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Towards a common carbon currency: Exploring the prospects for integrated global carbon markets

The Bank of New York Mellon's Office of Innovation has partnered with Point Carbon, a leading worldwide consulting and research firm, to look at and assess today's rapidly growing carbon markets. Together we explore the future evolution of carbon trading as a means of achieving global environmental goals.

*Our partner in developing this
research paper...*



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Summary

- Environmental policy is gradually moving from command and control regulation to leveraging the advantages of competitive markets. Due to their physical nature, greenhouse gases lend themselves perfectly to emissions trading on a global level.
- The global carbon market is growing rapidly. Trading volume in the first half of 2008 at \$59 billion reached the levels for all of 2007 at \$63 billion. This growth is predominantly attributable to the European Union Emissions Trading Scheme (“EU ETS”) and to increasing interest in global Kyoto credits from the Clean Development Mechanism (“CDM”) and Joint Implementation (“JI”).
- In the mid-term we see the potential of direct or indirect linking of regional cap and trade programs comprising emitters in Europe, North America and Oceania/Asia, potentially reaching a combined cap of over 9 billion tons. Point Carbon estimates that a linked global cap and trade market could reach a turnover of \$3 trillion by 2020.
- The reductions necessary to mitigate global warming require global market mechanisms that allocate capital to the lowest-cost abatement opportunities. This enables emissions to be reduced faster and in greater scale than would occur under regional or national programs. Current and proposed restrictions on linking markets increase compliance costs and inhibit efficient capital allocation. Ideally, emitters should be offered the widest set of options to reach their emission reduction targets, including the use of imported allowances or offsets. This recognition needs to remain at the core of a continuation of the Kyoto protocol or a similar global agreement on climate change.
- To provide a legitimate contribution to climate change goals, emissions trading must deliver real and cost-efficient emissions reductions. For markets to perform efficiently, they need to deliver real reductions and be standardized, liquid, transparent and predictable.
- Different views of what constitutes real, permanent, additional and verifiable emissions reductions have created a plethora of offset standards used by various mandatory and voluntary carbon programs. We view CDM as the best point of departure for creating a framework that could attract general recognition from larger global cap and trade programs. This would require subscribing nations to adopt and make necessary adaptations to the program multilaterally.
- Market designs need to be sensitive to the requirements of efficient markets and provide the basic preconditions to support secondary markets. As markets mature, market participants will require more sophisticated transaction models supported by financial intermediaries such as exchanges, custody and trust banks, and clearinghouses.
- A highly-rated global custody and trust bank, such as The Bank of New York Mellon, has the infrastructure and expertise to deliver a comprehensive suite of registry, cash, custody and post-trade services to enhance the efficiency of the global carbon market.

Chapter 1 Prerequisites of a global carbon market

Greenhouse gases have equal effects on climate change irrespective of where they are emitted.

Introduction

The causes and consequences of climate change have forced the global community to curb emissions of greenhouse gases. The scale of this challenge calls for use of policy tools that combine environmental and economic efficiency. Environmental policy gradually has recognized the benefits of moving from command and control policies toward leveraging the advantages of competitive markets. Emissions trading has been adopted successfully to control emissions of sulfur dioxide (SO₂) and other pollutants in the United States. Due to their physical nature, greenhouse gases lend themselves perfectly to global emissions trading:

- First and foremost, greenhouse gases have equal effects on climate change irrespective of where they are emitted. Hence, reductions in emissions of greenhouse gases carry the same environmental benefits wherever they take place. This physical nature has far reaching consequences for the politics of climate change. Not least, it calls for policies to curb emissions on a global scale. However, economic resources and political motivation to deal with climate change are distributed unevenly. As availability of capital is limited, reductions will arrive faster and in larger scale if capital is allocated to projects where reductions are least expensive. This provides the foundation for a potentially global exchange of capital and emission rights.
- Most greenhouse gas emissions are associated with production or consumption of energy. As countries develop economically, the efficiency with which they produce and consume energy improves gradually. Various levels of economic development, energy efficiency and environmental regulation also entail very different marginal costs of reducing greenhouse gas emissions among economic regions.

Recognition of the physical properties of greenhouse gases and global economic realities have necessitated the development of international treaties to suggest how reductions of greenhouse gases can be promoted in an equitable, expedient and cost efficient manner. Global regulation is a prerequisite to facilitate a market-based system for exchange of capital and emissions reduction credits on global scale.

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Greenhouse gases predominantly comprise carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphurhexafluoride (SF₆).

While these gases have very different physical properties, from a climate change perspective they share the attribute of having a global warming potential that physicists can quantify. This allows us to convert emissions of all greenhouse gases into a carbon dioxide equivalent (“CO₂e”). Hence, the physical nature and known global warming implications of various greenhouse gas emissions allow us to establish one single uniform product that lends itself to being traded as a commodity

UNFCCC and the Kyoto Protocol

The United Nations Framework Convention on Climate Change (“UNFCCC” or the “Convention”) is a non-binding international agreement that sets the basic legal foundations for international cooperation on climate change among almost all UN member states (191 countries). At its heart is the ultimate objective to stabilize greenhouse gas concentrations in the atmosphere “at a level that would prevent dangerous anthropogenic interference with the climate system”¹.

The Convention places the heaviest burden for fighting climate change on industrialized nations, since they are responsible for most historic as well current greenhouse gas emissions. These countries agreed under the Convention to support climate-change mitigation activities in developing countries by providing financial support and transfer of environmental technologies.

In December 1997, after two-and-a-half years of negotiations, countries reached agreement on a text that set legally binding reduction targets for industrialized countries, a timetable for reaching those targets and a set of mitigation approaches.

It is important to note that the UNFCCC did not impose any binding caps, timetables or emissions reduction (mitigation) approaches on its parties, but rather offered its signatories the option of negotiating binding plans to curb emissions. In December 1997, after two-and-a-half years of negotiations, countries reached agreement on a text that set legally binding reduction targets for industrialized countries, a timetable for reaching those targets and a set of mitigation approaches. The final text was named the Kyoto Protocol because it was agreed upon in the Japanese city of Kyoto. The Kyoto Protocol contained two groundbreaking features:

- It set reduction targets for greenhouse gas emissions from industrialized countries of 5 percent, measured against a base year of 1990 to be achieved during the period from 2008-2012.
- It provided for voluntary participation of developing countries through “project-based mechanisms.”

Between 2001 and 2005, over 100 signatories ratified the Protocol and in February 2005, eight years after agreement on the text, Russia submitted its instruments of ratification and Kyoto entered into force. To date (October 2008), there are 183 parties to the Kyoto Protocol. The United States established early in 1998 that it would not ratify the Protocol in view of the stringency of its targets.

However, not least due to important contributions from the United States during the negotiations of the protocol, the final agreement included “flexible mechanisms” – innovative and market-based approaches to reducing global emissions of greenhouse gases in the most cost effective ways.

Flexible mechanisms

Flexible mechanisms essentially are a means of creating reductions in global greenhouse gas emissions at the least cost. They employ the power of competitive markets to allocate capital to the cheapest emissions reduction opportunities. The Kyoto Protocol contains three such “flexible mechanisms:” Emissions Trading, the Clean Development Mechanism (“CDM”) and Joint Implementation (“JI”), thereby presenting a framework for a carbon market comprising all signatory states.

Emissions trading is a mechanism for signatory states with quantitative commitments to transfer emissions allowances among themselves depending on their relative ability to reach their targets.

Emissions trading is a mechanism for signatory states with quantitative commitments to transfer emissions allowances among themselves depending on their relative ability to reach their targets. In principle, this allows one state to emit above its target emissions levels if another state, against compensation from the first state, reduces its emissions by correspondingly more. National commitments typically are transferred to private entities that trade with each other and across states. States receive an allocation of Assigned Amount Units (AAUs) corresponding to their permitted emissions over the 2008-2012 time period and have to surrender allowances or credits corresponding to their total emissions after the expiry of the first commitment period.

Even though it was politically unrealistic to expect quantitative reduction commitments from most developing countries, it was critical to establish incentives for emissions reductions to take place in these countries.

Carbon markets comprise two distinctly different markets: 1) the regulated markets, and 2) the voluntary markets

Even though it was politically unrealistic to expect quantitative reduction commitments from most developing countries, it was critical to establish incentives for emissions reductions to take place in these countries. Project-based mechanisms could offer the opportunity to eliminate inefficient production and use of energy, improve technology transfer and promote sustainable development in developing countries. Establishing proper incentives to improve the carbon intensity of developing economies would thus contribute to reaching a reduction of global emissions at a lower total cost. CDM offers industrialized countries a way of meeting their reduction commitments by investing in reduction projects in developing countries. Investors get emissions reduction credits corresponding to verified emissions reductions in return for the capital required to make reduction projects economically feasible. The JI mechanism is a similar project-based investment program between companies in states that have quantitative emissions reduction targets.

