

# WORKING PAPER

## U.S. Carbon Market Design: Regulating Emission Allowances as Financial Instruments

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## I. Executive Summary

Financial markets typically evolve as they grow over time, and regulatory changes often follow the development of new financial products or respond to failures in the market system. The de novo creation of a U.S. carbon market to reduce the nation's greenhouse gas (GHG) emissions presents lawmakers with the opportunity to design a transparent, efficient carbon market that builds on the best practices for market regulation and lessons learned from recent market failures.

The design of a carbon trading system is not happening in a vacuum, as carbon markets already exist in the European Union (the EU Emission Trading Scheme), among ten states in the Northeast and Mid-Atlantic U.S. (the Regional Greenhouse Gas Initiative), and through mechanisms established under the Kyoto Protocol (the Clean Development Mechanism and Joint Implementation). While the size and the scope of an economy-wide cap-and-trade system in the U.S. would likely dwarf these existing carbon markets, each offers potentially useful lessons about market design and oversight.

The following principles can guide policymakers as they consider the market design options available to them:

- The price of carbon should accurately reflect the expected marginal costs of abatement. To the extent that prices are accurate, consumption and investment decisions will be made in the most efficient manner possible.
- The market should provide enough information to market participants and observers to minimize trading costs and uncertainty about market activity. To the extent that prices, trade volumes, and current bids and offers are transparent (in real time), the accuracy of prices will be enhanced, thus minimizing trading costs and uncertainty.
- The market should be fair to market participants and the consumers and businesses affected by it. To the extent that the market cannot be manipulated or distorted, it can best be used for the purpose it was created—to minimize the cost of reducing GHG emissions.

At the outset, policymakers will identify a regulator to oversee the U.S. carbon market. There are four federal agencies whose current roles regulating markets and/or emissions make them viable candidates: the Commodity Futures Trading Commission (CFTC), the Securities and Exchange Commission (SEC), the Federal Energy Regulatory Commission (FERC), and the Environmental Protection Agency (EPA). Congress may choose to fit the carbon market into an existing regulatory structure, create a hybrid regulatory structure for the carbon market that draws on expertise from each agency, or create an entirely new agency altogether.

There will be two primary categories of carbon instruments that trade in the marketplace – (1) carbon allowances and verified offset credits – each representing the equivalent of one ton of carbon dioxide (CO<sub>2</sub>) – and (2) allowance derivatives. A number of factors will influence how and where carbon instruments trade, including:

- Whether similar regulations will apply to each category of carbon instrument and what rules will apply to exchanges trading carbon allowances and/or allowance derivatives, brokers, and specific financial instruments;
- Whether over-the-counter transactions are permitted and, if so, whether and how information about these transactions is “printed” on exchanges, reported to regulators, or otherwise made available to market participants, government officials, and/or the general public;
- Whether there will be limitations on who is eligible to participate in carbon auctions and carbon trading;
- Whether the U.S. carbon market links with other regional and/or international markets; and
- The accounting standards for carbon instruments and whether emitters will be required to use mark-to-market accounting for allowances they are holding for compliance purposes.

Policymakers seeking to promote a high level of transparency for and oversight of the U.S. carbon market could consider incorporating one or all of the following options:

- Regulating exchanges and brokers participating in the carbon market,
- Tracking allowance trading activity through a central limit order book and/or an automated quotation system,
- Imposing limits on the maximum number of allowance-based instruments that a single trader or group of traders may control at one time (either through regulation or by requiring exchanges to set their own position limits), and/or
- Setting minimum margin requirements for traders purchasing allowance-based instruments (again through regulation or by requiring exchanges to set their own position limits).

Careful consideration of these factors should allow Congress to design a cap-and-trade system with the appropriate levels of transparency and oversight, achieving a market that operates efficiently, allows emitters to take advantage of cost-effective abatement opportunities, and avoids price volatility caused by market manipulation and excessive speculation.

## II. Introduction

Financial markets typically evolve over time as they grow, and regulatory changes often follow the development of new financial products or respond to failures in the market system. The de novo creation of a U.S. carbon market to reduce the nation's greenhouse gas (GHG) emissions presents lawmakers with a series of choices regarding market structure, size, and regulation. Because allowance prices in an economy-wide GHG cap-and-trade system will likely cause an increase in energy prices for all consumers, it will be important that policymakers understand these choices and their potential impacts on market participants, trading activity, and the ability of the market to achieve its ultimate goal—allowing covered emitters to efficiently reduce their GHG emissions.

At the outset, the following principles can guide policymakers as they consider the options available to them:

- The price of carbon should accurately reflect the expected marginal costs of abatement. To the extent that prices are accurate, consumption and investment decisions will be made in the most efficient manner possible.
- The market should provide enough information to market participants and observers to minimize trading costs and uncertainty about market activity. To the extent that prices, trade volumes, and current bids and offers are transparent (in real time), the accuracy of prices will be enhanced, thus minimizing trading costs and uncertainty.
- The market should be fair to market participants and the consumers and businesses affected by it. To the extent that the market cannot be manipulated or distorted, it can best be used for the purpose it was created—to minimize the cost of reducing GHG emissions.

Lawmakers who are concerned about manipulation and excessive speculation in the U.S. carbon market may opt for more government involvement in the design and operation of the carbon marketplace. Other lawmakers, however, may feel that the recent expansion of government oversight regarding energy commodity markets provides sufficient regulation and a limited role for the government in the operation of the carbon market is desirable. The resolution of these issues will have significant impacts on market oversight, transparency, and enforcement.

As of January 2009, two main legislative options have been offered for regulating the carbon market: (1) a system that would include carbon trading within the existing model for commodities trading, as amended by the 2008 Farm Bill; or (2) a specific regulatory structure for carbon trading, as proposed in the Investing in Climate Action and Protection Act, an economy-wide GHG cap-and-trade bill introduced by Representative Ed Markey in June 2008<sup>1</sup> (the Markey Bill) and also included in a draft cap-and-trade bill released by Representatives John Dingell and Rick Boucher released for comment in October 2008 (the Dingell-Boucher discussion draft). Both approaches are described in Section VIII below, and additional requirements for carbon market oversight are outlined for policymakers seeking to further regulate market participants.

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<sup>1</sup> H.R. 6186. 110<sup>th</sup> Cong. (2008).

This paper provides an overview of the financial instruments likely to trade in a U.S. carbon market, the structure of existing carbon markets around the world, and unique issues raised by the creation of a financial market for carbon, including who will regulate the domestic market, how accounting standards may influence trading of allowance-based instruments, and the elements necessary to allow a domestic market to link with international markets. It then describes options for regulating allowance and allowance derivative markets. An Appendix provides a side-by-side comparison of options at either end of the spectrum for regulating allowance-based financial instruments: the existing structure for commodities regulation and an electronic marketplace with registered, linked exchanges and automated monitoring.

### III. Financial Instruments Likely to Trade in the U.S. Carbon Market

There likely will be two primary categories of emissions instruments trading in a GHG market: allowances (including verified offset credits)<sup>2</sup> and allowance derivatives (primarily futures and options). The allowances, representing the equivalent of one metric ton of CO<sub>2</sub> (MtCO<sub>2</sub>), will either be purchased at auction by market participants or allocated for free to emitters subject to the national cap, states, and/or government agencies to fund specific policy mandates.<sup>3</sup> Whether auctioned or allocated for free, or some combination of both, trading will presumably be allowed among parties bidding to hold these allowances for compliance purposes.

#### A. Allowances

Allowances—the equivalent of one ton of CO<sub>2</sub>—are the actual compliance instruments that covered emitters will use to meet their obligations under the emissions cap. At the end of the compliance period, covered emitters will transfer to the U.S. Environmental Protection Agency (EPA) (or other designated regulator) allowances for each ton of CO<sub>2</sub> they emitted during the period. The allowances will trade on **exchanges**, through over-the-counter (**OTC**) transactions, or some combination thereof.

#### OTC and Exchanges

**OTC** transactions are executed directly between private parties. OTC trades are typically less standardized and are characterized by a higher level of counterparty risk (e.g., risk that one of the parties will not be able to honor the contract or risk that the underlying financial instrument is not sound) and typically face little or no regulatory oversight.

Trading on **exchanges** (e.g., CME, NYSE, and NASDAQ) takes place in a centralized location and the products are standardized to allow trading. Exchanges typically “clear” trades through a central counterparty (i.e., an organization that underwrites the contracting parties’ relative positions), thereby reducing counterparty risk. Market information, such as prices and trading volume, are available to members of the exchange and potentially the public.

<sup>2</sup> Differential treatment of domestic and international offset credits, as was proposed in the Lieberman-Warner Climate Security Act, could result in different clearing prices for each instrument and different types of derivative products. For the purposes of this paper, we assume that offset credits, once verified, will be eligible to trade in the marketplace in a manner similar to carbon allowances.

<sup>3</sup> S. 3036, 110<sup>th</sup> Cong. (2008)

The volume of allowances trading in the marketplace may depend on a number of factors, including:

- whether multiple vintage years of allowances are made available at the initiation of the market;
- whether compliance true-ups occur annually, biannually, or at some greater interval;
- whether allowances can be banked from compliance period to compliance period;
- whether restrictions are put in place to limit market participation (i.e., if only certain entities are allowed to buy and hold allowances this could diminish liquidity and trades);
- whether there are cost containment mechanisms built into the cap-and-trade system and how those mechanisms operate;<sup>4</sup> and
- whether covered emitters are able to reduce their GHG emissions rapidly. If an emitter receives free allowances and makes reductions faster than expected, that emitter can sell the allowances in the marketplace to others who may not be able to do so as quickly or cheaply. Additionally, emitters who make rapid reductions could bank allowances for future use, potentially leading to a larger volume of allowances trading in later years.

A low volume of allowances in the marketplace and/or significant concerns about allowance price volatility in future years may cause the majority of allowance-based instruments to trade as derivatives (including forward contracts) rather than allowances, as is currently the case with the European Union Emission Trading Scheme (EU ETS).

## **B. Allowance Derivatives**

Based on experiences in other markets, a wide range of derivative instruments could surface to allow parties to manage risk and thereby temper market volatility. Because these instruments are sometimes intricate, and risk exposure is sometimes difficult to ascertain, clear and transparent<sup>5</sup> recording of all cleared transactions (OTC and exchange) could help ensure that market functions better and protects its participants.

