinks meet all applicable requirements of Article 6 of the Kyoto Protocol and the JI guidelines.

Eligibility Requirements: There are six Eligibility Requirements for Participating in Emissions Trading (Art. 17) for Annex I Parties. Those are: (i) being a Party to the Kyoto Protocol, (ii) having calculated and recorded one's Assigned Amount, (iii) having in place a national system for inventory, (iv) having in place a national registry, (v) having submitted an annual inventory and (vi) submit supplementary information on assigned amount. An Annex I party will automatically become eligible after 16 months have elapsed since the submission of its report on calculation of its assigned amount. Then, this Party and any entity having opened an account in the registry can participate in Emissions Trading. However, a Party could lose its eligibility if the Enforcement Branch of the Compliance Committee has determined the Party is non-compliant with the eligibility requirements.

Emission Reductions (ERs): The measurable reduction of release of greenhouse gases into the atmosphere from a specified activity, and a specified period of time.

Emission Reductions Purchase Agreement (ERPA): Agreement which governs the transaction of emission reductions.

Emission Reduction Units (ERUs): A unit of emission reductions issued pursuant to Joint Implementation. One ERU represents the right to emit one metric ton of carbon dioxide equivalent.

Emissions Trading Scheme (ETS): See cap and trade.

EU-10: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia.

EU-15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.

European Union Allowances (EUAs): The allowances in use under the EU ETS. An EUA unit is equal to one metric ton of carbon dioxide equivalent.

European Union Emission Trading Scheme (EU ETS): The EU ETS was launched on January 1, 2005, as a cornerstone of EU climate policy toward its Kyoto commitment and beyond. Through the EU ETS, Member States allocate part of the efforts toward their Kyoto targets to domestic emission sources (mostly utilities). Over 2008–12, emissions from mandated installations (about 40 percent of EU emissions) are capped on average at 6 percent below 2005 levels. Participants can internally reduce emissions, purchase EUAs or acquire CERs and ERUs (within a 13.4 percent average limit of their allocation over 2008–12). The EU ETS will continue beyond 2012, with further cuts in emissions (by 21 percent below 2005 levels in 2020 or more, depending on progress in reaching an ambitious international agreement on climate change).

First Commitment Period: The five-year period, from 2008 to 2012, during which industrialized country have committed to collectively reduce their greenhouse gas (or "carbon") emissions by an average of 5.2 percent compared with 1990 emissions under the Kyoto Protocol.

Green Investment Scheme (GIS): A GIS is a voluntary mechanism through which proceeds from AAU transactions will contribute to contractually agreed environment- and climate-friendly projects and programs both by 2012 and beyond.

Greenhouse Gases (GHGs): Both natural and anthropogenic, greenhouse gases trap heat in the Earth's atmosphere, causing the greenhouse effect. Water vapor (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), and ozone (O_3) are the primary greenhouse gases. The emission of greenhouse gases through human activities (such as fossil fuel combustion or deforestation) and their accumulation in the atmosphere is responsible for an additional forcing, contributing to climate change. The Kyoto Protocol regulates six GHGs: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_20), as well as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6).

Global Warming Potential (GWP): An index representing the combined effect of the differing times greenhouse gases remain in the atmosphere and their relative effectiveness in absorbing outgoing infrared radiation.

Internal rate of return: The annual return that would make the present value of future cash flows from an investment (including its residual market value) equal the current market price of the investment. In other words, the discount rate at which an investment has zero net present value.

International Transaction Log (ITL): The ITL links together the national registries and the CDM registry and is in charge of verifying the validity of transactions (issuance, transfer and acquisition between registries, cancellation, expiration and replacement, retirement and carry-over). It is the central piece of the emissions trading under the Kyoto Protocol.

Japan-Voluntary Emissions Trading Scheme (J-VETS): Under the J-VETS, companies receive subsidies to implement mitigation activities in line with voluntary commitments and can resort to emissions trading (incl. offsets) to meet their commitments with more flexibility. Though growing, impact remains limited: over the first three years of the scheme, participants (288 companies) have reduced their emissions by about one million tCO_2e. The J-VETS has contributed to the development of MRV system, third-party verification system, and the registry system. The J-VETS has been incorporated to the Experimental Integrated ETS as one of participating options.

Joint Implementation (JI): Mechanism provided by Article 6 of the Kyoto Protocol, whereby entities from Annex I Parties may participate in low-carbon projects in hosted in Annex I countries and obtain Emission Reduction Units in return.

Kyoto Mechanisms (KMs): the three flexibility mechanisms that may be used by Annex I Parties to the Kyoto Protocol to fulfill their commitments. Those are the Joint Implementation (JI, Art. 6), Clean Development Mechanism (CDM, Art. 12), and International Emissions Trading (Art. 17).

Kyoto Protocol: Adopted at the Third Conference of the Parties to the United Nations Convention on Climate Change held in Kyoto, Japan in December 1997, the Kyoto Protocol commits industrialized country signatories to collectively reduce their greenhouse gas emissions by at least 5.2 percent below 1990 levels on average over 2008–12 while developing countries can take no regret actions and participate voluntarily in emission reductions and removal activities through the CDM. The Kyoto Protocol entered into force in February 2005.

Monitoring Plan: A set of requirements for monitoring and verification of emission reductions achieved by a project.

