CARBON MARKET DESIGN & OVERSIGHT: A SHORT OVERVIEW

INTRODUCTION

At the heart of any successful cap-and-trade program is a well-functioning market for the trading of emissions allowances. The sulfur dioxide allowance market created under 1990 Clean Air Act Amendments to control acid rain is an example of such a success. At the same time, several recent high-profile market crises, such as the 2008 petroleum price spike, the crash of subprime mortgage and credit default swap (CDS) markets, the Lehman bankruptcy, and the Madoff Ponzi scheme have led many to question market mechanisms.

Yet, these events should not be viewed as indictments of markets in general, as our entire economy is in fact a market-based system. Rather, they serve to highlight the critical need for appropriate market design, transparency and oversight. Luckily, Congress has the opportunity to design the carbon trading market oversight framework at a point in time before long-standing carbon trading practices and systems have been fully established. This presents the opportunity to get the system right from the outset.

Oversight is critical because a carbon market will be intimately connected to other energy markets, including natural gas, coal, petroleum, and electricity. Because of these links, the potential exists for manipulation of one or more of these markets to result in pricing issues in the others. Furthermore, while a carbon market has many characteristics of a traditional commodity market, it also differs in two important aspects:

- First, the carbon market exists specifically to address an environmental goal—to reduce greenhouse gas (GHG) emissions—and regulated entities will have no choice but to participate.

- Second, there is a limited supply of emissions allowances, determined by the government, which will decrease over time.

So in essence, both demand and supply are created by the government. To address these realities, lawmakers should build upon best practices and lessons from a number of existing markets to create the optimal design and oversight mechanisms to ensure a viable, transparent, and robust carbon market.

THE ROLE OF CAP AND TRADE & THE U.S. CARBON MARKET

A market-based cap-and-trade system offers the most cost-effective means of reducing GHG emissions by unleashing innovation, spurring investment in new, sustainable technologies, and concentrating action on the lowest cost solutions. In general, a cap-and-trade system works by first setting a cap, or limit, on the amount of GHGs that regulated firms are allowed to release. A tradable GHG certificate, or allowance, is created for each ton of capped emissions, and these allowances are distributed to firms and other entities either through an auction, free allocation, or some combination of the two.

At the end of each compliance period, regulated firms must submit to the government a quantity of allowances equivalent to their emissions. Trading provides regulated firms the flexibility either to

reduce their own emissions and sell excess allowances, or to buy the extra allowances they need from other firms (or from a government at auction), whichever is cheaper. A wide body of economic and historical evidence shows that market-based systems can achieve the same environmental benefits at a considerably lower cost than traditional command-and-control regulations, which require regulated firms to take specific actions or install prescribed technologies.

One of the central features of a cap-and-trade system is that the buying and selling of allowances results in a price on emissions, which in turn provides information to firms about whether it is cheaper for them to reduce their emissions or to buy allowances on the market. Ensuring that regulatory agencies, industry, and consumers see this price signal and factor it into their decision making is essential to create the incentive to reduce emissions and to invest in low-carbon technologies. As both the cap and the number of available allowances is reduced over time, all else being equal, the price of GHGs will rise and create a continuing incentive for firms to find new ways to reduce their emissions. This incentive to innovate and induce technological change also lowers emissions-control costs over time.

A carbon market can best achieve these results if it is designed to function efficiently from the beginning. A well-designed policy should include effective means to prevent excessively high prices (a political as well as economic question), extreme price volatility, and it should include oversight provisions to prevent market manipulation, irresponsible risk-taking, and other problems. Thousands of businesses would be affected by a mandatory GHG emissions trading system, and there is a strong public interest in ensuring that the market functions efficiently and allowance prices generally reflect the balance of supply and demand.

The market should be fair to its participants and to 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 reduce GHG emissions at the least possible cost to the economy. Yet, to understand the best way to design a new market and the options to create proper transparency and oversight, it is first necessary to know some of the basics of carbon markets and their key structural components.

ELEMENTS OF THE CARBON MARKET

Two primary types of financial tools, or *instruments*, are likely to trade in the carbon market: allowances and allowance derivatives.[1] The following paragraphs highlight the fundamental differences between these types of carbon financial instruments, the ways in which they can be traded, and the alternatives for who could regulate them.