The major categories of derivative instruments include:

- Forward contract— A cash transaction in which a commercial buyer and seller agree upon delivery of a specified quality and quantity of goods at a specified future date. Terms may be more “personalized” than is the case with standardized futures contracts (i.e., delivery time and amount are as determined between seller and buyer). A price may be agreed upon in advance, or there may be agreement that the price will be determined at the time of delivery.
- Futures contract – A futures contract is similar to a forward contract, but includes standard contractual terms and can be traded on exchanges. The CFTC defines a futures contract as an agreement to purchase or sell a commodity [or other financial

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<sup>4</sup> For more information regarding cost containment options, see [www.nicholas.duke.edu/institute/carboncosts/](http://www.nicholas.duke.edu/institute/carboncosts/).

<sup>5</sup> For purposes of this paper, the term “transparent” includes accurate information about the financial instruments that are trading, the prices at which they trade, and the entities involved in the trade, as required for operation of an efficient market.

instrument] for delivery in the future: (1) at a price that is determined at initiation of the contract; (2) that obligates each party to the contract to fulfill the contract at the specified price; (3) that is used to assume or shift price risk; and (4) that may be satisfied by delivery or offset.

- Option – A contract that gives the buyer the right, but not the obligation, to buy or sell a specified quantity of a commodity or other instrument at a specific price within a specified period of time, regardless of the market price of that instrument.
- Swap – In general, the exchange of one asset or liability for a similar asset or liability for the purpose of lengthening or shortening maturities, or raising or lowering coupon rates, to maximize revenue or minimize financing costs. For example, this may entail selling one securities issue and buying another in foreign currency or it may entail buying a currency on the spot market and simultaneously selling it forward. Swaps also may involve exchanging income flows; for example, exchanging the fixed rate coupon stream of a bond for a variable rate payment stream, or vice versa, while not swapping the principal component of the bond. Swaps are generally traded OTC.

Derivatives are typically used for two purposes: risk management and investment. The risk management potential may be especially important in the early years of a cap-and-trade system as capped entities adjust to the risk and volatility in the new carbon market. On the other side of a derivative transaction, a counterparty assumes the risk in exchange for a return on the investment.

Energy industries traditionally use derivatives to manage the risk of very high (or very low) prices in fuel markets by locking in prices for future purchases.<sup>6</sup> Emitters subject to a federal cap-and-trade system for GHG emissions may have similar concerns about volatility in the cost of allowances. Derivative contracts for allowances could allow capped entities to hedge the price risk of carbon allowances several years out.

Unlike allowance trading, trading in allowance derivatives will be unaffected by the volume of allowances available in the marketplace because derivatives trade on *promises* to deliver allowances at a later date rather than the actual exchange of an allowance. As a result, allowance derivatives may represent the majority of allowance-based financial instruments that trade, especially during the early years of the U.S. carbon market when there may be fewer allowances in circulation.

## IV. Existing Carbon Markets

Carbon allowances are currently trading through mandatory government programs such as the EU ETS, other international programs under the Kyoto Protocol, and the Regional Greenhouse Gas Initiative (RGGI) implemented by ten states in the Northeastern United States. While an economy-wide U.S. carbon market would likely dwarf these markets in terms of value and trading volume, they do provide useful initial experiments in designing and maintaining large mandatory trading systems for allowance-based financial instruments.

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<sup>6</sup> Robert Pirog, *Derivatives, Risk Management, and Policy in the Energy Markets*, CRS Report for Congress (2006): 3.

## A. European Union Emission Trading Scheme

The European Union launched the EU ETS—the world’s first government-mandated GHG cap-and-trade system—in 2005. The EU ETS covers 12,000 emitting facilities primarily in the power sector, specified industrial sectors, and combustion facilities with a thermal input greater than 20 MW (thereby covering most of the fossil fuel installation in the power industry). The ETS covers approximately 50% of EU CO<sub>2</sub> emissions covered by the Kyoto Protocol.

The goal of the EU ETS is to reduce emissions to 20% below 1990 levels by the end of 2020—a decline of 1.74% annually starting in 2012.<sup>7</sup> Phase I of the EU-ETS (2005–2008) was a pre-Kyoto trial phase. Phase II tracks the Kyoto Protocol commitment period of 2008–2012. Phase III (2013–2020) represents a unilateral commitment by the EU to reduce GHG emissions and was not negotiated into the Kyoto Protocol. During Phase II, the ETS will expand to cover the airline industry (3% of total EU GHG emissions), although the European Parliament and the European Council are still debating details on starting date, emissions cap for the sector, and amount of allowances that will be auctioned each year.<sup>8</sup> Notably, the EU ETS does not directly cover surface transportation.

Allowances in the EU ETS are issued on an annual basis for one vintage year, with the allocation or auction occurring at the end of February. Notably, allowances are surrendered to cover the previous year’s GHG emissions each April. Due to rules that allow banking of allowances within each Phase, this allows covered entities to effectively cover shortages in a given year with allowances issued for the next year.<sup>9</sup> Given this structure, European Union Allowances (EUAs) in circulation at any given time are equal to the amount allocated or auctioned the prior February, which in 2007 was 2074 million and in Phase II will be 2098 million annually.<sup>10</sup> This increase in allowances is due to the addition of Romania and Bulgaria to the cap in 2007.

The EU ETS commenced when the Emissions Trading Directive became law in October 2003. The Directive established the European Commission<sup>11</sup> as the governing body overseeing the EU ETS. The Commission has the authority to authorize legislation, specify compliance penalties, and is the only national framework that has been given legal force. In Phase I of the EU ETS, regulation was highly decentralized as member states developed their own monitoring, reporting, and verification procedures that were monitored by the EU Monitoring and Reporting Guidelines developed by the European Commission.

As characterized by a recent study by the Pew Center on Global Climate Change, the EU ETS (The European Union’s Emission Trading Scheme in Perspective, May 2008), “in many ways [the EU ETS] can be seen as 27 largely independent trading systems that have agreed to make their

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<sup>7</sup> Denny A. Ellerman and Paul L. Joskow, *The European Union’s Emissions Trading System in Perspective* (2008): 3.

<sup>8</sup> World Bank Institute, *State and Trends of the Carbon Market* (2008): 17.

<sup>9</sup> Ellerman, 3.

<sup>10</sup> World Bank Institute, 10.

<sup>11</sup> Acting as the EU’s executive arm, the European Commission’s jurisdiction extends well beyond the carbon markets, responsible for implementing and enforcing decisions by the European Parliament. Under 2003/87/EC (entered into force in October 2003) the Commission was given responsibility for oversight of the EU ETS, which includes approval of each country’s National Allocation Plan. This effectively sets the cap on carbon emissions for the EU as a whole.

allowances commonly tradable.<sup>12</sup> Each member state maintains its own electronic registry to record the creation, transfer, and surrender of allowances, although this is highly consistent across member states. Transfers of EUAs among installations between states are recorded in state registries as well as the Community Independent Transaction Log (CITL), which is an EU-wide registry maintained in Brussels. Additionally, individuals or organizations that want to participate in the trading of EU ETS allowances must register and open a trading account with its national registry.<sup>13</sup> The European Commission has proposed a set of amendments for Phase II pursuant to an ETS review process created by the Emissions Trading Directive. Under these amendments, the highly decentralized structure of the EU ETS would be largely absolved and issues such as an EU-wide cap and allocation/auction decisions would be determined centrally.<sup>14</sup> These amendments will be decided on by the EU governments and the European Parliament in 2009, with the amended ETS beginning operation in 2013.<sup>15</sup>

The EU ETS markets are open to any interested traders, not just regulated entities. Contracts for approximately two billion European Union Allowances (EUAs) were exchanged in the first three quarters of 2008, with a market value of \$68.5bn (€53bn) and average settlement of \$34/t (€27/t).<sup>16</sup> The price of carbon witnessed a steep decline in the second half of 2008, falling 47% from a high of €30/ton on July 1 to €16/ton as of December 23, reflecting the economic crisis affecting the EU and much of the rest of the world's economy.

Fifty three percent of total EU ETS trades take place OTC, while trades made on exchanges totaled slightly less at \$32.1bn (€25bn), or 47%.<sup>17</sup> The majority of exchange trades (85%) are made through the European Climate Exchange (ECX). ECX contracts are cleared by Europe's largest clearinghouse LCH.Clearnet and regulated by the Financial Services Authority (FSA) in the UK due to its location in London. In addition to clearing trades that take place through its exchange, ECX also clears a sizeable percentage of OTC trades (38% in 2007).<sup>18</sup> Other active exchanges include Bluenext, the Chicago Climate Exchange (CCX), Climex, EEX, EXAA, Green Exchange, GME/PEX, MCX, and Norpool.<sup>19</sup> OTC trades are made through eight brokers (MF Global Energy, Evolution Markets, CantorCO2e, Tullet Prebon, ICAP, TFS Energy, Spectron, and GFI Group).

Futures contracts account for the majority of volume and value of transactions. Options represent a 2%–3% share of activity (both volumes and values), although there may be OTC transactions of options not reported.<sup>20</sup> Contracts for EUA trades, options, and futures are

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<sup>12</sup> Ellerman, 5.

<sup>13</sup> EU Emissions Trading Scheme (EU ETS) Registry Regulation 2216/2004/EC.

<sup>14</sup> Ellerman, 11.

<sup>15</sup> Europa. Climate change: Commission welcomes final adoption of Europe's climate and energy package. <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1998&format=HTML&aged=0&language=EN&guiLanguage=en>; Climate Action Network Europe. <http://www.climnet.org/EUenergy/ET.html>.

<sup>16</sup> New Carbon Finance. Carbon Industry Intelligence Research, Carbon Market Round Up Q3 2008 (2008): 2. [http://www.newcarbonfinance.com/download.php?n=RN\\_State\\_of\\_Carbon\\_Market\\_Q308.pdf&f=fileName&t=NCF\\_downloads](http://www.newcarbonfinance.com/download.php?n=RN_State_of_Carbon_Market_Q308.pdf&f=fileName&t=NCF_downloads).

<sup>17</sup> New Carbon Finance, 3.

<sup>18</sup> World Bank Institute, 14.

<sup>19</sup> New Carbon Finance, 3.

<sup>20</sup> Id.

currently available for December delivery up to 2014, although fewer contracts trade for the later vintage years.<sup>21</sup>

In contrast to the market oversight provisions in the Markey Bill and the Dingell-Boucher draft, there is not one regulator assigned to oversight of financial instruments in the EU ETS. Instead, individual countries where exchanges exist develop regulation structures for the exchange and financial instruments.