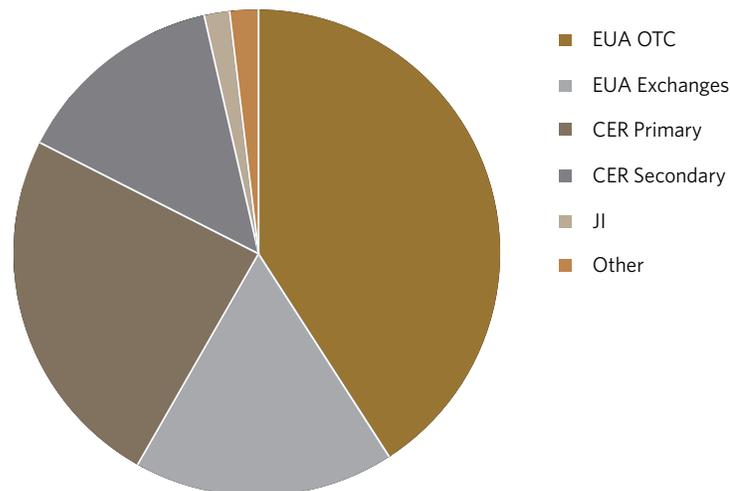
As a result, the flexible mechanisms introduced two fundamentally different carbon instruments. Emission allowances, also referred to as permits, represent a right to emit a certain amount of greenhouse gases, typically one ton of CO₂e. Emission credits, also referred to as offsets, represent verified reductions of emissions of greenhouse gases, typically one ton of CO₂e avoided. These two types of instruments can be used separately or in combination in regulatory schemes where emitters are placed under a cap or under an individual emission reduction requirement.

Main implementation models

Carbon trading is a financial market not to be confused with trading physical quantities of greenhouse gases. The financial representation of greenhouse gases is either a permit to emit greenhouse gases or a proof that a certain amount of greenhouse gas emissions is being avoided.

Carbon markets comprise two distinctly different markets: 1) the regulated markets where demand is created by legislative mandates, and 2) the voluntary markets where emitters or individuals causing emissions can offset these emissions by purchasing verified emissions reductions (offsets). Voluntary demand originates in a combination of private and corporate social responsibility and commercial advantages derived from accommodating preferences in retail, labor and financial markets. As evident from Figure 1, the voluntary market which represents a significant share of “Other” is dwarfed in size by current and prospective regulated markets.

Figure 1: 2007 Carbon Market - Volume (MtCO₂e)



Source: Point Carbon

Mandatory carbon trading programs essentially comprise two alternative approaches. Regulation may address individual emitters' level of emissions by mandating specific emissions reductions or carbon intensity levels. To comply under this type of program (also referred to as baseline and credit programs), emitters face the choice of reducing emissions or surrendering verified emissions reductions (credits/offsets) for any shortfall between their actual emissions and their target level emissions.

Alternatively, regulation may address emissions of a group of emitters by placing a total cap on their permissible emissions known as "cap and trade." In cap and trade programs, emitters need to surrender rights to emit (allowances or credits) equal to their measured emissions. As most cap and trade programs cover a limited geographic area or selected emission sectors, they can be combined with verified reductions from outside the program to offset emissions increases above the cap. Provided certain conditions are met, this creates fungibility between offsets and allowances. Both instruments carry the same environmental value and can be used for compliance interchangeably. While the concept of trading verified emissions reductions may carry environmental attractiveness, offsets have met challenges because it has proved very difficult to establish appropriate "business as usual" benchmarks against which reductions should be measured.

In principle, regulators face the choice of adopting either of these two main market models as their fundamental approach to regulate emissions. Cap and trade based emissions trading programs seem to be the most favored approach despite the existence of baseline and credit programs in Australia and Canada.

Environmental efficiency

To provide a legitimate contribution to climate change goals, emissions trading must deliver real and cost efficient emissions reductions. The quality and the value of offsets and allowances can be viewed as a proxy for the environmental integrity of a program. An allowance (a right to emit one ton of carbon) only holds value if there is a shortage of allowances relative to business as usual emissions levels. The price of the allowance should then correspond to the marginal cost of reducing emissions to the target level.

To be legitimate, it is widely recognized that carbon credits or offsets need to represent real, additional, permanent and verifiable reductions in emissions of greenhouse gases. Real reductions are measured net of any indirect emissions increases caused by a reduction measure. Being additional - maybe the most contested property of many offsets - requires that the emissions reductions go above and beyond business as usual, i.e. exceed any reduction that would occur in the absence of the financial incentive stemming from climate change regulation. In addition, emissions reductions should be permanent, e.g. sequestered carbon should not resurface through tectonic activities, wildfire, or other unforeseen events. Finally, reductions need to be verifiable, in the sense that emissions reductions reported can be endorsed by an objective third party.

Upon satisfying these preconditions, offsets are legitimate greenhouse gas reductions that can be used to offset an emissions reduction target on an individual, regional or even national level. However, both the Kyoto protocol and most national environmental policies place limits on the extent offsets may be used to justify emissions growth. Most policies adopt carbon trading as supplemental to domestic reduction efforts. Supplementarity is a manifestation of widespread political imperatives that climate change needs to be combated by measurable actions to reduce greenhouse gas emissions at a local and national level.

Regulators face the choice of adopting either a credit based program or a cap and trade based emissions trading program. Cap and trade programs seem to be the most favored approach.

It is widely recognized that carbon credits or offsets need to represent real, additional, permanent and verifiable reductions in emissions of greenhouse gases.

Economic efficiency

Certain conditions need to be in place for markets to evolve and eventually develop into efficient commodity markets. Initially, it is critical to recognize that carbon markets, with the exception of voluntary demand, are not natural markets. Demand is not driven by consumer preferences, but mainly created by climate change legislation. In fact, most significant parameters of cap and trade markets are set by regulation.

In creating regulated markets, legislators and regulators need to be sensitive to the prerequisites of efficient markets. Without this recognition, carbon markets may not deliver the advantages that traded markets can potentially provide over other policy options. At the same time, regulated entities and market participants need to be sensitive to the fact that carbon markets are policy tools and, as such, are vulnerable to changing political priorities. Political risk is prevalent in most markets, but to an even greater extent in markets created by political imperatives and legislation.

For markets to reach an advanced stage of development and economic efficiency, they need to be characterized by:

- Standardization
- Liquidity
- Transparency
- Predictability

Standardization is achieved by the uniformity of the commodity being traded. Can the properties of the commodity be clearly defined and measured? The fewer product variants that are traded, the more transparent and larger the market is likely to become. Currently, a greenhouse gas allowance (i.e. a right to emit 1 ton of CO₂e) is a well-defined tradable financial instrument (e.g. the European Union Allowance (“EUA”) in the EU ETS.) However, if different programs do not mutually recognize each others’ allowance types, these allowances will not be fungible and they could potentially trade at different price levels in their respective markets. Offsets or verified reductions in greenhouse gases can be transformed into a uniform product on the basis of their global warming potential. However as the rules and practices surrounding multiple offset programs are different, buyers tend to prefer certain programs or offset types. Currently, the offset market is a very diverse market with a wide range of standards, products and prices. Certified Emission Reductions (“CERs”) from CDM and Emission Reduction Units (“ERUs”) from JI are among the most standardized instruments with prospects of developing reasonable liquidity and market acceptance.

Liquidity is an important prerequisite of an efficient market. Liquidity can be measured in terms of transaction volume, frequency and price spread between bid and ask prices. A narrow price spread is an indicator of a liquid market. Liquidity is important for market confidence. In order to attract a high volume of transactions, many market participants need confidence that transactions of different sizes can be made quickly and at uniform and predictable prices. In liquid markets, large transactions do not move prices noticeably. Sufficient liquidity hence attracts transactions and breeds more liquidity. The price then becomes a trusted reference which again is a prerequisite to support a derivative market on top of the cash market. To achieve liquidity and transparency we need large markets with many players as well as market infrastructure that reduces risk for counterparties, minimizes transactions cost and maximizes operational efficiency.