The Cash Commodities Market

As mentioned above, tradable certificates to emit one ton of GHGs, also known as allowances, are the actual compliance instruments that regulated emitters will use to meet their obligations under an

[1] While it is likely that offset credits will trade in the market in addition to allowances, this paper focuses primarily on "allowances."

emissions cap. At the end of the compliance period, regulated emitters will transfer to the U.S. Environmental Protection Agency (or other designated regulator) allowances for each ton of GHGs, measured in carbon dioxide equivalents (CO_2e) they emitted during the period. The initial distribution of allowances by the government is referred in financial terms as the *primary cash market*, while the *secondary cash market* refers to the marketplace where allowances are traded among participants. This is similar to the physical exchange of any commodity, such as oil, metals, or agricultural goods. Secondary market trades are known as *cash* or *spot* markets because the actual commodity, in this case an allowance, is transferred from the seller to the buyer for cash "on the spot."

The Derivatives Market

In contrast to a commodity that is physically traded between two parties, a derivative is a financial product that derives its value from an underlying commodity or asset. The primary purpose of derivatives is to allow those who buy and sell commodities to manage the risk of very high (or very low) prices by essentially guaranteeing or "locking-in" a price for a future purchase.

Emitters in a cap-and-trade system, such as utilities, will have concerns about both the volatility and the future direction of allowance prices, and some will likely look to derivatives as a way to minimize (or *hedge*) these concerns. *Hedging* is the process of reducing financial risk by taking two positions that will counteract each other if prices change. For example, if a firm believes it will need additional allowances in the future and the price at that time will be higher, it might want to purchase allowance futures. A *future* is a standardized, transferable, exchange-traded contract that requires delivery of a commodity at a specified price on a specified future date. Purchasing allowance futures would be a way to minimize the risk associated with the expected price increase. If the price in the cash market does in fact go up, the firm can then choose to take delivery of the allowances in the futures contract that they bought at the lower price. This increased certainty about what it will cost to comply with regulations in the future can also help firms analyze their emissions reduction options.

Based on experiences in other markets, a wide range of derivative instruments could be used by regulated entities (such as manufacturers and power generators) to manage the risk of higher (or lower) prices. The major categories of derivative instruments include:

- **Forward contract** – A privately negotiated, individualized cash transaction in which a commercial buyer and seller agree upon delivery of commodity at a future date. 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 standardized contract involving an established quantity of an underlying asset (e.g., an allowance) that will be physically delivered or settled for cash at a known future date. The price is determined through the bid and offers that are made on trading platforms such as regulated exchanges and the price is established at the initiation of the contract. Futures contracts are cleared through a designated derivatives clearinghouse, which is described further below.

- **Option contract** – Gives the buyer the right, but not the obligation, to buy or sell a specified quantity of a commodity at a specific price within a specified period of time, regardless of the spot market price of the commodity at that time.

- **Swaps** – A transaction between parties that involves an exchange of allowances (or offsets) or other cash-flows in order to maximize revenue or minimize financing costs for each party.

Because derivatives can take several different forms and are not limited in number like the physical allowances themselves, the volume of derivatives that trade will very likely be higher than the volume of allowances. Commodity futures generally trade a multiple of several times the volume of the underlying commodity—for instance, corn and bean futures trade twenty to thirty times the global production of the physical commodities. Since allowances will likely be distributed for a limited number of years at a time, it follows that during the early years of a U.S. GHG cap-and-trade system there will be a limited number of allowances in circulation. An even smaller number may actually be traded, particularly as new participants learn how to operate in a market-based compliance system.

Unless lawmakers decide to release more than one or two years of allowances at the outset, allowance derivatives may represent the majority of trading in the market, and as such could play a critical role in managing price volatility. To have an efficiently functioning market, the goal is to have enough units trading in the system (allowances, future, options, etc.) to allow large transactions to occur without causing a substantial change in the market price. If this goal is met, the market is said to be *liquid,* with the total amount of tradable units providing *liquidity.* While derivatives and market liquidity do not prevent price volatility, they can help to reduce it by providing an accessible means for market participants to hedge their price exposure in an efficient manner.