## B. Project-Based Credit Markets: Clean Development Mechanism and Joint Implementation

“Project-based” carbon reductions may also be used for compliance with emissions caps under certain schemes. The Kyoto Protocol creates two categories of project-based credit markets:

- The Clean Development Mechanism (CDM) covers projects in developing countries that are not subject to an emissions cap under the Kyoto Protocol. The CDM allows capped industrialized countries to finance GHG-reducing projects in developing countries. In exchange, the industrialized countries receive credits for the amount of CO<sub>2</sub> emissions avoided by the projects in the form of certified emission reductions (CERs). The industrialized countries can use CERs to offset their own CO<sub>2</sub> emissions for compliance with the Kyoto Protocol or trade them in the open market.<sup>22</sup>
- Joint Implementation (JI) provides a similar mechanism to CDM whereby capped industrialized countries may acquire emission reduction credits in the form of emission reduction units (ERUs) when they finance projects that reduce net emissions in other capped countries.<sup>23</sup> JI projects account for less than 4% of total project-based transactions.<sup>24</sup>

RRGI (the cap-and-trade system designed for the Northeastern United States, described in more detail below) and legislative proposals for federal carbon markets allow for varying levels of project-based **carbon offsets** from uncapped sectors, and potentially uncapped countries.

A key issue with project-based emission credits is that the projects cannot generate tradable emission credits until they are approved by a designated governing body and the emission reductions are verified and registered. For example, CDM projects must qualify through a public registration and issuance process designed to ensure measurable and verifiable emission reductions that are

In a GHG cap-and-trade system, **carbon offsets** are tradable financial instruments representing verified emission reductions by entities not subject to the emissions cap. Capped entities may use offset credits to meet a portion of their compliance obligations, subject to the rules of the cap-and-trade system. For detailed information on carbon offsets policy, see [www.nicholas.duke.edu/institute/offsets.html](http://www.nicholas.duke.edu/institute/offsets.html).

<sup>21</sup> Id.

<sup>22</sup> United Nations Framework Convention on Climate Change.  
[http://unfccc.int/kyoto\\_protocol/mechanisms/clean\\_development\\_mechanism/items/2718.php](http://unfccc.int/kyoto_protocol/mechanisms/clean_development_mechanism/items/2718.php).

<sup>23</sup> United Nations Framework Convention on Climate Change.  
[http://unfccc.int/kyoto\\_protocol/mechanisms/joint\\_implementation/items/1674.php](http://unfccc.int/kyoto_protocol/mechanisms/joint_implementation/items/1674.php).

<sup>24</sup> New Carbon Finance. 2.

additional to reductions that would have occurred without the project. The CDM Executive Board oversees the mechanism and is answerable ultimately to the countries that have ratified the Kyoto Protocol.<sup>25</sup> The Joint Implementation Supervisory Committee, under the authority and guidance of the Carbon Mitigation Program, supervises the verification procedure for JI projects.<sup>26</sup>

Because project-based credits are not available until emission reductions are verified and registered, most project-based transactions have been forward contracts to provide developers with the necessary capital to develop the projects.

The CDM has been a fairly robust market to date, accounting for the vast majority of project-based market activity (87% of total volume and 91% of value transacted in 2007).<sup>27</sup> This volume is largely due to the fact that the EU accepts CERs and the JI equivalent for compliance with the EU ETS. In all, CDM and JI projects resulted in 1,664 MMTCO<sub>2</sub> of project-based emission credits between 2002 and 2007,<sup>28</sup> with private parties in the EU responsible for approximately 64% of the purchases.

The majority of CDM trades occur on the OTC markets (71% by value or \$7.1B in 2008).<sup>29</sup> Trading in secondary CERs (CERs purchased from a financial institution or other entity that has previously purchased the credits directly from the carbon project owner) have more than doubled, from \$4B in the first three quarters of 2007 to \$10B over the same period in 2008.<sup>30</sup> The primary CDM market (CERs purchased directly from project developers) has decreased in the first three quarters of 2008 by 7% in terms of value and 26% in terms of volume. JI transactions were up more than fivefold in Q3 2008 vs. Q3 2007.

Markets need a mechanism to convert project-based credits into compliance instruments to ensure the integrity of the cap. For example, the EU's Community Independent Transaction Log (CITL), the central registry for tracking ownership of allowances in the EU ETS, is linked electronically to the International Transaction Log (ITL), the United Nation's system for tracking CERs.<sup>31</sup> By linking the two systems, governments can ensure that only verified emission reduction credits are accepted into their emissions markets and that these credits are not re-used after applied to compliance.

### C. The Regional Greenhouse Gas Initiative

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<sup>25</sup> United Nations Framework Convention on Climate Change. Designated National Authorities. <http://cdm.unfccc.int/DNA/index.html>.

<sup>26</sup> United Nations Framework Convention on Climate Change. JI Supervisory Committee. [http://ji.unfccc.int/Sup\\_Committee/index.html](http://ji.unfccc.int/Sup_Committee/index.html).

<sup>27</sup> World Bank Institute. 25.

<sup>28</sup> World Bank Institute. 23.

<sup>29</sup> New Carbon Finance. 4.

<sup>30</sup> Id.

<sup>31</sup> Europa. Emissions Trading: Commission to connect EU with UN carbon credit registry before December. <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1246&format=HTML&aged=0&language=EN&guiLanguage=en>.

Ten U.S. states in the Northeast and Mid-Atlantic regions are participating in RGGI, the first mandatory GHG market in the United States.<sup>32</sup> RGGI covers fossil fuel power plants in the region with a generating capacity of at least 25 MW.<sup>33</sup> The initial cap for the region is approximately 188 million tons of CO<sub>2</sub>, declining by 10% between 2009 and 2018.<sup>34</sup> Like the EU ETS, RGGI allows any interested trader to participate in the auctions and subsequent markets. Non-emitters who wish to participate in the auction process must receive prior approval from a state regulator.

Each state participating in RGGI is responsible for the implementation and regulation of the trading system within its borders, including the amount of allowances that are auctioned versus the amount that are allocated for free.<sup>35</sup> To date, all states have chosen to auction 100% of the allowances. After each auction, allowances can be bought and sold on a secondary market. The first RGGI auctions took place in September and December 2008, with clearance prices of \$3.07 and \$3.38 respectively.<sup>36</sup> These prices are significantly lower than the EU ETS due to differences in the stringency of the emission reduction targets. After each RGGI auction, the participating states publish the auction clearing price and the total volume of allowances sold.<sup>37</sup>

RGGI allows covered power plants to use carbon offsets to account for 3.3% of their compliance obligations. This percentage may increase to 5% and 10% if allowance prices exceed certain price thresholds.<sup>38</sup> The five categories of offsets accepted by RGGI include:

- landfill methane capture and destruction;
- reduction in emissions of sulfur hexafluoride (SF<sub>6</sub>) in the electric power sector;
- sequestration of carbon through afforestation;
- reduction or avoidance of CO<sub>2</sub> emissions from natural gas, oil, or propane end-use combustion due to end-use energy efficiency in the building sector; and
- avoided methane emissions from agricultural manure management operations.<sup>39</sup>

RGGI employs an allowance tracking system (COATS) that manages participants' allowance accounts and emissions data from regulated sources.<sup>40</sup> The system is capable of tracking allowance rewards and allocations by participating states, transfer of allowances from covered

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<sup>32</sup> In addition to RGGI, states in the Western and Midwestern U.S. are also creating regional cap-and-trade systems to limit GHG emissions – the Western Climate Initiative and the Midwest Greenhouse Gas Accord, respectively.

<sup>33</sup> Regional Greenhouse Gas Initiative: About RGGI, <http://rggi.org/about.htm>. States participating in RGGI include Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

<sup>34</sup> New York State Department of Environmental Conservation. How the Carbon Dioxide Budget Trading Program Works. <http://www.dec.ny.gov/energy/39276.html>. Regional Greenhouse Gas Initiative (RGGI). <http://rggi.org/about>.

<sup>35</sup> For instance, in New York, responsibility is shared by three departments of state government: the Department of Environmental Conservation (DEC); the Department of Public Service, and the Energy Research and Development Authority (NYSERDA).

<sup>36</sup> Connecticut Department of Environmental Protection. RGGI States' CO<sub>2</sub> Auction Continues Strong Performance. <http://www.ct.gov/dEP/cwp/view.asp?A=2711&Q=430250>.

<sup>37</sup> Regional Greenhouse Gas Initiative (RGGI). Executive Summary. [http://www.mde.state.md.us/assets/document/RGGI\\_Executive\\_Summary.pdf](http://www.mde.state.md.us/assets/document/RGGI_Executive_Summary.pdf).

<sup>38</sup> Id.

<sup>39</sup> Regional Greenhouse Gas Initiative (RGGI). Offsets. <http://rggi.org/offsets>.

<sup>40</sup> Regional Greenhouse Gas Initiative (RGGI). 2008. <http://www.rrgi.org/tracking>.

entities and general accounts, and tracking of emissions and offset projects.<sup>41</sup> Potomac Economics, an independent market monitor, oversees auctions and subsequent market activity.<sup>42</sup> The monitor observes the auction qualification process and the conduct of the auction itself, and reports on whether the auction was conducted in accordance with the participating states' regulations and whether the auction results represented a competitive outcome. Additionally, Potomac Economics monitors activity in the secondary market, and identifies attempts to exercise market collusion or price manipulation.<sup>43</sup> Trading information is made available to Potomac through RGGI and its tracking system (detailed below) and any findings associated with an uncompetitive auction or misconduct are reported back to RGGI to be passed on to state or federal regulators.

The majority of allowance and futures trading occurs on the Chicago Climate Exchange (CCX) and the Chicago Climate Futures Exchange (CCFE), which is owned by the CCX. Spot contracts for RGGI allowances and offsets are primarily traded on the CCX, which the CFTC has determined is an exempt commercial market and is therefore not subject to many of the regulatory requirements facing traditional commodities exchanges (i.e. product clearing, certain informational requirements, etc.).<sup>44</sup> The CCX is monitored by the Financial Industry National Regulatory Association (FINRA), which also acts as an auditor and verifier for emissions data. The CCFE is a CFTC designated contract market with the National Futures Association providing market surveillance, and clearing of futures and derivative contracts occurs through The Clearing Corporation (CCorp).<sup>45</sup> CME and OTC markets also participate in trading RGGI instruments.