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Reliable information on market prices, volumes and transaction behavior provides companies, investors and governments with critical benchmarks to assess carbon exposure, to inform investment and transaction decisions as well as to conduct policy and regulatory analysis.

From a public policy perspective, market transparency facilitates market oversight and regulatory development and enhances public acceptance of market-based environmental policies.

Derivative markets are efficient means by which large players hedge or manage risks associated with volatile cash markets. Currently, with the exception of the EU ETS, most regional carbon markets are too small to be considered liquid. Markets need size to develop economic efficiency. Size can be achieved by creating effective linking mechanisms or preferably merging multiple carbon trading programs.

Market transparency enhances the efficiency of markets by providing market participants with symmetric information. Reliable information on market prices, volumes and transaction behavior provides companies, investors and governments with critical benchmarks to assess carbon exposure, to inform investment and transaction decisions as well as to conduct policy and regulatory analysis. Market information enhances possibilities of exploiting arbitrage opportunities and hence improves the linking of dispersed markets. Not all market participants are equally well served by transparency, but symmetric information generally contributes to a fair and level playing field and enhances market participation. Exchanges typically provide the best transparency in terms of access to market data such as transaction prices and volumes, price spreads and contracts.

From a public policy perspective, market transparency facilitates market oversight and regulatory development and enhances public acceptance of market-based environmental policies. Transparency is an important consideration of European Union (“EU”) financial market regulation as well as a fundamental goal of the US Securities and Exchange Commission. The EU ETS has reached a fair level of market transparency through disclosure of transaction data from the prominent exchanges, through the Community Independent Transaction Log (“CITL”), and through independent third-party information providers. The primary CDM market has an advanced level of transparency at the project and process level due to the disclosure requirements in the CDM (including public review requirements), but there is limited availability of price and transaction data. Currently, voluntary offset markets have a limited level of transparency.

Market certainty is an issue particularly relevant for carbon markets as their existence is politically motivated. Often carbon markets and their regulation are time constrained. This is significant to how markets price risk and, as a result, has an impact on the final cost effectiveness of carbon trading as a climate change policy option. Investors (e.g. in power plants) need confidence in the existence and levels of a carbon price over a time-span of 30 to 40 years of which the first 20 years are economically very significant. Correct market prices ensure that the markets perform their economic function of efficiently allocating capital resources. If markets price a high level of risk into carbon prices due to political uncertainty, it may impede the functioning of the market as a means of stimulating carbon reduction investments at the lowest cost. The EU ETS initially failed to provide investors with a desired level of certainty. However, recent announcements have indicated a lifespan of the European program until 2020, but critical parameters defining the stringency of this scheme are pending the outcome of global climate policy negotiations.

Chapter 2: State of the global carbon market

Introduction

The global carbon market is growing rapidly. In the first half of 2008 (\$59 billion) it almost reached the level for all of 2007 (\$63 billion). This growth is predominantly attributable to the EU ETS and increasing interest in global Kyoto credits (CDM/JI). As new regional trading schemes emerge, the market is faced with a variety of new national compliance certificates, registries, protocols, and accounting systems. This chapter will address the fragmentation of the mandatory and voluntary carbon reduction schemes and demonstrate the impediments that these create in the context of developing a truly international carbon market.

Compliance markets

Compliance markets, and particularly the EU ETS, dominate the international market for carbon credits both in volume and financial value.

Table 1: Compliance Markets

Name	Type	Start Date	Cap Size MtCO ₂ e	Value (2007)	Allowance Price (2007)
New South Wales Greenhouse Gas Abatement Scheme	Baseline and Credit	2003	N.A.	\$81 Million	\$3 - \$10
EU Emissions Trading Scheme	Cap and Trade	2005	2,100	€28,133 Million	€12.60 - €30.75
Alberta Abatement Scheme	Baseline and Credit	2007	N.A.	N/A	N/A
New Zealand ETS	Cap and Trade	2008	62	N/A	N/A
Swiss Federal ETS	Cap and Trade	2008	4	N/A	N/A
Regional Greenhouse Gas Initiative	Cap and Trade	2009	171	N/A	\$3.07 - \$8.45

Source: Point Carbon

The Kyoto market

The Kyoto market is the largest cap and trade carbon market in existence yet. It is a market between the compliant entities of the Kyoto Protocol – the 37 national states of Annex B – which have committed themselves to an average of 5 percent total emissions reductions during the period from 2008-2012 compared to their 1990 emissions levels. Compliant states are assigned AAUs equivalent to their cap and can trade these between them. Carbon credits developed under CDM (CERs) and JI (ERUs) can be used by nations for compliance under the Kyoto Protocol or by businesses for compliance under cap and trade programs such as the EU ETS. It is not expected that AAUs will be traded to any great extent. However, the Kyoto market has become an important driver in creating global emissions reductions and transactions under the CDM/JI mechanism. In 2007, the CDM and JI market traded a total of 0.6 billion tons and \$18 billion worth of credits.

European Union Emission Trading Scheme

The EU ETS cap and trade scheme began in 2005 and is the world's largest carbon market among private entities. The scheme covers energy and industrial sectors of 27 European countries with a total cap of 2.1 billion tons of CO₂e/year. The traded instrument is the EUA. As of the writing of this report, the price for Phase 2 EUAs is in the range of \$22-25/ton. The total value of trading in the EU ETS was approximately \$44 billion in 2007. Emitters are allowed to use CDM/JI offsets for compliance subject to individual quantitative restrictions. The EU ETS has not yet created significant emissions reductions within the EU, but it has been the main driving force behind the development of thousands of emissions reduction projects under CDM in more than 100 developing countries. Estimates from the World Bank indicate that CDM has leveraged \$59 billion of investment capital to developing countries in the 2002-2007 time period.

New South Wales Greenhouse Gas Abatement Scheme (GGAS)

The New South Wales GGAS is the oldest carbon market coming into effect in 2003. Unlike cap and trade programs, the GGAS places an intensity cap of 7.27 tons of CO₂ per capita on power supplies. Compliant entities are limited to use verified emissions reductions from Australia for compliance. The market has traded in the \$3-10/ton² range and was valued at \$81 million in 2007. The program has been contested by concerns over lack of additionality and uncertainty regarding eventual replacement by a federal Australian program.

The Alberta Abatement Scheme

The Canadian province of Alberta introduced a carbon market in 2007 requiring all large point-source emitters to reduce the carbon intensity per unit of production by 12 percent. Only offsets produced in Alberta are eligible for use under this scheme. Emitters can meet their compliance obligation by buying into the government-run technology fund at \$15/ton³, putting an effective price cap on the market.

The New Zealand Abatement Scheme

New Zealand has recently introduced an economy-wide cap and trade scheme that will cover the forestry sector in 2008 and will sequentially include additional industries until in 2013, when the entire economy will be covered. When all economic segments are included, the scheme is expected to cover 62 million tons of CO₂e. For the initial period (2008-2012) compliant entities will be allowed to surrender both local allowances (called "NZUs") and Kyoto units (with restrictions) for compliance purposes. Offsets also can be generated by non-covered economic segments within New Zealand.

The Swiss Abatement Scheme

The Swiss emissions trading scheme began in 2008. Emission allowances are allocated to the companies free of charge, and CDM/JI credits may be used to cover a maximum of 8 percent of the target reductions. Point Carbon estimates the size of the covered market at 4 million tons of CO₂.

² Exchange rate A\$= \$0.83

³ Exchange rate C\$=\$1.00

The Northeast Regional Greenhouse Gas Initiative (RGGI)

RGGI is the first mandatory compliance market in the United States, covering 188 short tons of carbon emissions from power producers in 10 northeastern states: Connecticut, Delaware, Maryland, Massachusetts, Maine, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. RGGI is set to begin in January of 2009. RGGI permits the use of offsets and allows increased use and wider origination of offsets depending on market prices. At lower prices offsets must be sourced from within the United States, either in RGGI states or in states which sign a memorandum of understanding. Upon reaching the maximum price threshold, participants are eligible to use EUAs and CERs to meet a portion of their compliance. During the first allowance auction held on September 25, 12.5 million allowances were sold at a price of \$ 3.07/ton.