Derivatives also greatly contribute to identifying the price of a commodity, which is known as *price discovery*. Accurate price signals are the most efficient transmitters of economic information, as they indicate when supply is either low or high, when demand is robust or weak, and when firms should take notice of longer-term trends. When prices, trade volumes, and current offers to buy and sell are transparent, the accuracy of prices is enhanced and uncertainty is reduced. In some commodities where there are multiple delivery locations and types of product grades (such as grain), the price in the derivatives market serves as the benchmark, because it reflects both standardized terms and conditions for the commodity. This standardization provides a valuable economic service by providing companies the price information they need for planning and investment purposes.

WHERE TRADING OCCURS

As mentioned above, the U.S. Environmental Protection Agency (EPA) will first distribute a specific number of allowances (at least one years' worth) through an auction, free allocation, or a combination of both in the primary market. These allowances and their derivative financial products will then trade in the secondary market either through bilateral contracts that occur directly between parties, often referred to as *over-the-counter* (OTC) transactions, or through contracts made through an intermediary

such as an exchange. Important differences exist between OTC and exchange-based transactions, and these differences are explained below.

Exchanges

Trading on exchanges (e.g., Chicago Mercantile Exchange, New York Mercantile Exchange) takes place in a centralized location and the product contracts are standardized for terms such as the quantity of the commodity and the date of its delivery (e.g. 1,000 barrels of light sweet crude oil delivered in June 2010). Exchanges are highly regulated, and market information, such as prices and trading volume, are made available to members of the exchange, the government, and usually the public.

Transactions executed on an exchange go through a process known as *clearing,* which is done by a *clearinghouse.* Every exchange has a partner clearinghouse, which acts as the central counterparty to every transaction—meaning that it guarantees the financial soundness of both parties by acting as the buyer to each seller and the seller to each buyer. This process effectively eliminates the risk to both parties that the other might default (known as *counterparty risk*).

In order to trade on an exchange one must be a member, or have an account with a member, and have an amount of cash deposited into its account to cover their maximum expected one-day loss (this is known as *collateral, performance bond,* or *margin*). If the value of the positions held by an exchange member goes down, the member must make a payment to cover this loss—sometimes the same day or at the latest before the market opens for trading the next day. If payment cannot be made, the member must sell the related position.

This system is remarkably effective. According to CME Clearing (the clearinghouse associated with exchanges such as the Chicago Board of Trade and the NY Mercantile Exchange), there has neither been a failure by a clearing member to meet its performance bond or delivery obligations, nor has there been a failure of a clearing member firm resulting in a loss of customer funds in the over 100 years of operations, which clears 98 percent of all the futures and options in the United States. It is this effective clearing function and the standardization that makes exchange trading a popular and efficient market design feature.

Over-the-Counter (OTC)

In contrast to exchange-based trading, OTC trades are executed directly between private parties, use typically less standardized contracts, and currently face less regulatory oversight. They are also characterized by a higher level of risk than exchange-based trades, where either the buyer or seller might default on the agreement (counterparty risk). According to market date, in the European Union Emissions Trading System (EU-ETS) the OTC market is very important, as it has historically accounted for over half of all trades.

While there has been considerable criticism regarding the lack of transparency of the OTC market over the past year, certain OTC trades are often cited as playing a critical role in a carbon market system. For example, a utility building a new power plant might want to lock in (hedge) carbon allowance prices for

a decade or more in the future. Yet most exchange-traded futures contracts trade only a limited number of years into the future, because beyond a certain point (typically 3-5 years) it is difficult to find counterparties to complete enough transactions for the market to be liquid.

Yet there are cases in which a regulated entity might need to guarantee a carbon price a decade or more in the future. For instance, take the example of a utility looking to finance a new power plant over one or more decades. In order to hedge the price of carbon over this period of time, the utility would likely have to look to an OTC contract to achieve this goal. As will be explained further below, OTC trades also do not have the same cash collateral requirements as exchange trades, and as such can be more cost effective for firms looking to hedge their compliance cost risk for large transactions.

WHO SHOULD REGULATE?

At the outset, policymakers will identify a regulator to oversee the U.S. carbon market. Congress may choose to fit the carbon market into an existing regulatory structure, create a hybrid structure that draws on the expertise of multiple agencies, or create an entirely new agency. There are three federal agencies that currently have roles regulating markets and/or emissions that make them viable candidates: the EPA, the Commodity Futures Trading Commission (CFTC), and the Federal Energy Regulatory Commission (FERC).