#### **D. Voluntary markets**

In addition to the government-sanctioned carbon markets described above, small markets for voluntary GHG emission reductions have also developed in recent years.<sup>46</sup> Buyers of voluntary reductions may use these credits to offset the carbon emissions associated with their business. Other buyers in the voluntary markets purchase these credits or verified emissions reductions (VERs) in anticipation of using them for compliance under a future state, regional, or federal carbon cap and trade program. Although these voluntary markets are not tied to enforceable compliance requirements, U.S. exchanges such as the CCX have formed around these markets and may contribute to an initial infrastructure for a U.S. compliance market.

### **V. Issues to Consider when Designing the Carbon Market**

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<sup>41</sup> Id.

<sup>42</sup> Potomac Economics. Emissions Allowance Market Monitoring. [http://www.potomaceconomics.com/practice\\_areas/emissions\\_allowance\\_market\\_monitoring](http://www.potomaceconomics.com/practice_areas/emissions_allowance_market_monitoring).

<sup>43</sup> Id.

<sup>44</sup> For more information on exempt commercial markets, see section V(A)(1).

<sup>45</sup> Chicago Climate Futures Exchange. CCFE® Futures and Options on RGGI CO2 Allowances. [http://www.ccfex.com/about\\_ccfe/products/rggi/RGGI\\_Futures\\_and\\_Options\\_Overview.pdf](http://www.ccfex.com/about_ccfe/products/rggi/RGGI_Futures_and_Options_Overview.pdf).

<sup>46</sup> Total 2007 transactions on U.S.-based voluntary markets (including OTC transactions and transactions on the Chicago Climate Exchange (CCX)) represent less than 0.1% of U.S. GHG emissions.

Markets typically evolve over time. In the case of the U.S. carbon market, however, Congress and federal regulators will draft and implement legislation that creates the market de novo, presenting policymakers with a number of choices regarding federal oversight and market structure that they will need to make before the market starts.

The carbon market will be fundamentally different from traditional commodities markets in at least two key aspects. First, the supply (i.e., the emissions cap) will be fixed at the start of the program and decline steadily over time. Market participants will not be able to increase the supply of allowances to respond to high prices and/or increased demand for the product. Second, unlike traditional commodities such as corn, soybeans, or petroleum, there will be no cost for storing carbon allowances for sale at a later date. Both aspects raise additional concerns about the ability to manipulate the market – constrained supply potentially making it easier for an investor or group of investors to affect trading activity and no cost for storing allowances removing a disincentive to accumulating large amounts of a commodity for sale at a later date – and highlight the importance of appropriate market regulation at the outset.

## **A. Identifying the Federal Agency to Regulate the U.S. Carbon Market**

There are four federal agencies whose current roles regulating markets and/or emissions make them viable candidates to oversee the U.S. carbon market: the Commodity Futures Trading Commission (CFTC), the Securities and Exchange Commission (SEC), the Federal Energy Regulatory Commission (FERC), and the Environmental Protection Agency (EPA). These agencies are characterized by different levels of transparency, oversight, and enforcement authority and Congress may choose to fit the carbon market into an existing regulatory structure, create a hybrid regulatory structure for the carbon market that draws on expertise from each agency, or create an entirely new agency altogether.

### **1. Commodity Futures Trading Commission**

The CFTC regulates domestic commodity futures and options markets. Privately negotiated (e.g., OTC) derivatives, however, are not subject to CFTC oversight. The CFTC has jurisdiction over four general areas:

- Designated Contract Markets (DCMs) – futures or options traded on commodity exchanges subject to CFTC oversight;
- Exempt Commercial Markets (ECMs) – futures or options of exempt commodities<sup>47</sup> traded on a principal-to-principal basis on electronic trading facilities;
- Clearing Organizations – a clearinghouse or similar entity providing clearing services with respect to futures and options traded on a DCM; and

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<sup>47</sup> U.S. Commodity Futures Trading Commission. “The Commodity Exchange Act defines an exempt commodity as any commodity other than an excluded commodity [*i.e.*, security, currency, interest rate, debt instrument, or credit rating] or an agricultural commodity. Examples include energy commodities and metals.” Glossary. [http://www.cftc.gov/educationcenter/glossary/glossary\\_e.html#excludedcommodity](http://www.cftc.gov/educationcenter/glossary/glossary_e.html#excludedcommodity).

- Intermediaries – a broker or other third party acting on behalf of another entity in connection with futures and options trading.<sup>48</sup>

Different regulatory requirements apply to each category listed above. For example, DCMs must publish daily reports on prices, volume, open interest, and opening and closing ranges. They also keep detailed confidential information on all trades for the purposes of identifying and providing evidence of manipulation. All of this information must be made available to the CFTC. ECMs are subject to a lower level of regulation. They must register with the CFTC and provide pricing information to the public if the CFTC determines it plays a significant role in price discovery for that commodity. ECMs must also maintain records of and provide CFTC access to trading protocols and transactions and inform the CFTC of possible fraud.

An amendment to the 2008 Farm Bill, introduced by Senators Diane Feinstein, Carl Levin, and Olympia Snowe, increased the CFTC’s authority over electronic commodities markets in order to detect and prevent manipulation and to limit speculation in U.S. electronic energy markets. This was implemented to prevent the price volatility beyond normal supply and demand factors that occurs when speculation is involved. Specifically, the amendment requires that electronic exchanges begin policing their own trading operations similar to DCMs such as CME. The amendment requires electronic exchanges to prevent manipulation and price distortion by: (1) monitoring trading; (2) ensuring contracts are not susceptible to manipulation; (3) creating position limits to prevent excessive speculation; and (4) reducing holdings of traders who violate position limits. Exchanges must establish an audit trail with information about trading activity and supply reports to the CFTC regarding large trader activity. The amendment also requires exchanges to publish price, trading volume, and other trading data on a daily basis.

The 2008 Farm Bill requires the CFTC to review trading activity to identify electronic contracts that are significant in determining market prices and therefore must be regulated as described above. The CFTC determines which electronic contracts fall into this category by considering the following: (1) whether the contract trades in a significant volume and (2) whether traders use the contract to help determine the price of subsequent contracts.

A limited amount of information collected by the CFTC is made available to the public, including:

- activities of large actors in the market;
- bank participation in futures and options markets;
- information about the buying and selling of U.S. treasury futures; and
- information about the location and activities of intermediaries.

**Defining “speculation” and “manipulation”**

**Speculation** – the assumption of risk in order to profit from price fluctuations – is an inherent characteristic of any financial market. **Market manipulation** typically refers to a direct attempt to interfere with the operation of a market and **excessive speculation** typically refers to excessive risk that drives price volatility beyond the normal function of supply and demand.

<sup>48</sup> U.S. Commodity Futures Trading Commission. Industry Oversight. <http://www.cftc.gov/industryoversight/index.htm>.

The CFTC can pursue enforcement actions against “individuals and firms registered with the Commission, those who are engaged in commodity futures and option trading on designated domestic exchanges, and those who improperly market futures and options contracts.”<sup>49</sup>

## 2. Securities and Exchange Commission

The SEC is an independent agency with primary responsibility for enforcing federal securities laws and regulating the securities industry, the nation’s stock and options exchanges (e.g., NYSE, NASDAQ, and AMEX), and other electronic securities markets. The SEC oversees securities traded on national security exchanges as well as exchange-traded derivatives such as currency options, stock options, and options on stock indexes. The Commission also regulates mutual funds and collects information on their investment strategies, risk, pricing, financial performance, and portfolio contents. All broker-dealers of equity instruments must register with the SEC.

The SEC requires publicly-traded companies to submit quarterly and annual reports as well as other periodic reports. The Commission maintains a free online database—EDGAR (the Electronic Data Gathering, Analysis, and Retrieval system)—from which investors and the general public can access this and other information filed with the agency. EDGAR includes information about publicly traded companies, mutual funds, and certain insurance products.

In 1975, Congress amended the Securities Exchange Act to create a National Market System (NMS) to connect equities markets. Today, these markets are linked electronically, providing real-time pricing information across equities exchanges. The NMS and the SEC’s “best execution” standard that requires brokers to offer the best price available on any securities exchange help ensure an open and competitive pricing system for the nation’s equities markets. Equities exchanges typically release price and trading volume information on a delayed feed that is available to the public.

The SEC can bring civil enforcement actions against individuals or companies for accounting fraud, providing false information, engaging in insider trading, or other violations of securities law.<sup>50</sup> Notably, the SEC has limited jurisdiction over hedge funds, making it difficult for investors to verify these funds’ representations of earnings.<sup>51</sup>

## 3. Federal Energy Regulatory Commission

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<sup>49</sup> U.S. Commodity Futures Trading Commission. Enforcement Actions. <http://www.cftc.gov/lawandregulation/enforcementactions/index.htm>.

<sup>50</sup> U.S. Securities and Exchange Commission. Performance and Accountability Report. <http://www.sec.gov/about/secpar/secpar2007.pdf>.

<sup>51</sup> A hedge fund can be defined as a private fund, usually open to a limited number of investors, which is subject to less regulation than a normal fund and typically involves higher risk. A hedge fund is exempt from registration requirements under Federal Securities Law by filing Form D with the SEC, initiating a private placement memorandum, and only offering its services to accredited investors (net worth > \$1M or institutional investors). Additionally, hedge funds are not required to make periodic reports under the Securities Exchange Act of 1934 – [www.sec.gov/answers/hedge.htm](http://www.sec.gov/answers/hedge.htm).

The FERC is an independent agency that regulates interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, and oil pipeline rates.<sup>52</sup> FERC also reviews and authorizes liquefied natural gas (LNG) terminals, interstate natural gas pipelines, and non-federal hydropower projects.

Congress enacted the Energy Policy Act of 2005 to expand FERC's ability to fight market manipulation in response to the high profile scandals involving Enron, Reliant Energy Services, and British Petroleum.<sup>53</sup> For example, Congress expressly prohibited energy market manipulation and filing false information.<sup>54</sup> Congress also amended the Federal Power Act in the same year to enhance the transparency of the electricity market. The amendments direct FERC to "provide for the dissemination, on a timely basis, of information about the availability and prices of wholesale electric energy and transmission service" to states, buyers, sellers, users, and the public.<sup>55</sup> These changes followed similar amendments to the Natural Gas Act in 2000 that granted FERC authority to ensure transparency of the wholesale and interstate natural gas market.<sup>56</sup>

As one example of FERC's efforts to promote transparency, the Commission requires all public utilities to make Electric Quarterly Reports "summarizing the contractual terms and conditions in their agreements for all jurisdictional services (including market-based power sales, cost-based power sales, and transmission service) and transaction information for short-term and long-term market-based power sales and cost-based power sales during the most recent calendar quarter."<sup>57</sup>

FERC has the authority to bring enforcement actions in district court, bring evidence to the Attorney General who can institute criminal proceedings,<sup>58</sup> and directly collect civil penalties for most violations relating to energy markets, including market manipulation.<sup>59</sup> FERC also has broad authority to require public utilities, natural gas companies, and other licensees to preserve records or make special reports in order to gather information that may be necessary to carry out the Federal Power Act and Natural Gas Act.<sup>60</sup>

The Markey Bill and the Dingell-Boucher discussion draft designate FERC as the regulator of allowance-based financial instruments.