Up-and-coming compliance markets

The federal government of Australia recently released a green paper outlining a federal economy-wide cap and trade scheme covering all six Kyoto gases. The scheme is expected to come into effect in 2010 and would cover an estimated 446 million tons of CO₂e in 2010. Kyoto credits would be eligible for compliance within certain quantitative limitations. The federal government of Canada has released a climate change plan in 2007 that is intended to reduce emissions 20 percent by 2020, and 60 to 70 percent by 2050 relative to 2006 levels. The baseline and credit trading program is expected to start in 2010 and force covered entities to reduce their emissions intensity by 18 percent below 2006 levels and then an additional 2 percent each year. Offsets can be sourced domestically from non-covered entities and all CDM projects are eligible but limited to 10 percent of each firm's compliance target. Cost containment mechanisms have been suggested that are likely to limit the attractiveness of using international offsets.

Currently, there are no details as to the state of the United States federal emissions trading scheme. Although there has been increased interest in climate change legislation, the most likely candidate, the Lieberman-Warner Climate Security Act, failed to pass a senate vote in June of 2008. The Lieberman-Warner Act would start out with a cap at approximately 5.8 billion tons of CO₂e. Point Carbon expects federal climate legislation to be enacted some time after 2010.

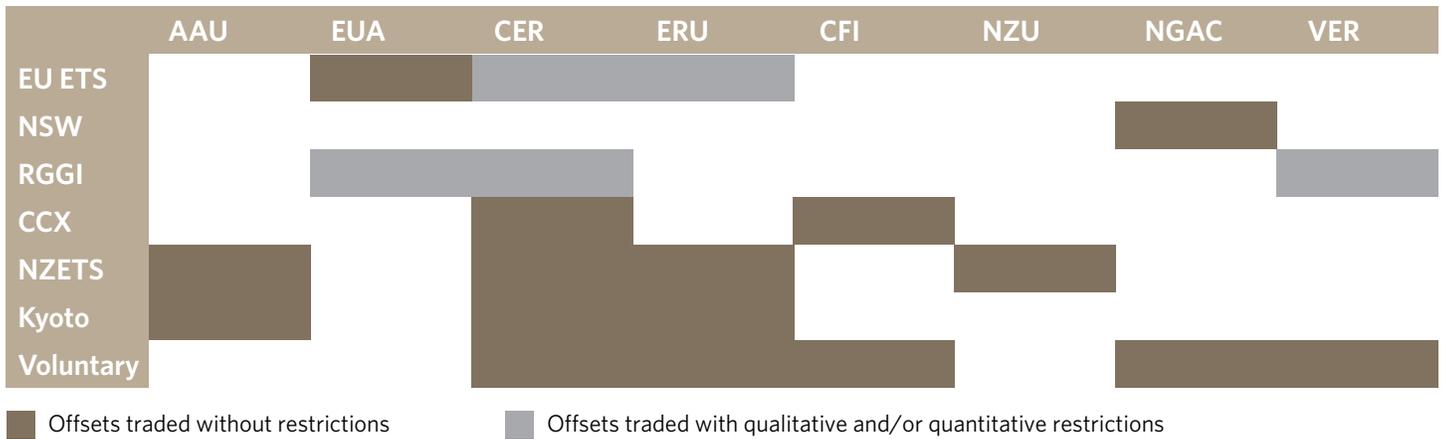
The Western Climate Initiative includes California and five other states; New Mexico, Oregon, Washington, Arizona, and Utah as well as four Canadian provinces British Columbia, Manitoba, Ontario and Quebec. It was formed in February 2007, and member states have committed to a 15 percent greenhouse gas emissions reduction goal below a 2005 baseline by 2020. If implemented, the plan could reach a cap of approximately one billion tons.

The Midwestern Greenhouse Gas Accord consists of Iowa, Illinois, Kansas, Minnesota, Wisconsin, Michigan, and Manitoba. The Midwestern Greenhouse Gas Accord was signed in November 2007, and aims to incorporate an approximate emissions target of 16 percent below 2005 levels. The program is intended to start in 2012 and will incorporate a regional cap-and-trade system covering most sectors of the economy. The scheme is expected to cover approximately 1.1 billion tons of CO₂e by 2012.

Global Warming Solutions Act, AB 32 (California) is a California Law that in 2006 mandated the first state-wide total economy cap on greenhouse gas emissions in the US. The law requires the California Air Resources Board (CARB) to create, monitor, and enforce a greenhouse gas reporting and reduction program that will bring the state to a 1990 level of emissions by 2020. On or before January 1, 2011, CARB must officially put into place specific regulations to achieve the global warming emissions reductions. A cap and trade program is expected to be put in place that would cover nearly 427 million tons of CO₂e.

In conclusion, the various mandatory programs in operation place very specific requirements on which allowances and credits are eligible to be used for compliance. The lack of common recognition of each others' compliance instruments (see Table 2) pose a challenge to the development of fungible, liquid and efficient markets.

Table 2: Offsets Traded Under Various Programs



Source: The World Bank, "State and Trends of the Carbon Market 2008"

The lack of common recognition of each others' compliance instruments pose a challenge to the development of fungible, liquid and efficient markets.

Voluntary markets

The voluntary market remains a small but growing portion of the overall global carbon market. Volumes and values tripled from 2006 to 2007, which witnessed the trade of 65 million VERs worth \$337 million (if Carbon Financial Instruments ("CFIs") traded on the Chicago Climate Exchange ("CCX") are included)⁴. The strong growth and variety of products offered in the voluntary space have spurred the development of numerous standards and registries designed to give consumers confidence that the credits they purchase are real and verifiable. In 2007, 87 percent of credits transacted in the over-the-counter ("OTC") market were verified by a third party, with the most widely used standard being the Voluntary Carbon Standard ("VCS"), followed by VER+ and the Gold Standard. In addition, the CCX is using its own set of standards for voluntary offsets. These standards offer guidance as to the type of projects that qualify for offsets, how their environmental qualities should be assessed, monitored, reported and verified, etc. The main features of these programs are listed in Table 3.

4 Ecosystem Marketplace & New Carbon Finance "State of the Voluntary Market 2008"

Another set of standards applies to the specific methodologies adopted for monitoring, verification and reporting of emissions reductions. The ISO 14064/65 standards are part of the International Organization for Standardization (ISO) family of standards. The ISO standards are not intended to support a particular greenhouse gas program, but are instead designed to be “regime neutral” so that they could be utilized by any abatement program⁵. The World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI) Protocol for Project Accounting (WBCSD/WRI GHG Protocol) is a widely accepted set of guidelines used by project developers and incorporated into numerous standards, such as the California Climate Action Registry (“CCAR”) Protocols and the ISO 14064 standards.

Table 3: Voluntary Markets

Standard name	Sponsoring organizations	Volume certified to date	Project types	Additionality requirements	Registry
Gold standard for voluntary emissions reductions (VGS)	Gold standard foundation	730,887	Renewable energy, energy efficiency	Same as UN	Gold Standard database
VER+	TUV SUD	981,512	Any except nuclear, large hydro	Same as UN	Blue Registry
Voluntary offset standard (VOS)	International Carbon Investor Services (ICIS)	N.A.	Any except nuclear, HFC-23, large hydro	Same as UN	-
Community Climate Biodiversity (CCBA)	CARE, Nature Conservancy, Rainforest Alliance, others	45,695	LULUCF	Various: financial, political barriers, common practices, etc.	CCBA database
Carbon Financial Instrument	Chicago Climate Exchange (CCX)	50,462,900	Methane, soil, forestry, renewables	Benchmark: beyond BAU; top performers	CCX
Voluntary carbon standard (VCS) version 1-3	IETA, Climate Group, World Economic Forum	N.A. ⁶	List of 15 categories; LULUCF, others tbd	Includes performance standards, barrier analysis	The Bank of New York Mellon. APX, TZ1, CDC

Source: Point Carbon, “Voluntary Carbon Markets: Lost in transactions?” and Bank of New York Mellon

In addition to verification standards, supplier certifications are intended to provide a mark of quality recognizable by consumers wishing to engage in the voluntary space. The newest is the proposed UK-based Code of Best Practice for Consumers & Voluntary Code of Best Practice on Carbon Offsetting. In the United States, the Green-e Climate Standard was launched in early 2008 and developed primarily to provide certification services for retail providers retiring carbon credits to sell as carbon offsets to customers. This program awards certification to specific project-based standards including the CDM, the Gold Standard, and the VCS. However being unregulated instruments, VERs do not qualify for compliance under established mandatory markets.

⁵ http://www.climatechange.sgs.com/iso_14064_climatechange

⁶ Approximately 37 projects have registered with The Bank of New York Mellon’s VCU registry as of Nov 2008.

Market statistics - traded volumes

Although the voluntary market grew significantly in 2007, the compliance market still dwarfs the voluntary space (VERs and CFIs) both in volume traded and financial value.