Environmental Protection Agency (EPA)

While the EPA does not traditionally regulate financial markets, it does have oversight authority for its emissions trading programs, including the successful sulfur dioxide (SO_2) emissions trading system. This oversight includes management of the distribution, auction, and transfer of emissions allowances. EPA does not oversee the actual trading of emissions allowances, however, nor does it have a mechanism to provide price reporting or transparency for market transactions. The CFTC provides oversight for the SO_2 market.

Commodity Futures Trading Commission (CFTC)

Congress created the CFTC in 1974 as an independent agency with the mandate to regulate commodity futures and option markets in the United States. The agency's mandate has been renewed and expanded several times since then, most recently by the Commodity Futures Modernization Act of 2000. The CFTC assures the economic utility of the futures markets by: encouraging their competitiveness and efficiency; protecting market participants against fraud, manipulation, and abusive trading practices; and by ensuring the financial integrity of the clearing process.

Federal Energy Regulatory Commission (FERC)

FERC regulates interstate wholesale power transactions, wholesale electric rates, hydroelectric licensing, natural gas pricing, and oil pipeline rates. FERC also reviews and has ultimate responsibility for permitting liquefied natural gas (LNG) terminals, interstate natural gas pipelines, and non-federal hydropower projects.

Each of the above agencies has its own relevant experience that could be valuable in ensuring a smoothly functioning carbon market, and in the end, the decision of which agency or agencies are chosen as regulators should be determined based on this experience. It is critical that the agency or agencies chosen to oversee both the cash allowance and derivative markets have deep expertise and experience in those markets, and sufficient staff to carry out oversight—all of which will help to ensure efficient operation and effective oversight from the market's outset.

COMPARISON OF OVERSIGHT PROVISIONS IN RECENT & CURRENT LEGISLATIVE PROPOSALS

The carbon market oversight provisions in the Waxman-Markey ACES bill (H.R. 2454) represent the latest evolution of such policies in cap-and-trade legislation. The 2007 Lieberman-Warner bill had no language for regulating the carbon market; instead, it established a Carbon Market Efficiency Board (CMEB), which was charged with both monitoring the market and employing various cost containment measures. The final Senate floor version of Lieberman-Warner (S.3036) would have established a federal interagency working group to determine each agency's oversight responsibilities and to promulgate regulations for all aspects of the carbon market.

The 2008 Dingell-Boucher draft did away with the CMEB and assigned FERC jurisdiction over the entire carbon market including both cash allowances and derivatives. Dingell-Boucher had detailed provisions on market regulation and enforcement, and gave FERC authority to take emergency measures—subject to the President's assent—in case of excessive price fluctuations or other major market disturbances.

The Waxman-Markey ACES bill (H.R. 2454) creates distinct oversight regimes for allowances and derivatives. The bill instructs FERC to develop and implement regulations for oversight of the regulated allowance cash market. At the same time, an interagency working group would develop and recommend to the President proposals for regulating the allowance derivative market. However, the default rule in the bill would assign oversight of this market to the CFTC. The Boxer-Kerry bill (S.1733) included only placeholder language for market oversight, while the Carbon Market Oversight Act proposed by Senators Feinstein and Snowe (S.1399) lays out a comprehensive regulatory framework.

Current Proposals

A number of lawmakers and the Obama administration have introduced financial market reform proposals that would tighten oversight of all commodity markets in an effort to curb "excessive speculation" and address what they view as weak spots in market regulation. These would include the establishment of a legal and regulatory framework for the oversight of new environmental commodity markets. However, the proposals vary substantially, and consensus has yet to emerge on the appropriate set of obligations and restrictions that should apply to commodities trading, including carbon emissions trading. The debate is complicated by the sophistication of these markets, the challenge of foreseeing the consequences of regulatory action, and the desire to respond decisively to the market failures and volatility of the past couple of years.

One of the central issues of this debate is whether energy derivatives, including carbon-related derivatives, should be allowed to trade outside of exchanges in the OTC market. Given that OTC transactions are subject to less monitoring and regulatory constraints than those carried out on exchanges, some policymakers question whether OTC transactions should be permitted. Others contend OTC trades should be allowed, but limited to certain types of buyers and sellers, required to go through clearinghouses, reported to regulators, or disclosed to the public. Other measures being considered, such as limits on the amount of derivatives that an individual can hold (*position limits*), the amount and type of assets that must be set aside in case of default (*collateral requirements*) and restrictions on who can participate in the market, could apply to exchange-based as well as non-exchange-based transactions.