#### **4. Environmental Protection Agency**

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<sup>52</sup> Brian M. Simmet, The Federal Energy Regulatory Commission. FERC's Authority to Impose Monetary Remedies for Federal Power Act and Natural Gas Act Violations: An Analysis. <http://www.ferc.gov/about/ferc-does.asp>.

<sup>53</sup> Jerry W. Markham, Commodities Regulation: Fraud, Manipulation & Other Claims: FERC Manipulation Authority (2008). 42 USC 15801.

<sup>54</sup> 16 USCA § 824u & v.

<sup>55</sup> 16 USCA § 824t.

<sup>56</sup> 15 USCA § 717 t-2 (also see 18 CFR Parts 260, 284 and 385 for final rule implementing this provision, issued Dec. 26, 2007)

<sup>57</sup> These reports are made publicly available online at <http://www.ferc.gov/docs-filing/eqr.asp>.

<sup>58</sup> 16 USCA § 825 m and 15 U.S.C.A. § 717s.

<sup>59</sup> 16 USCA § 820-1 (allows collection of civil penalties for violations of subchapter II of the Act) and 15 U.S.C.A. § 717t-1 (for violations under 15 USCA Ch. 15b Natural Gas).

<sup>60</sup> 16 U.S.C.A. § 825, 16 U.S.C.A. § 825c and 15 U.S.C.A. § 717i.

The EPA regulates air quality, water quality, endangered species, and various hazardous and toxic substances. The EPA plays a major role in the legislative proposals to establish cap-and-trade programs for GHG emissions introduced in the 100<sup>th</sup> Congress—having primary responsibility for enforcing emissions obligations. While the EPA does not traditionally regulate financial markets, it does have oversight authority over the first and, to date, only federal cap-and-trade program for pollutants—the trading program for sulfur dioxide (SO<sub>2</sub>) emissions established under the Clean Air Act’s Acid Rain Program.<sup>61</sup> This oversight includes regulation of air pollutants by effected sources and the management of the system for distribution and transfer of emissions allowances. It does not include oversight over emissions trading, per se, nor does it have a mechanism to provide price reporting or transparency.

In December 2007 Senator Feinstein introduced the Emission Allowance Market Transparency Act of 2007.<sup>62</sup> If enacted, this bill would have identified the EPA as the primary regulator of emission allowances (including GHG allowances) and granted the Agency authority to enact regulations to ensure price transparency for the allowance-based financial instruments, including forward contracts, futures contracts, and options.<sup>63</sup>

## **B. Eligible Market Participants**

When designing the U.S. carbon market, lawmakers will have the option to determine who may participate in the auction and/or who may receive allocations of allowances. While neither RGGI nor the EU ETS restrict the entities who may participate in their respective carbon markets, lawmakers concerned about excessive speculation in the carbon market may seek to limit access to allowance auctions to only those entities covered by the cap. Allocating allowances to states or to other parties such as federally-created corporations (such as the Climate Change Credit Corporation proposed in the original Lieberman-Warner bill<sup>64</sup>) identified by legislation would, however, lead to additional participants in the marketplace.

On the other hand, restricting market participants would create a significant restraint on liquidity in the marketplace, potentially making it difficult for emitters seeking to buy or sell allowances to find counterparties to the transactions. In addition, more market participants generally make it less likely that any one actor could corner a market. There may be a difference between those entities eligible to receive allowances or purchase them at an auction and the entities that participate in the secondary market (i.e., trading after the initial distribution of allowances via government-run auctions and allocations). The existence of a secondary market may make it difficult to effectively constrain participation in the carbon market, as non-emitters may seek to purchase allowances and offer derivative instruments through exchanges and OTC transactions.

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<sup>61</sup> U.S. EPA, Clean Air Markets: Acid Rain Program SO<sub>2</sub> Allowances Fact Sheet .  
<http://www.epa.gov/airmarkt/trading/factsheet.html>.

<sup>62</sup> S. 2423, 110<sup>th</sup> Cong. (2007).

<sup>63</sup> Id. at Sec 2(a).

<sup>64</sup> S. 2191, 110<sup>th</sup> Cong. (2007) at Title IV, Subtitle B.

### C. Percentage of Auctioned Allowances

Lawmakers and regulators will need to consider the size of the carbon market; the corresponding credit or cash reserves that will be necessary to finance allowance purchases (if, for example, they are auctioned); and how purchasing allowances will affect sectors' abilities to raise capital for regular business operations. Figures 1 and 2 below demonstrate the total cost to covered entities for purchasing allowances under different auction scenarios and allowance prices.<sup>65</sup> For example, assuming the federal government auctions 100% of allowances (i.e., no covered emitters receive free allowances) for vintage year 2013 at a price of \$20/ton of CO<sub>2</sub>, covered emitters would pay a total \$120 billion at the auction. Similarly, if the auction price were \$30/ton of CO<sub>2</sub>, the size of the auction would reach \$180 billion. Figure 2 demonstrates the size of the auction if the federal government elected to auction five years of allowances at one time. These examples demonstrate the initial value of the market before trading begins.

**Figure 1: One-Year Allowance Auction Scenarios (auction size \$ in billions)**

		Auction Price \$/ton CO <sub>2</sub> e					
		\$15	\$20	\$25	\$30	\$35	\$40
% Auctioned	20%	\$18.0	\$24.0	\$30.0	\$36.0	\$42.0	\$48.0
	40%	\$36.0	\$48.0	\$60.0	\$72.0	\$84.0	\$96.0
	60%	\$54.0	\$72.0	\$90.0	\$108.0	\$126.0	\$144.0
	80%	\$72.0	\$96.0	\$120.0	\$144.0	\$168.0	\$192.0
	100%	\$90.0	\$120.0	\$150.0	\$180.0	\$210.0	\$240.0

**Figure 2: Five-Year Allowance Auction Scenarios (auction size \$ in billions)**

		Auction Price \$/ton CO <sub>2</sub> e					
		\$15	\$20	\$25	\$30	\$35	\$40
% Auctioned	20%	\$90.0	\$120.0	\$150.0	\$180.0	\$210.0	\$240.0
	40%	\$180.0	\$240.0	\$300.0	\$360.0	\$420.0	\$480.0
	60%	\$270.0	\$360.0	\$450.0	\$540.0	\$630.0	\$720.0
	80%	\$360.0	\$480.0	\$600.0	\$720.0	\$840.0	\$960.0
	100%	\$450.0	\$600.0	\$750.0	\$900.0	\$1,050.0	\$1,200.0

To put these amounts in perspective, \$120 billion represents approximately 30% of the total 2007 U.S. corporate tax revenue.<sup>66</sup> Furthermore, a 100% auction at \$30/ton of CO<sub>2</sub> represents 132% of the total amount of debt and equity issued by the utilities in 2008. Figure 3 provides a snapshot of the impact on the major industrial sectors that will likely be covered by climate legislation.

<sup>65</sup> Both figures use a cap of 6,000 MMTCO<sub>2</sub> for demonstration purposes. This amount is slightly higher than the initial caps in the Lieberman-Warner Climate Security Act (S. 3036) and the Dingell-Boucher-Dingell draft legislation released by the House Energy and Commerce Committee on October 7, 2008 (5,775 MMTCO<sub>2</sub> (2012) and 5,912 MMTCO<sub>2</sub> (2014) respectively).

<sup>66</sup> Bureau of Economic Analysis: Government Current Receipts and Expenditures. <http://www.bea.gov/national/nipaweb/GovView.asp>.

**Figure 3: Impact by Industry**  
(Emissions in MTCO<sub>2</sub>, \$ in millions)

	Emissions by Sector	Total Emissions*	Funding @ \$25/MtCO <sub>2</sub> e	Debt Issued 2008	Funding as a %	Equity Issued 2008	Funding as a %	Debt + Equity Issued 2008	Funding as a %
Utilities	40%	2,433	\$60,825	\$52,995	115%	\$2,417	2516%	\$55,412	110%
Energy	33%	2,009	\$50,225	\$57,141	88%	\$23,314	215%	\$80,455	62%
Industrials/Materials	16%	987	\$24,675	\$62,454	40%	\$32,971	75%	\$95,425	26%
Other	10%	592	\$14,800	\$2,072,249	1%	\$291,019	5%	\$2,363,268	1%
<b>TOTAL</b>	<b>100%</b>	<b>6,021</b>	<b>\$150,525</b>	<b>\$2,244,838</b>	<b>7%</b>	<b>\$349,721</b>	<b>43%</b>	<b>\$2,594,559</b>	<b>6%</b>

\*Based on estimates from the DOE/EIA's Emissions of Greenhouse Gases in the U.S. 2007  
Financial Data Provided by Thomson One Banker

## D. Recent Lessons from Other Markets

There were a number of issues involving markets in 2008 that may influence the design of a U.S. carbon market. In particular, questions about speculation driving up oil prices and the credit default swaps at the heart of the recent credit crisis have raised concerns about creating a new multi-billion dollar market as part of a national policy to limit GHG emissions. Both issues involve financial instruments that traditionally allow market participants to hedge risks—a concern that will likely be present in the carbon market—and in both instances lawmakers and regulators are working to correct the market structure elements that may have contributed to the issues. It is therefore prudent to consider lessons learned from each issue so lawmakers can design the carbon market to avoid similar breakdowns from the outset.

### 1. Oil Markets

The rapid increase in petroleum prices in the late spring and early summer of 2008 had significant impacts across the economy. If carbon allowances experience similar rapid price increases and lawmakers are unable to determine the underlying cause(s), support for the carbon market, and thus the overall policy to combat climate change, could erode. Because the U.S. carbon market will be created by federal legislation, the government could end or substantially curtail the market by relaxing the underlying carbon compliance requirements—a power they do not have in oil markets or other traditional commodity markets.