Nationally Appropriate Mitigation Actions (NAMAs): Refers to a set of mitigation policies and/or actions a developing country undertakes aiming at reducing its GHG emissions and reports to UNFCCC on a voluntary basis. The concept of NAMAs emerged in 2007 under the UNFCCC Bali Action Plan, which called for "[the implementation of] Nationally Appropriate Mitigation Actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity building, in a measurable, reportable and verifiable manner." Through international negotiations within the UNFCCC, NAMAs have been steadily refined. The Cancun Agreement of last December achieved significant progress in the concept of NAMAs and, inter alia, set milestones for the development of a central registry of NAMAs (including NAMAs seeking international funding support) and guidelines for measuring, reporting and verification (MRV). Definitions on these elements are expected by the end of this year.

National Allocation Plans (NAPs): The documents, established by each Member State and reviewed by the European Commission, that specify the list of installations under the EU ETS and their absolute emissions caps, the amount of CERs and ERUs that may be used by these installations as well as other features such as the size of the new entrants reserve and the treatment of exiting installations or the process of allocation (free allocation or auctioning).

New South Wales Greenhouse Gas Reduction Scheme (NSW GGAS): Operational since January 1, 2003 (to last at least until 2012), the NSW Greenhouse Gas Abatement Scheme aims at reducing GHG emissions from the power sector. NSW and ACT (since January 1, 2005) retailers and large electricity customers have thus to comply with mandatory (intensity) targets for reducing or offsetting the emissions of GHG arise from the production of electricity they supply or use. They can meet their targets meet their targets by purchasing certificates (NSW Greenhouse Abatement Certificates or NGACs) that are generated through project activities.

New Zealand Emissions Trading Scheme (NZ ETS): The NZ ETS will progressively regulate emissions of the six Kyoto gases in all sectors of the economy by 2015. Forestry is covered since 2008 and by July 1, 2010, stationary energy, industrial process and liquid fossil fuel will be phased-in. The government recently announced, however, that full implementation could be delayed if adequate progress is not made in establishing similar regulations in other developed countries.

Offsets: Offsets designate the emission reductions from project-based activities that can be used to meet compliance—or corporate citizenship—objectives vis-à-vis greenhouse gas mitigation.

Primary transaction: A transaction between the original owner (or issuer) of the carbon asset and a buyer.

Project Design Document (PDD): A central document of project-based mechanisms, the PDD notably describes the project activity (including environmental impacts and stakeholders consultations), the baseline methodology and how the project is additional as well as the monitoring plan.

Project Idea Note (PIN): A note prepared by a project proponent presenting briefly the project activity (for example, sector, location, financials, estimated amount of ERs, and so on).

REDD plus (REDD+): All activities that reduce emissions from deforestation and forest degradation, and contribute to conservation, sustainable management of forests, and enhancement of forest carbon stocks.

Regional Greenhouse Gas Initiative (RGGI): Under RGGI, 10 Northeast and Mid-Atlantic states aim to reduce power sector CO_2 emissions by 10 percent below 2009 levels in 2019. Within this ten-year phase, there are three shorter compliance periods. During the first and second compliance periods (2009–11 and 2012–14) the cap on about 225 installations is set at 171 $MtCO_2e$ (or 188 M short ton CO_2e). This is followed by a 2.5 percent per year decrease in cap during the third compliance period (2015–18).

Reforestation: This process increases the capacity of the land to sequester carbon by replanting forest biomass in areas where forests have been previously harvested.

Registration: The formal acceptance by the CDM Executive Board of a validated project as a CDM project activity.

Removal Unit (RMU): RMUs are issued by Parties to the Kyoto Protocol in respect of net removals by sinks from activities covered by Article 3(3) and Article 3(4) of the Kyoto Protocol.

Secondary transaction: A transaction where the seller is not the original owner (or issuer) of the carbon asset.

Supplementarity: Following the Marrakesh Accords, the use of the Kyoto mechanisms shall be supplemental to domestic action, which shall thus constitute a significant element of the effort made by each Party to meet its commitment under the Kyoto Protocol. However there is no quantitative limit to the utilization of such mechanisms. While assessing the NAPs, the European Commission considered that the use of CDM and JI offsets could not exceeded 50 percent of the effort by each Member State to achieve its commitment. Supplementarity limits may thus affect demand for some categories of offsets.

United Nations Framework Convention on Climate Change (UNFCCC): The international legal framework adopted in June 1992 at the Rio Earth Summit to address climate change. It commits the Parties to the UNFCCC to stabilize human induced greenhouse gas emissions at levels that would prevent dangerous manmade interference with the climate system, following "common but differentiated responsibilities" based on "respective capabilities."

Validation: Validation is the process of independent evaluation of a project activity by a Designated Operational Entity (DOE) against the requirements of the CDM. The CDM requirements include the CDM modalities and procedures and subsequent decisions by the CMP and documents released by the CDM Executive Board.

Verified Emission Reductions (VERs): A unit of greenhouse gas emission reductions that has been verified by an independent auditor. Most often, this designates emission reductions units that are traded on the voluntary market.

Verification: Verification is the review and ex post determination by an independent third party of the monitored reductions in emissions generated by a registered CDM project, a determined JI project (or a project approved under another standard) during the verification period.

Voluntary market: The voluntary market caters for the needs of those entities that voluntarily decide to reduce their carbon footprint using offsets. The regulatory vacuum in some countries and the anticipation of imminent legislation on GHG emissions also motivates some pre-compliance activity.

Western Climate Initiative (WCI): The WCI covers a group of seven U.S. states (Arizona, California, Montana, New Mexico, Oregon, Utah, and Washington) and four Canadian provinces (British Columbia, Manitoba, Ontario, and Quebec), with an aggregate emissions target of 15 percent below 2005 levels by 2020. Other U.S. and Mexican states and Canadian provinces have joined as observers.

NOTES

NOTES

www.carbonfinance.com

Carbon Finance
AT THE WORLD BANK
1818 H STREET, NW
WASHINGTON, DC 20433 USA

FSC Logo