Closing Loopholes

Most of the current proposals to increase oversight over commodities and futures markets would strengthen regulatory authority to intervene in markets to preserve their competitiveness and integrity. The proposals aim to close, at least partly, three regulatory loopholes: the Enron Loophole, the London Loophole, and the Swaps Loophole. While these loopholes pertain to energy trading, they have potential relevance for carbon trading, which under existing legislation would be regulated in the same way. Current proposals differ primarily in the agencies to which they grant regulatory authority, as well as in the means they deploy to regulate OTC derivatives trading.

Loophole	Description
Enron Loophole	This loophole allowed OTC derivatives trading on exempt commercial markets (such as energy and minerals) to avoid CFTC regulation. The 2008 Farm Bill closed this loophole only in part, as it allows CFTC to regulate these trades when it determines that the derivatives play a significant price discovery role (i.e., their prices are used as references for other transactions or markets).
London Loophole	Used mainly by speculators in foreign futures markets to indirectly access U.S. energy markets. This has been addressed at least in part by information sharing agreements between the CFTC and the UK's Financial Services Authority.
Swaps Loophole	Used mainly by institutional investors of OTC swaps to avoid position limits that would be applicable to direct transactions in the underlying futures.

MARKET OVERSIGHT CONSIDERATIONS & OPTIONS

As with any financial market, the carbon market should reflect a balance between free market activity and regulation to enable innovation, market confidence, and ultimately a least-cost method to achieve an environmental outcome. Policymakers should encourage transparency and seek to prevent both excessive speculation that drives price volatility beyond the normal function of supply and demand, as well as attempts to interfere with and manipulate the market.

As highlighted above, one of the central questions being debated today is whether OTC transactions would be permitted in the carbon market and, if so, whether they will be required to go through a clearing process and reported to regulators, other market participants, government officials, and/or the general public. The next part of this brief takes a closer look at this issue, including possible approaches for addressing concerns with the OTC market.

Oversight of Trade in Commodity-Based Derivatives under Existing U.S. Regulations

The Commodity Futures Modernization Act of 2000 established three classes of commodities: agricultural commodities, excluded commodities, and exempt commodities. Trade oversight rules vary depending on the class of commodities on which derivatives are based.

- Agricultural commodities include crops that are tradable.
- Excluded commodities include interest and exchange rates, currencies, indices, and other financial commodities.
- Exempt commodities, defined as commodities that are neither agricultural nor excluded, include mainly energy and minerals. Emissions allowances would presumably also fall under this category. OTC derivatives on these types of commodities are exempt from most regulation under the Commodities Exchange Act (CEA), including the obligation to trade on regulated exchanges, and are subject only to certain anti-fraud and anti-manipulation provisions.

The Waxman-Markey bill would treat emissions allowances as exempt commodities, but require that derivatives transactions be cleared in order to be exempt from most CEA provisions. It would also create a separate category for energy commodities, which would then be subject to a unique set of stringent oversight rules.

OTC and Exchange-Based Trading: Market Roles and Oversight Challenges

While there is no doubt that exchange-based trading allows more transparency and possibly more direct access for market regulators, many market observers counter that OTC trading should play a role in a carbon market. In order to shed light on the debate about the extent and circumstances that OTC trading in carbon derivatives might be allowed, this section lays out some of the core functions of and rationales for OTC versus exchange-based trading, and some of the market and regulatory considerations associated with each.

Rationales for OTC Transactions

Failure to precisely hedge a particular carbon risk can result in earnings volatility and an increase in the cost of capital, thus the flexibility of OTC transactions is an often-cited reason for allowing them to play a role in the emissions market. This flexibility comes in several forms including:

1. **Customization of contracts**. In a variety of circumstances, a customized contract is essential, as the following cases illustrate.

   - *Contingent contracts*, in which quantities of the goods or services exchanged are conditional, are typically difficult to standardize and to trade on an exchange. An example in the carbon market would be a transaction involving emissions reductions from an offset project. In this case, the purchaser is buying a stream of future emissions reductions, the volume and timing of which is uncertain due to many factors, including project approval, verification, and performance. Given these uncertainties, the buyer would ideally negotiate a non-standard contract where delivery was contingent on the project's outcome.