No federal agency has comprehensive authority to regulate the oil market. Traders using domestic exchanges are required to keep records of all trades and report large trades to the CFTC. These reports, together with daily trading data, are the CFTC's primary tools to gauge the extent of speculation in the markets. The trading of energy commodities by large firms through OTC transactions is exempted from CFTC oversight, however. The 2008 Farm Bill places electronic exchanges that trade energy commodities under CFTC jurisdiction and requires those exchanges to maintain an audit trail for transactions and to provide the CFTC with sufficient information to determine which trades are large enough to affect market prices.<sup>67</sup>

<sup>67</sup> The Food, Conservation, and Energy Act of 2008. Title VIII: CFTC Reauthorization Act of 2008.  
<http://www.govtrack.us/congress/bill.xpd?bill=h110-2419>.

When crude oil prices spiked during late spring and early summer 2008, policymakers, industry analysts, and the public struggled to determine the cause or causes. For example, the CFTC spearheaded an Interagency Task Force on Commodity Markets to investigate the claims of speculators' influence on the petroleum market.<sup>68</sup> The task force concluded that "market fundamentals" such as supply and demand were likely responsible for the oil price increases, and that increased speculation was not statistically correlated with the increases. Prior to the release of the task force's finding, however, the chair of the CFTC testified before a joint hearing of the Senate Appropriations Subcommittee on Finance and the Senate Agriculture Committee and stated that the Commission could not rule out market manipulation in the petroleum market.<sup>69</sup> Further demonstrating the conflicting information at the time, a study of the oil market by Masters Capital Management claimed that speculation significantly impacted the market. The study stated that over \$60 billion was invested in oil during the first six months of 2008, helping drive the price per barrel from \$95 to \$147 per barrel, and that by the beginning of September, \$39 billion had been withdrawn by speculators, causing prices to fall.<sup>70</sup>

A transparent marketplace could provide carbon market participants, regulators, and potentially the general public with information to determine where carbon instruments are trading, the entities involved in the transactions, the trading volume, and the prices at which they are trading. This, in turn, could allow government officials and market watchdogs to quickly determine the cause(s) of unusual price volatility. In addition, information about prices, volume, and bid/ask spreads could also help market participants make informed investment decisions, thereby reducing some of the causes of price volatility in the first place.

## 2. Credit Default Swaps

The credit crisis in fall 2008 brought to light problems caused by credit default swaps (CDSs) – a major derivative instrument traded OTC and subject to little regulation. While CDSs – insurance-like contracts that allow investors to speculate on changes in an entity's credit quality in return for guaranteeing against an adverse outcome – have been recognized by the U.S. Treasury and others as legitimate tools to manage risks, there is widespread acknowledgment that more government oversight to ensure the underlying value and integrity of the financial instruments might have prevented the financial collapse that occurred when default rates surged and counterparties were left with near limitless and largely hidden liabilities that they could not cover.

In November 2008, the Depository Trust and Clearing Corp, which runs a warehouse for CDS trade confirmations accounting for around 90% of the total market, announced that it will release market data on the outstanding value of CDS trades on a weekly basis.<sup>71</sup> This announcement coincides with an announcement from the President's Working Group on

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<sup>68</sup> Interagency Task Force on Commodity Markets. Interim Report on Crude Oil. [www.cftc.gov/stellent/groups/public/@newsroom/documents/file/itfinterimreportoncrudeoil0708.pdf](http://www.cftc.gov/stellent/groups/public/@newsroom/documents/file/itfinterimreportoncrudeoil0708.pdf).

<sup>69</sup> Ian Talley, "Limits Put on Some Oil Contracts On ICE Amid Outcry Over Prices," *The Wall Street Journal*, June 17, 2008. [http://online.wsj.com/article/SB121372236904981339.html?mod=googlenews\\_wsj](http://online.wsj.com/article/SB121372236904981339.html?mod=googlenews_wsj).

<sup>70</sup> J. Joseph Herbert. Study links oil prices to speculation. *The Associated Press*, Sept. 11, 2008.

<sup>71</sup> The Depository Trust and Clearing Corporation. DTCC to Provide CDS Data from Trade Information Warehouse. [http://www.dtcc.com/news/press/releases/2008/warehouse\\_data\\_values.php](http://www.dtcc.com/news/press/releases/2008/warehouse_data_values.php).

Financial Markets that the Federal Reserve Board of Governors, the Securities and Exchange Commission, and the Commodity Futures Trading Commission will oversee the development of central counterparty services for the CDS market.

Regulating allowance derivatives from the outset could help avoid the recent problems associated with instruments such as CDSs. Proper levels of market transparency and government oversight could help ensure that emitters have options for managing the risks associated with price volatility or abatement while avoiding financial instruments whose underlying value and associated risks are difficult to ascertain.

## VI. Accounting for Emission Allowances

SEC practice is to rely on accounting standards created by private institutions such as the Financial Accounting Standards Board (FASB)<sup>72</sup> and the International Accounting Standards Board (IASB) rather than create its own standards. The SEC can, however, establish accounting and reporting standards for publicly held companies. Congress may consider granting similar authority to the federal agency responsible for regulating the U.S. carbon market in order to facilitate uniformity in reporting.<sup>73</sup> Government-issued accounting standards could also address concerns such as **mark-to-market** accounting that could lead to artificial income volatility for covered emitters holding allowances for compliance purposes.

Currently, there is no single recognized accounting standard for allowance allocation. The EU initially operated its carbon liability reporting requirements under IFRIC 3 (International Financial Reporting Interpretations Committee), but this standard was withdrawn in June 2005. Among the issues with IFRIC 3 was the mismatch between the valuation of assets and liabilities, which led to artificial income volatility. There are currently many different accounting treatments emerging (there are up to 15 different approaches for balance sheet methodologies alone), which serves to undermine the accuracy and comparability of public financial statements.<sup>74</sup>

**Mark-to-market** accounting is a method of valuing assets on an entity's books, in part by requiring holders of financial instruments to assign a value to the instruments based on their current market price. For example, companies holding emission allowances—whose value may change during the course of trading—would have to make regular adjustments to their balance sheets to account for the changes in price of the asset. Assets not available for sale would not be subject to mark-to-market accounting.

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<sup>72</sup> "FASB's financial accounting and reporting standards are recognized as "generally accepted" for purposes of the federal securities laws. As a result, registrants are required to continue to comply with those standards in preparing financial statements filed with the Commission, unless the Commission directs otherwise." U.S. SEC, Policy Statement: Reaffirming the Status of the FASB as a Designated Private-Sector Standard Setter. <http://www.sec.gov/rules/policy/33-8221.htm>.

<sup>73</sup> Securities Exchange Act of 1934.

<sup>74</sup> PricewaterhouseCoopers (PwC) and the International Emissions Trading Association (IETA). Trouble-Entry Accounting – Revisited: Uncertainty in Accounting for the EU Emissions Trading Scheme and Certified Emission Reductions. <http://www.ieta.org/ieta/www/pages/getfile.php?docID=2535>.

The IASB and the FASB are conducting a joint study to develop guidance for emission allowance accounting, with a draft expected in the second half of 2009<sup>75</sup> and an International Financial Reporting Standard expected in 2010.<sup>76</sup> The IASB has identified the following questions regarding the treatment of emission allowances for accounting purposes:

- i. Are emissions allowances assets? Is this conclusion affected by how the allowance is acquired? What is the nature of the allowance (e.g., a license to emit or a form of emission currency)? If allowances are assets, should they be recognized, and, if so, how should they be measured initially?
- ii. What is the corresponding entry for an entity that receives allowances from government free of charge? Does a liability exist? If so, what is the nature of the liability and how should it be measured both initially and subsequently?
- iii. How should allowances be accounted for subsequently?
- iv. When should an entity recognize its obligations in emissions trading schemes and how should they be measured?
- v. What are the overall financial reporting effects of the above decisions?<sup>77</sup>

The answers to these questions could impact how emission allowances trade, as accounting-driven products can push trading volume to OTC transactions and less regulated markets. For example, if allowances are treated as assets requiring mark-to-market accounting, holders may have a disincentive to purchase emission allowances and instead may seek derivative products to minimize the earnings volatility reflected on their balance sheets.

Principles-based accounting standards developed by government regulators, FASB, or the IASB could allow different treatment for allowances held for compliance purposes and those held as investments to sell at a later date, thereby removing the risk of balance sheet volatility that may otherwise be associated with the possession of allowances for compliance. Elements of principles-based accounting could include the following:

- emitters' abatement liabilities are uncertain and could be off-balance sheet (as they are today);
- free allowances have no cost to the emitter and could be off-balance sheet (as they are today in the domestic SO<sub>2</sub> market);
- purchased allowances could be held as intangible assets, and be subject to impairment rather than mark-to-market, *if the intention of the holder is to submit the purchased allowances for compliance*;
- purchased allowance derivatives could be held as deferred expenses on the balance sheet, *if the intention of the holder is to exercise the derivatives and submit the underlying allowances for compliance* (at which time the deferred expense will flow through the income statement); and
- financial intermediaries and other carbon investors could use fair value accounting and mark all carbon instruments to market if they have no compliance obligation.

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<sup>75</sup> International Accounting Standards Board (IASB). IASB Work Plan <http://www.iasb.org/Current+Projects/IASB+Projects/IASB+Work+Plan.htm>.

<sup>76</sup> FASB & IASB, Agenda Paper 9A: Emission Trading Schemes: Background Materials, Oct. 21, 2008; IASB. Emissions Trading Schemes. <http://www.iasb.org/NR/rdonlyres/D0D0B44A-254A-4112-9FCE-34178B236D07/0/ProjectUpdateEmission022008.pdf>.

<sup>77</sup> Id.

## VII. Linkage with Regional and International Carbon Markets

Market linkage occurs when one system recognizes the financial instrument (e.g., allowance or offset credit) operating within another market and allows its use to meet compliance obligations of the first system. The key purpose of linking carbon markets is to establish a common carbon cost and to facilitate access to the lowest cost abatement opportunities. Linkage with other compliance markets can also mitigate the effect of “leakage,” or reshuffling emission sources to comply with local regulations without achieving incremental reductions.

### A. State and Regional Carbon Markets

Allowance instruments issued at the regional level<sup>78</sup> and banked by covered entities or other market participants need not lose value when a regional system is superseded by a national market. Options for dealing with outstanding allowances issued by regional markets include: applying a conversion ratio, or a multiplier, to the allowance instruments to “convert” them into national compliance currency; permitting the continuation of state or regional cap-and-trade systems; or preempting state and regional allowance trading systems altogether.<sup>79</sup> The Dingell-Boucher discussion draft, for example, provides that any entity holding California or RGGI allowances as of December 31, 2011, be compensated for the cost and carrying value of these instruments.<sup>80</sup> The discussion draft also proposes similar value-redemption for certain offset instruments. The Lieberman-Warner bill, on the other hand, allows state-based markets to coexist with the federal market, provided the state emission reduction requirements are at least as stringent as the federal system.<sup>81</sup> Signals from the federal government about how it will treat state and regional emission allowances will likely affect trading patterns in the regional markets.