Table 4: Trading Volume by Offset Type

	2006		2007		2008 (H1)	
	Volume (Mt)	Value (\$ mil)	Volume (Mt)	Value (\$ mil)	Volume (Mt)	Value (\$ mil)
EUA	1,017	28,738	1,643	44,560	1,296	47,543
CER	563	6,209	947	18,594	502	12,011
ERU	21	150	38	516	26	440
VER	14.3		42	258	N/A	N/A
CFI	10.3	38	23	72	N/A	N/A

Source: Point Carbon, New Carbon Finance: "VER/CFI: Ecosystem Marketplace"

The carbon market continues to mature financially with a variety of exchanges now offering a selection of EUA and CER contracts and derivatives. The market is still dominated by OTC transactions, but the share of exchange-traded carbon products is growing. The major player is the European Climate Exchange ("ECX"), with Nord Pool, BlueNext and the European Energy Exchange posting smaller market shares. Review of data from the major exchanges reveals that the carbon market still has more room to grow. Nearly 2/3 of all transactions registered on the largest carbon exchange, the ECX, are clearing services offered for OTC transactions. EUA futures are the most widely traded contracts followed by EUA spots and CER futures

Table 5: 2007 Traded Volumes (Mt CO₂e)

	ECX	BlueNext	EEX (Carbix)	NordPool	Totals
EUAs					Total Exchange
Spot	-	23,703,000	3,474,977	1,408,000	28,585,977
Futures	373,399,000	1,065,000	9,067,000	25,290,000	408,821,000
Options	10,731,000	-	-	-	10,731,000
CERs					
Futures	27,485,000	-	-	5,667,000	33,152,000
Total Exchange	411,615,000	24,768,000	12,541,977	32,365,000	481,289,977
OTC (All Instruments)					Total OTC
Cleared Volume	777,338,000	-	10,127,166	64,143,000	851,608,166
Uncleared	-	-	-	-	157,455,834
Total OTC	1,188,953,000	24,768,000	22,679,143	96,508,000	1,009,064,000

Source: ECX, BlueNext, EEX, NordPool, Point Carbon

Transaction infrastructure

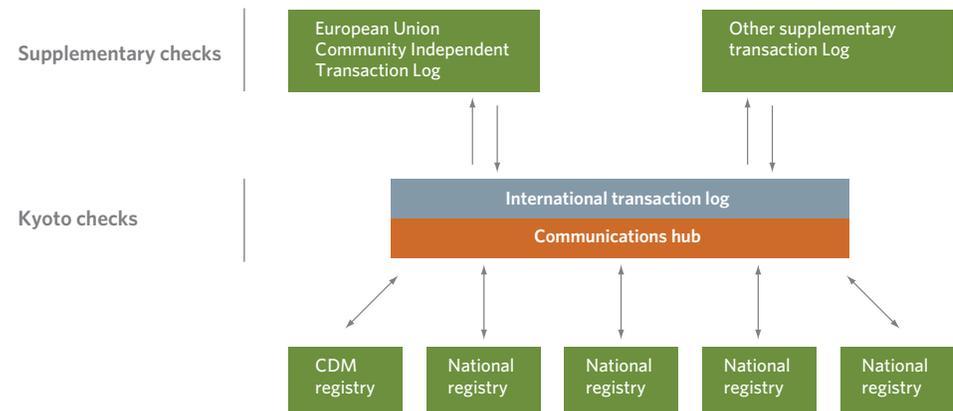
Registries are the backbone of the carbon market and are used to track emissions of individual entities, emissions reductions and transactions between participants.

Registries are the backbone of the carbon market and are used to track emissions of individual entities, emissions reductions and transactions between participants. An effective system of registries is critical for an intangible good like carbon to ensure against double counting of emissions reductions and final retirement of credits.

International Transaction Log - Community Independent Transaction Log

The purpose of the Kyoto International Transaction Log (“ITL”), and European Community ITL (“CITL”) is to ensure the accurate accounting, issue, holding, transfer, and surrender of carbon allowances across Kyoto and EU ETS participants. The ITL records the holdings of Kyoto units, and any transactions involving them, through a structure of accounts. This is similar to the way that banks record balances and movements in money using accounts allocated to individuals. The CITL and national registries process unit types and transactions defined under emissions trading schemes, such as EU ETS. It is important to note that the CITL and ITL record only movements of the physical instruments, all of the financial transactions associated with carbon trading are handled externally of the emissions registries.

Figure 2: International Transaction Log



Source: UNFCC

The voluntary markets differ greatly in this respect. Although there is increasing use of third-party standards and OTC registries in the voluntary space, there is, to date, no central registry confirming the data between the voluntary registries. Some voluntary standards, such as the VCS and the Gold Standard, maintain their own supplier database to ensure that their VERs don't end up in multiple registries and thus maintain the environmental integrity of their standards. In addition to voluntary standards, many retailers maintain organization-specific registries. The following is an overview of some of the most widely used OTC registries in the voluntary space.

Environmental Resources Trust (“ERT”) Greenhouse Gas Registry Program

The ERT Greenhouse Gas Registry is the longest-standing registry in the voluntary carbon markets. Created in 1997, the registry tracks VERs and actual carbon credits. Both buyers and suppliers can register credits that they may either re-sell or retire. The ERT registry provides third party validation and verification services with standards varying on a case-by-case basis. In March, 2007, ERT selected APX to provide technological support for its Greenhouse Gas Registry Program.⁷

The Bank of New York Mellon’s Global Custodial Registry Service for Voluntary Carbon Units

The Bank of New York Mellon’s custodial registry was created to become a means of accounting for the VCS VCUs, and aims to streamline delivery and settlement of VCUs. This centralized, electronic accounting system stores VCUs, assigns each a unique serial number for tracking and verification purposes, and provides clear parameters for defining account ownership. The custodial registry requires that its credits are certified under the VCS and the account information of members is not publicly disclosed.⁸

The California Climate Action Registry’s Climate Action Reserve (“CCAR”)

The CCAR was established by California law as a non-profit voluntary registry for greenhouse gas emissions to protect and reward California companies for pre-compliance emissions reductions. Building on its emissions reporting system, CCAR partnered with APX Inc. in 2007 and launched the Climate Action Reserve to track and register voluntary projects verified to CCAR protocols.⁹

The Chicago Climate Exchange (“CCX”) Registry

The CCX registry is an accounting system for the CCX’s cap and trade scheme. Suppliers seeking to include their credits in the registry must first become members and then have their offsets approved by the CCX Committee on Offsets, which assigns serial numbers to ensuing third-party verified credits. Because both emission reduction allowances and project-based offset credits are traded on the CCX, the registry is both an emissions reductions tracking program and a carbon credit accounting system. The registry is transparent and provides publicly-available information regarding transaction volume, the offset provider/aggregator, project type, and location.¹⁰

TÜV SÜD’s BlueRegistry

TÜV SÜD created the BlueRegistry to track certified VERs and renewable energy credits. Initially, the database was exclusive to VER+ credits and renewable energy certificates. However, TÜV SÜD is now working to transform BlueRegistry into a “master” registry for verified voluntary carbon credits. The BlueRegistry is designed to be transparent, and maintains publicly available information on factors such as credit-type, credit ownership and vintage.¹¹

7 <http://www.ecoregistry.org/>

8 <http://www.bnymellon.com/news/commentaries/issuerservices/vcu.pdf>

9 <http://www.climateregistry.org/>

10 <http://www.chicagoclimatex.com/content.jsf?id=501>

11 http://www.tuev-sued.de/technical_installations/energy_and_environmental_services/environmental_services/climate_change/blueregistry

Chapter 3 Vision of a global carbon market

Introduction

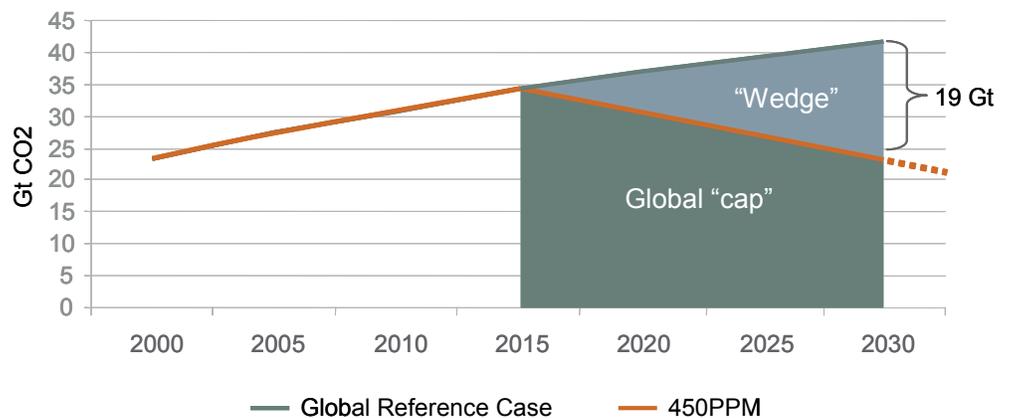
While the EU ETS program holds the promise of becoming an environmentally and economically efficient market, the current state of other global carbon markets leaves much to be desired. In Chapter 2, we observed that there is significant segmentation, multiple standards, registries and lack of transparency. There are powerful political signals that future climate change agreements may curtail the use of free markets. While having successfully channeled huge amounts of capital to projects in developing countries, CDM is being accused of a lack of additionality and bureaucratic procedures. In this chapter, we address the potential and advantages of expanding global markets, identify the main obstacles to reaching environmental and economic efficiency and discuss the measures needed to develop larger and more efficient markets. We also address the critical question of how markets can deliver the desired combination of environmental effectiveness and economic efficiency.