### B. International Carbon Markets

In order to support a global solution to climate change and continue to reduce costs through expanding the market, the U.S. carbon market may eventually link to other international trading regimes tied to binding commitments of other countries (e.g., EU ETS). This linkage could be unilateral, where one government recognizes the instrument of another, or bilateral, where the instruments are mutually recognized. The following is a list of factors that may affect the ability to link carbon markets:

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<sup>78</sup> For example, RGGI, the Western Climate Initiative, or the Midwest Greenhouse Gas Accord.

<sup>79</sup> For a more detailed discussion of the interaction of state and federal GHG markets, see Jonas Monast, Integrating State, Regional, and Federal Greenhouse Gas Markets: Options and Tradeoffs. *Duke Environmental Law & Policy Forum*, 2008.

<sup>80</sup> 110<sup>th</sup> Congress. 2008. Dingell-Boucher legislative proposal to reduce U.S. greenhouse gas (GHG) emissions. (Dingell-Boucher would, among other things, amend the federal Clean Air Act to establish a GHG cap-and-trade program at the U.S. Environmental Protection Agency. <http://www.instituteforenergyresearch.org/wp-content/uploads/2008/10/dingell-boucher-draft-cap-and-trade-bill.pdf>.)

<sup>81</sup> Dingell-Boucher Discussion Draft. 2008.

- *Environmental integrity* – A linked system should yield greater reductions—or at least less expensive reductions of the same quality—than a web of independent systems. Since the level of the cap (and thus the number of allowances in the marketplace) has a direct impact on the price of allowances, regimes may have an incentive to relax their caps and issue additional allowances for sale in international markets. Linking to a partner with similar reduction goals will prevent one jurisdiction from relaxing the cap to capture economic rents.
- *Price caps* – A price cap in one regime may provide a disincentive for other markets to link to it, as the maximum price in one market would effectively ensure that prices in all linked markets would also be capped at that level. Such a price cap could reduce the overall price of GHG allowances in linked markets to such a level that policymakers may worry that it would eliminate the incentive for emitters to invest in low-carbon technologies.
- *Penalties* – If penalties for non-compliance are not generally similar between linked markets, systems with lower penalties could create an incentive for covered emitters to “buy” their way out of compliance and thus jeopardize the reduction target as a whole. Setting penalties in linked markets well above the market price is one method for avoiding this outcome.
- *Fungibility of third-party credits* – Refusal to accept certain types of credits does not necessarily block them from indirect entry. One or more of the linked partners may have less stringent eligibility standards and facilitate the inflow of these credits into the general system. For example, early versions of the Lieberman-Warner Climate Security Act, a GHG cap-and-trade bill debated in the U.S. Senate in 2008, prohibited CDM projects but allowed trading with other compliance regimes such as the EU ETS that may accept CDM credits. Under that scenario, emitters in the EU ETS could satisfy their own compliance obligations using CDM credits and sell excess EUAs in the U.S. market. As a result, CDM credits would indirectly affect price and supply of allowances available in the U.S. market.
- *Verification and monitoring* – Standards should be comparable among the linked partners. Inconsistent protocols could jeopardize the integrity of the entire system.

## VIII. Options for Regulating Allowance and Allowance Derivative Markets

If Congress does not create a specific structure for regulating allowance-based financial instruments, regulation would likely fall under the CFTC’s existing structure for regulating commodities. The Markey Bill and the Boucher-Dingell discussion draft provide another model for carbon market regulation, granting the FERC oversight responsibility. In addition to these models, other options are available for policymakers to increase levels of transparency and/or oversight in the carbon market.

## A. Commodity Trading Model

The current standard for regulating energy commodity trading is found in an amendment to the 2008 Farm Bill introduced by Senators Feinstein, Levin, and Snowe.<sup>82</sup> The amendment, described in section (V)(A)(1) above, is essentially principals-based regulation, the key provision of which is post-trade reporting of market-moving transactions. This standard would likely apply to carbon trading unless Congress enacts other specific provisions for the U.S. carbon market.

## B. Specific Regulatory Structure for Carbon Allowances (The Markey Bill and the Dingell-Boucher Discussion Draft)

The Markey Bill included a significant section on financial market regulation which was also incorporated into the Dingell-Boucher discussion draft.<sup>83</sup> Under these legislative proposals, carbon market oversight responsibilities, including prevention of fraud and manipulation, reside with FERC, and FERC's jurisdiction extends to "accounts, agreements, and transactions involving a regulated instrument, whether inside or outside the U.S., that are not subject to jurisdiction of the SEC."<sup>84</sup> FERC would prescribe regulations that establish position or transaction limitations and position accountability requirements. It would administer this authority in consultation and coordination with the administrator of the EPA. The proposals create an Office of Carbon Market Oversight within FERC that would be managed by a Commission-appointed Director.

Entities participating in the settlement or netting activities of a regulated instrument would have to register with FERC as a carbon **clearing organization**. Additionally, a facility that executes trades or other transactions by accepting bids and offers involving a regulated carbon instrument would have to register with FERC as a carbon trading facility. Allowance derivative trading would be exempt from this requirement provided the transactions take place between persons who are eligible contract participants.

Facilities seeking status as a registered trading facility would have to demonstrate that they can prevent market manipulation, ensure fair and equitable trading, maintain financial integrity of the transactions, have disciplinary procedures for those violating their rules, and make public daily information on settlement prices, volume, open interest, and opening and closing ranges for all regulated instruments traded on the trading facility. The facilities would enforce rules governing the operation of any electronic trading platform.

Similarly, brokers, dealers, and traders of

**Central clearing organization (or "central clearing"):** an independent entity that provides a central point to process all trades for one or several exchanges. Clearing houses settle trades, ensure delivery of the financial instruments, and report trading data to exchange members and, if required, regulators. Central clearing houses also guarantee the performance of derivative instruments, thereby reducing counterparty risk.

<sup>82</sup> Feinstein-Levin-Snowe, Measures to Close the "Enron Loophole", 2008. CFTC Reauthorization Act of 2008.

<sup>83</sup> Dingell-Boucher Discussion Draft,

[http://energycommerce.house.gov/images/stories/Documents/PDF/selected\\_legislation/clim08\\_001\\_xml.pdf](http://energycommerce.house.gov/images/stories/Documents/PDF/selected_legislation/clim08_001_xml.pdf).

<sup>84</sup> Dingell-Boucher Discussion Draft, part IV sections 401-409, <http://www.instituteforenergyresearch.org/wp-content/uploads/2008/10/dingell-boucher-draft-cap-and-trade-bill.pdf>

allowances, credits, and related derivatives would be required to register with FERC, and would be prohibited from engaging in manipulative or deceptive practices, such as attempting to corner the market or spreading false information. Finally, brokers, dealers, and traders would be subject to specific reporting requirements, and their records would be subject to inspection at the discretion of FERC staff. Trading facilities that violate FERC’s regulations would be subject to fines and/or suspension from trading.<sup>85</sup>

### **C. Additional Options for Increasing Transparency and/or Oversight in the U.S. Carbon Market**

In addition to the regulatory provisions described above, policymakers could also incorporate one or all of the following elements into the carbon market structure.

#### **1. Regulating Carbon Exchanges**

##### **a. A Single Electronic Market for Allowance-Based Instruments**

Congress could require that allowances (including offset credits) and allowance derivative instruments trade on a single electronic platform. Exchanges could submit bids to the regulator to operate the market. The regulator may need to offer a base payment or authorize a certain level of exchange fees to incent exchanges to submit bids. Creating the rules for an electronic market could allow policymakers to incorporate a host of best practices. For example, the market could incorporate the CLOB requirement described above, and exchange members could be required to “print” trades executed by its facility (e.g., OTC trades) on the CLOB.

Policymakers could incorporate the SEC’s “best execution” duties for brokers and create a membership category for capped entities to operate as full exchange members without being registered as broker-dealers. The exchange could be required to provide free access to best bid/offer price and volume, last sale, and current trading volume to all who want access to such a feed electronically.

##### **b. Registered Exchanges and Membership Requirements for Brokers**

If policymakers prefer a competitive marketplace with trades taking place on multiple exchanges, the legislation or implementing regulations could require (1) exchanges to register with the regulator and (2) traders of allowance-based instruments to be members in good standing of a registered carbon exchange. As with the single electronic market described above, the rules could require members of the registered exchanges to print trades executed by registered facilities. In addition, the rules could allow only registered carbon traders to solicit, act as a dealer, or make markets in allowances (including offset credits), futures, options, or borrowing.

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<sup>85</sup> Id.

### c. Registered Carbon Derivative Exchanges

Trading of futures, options, swaps and other such carbon derivative products could be limited to registered carbon derivative exchanges (RCDE) approved by the regulator. The RCDEs could compete against one another for volume and each could have their own clearing organization. RCDEs could choose floor trading or fully electronic formats, but in either case the result could be a transparent real-time marketplace satisfactory to the regulator. The regulator could set minimum margin requirements and maximum position limits for the RCDEs to enforce, with such amounts to be adjusted over time subject to market conditions. The Regulator could also set standards for RCDE membership.

## 2. Tracking Allowance Trading Activity

### a. Central Limit Order Book for Carbon

A central limit order book (CLOB) provides a central location to consolidate unexecuted market orders (e.g., offers to buy or sell a specific quantity of equities at a specific price). A “hard” CLOB, for example, executes orders automatically, while a “soft” CLOB provides market participants with information to facilitate trading but does not execute the actual trade. In most marketplaces, the CLOB shows orders to buy and sell and also the name of the market maker (e.g., broker) who posted each order, but not necessarily the name of the underlying buyer or seller. Because CLOBs provide traders with real-time price information, they generally lead to lower price volatility, lower bid-offer spreads, less chance for manipulation, and more efficient market monitoring. Regulators could also have access to the CLOB to track trading activity. Legislation could establish a CLOB for allowance trading, operated either by a federal agency or a private exchange with the information made available to the market regulator, market participants, and possibly market observers.

### b. Automated Quotation System

An automated quotation system is another tool to provide market participants, regulators, and/or the general public with real time information about trading volume and prices. Unlike a CLOB (described above), an automated quotation system would not provide information about bids and offers or identify the parties participating in the trading activity.

## 3. Preventing Manipulation/Excessive Speculation – Position Limits

One option to ensure that a single market participant or group of participants does not amass enough of a particular commodity to affect prices is to impose limits on the maximum number of contracts or options the participant/group of participants may hold at any one time. Regulators would likely need to distinguish between allowance-based instruments held by emitters for compliance purposes and those held as investments. Position limits may be set by regulation or by individual exchanges. For example, the CFTC imposes speculative position limits on

[m]ost physical delivery and many financial futures and option contracts. ... For several markets (corn, oats, wheat, soybeans, soybean oil, soybean meal, and cotton), the limits are determined by the Commission and set out in Federal regulations (CFTC Regulation 150.2, 17 CFR 150.2). For other markets, the limits are determined by the exchanges. The Commission has adopted 'Acceptable Practices' for the establishment of exchange-set limits.<sup>86</sup>

For an example of exchange-imposed position limits, see <http://www.cmegroup.com/market-regulation/position-limits/>.

#### 4. Reducing Counterparty Risk – Minimum Margin Requirements

Brokers and exchanges typically allow investors to purchase equities or commodities on margin – a good faith deposit made to a broker, exchange, or clearing organization. Commodity exchanges tend to set their own minimum margin requirements for each type of commodity. In the case of securities, the Federal Reserve Board sets an initial margin requirement of 50% for stock purchases.<sup>87</sup> A minimum margin requirement for carbon exchanges could help ensure that counterparties are able to meet their contractual obligations and help limit losses if one of the parties is unable to do so.

## IX. Conclusion

The initial design of the regulatory structure for the financial instruments associated with the U.S. carbon market will play a significant role in determining how the instruments will trade and the type of information that is available to regulators, market participants, and the general public. Existing regulatory models for financial markets, including the GHG cap-and-trade systems currently in operation, provide useful lessons for the design of a market-based approach to limit GHG emissions. Building upon these lessons, policymakers can implement an appropriate regulatory structure for allowance-based financial instruments at the outset, ensuring an efficient and effective approach to reducing the nation's GHG emissions.

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<sup>86</sup> U.S. CFTC, Speculative Limits, [http://www.cftc.gov/industryoversight/marketsurveillance/speculativelimits.html#P8\\_883](http://www.cftc.gov/industryoversight/marketsurveillance/speculativelimits.html#P8_883). The CFTC's *Guidance on, and Acceptable Practices in, Compliance with Core Principles* is available at 17 C.F.R. § 38, App. B (2009).

<sup>87</sup> See Federal Reserve Board Regulation T, 12 CFR §220 (2009).

## APPENDIX

Policymakers creating an economy-wide GHG cap-and-trade system face numerous choices regarding the regulatory structure for the distribution and trading of allowance-based financial instruments. Existing models for market regulation suggest two general options at either end of the carbon market regulatory spectrum, with additional options lying in between. On one end of the spectrum is the existing structure for commodities regulation. On the other end is an electronic marketplace with automated monitoring that draws on lessons from both commodities and equities marketplaces. The following table provides a side-by-side comparison of these two models.

	<b>Commodities Model</b>	<b>Electronic Marketplace with Automated Monitoring</b>
<b>Exchange Trading Venues</b>	<ul style="list-style-type: none"> <li>• Competitive exchanges</li> <li>• International as well as domestic exchanges competing for volume</li> <li>• Feinstein-Levin provisions designed to prevent regulatory arbitrage in international and OTC markets</li> </ul>	<ul style="list-style-type: none"> <li>• Registered exchanges compete for trading volume</li> <li>• A CLOB format would be required for eligibility as a registered exchange</li> <li>• Registered exchanges could be linked via a National Market System for allowances</li> <li>• Best execution requirement for allowances</li> </ul>
<b>OTC Allowance Trades</b>	<ul style="list-style-type: none"> <li>• OTC trades by exchange members do not have to be “printed” on an exchange</li> <li>• Post-trade reporting pursuant to Feinstein-Levin aids in investigations but does not create real-time transparency</li> <li>• Exchange feeds have limited public disclosure</li> <li>• Provide market for illiquid commodities and large, block trades</li> <li>• Cost-effective trading market for non-active market participants.</li> </ul>	<ul style="list-style-type: none"> <li>• The CLOB, or CLOBs, display bids, offers, last sale, and trade volume</li> <li>• Some free public access and moderate fees for more detailed exchange feeds</li> <li>• Members of registered exchanges would have a real-time “print” requirement for all OTC allowance trades</li> <li>• Transparency via the NMS could make readily transparent all trading in allowances</li> </ul>
<b>Exchange-Traded Derivatives</b>	<ul style="list-style-type: none"> <li>• Futures and options traded primarily on exchanges; though frequently internationally domiciled</li> <li>• Borrowing allowances for short sales would be an OTC market</li> <li>• Structured derivatives and swaps are OTC markets with counterparty risk (although some OTC products are cleared through an exchange, thereby addressing counterparty risk)</li> </ul>	<ul style="list-style-type: none"> <li>• Futures and options traded on registered exchanges</li> <li>• Registered derivative exchanges would be required to use a CLOB format</li> <li>• Swaps could be cleared through a stand-alone central clearing entity to remove counterparty risk</li> </ul>

	associated with the OTC market)	
<b>OTC Derivatives</b>	<ul style="list-style-type: none"> <li>• Intermediaries use listed products to hedge their exposures to structured derivative transactions done with producers and consumers of fossil fuel derived energy.</li> <li>• OTC derivatives are regulated through Feinstein-Levin but only to the degree that they impact market prices</li> </ul>	<ul style="list-style-type: none"> <li>• Exchange trading facilitates transparency and automated monitoring</li> <li>• Industrial accounting for exchange-traded derivatives (where exercise is intended) as a deferred expense would significantly reduce transaction costs for emitters and increase efficiency (see Appendix)</li> <li>• OTC derivatives done for accounting or tax purposes require further consideration in any case</li> </ul>
<b>Market Participants</b>	<ul style="list-style-type: none"> <li>• Open participation; particularly so given the significant volume of OTC and structured derivative transactions</li> <li>• Large pools of less regulated capital, such as hedge funds, are critical to facilitating structured OTC trades</li> <li>• Participants can design OTC and structured products as risk management tools, sometimes to optimize tax and accounting treatment</li> <li>• Intermediaries (including banks and hedge funds) dominate trading</li> </ul>	<ul style="list-style-type: none"> <li>• Registered exchanges could have broker-dealer, industrial, and institutional investor categories of membership</li> <li>• Direct participation by industrials, meaning producers and consumers of fossil fuel energy, should be encouraged</li> <li>• As part of the registration process, exchanges will have standards for membership approved by the regulator</li> </ul>
<b>Leverage and Margin</b>	<ul style="list-style-type: none"> <li>• Derivative contract margin is set by the exchange</li> <li>• OTC derivatives have inherent leverage as agreed to by the parties to the transaction</li> </ul>	<ul style="list-style-type: none"> <li>• The regulator sets a minimum margin requirement for contracts on registered exchanges</li> <li>• Minimum margin requirements could be adjusted over time to suit market conditions</li> </ul>
<b>Position Limits</b>	<ul style="list-style-type: none"> <li>• Some degree of position limitation is implied in Feinstein-Levin</li> <li>• Exchange position limits, if applicable, can be avoided through OTC transactions provided they do not violate Feinstein-Levin provisions</li> </ul>	<ul style="list-style-type: none"> <li>• Registered exchanges have maximum position limits set by the Regulator</li> <li>• Given print requirements and other provisions of TEAM, there will be less liquidity in OTC markets relative to exchange traded markets. This reduces the likelihood of outsize OTC positions in the first place</li> </ul>
<b>Market Regulator and Monitoring</b>	<ul style="list-style-type: none"> <li>• Significant OTC transactions, counterparty risk, and post-trade reporting will necessitate</li> </ul>	<ul style="list-style-type: none"> <li>• With competing registered exchanges using a CLOB format, the initial registration standards become the</li> </ul>

	<p>sophisticated financial regulation, likely the SEC or CFTC</p> <ul style="list-style-type: none"> <li>Given the factors above, significant staffing will be required to conduct investigations and monitor a broad marketplace</li> </ul>	<p>most critical part of the process</p> <ul style="list-style-type: none"> <li>With a CLOB format much of the basic market monitoring can be automated, in some cases algorithmically.</li> <li>Automated monitoring would facilitate FERC or EPA regulation of the carbon marketplace as an alternative to the SEC or CFTC</li> </ul>
<p><b>SEC Accounting Treatment for Allowances</b></p>	<ul style="list-style-type: none"> <li>Mark-to-market accounting will drive hedging business to intermediaries who will structure derivative products that minimize earnings volatility for emitters</li> <li>Accounting driven products push trading volume to OTC and less regulated markets</li> </ul>	<ul style="list-style-type: none"> <li>Industrials who are “short” abatement should be able to directly trade listed futures and options to manage their risk</li> <li>One means of facilitating this would be principles-based accounting that allows an industrial intending to exercise a derivative to book it as a deferred expense (see Appendix). This would limit the need for structured OTC derivative hedges from intermediaries</li> <li>Another means of facilitating this is by setting exchange membership standards to accommodate Industrial firm’s Treasury capabilities rather than simply applying traditional broker-dealer standards</li> </ul>

## *the Nicholas Institute*

The Nicholas Institute for Environmental Policy Solutions at Duke University is a nonpartisan institute founded in 2005 to engage with decision makers in government, the private sector, and the nonprofit community to develop innovative proposals that address critical environmental challenges. The Institute seeks to act as an “honest broker” in policy debates by fostering open, ongoing dialogue between stakeholders on all sides of the issues and by providing decision makers with timely and trustworthy policy-relevant analysis based on academic research. The Institute, working in conjunction with the Nicholas School of the Environment, leverages the broad expertise of Duke University as well as public and private partners nationwide.

## *the Climate Change Policy Partnership*

The Climate Change Policy Partnership (CCPP) researches carbon-mitigating technology, infrastructure, institutions and overall systems in order to inform lawmakers and business leaders as they lay the foundation of a low-carbon economy. Duke University’s CCPP is an interdisciplinary research program of the Nicholas Institute for Environmental Policy Solutions, the Nicholas School of the Environment, and the Center on Global Change. Our corporate partners make our research possible and help us bridge the gap between academic research, business expertise, and effective climate change policy application.

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