Market potentials

Institutions such as the US Energy Information Administration (“EIA”), International Energy Agency (“IEA”) and EU all provide forecasts of future emissions of carbon dioxide indicating that in the absence of stringent measures to curtail emissions, carbon dioxide emissions will increase from annual levels of 23 Gt (billion tons) in 2000 to 40-42 Gt by 2030.

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (“IPCC”) concludes that if increases of global average temperatures are to be kept within 2.0 -2.4 °C, CO2 emissions would need to fall 50-85 percent below the 2000 level by 2050. The IEA estimates that this scenario (450 parts per million, or PPM) would require CO2 emissions to fall to around 23 gigatons (“Gt”) (~2000 levels) in 2030. Emissions would then need to be cut by another 12-20 Gt by 2050.

Figure 3: Global CO2 emission forecast - 450 PPM reduction scenario



Source: Point Carbon, EIA, IEA and EU

Figure 3 depicts how emissions of CO₂ would have to develop to achieve a 450 PPM scenario, compared to a reference scenario (assuming status quo) constructed from an average of EIA, IEA and EU forecasts. Such a scenario – by many observers viewed as very ambitious and optimistic – could support a “global cap and trade scheme” with a cap gradually falling to 23 Gt in 2030 representing a theoretical maximum size of a global carbon market in terms of physical volume (CO₂). Emissions reductions compared to the reference scenario would have to reach 19 Gt of CO₂. Using a cross-section of available cost estimates, the requirement to reduce emissions by 19 Gt by 2030 would entail marginal abatement cost in the low \$50-100 tCO₂ range, supporting a market upward of a \$1 trillion based on a marginal cost pricing.

As a global cap and trade program of this size seems very unlikely, the target could inter alia be met by a combination of regional cap and trade programs (trading under the cap) with other jurisdictions offering carbon reduction credits (trading reductions from the wedge). In the mid-term we see the potential of direct or indirect linking of regional cap and trade programs comprising emitters in Europe, North America and Oceania/Asia, possibly reaching a combined cap of over 9 Gt. To put this market potential into perspective, the current EU program is capped at approximately 2 Gt/year while a federal US program most likely would be capped initially below 6 Gt/year. Point Carbon estimates that a linked global cap and trade market could reach a turnover of \$3 trillion by 2020 (at a carbon price \$75/t)¹².

A derivative market on top of a liquid homogenous cash market could reach up to multiples of ten times on top of physical volume. Table 6 shows velocity rates or market turnover rates¹³ for a selection of commodities and financial instruments. The numbers clearly indicate the immature nature of carbon markets and the growth potential inherent in this market.

Table 6: Market Turnover Ratios

Market	2005	2006	2007	2008 YTD
EUA - Carbon	12	41	66	102
EU Continental Power - Emerging market	60	120	150	N/A
London Stock Exchange	110	125	154	N/A
NASDAQ	250	270	303	N/A
Crude Oil	430	467	730	N/A
Nordic Power - Mature market	770	820	950	N/A

Source: World Federation of Exchanges, Point Carbon

¹² Point Carbon: Carbon Market Analyst May 2008. Carbon market transactions in 2020: Dominated by financials?

¹³ Percentage numbers indicate that at a turnover rate of 100, annual transaction value equals the value of the underlying assets - all instruments on average exchange hands once. Carbon velocity rate is calculated as the sum of all vintages divided by annual allocation/cap.

Impediments to efficient carbon markets

Efficiency of carbon markets come with size and geographic reach. Being political markets, the potential growth of the global carbon market first and foremost rests on political decisions concerning the role of market-based mechanisms as a means of reaching reduction targets - be it at state policy level or in global climate change negotiations.

Global climate change policy has significant implications on the interests of sovereign states and distributional implications need to be resolved through international negotiations. The potential of emission leakages to countries with more relaxed climate change policies, e.g. through transfer of manufacturing and jobs, makes climate change policy intimately linked with trade policies. Access restrictions to global carbon markets are increasingly considered as a means of forcing countries to assume climate change commitments while limited evidence has been put forward that such solutions would support environmental and economic efficiency. Both proposals for a new EU directive for Phase 3 of EU ETS and legislative proposals for federal cap and trade programs in the United States include such provisions.

We expect that many developed nations will favor internal abatement, even though such policies do not support the most cost-effective approach to reach greenhouse gas reduction targets.

The extent to which regions that are committed to capping emissions connect to a larger global cap and trade system will depend on the differences in stringency among different programs. National targets will depend on levels of economic development and environmental ambitions and will be set commensurate with what host nations find palatable. Differences in program stringency will yield different carbon price levels and compliance costs. Such disparities may limit the scope of linking because uninhibited linking would equalize prices and thus impose a higher cost on one party than desirable.

Linking markets also will be restricted by political priority to domestic emissions reductions. The European Union has aimed at achieving at least 50 percent of their emissions reduction target through EU-wide emissions reductions and the remainder through global carbon trading. Recent EU proposals seem to indicate that the emphasis on domestic reductions will be strengthened after 2013. Environmental non-governmental organizations (“NGOs”) strongly favor domestic action. We expect that many developed nations will favor internal abatement, even though such policies do not support the most cost-effective approach to reach greenhouse gas reduction targets. Enforcement of complementarity through quantitative restrictions on the import of allowances or offsets reduces the scope of global trading and creates market and price segmentation due to the cost of domestic reductions. As a result, the price of domestic allowances are typically more expensive than prices in the global offset markets.

While a lack of common measure of environmental “quality” poses challenges to the development of efficient global carbon markets, it also challenges public perceptions and political views of the role of carbon markets in climate change policy.

The inclination of politicians to adopt market-based solutions also depends on political perceptions of the environmental effectiveness of carbon markets. Do carbon markets deliver reductions below a business as usual scenario? This question cuts to the center of the concept of offsets and their political legitimacy. Despite widespread recognition and attention to the environmental integrity of offsets, carbon markets have not progressed to a stage at which the principles of real, additional, permanent and verifiable reductions are implemented in a uniform fashion. While a lack of common measure of environmental “quality” poses challenges to development of liquid and efficient global carbon markets, it also challenges public perceptions and political views of the role of carbon markets in climate change policy.

These issues explain the lack of common recognition of offsets among and within compliance and voluntary carbon markets. There are multiple standards and controversial issues over important eligibility criteria. An example of this is the persistent resistance of the EU to accept Land Use Land Use Change and Forestry (“LULUCF”) offsets, while a US federal program would be very receptive to using such offsets. Although it is technically possible to link cap and trade schemes with different offset acceptance criteria, it could prove politically difficult to reconcile such differences and markets could develop classes of offsets with different prices.

While political decisions are critical to shaping carbon markets, their long-term role as preferred policy tools depend on their environmental and economic efficiency.

While political decisions are critical to shaping carbon markets, their long-term role as preferred policy tools depend on their environmental and economic efficiency. Standardization, liquidity, transparency and predictability are key prerequisites of economically efficient markets. Legislators and regulators need to be sensitive to the fact that many of these features depend on decisions being made when markets are designed. Ignoring this could cause carbon markets to fail in outperforming alternative regulatory options.

The important symbiotic relationship between physical cash markets and financial derivative markets is critical for markets to perform an efficient allocative function. For financial markets to thrive there needs to be a liquid and trusted cash market. Equally important, when an efficient derivatives market exists, players are encouraged to trade in cash markets because instruments are available to manage fundamental price risk. This is demonstrated clearly in the CDM market where the emergence of financial offset instruments will facilitate risk management in primary CDM transactions and hence attract further investments and new players.

When markets grow liquidity and offer market participants confidence, new players are attracted to the markets, such as financial institutions, hedge funds, etc. These participants will add a new level of financial professionalism to the market and generally help markets develop further liquidity and efficiency.

There are numerous issues of a technical nature that inhibit development of efficient markets. The efficiency of the “back office” of markets is central to the functionality as well as the confidence in markets. Lack of uniform standards on registries, emission monitoring, measurement and verification complicate linking and reduce mobility of credits and ease of transactions.

Specifically, the voluntary carbon markets have a variety of carbon standards, many classes of instruments and low transparency. A reliable transaction infrastructure is a prerequisite to establish confidence, reduce risk premiums and hence lower cost of compliance. The lack of transparency and existence of disputable practices in voluntary markets affect customer acceptance and also slow market penetration to the extent it impacts public perceptions of carbon trading in general.

Confidence in markets is building as new market participants and new and advanced financial instruments are introduced continuously.

Despite these impediments, we clearly see an increasing trend in the convergence and size of global carbon markets. Confidence in markets is building as new market participants and new and advanced financial instruments are introduced continuously. In the mean time it is realistic to expect a level of fragmentation and price differentiation among different market jurisdictions.

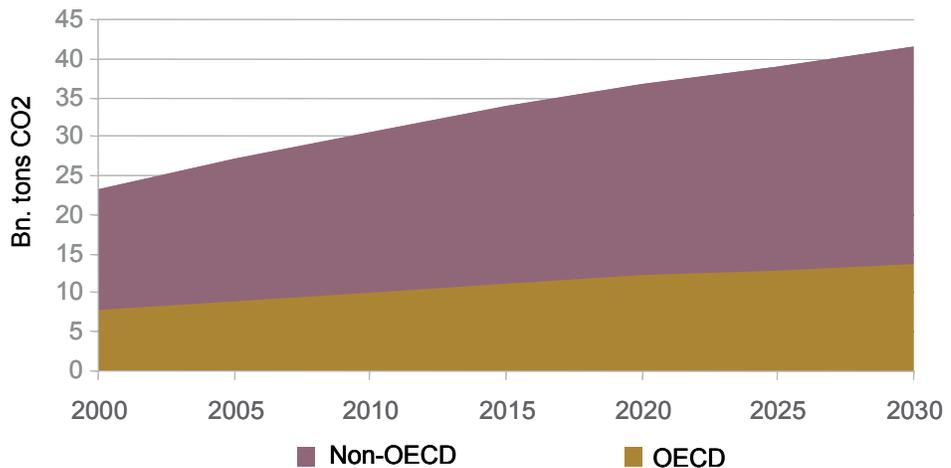
In order to sustain and develop, carbon markets need to provide environmental integrity and effectiveness as well as economic efficiency through standardization, liquidity, transparency and predictability.

The road to efficient global carbon markets

In order to sustain and develop, carbon markets need to provide environmental integrity and effectiveness as well as economic efficiency through standardization, liquidity, transparency and predictability. As many of these prerequisites are intimately connected to developments of climate change policies, we start by highlighting the significance and prospects of carbon markets as a global climate change policy option.

As recognized by the UNFCCC treaty, climate change policies need to address emissions reductions globally. As global negotiations proceed, new nations are likely to assume reduction commitments commensurate with their economic ability. The reasons for expanding emissions trading programs beyond industrialized nations are compelling. While per capita emissions in industrialized countries have reached significant levels, absolute emissions are growing faster in developing countries and economies in transition. Predictions from IEA, EIA and EU illustrate how emissions are expected to be distributed among developed and developing countries. These projections clearly demonstrate the imperative of engaging developing countries and their emissions reduction potential in global climate change policy solutions.

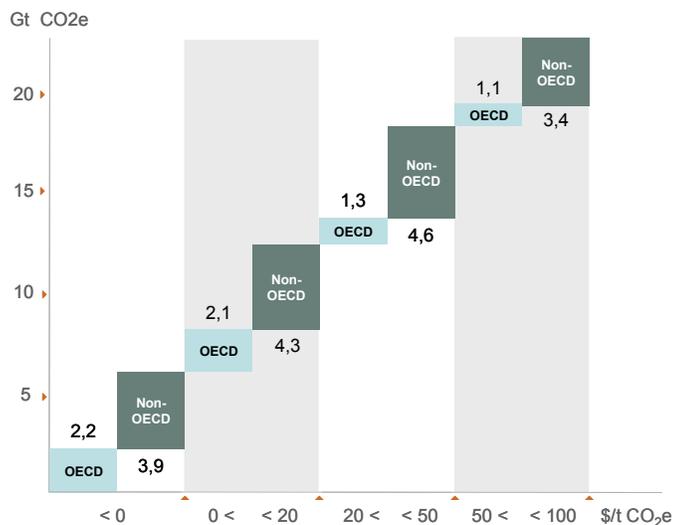
Figure 4: Average EIA-IEA-EU Projections of CO2 Emissions OECD vs . non-OECD



Source: Point Carbon, EIA, IEA and EU

The need to address the growing emissions in developing and transitioning economies is compounded by their economic benefits. The Intergovernmental Panel on Climate Change (“IPCC”) has issued estimates of global abatement cost and their distribution among economic regions. Figure 5 demonstrates the existence of large and low cost abatement potential in developing countries.

Figure 5: Global GHG Abatement Cost by Economic Region and Cost Range — 2030



Source: IPCC, IEA Graphic: Point Carbon

There is widespread agreement that reductions in greenhouse gas emissions will be achieved faster, in a larger scale and at lower cost if market-based solutions are adopted. The magnitude of reductions necessary to mitigate global warming requires solutions that allocate scarce resources – capital – to the lowest cost reduction opportunities. This was recognized by the Kyoto parties and became a key principle of the Protocol and the flexible mechanisms. This recognition needs to remain at the core of a continuation of the Kyoto Protocol or a similar global agreement on climate change. Irrespective of the difficult questions of equitable distribution of reduction commitments, free and uninhibited access to carbon markets should be available to all parties, and any constraint that could curtail markets and market-based mechanisms should be minimized.

As more countries adopt reduction targets and as more emitting sectors are included in cap and trade markets, we see an equivalent reduction in the volumetric scope of project-based markets.

While carrying political and moral significance, priority to domestic action (supplementarity) should not be implemented to the extent it impairs economic and environmental efficiency. Restrictions on linking increase cost of compliance and inhibit global markets and efficient capital allocation. Ideally, emitters should be faced with the widest set of options to reach their emissions reduction targets including the use imported allowances or offsets.

One of the greatest challenges facing evolution of global carbon trading is the future of project-based mechanisms. As more countries adopt reduction targets and as more emitting sectors are included in cap and trade markets, we see an equivalent reduction in the volumetric scope of project-based markets. However as substantial low-cost emission reduction potential is present in states that are likely to remain outside capped sectors, it is critically important to maintain and refine project-based mechanisms.

In the mid-term, we see the potential of direct or indirect linking of regional cap and trade programs comprising emitters in Europe, North America and Oceania/Asia. The process of direct or indirect linking of regional cap and trade markets would benefit significantly from a common approach to the use of offsets. Lack of consistent offset regulation contributes to price differentials among offsets types and among different capped markets.

Currently, the UNFCCC Kyoto project mechanisms are taking hits from several directions due to issues ranging from teething problems and politics, to misconceptions and erroneous accusations. Questions about the additionality of projects have resulted in the Executive Board of CDM developing stricter rules and improving enforcement of the program with the aim of safeguarding the environmental integrity of CDM.

Governments and politicians are simultaneously discussing different approaches to how this program can be taken forward as well as what role offsets, in general should play in various cap and trade program designs. Throwing the CDM mechanism into play has introduced significant political risk for project investors. Lack of predictability of long-term policy choices is likely to cause discontinuities in project investments in the CDM market which can already be observed from investor behavior relative to projects that will issue credits post 2012.

While there are aspects of the CDM mechanism that could be improved and are being addressed, we view CDM as the best point of departure for creating a scheme that could attract general recognition from the potential hosts of a larger global cap and trade program. This would require subscribing nations to multilaterally adopt and adapt the CDM according to mutually acceptable standards of environmental integrity, governance and procedural requirements as well as ensure adequate administrative resources to process the expected levels of offsets supplies.

Creating a common platform for offset eligibility is not an easy task. Despite common recognition that offsets need to be real, additional, permanent and verifiable reductions in emissions of greenhouse gases, there are challenges both in terms of interpretation, quantification and enforcement of these criteria. The concept of additionality is as critical to the environmental integrity of offsets as it is difficult to quantify. Ensuring the appropriate environmental quality and reputational aspect of offsets is a prerequisite to maintaining the position of offsets as a key abatement option. However the economic attractiveness of offsets is too compelling to be ignored and we believe international offsets should and will be an important component of cap and trade programs in order to contain the cost of ambitious political targets.

A uniform approach to offset standards would also need to address eligible sectors and jurisdictions. Particularly, there would be a need for a uniform approach to the use of offsets from land use and forestry sectors where, for example, the EU has been hesitant to move due to concerns over permanence, leakages, monitoring, etc. Lack of common recognition of offset categories could represent a potentially significant impediment to efficient linking of cap and trade programs.

The EU ETS and the CDM have reached a stage at which both systems recognize the advantages of uniform and standardized rules and procedures for accounting, monitoring and verification of emissions and emissions reductions. Proposals have been put forward in favor of harmonization. The necessity of harmonization also extends to the financial sector where the emergence of a new economic instrument has not yet been fully assimilated due to challenges such as lack of uniform financial accounting standards and taxation ambiguities.

Currently, large parts of the voluntary market do not satisfy transparency, liquidity and standardizations criteria required to be viewed as efficient markets. The abundance of standards prevalent in voluntary markets is not sustainable and further development of the voluntary market would be helped by a consolidation and harmonization of current work practices.

Despite common recognition that offsets need to be real, additional, permanent and verifiable reductions in emissions of greenhouse gases, there are challenges both in terms of interpretation, quantification and enforcement of these criteria.

Development of carbon market infrastructure

Being an intangible asset, the existence and title to carbon instruments needs to be managed by an electronic banking system – a registry – that tracks the whereabouts of the carbon units from their inception (issuance) to their final consumption (retirement). Registries are a critical part of the physical infrastructure of carbon markets performing several very important functions.

Ideally, registries should fulfill the following functions:

- Provide a reliable means of attaching title of a carbon instrument to a single account holder.
- Facilitate markets by providing transfer of title to carbon instruments between holders, while ensuring an auditable trail from issuance to retirement of the instrument.
- Provide regulators with a way of checking compliance in mandatory trading programs as account holdings can be quickly reconciled with compliance requirements and the proper amount of allowances/credits can be retired.
- Improve environmental integrity and public acceptance of carbon markets by providing transparency and a means of preventing multiple uses by ensuring that credits are appropriately retired.

Some registries currently in operation experience a number of issues related to ensuring title to instruments, providing good legal documentation and preventing double counting of environmental attributes.

While these criteria constitute prerequisites for supporting reliable and efficient markets, not all registries currently in operation provide users with adequate capabilities to meet these conditions. Typically, registries that are not part of a more comprehensive regulatory scheme experience a number of issues related to ensuring title to instruments, providing good legal documentation and preventing double counting of environmental attributes.

The Kyoto Protocol has instituted an internationally harmonized carbon registry including national registries aimed at tracking the various carbon units of the Kyoto Protocol. In the EU, these national registries have been expanded to cover the allowances traded under the EU ETS in order to provide consistency with each member state's possession of Kyoto instruments. Voluntary carbon markets have not yet achieved the same level of harmonization as regulated markets, with a few exceptions such as the Renewable Energy Certificate System ("RECS") of Europe that has demonstrated the ability to establish a multinational system for voluntary environmental markets.

Registries serve a vital role in creating an ownership trail for offsets. However, they are primarily designed to facilitate record-keeping for compliance purposes and are not designed to facilitate low-risk and low-cost financial transactions. In the regulated on-exchange markets, banks, and clearinghouses (associated with the various carbon exchanges), have stepped-in and are mitigating risk through the use of intermediate accounts in registries where the securities remain until transactions between buyers and sellers are closed. However, much trading today is done off-exchange in OTC markets. In these markets, the simultaneous movement of cash associated with the offsets is decoupled from the movement of offset positions in registries, creating delivery and payment risk and operational complexity for market participants.

The problem in voluntary markets is compounded by the multitude of registries and standards faced by potential investors. There is no consistent system to ensure that credits are not double-issued under multiple programs or even used for multiple purposes without being appropriately retired. As the various offset types represent different instruments, there is limited interconnectivity between registries. The voluntary market, being unregulated, has reached a state at which consolidation both in terms of standards and technical infrastructure is desirable. The diversity of standards and environmental qualities need to be addressed through contributions from investors and buyers aiming for greater harmonization of quality parameters, reporting, verification procedures, retirement rules, etc. In the voluntary market, players could be served by transaction platforms that bridge and manage holdings across multiple standards and instruments.

From the perspective of market makers and other financial intermediaries (broker/dealers, hedge funds, carbon funds, etc.) that are dealing with multiple portfolios and striving to promote market liquidity, the payment risk and fragmented infrastructure add cost and create operational complexity and burden. Fortunately, we do not have to look far for solutions to these issues. Precedent exists in the manner in which mainstream markets, such as equity and bond markets, have evolved.

The Bank of New York Mellon, an independent third-party, custody and trust bank, has the expertise and infrastructure required to drive transactional efficiencies and reduce operational complexity for all market participants. The Bank of New York Mellon is developing a “central custody and post-trade facility” that bridges the gap between existing infrastructure and the needs of a more robust financial market, such as:

The Bank of New York Mellon has the expertise and infrastructure required to drive transactional efficiencies and reduce operational complexity for all market participants.

- Single point of access to both the regulated as well as voluntary markets: Provides participants with a single view and means to access their entire Carbon portfolio (EUAs, CERs, VCU, etc.) and perform all transactions including trading, cancellation and retirements in one place.
- “Delivery against Payment:” Provides the ability to deliver offsets against participant’s cash accounts reducing the trading risk for counterparties.
- Clearing and settlement of offset trades: Provides independent trade/retirement validations and confirmations as well as support for the physical delivery of different offset types.
- Facilitating cross-border payments and transactions: Provides support to manage cross-border transactions in multiple currencies.
- Enhanced transparency and reporting for all constituents: Provides electronic storage and access to verification reports, audit trails and third-party validation of account holding and retirement accounts and aggregate retirement/credit information.
- Managing operational complexity and administrative burden: Provides scale and expertise to manage the administration and paperwork associated with different offset types.
- Providing the framework for more sophisticated risk management: Provides services such as escrow and collateral management as the market continues to mature.

Improving the connectivity and consistency between physical registries and transaction services provide confidence to market participants and reduce transaction cost and risk. Consequently, evolution of the infrastructure of carbon markets plays an important role and is even a prerequisite for development of a liquid, efficient and credible global carbon market.

Conclusions

We have identified that a larger and efficient global carbon market plays a key role in reaching global greenhouse gas reduction targets. By adopting the power of markets in allocating capital efficiently, the global community is likely to reach emissions reduction targets faster and at a lower cost than what is possible under current policies. While the EU ETS supported by the Kyoto markets has come a long way toward reaching the goal of a market-based and global approach, no other carbon markets – mandatory or voluntary – have reached a desired level of environmental integrity or efficiency. A review of existing climate change policies and carbon markets demonstrates a fragmented approach to addressing the global environmental challenge.

While markets can be powerful tools in support of environmental policy, they need to be liquid, standardized, transparent, and predictable to perform efficiently. We have identified political stumbling blocks that are likely to curtail the potential of efficient carbon markets, but we maintain a very optimistic view of the prospects of growth in global carbon markets.

Acceptance and deployment of market-based solutions will require the combined efforts of market participants in delivering real and cost-efficient reductions, and from politicians in recognizing and facilitating competitive markets. The financial industry can improve performance and credibility of markets and build confidence among investors and politicians through continued improvement of market infrastructure and transaction support services. The Bank of New York Mellon has a dedicated team, expertise and infrastructure to support market participants in achieving this goal.

About Point Carbon:

Point Carbon is a world-leading provider of independent news, analysis and consulting services for global carbon and energy markets. Point Carbon provides critical insights into energy and environmental markets and offers comprehensive services providing professionals with market-moving information through monitoring fundamental information, key market players and business and policy developments.

For more information about Point Carbon go to www.pointcarbon.com

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