   - *Futures contracts* with delivery in the longer term (e.g. 5 or more years depending on the commodity) are not typically offered by exchanges. Parties wishing to hedge long-term risk must generally conduct transactions outside of an exchange, even when standardized contracts would otherwise be suitable. Some market participants point out that impeding an entity's ability to hedge its exposure to long-term financial risk could have negative repercussions for its credit rating and ability to invest. Because standardized contracts can only be purchased in set volume increments (e.g. 100 or 1,000), precise hedging for very specific amounts can require that contracts be drawn up directly between two parties (bilaterally).

2. **Flexible collateral requirements**. Exchanges—or more specifically clearinghouses—require traders to post *margin* (collateral in the form of cash or government securities) for their transactions. Margins fluctuate on a daily basis in line with underlying asset prices and traders' positions (the amount they own or owe), and can require traders to have a great deal of cash on hand. This can be especially true with futures market positions that are financed through debt, as small fluctuations in price can correspond to large variations in a trader's position. Margin requirements also tie up a great deal of cash as collateral, which means the cash cannot be used for other investments. This can be particularly burdensome for smaller participants and for utilities that need to hedge their carbon risk while also investing cash in equipment and infrastructure.

   If, for example, a power plant developer or financier were concerned about variations in the future price of emissions allowances and wanted to purchase a future long-term stream of allowances at a set price, this would be possible on an exchange only if 1) futures contracts on an exchange were available for the desired time period, and 2) the developer had the cash collateral to cover the value of the allowances. Meeting both of these requirements could be difficult.

In contrast to an exchange-traded futures contract transactions are negotiated bilaterally directly between two parties or through an intermediary it would be possible to design a forward contract of the desired length that utilized a wider range of assets, including less liquid ones (e.g. physical assets, such as the power plant itself, for collateral. While this increases the risk level to participants, it also frees up dollars that can be used for technology investments

3. **Ability to negotiate price**. While exchanges (and clearinghouses) create a transparent price, some companies feel that they are able to negotiate better prices bilaterally. In addition, some point out that they can reduce collateral requirements by using their credit rating to their advantage. Large utilities, for example, might be able to use both their regulatory standing as well as their size to negotiate more favorable forward pricing of emissions on the OTC market than they could receive on an exchange. If this were true, the OTC market could help to lower consumers' costs.

Rationales for Exchange-based Transactions

As noted, there have been increasing calls for moving all transactions associated with a federal carbon market to an exchange-based system. The major reasons often cited for this include:

1. **Transparency.** Exchanges post both the volumes traded and the prices at which the transactions occur instantaneously, ideally giving all market participants immediate access to the same information. This transparency ensures a level playing field for buyers and sellers alike, but it can also exist in brokered OTC markets. Exchanges also provide transparency to regulators and to the public, which is important given the public policy goals of a cap-and-trade program.

2. **Ease of oversight.** The centralized and transparent nature of an exchange makes it much easier for regulators to monitor and react to irregularities. It also makes it more difficult, although not impossible, for individual participants to "game" the system without being detected (e.g., insider trading). As an example, over 20 percent of all transactions in the oil market take place OTC, which can make it difficult for regulators whose visibility is limited to exchange trades to understand who is driving oil prices on a day-to-day basis.

3. **Absence of counterparty risk.** As described above, counterparty risk is the risk that either the buyer or the seller might default on a particular transaction. By requiring market participants to post margin (cash collateral) to cover their positions, clearinghouses have successfully created a system to mitigate counterparty risk and ensure that buyers and sellers are creditworthy market participants. This benefit is ensured by the clearinghouse, not the exchange itself, and thus is not exclusive to exchange-based transactions. Indeed, it is possible for OTC transactions to go through a clearing process as well, through services such as CME's ClearPort.

At the same time, collateral that is readily convertible to cash is an essential element of a central counterparty clearing system, and the only means to avoid the creation of systemic risk. The clearinghouse must hold sufficient liquid collateral to enable it to immediately meet the obligations of a customer that defaults, since as the central counterparty it must immediately fulfill the obligations of the defaulting clearing member. There is no way to do this (without adding debt to the system) if the clearinghouse is holding illiquid assets, such as real estate, as collateral.

4. **Market liquidity.** Market participants are drawn to centralized marketplaces where they know they can trade a certain commodity. Market liquidity and the instantaneous public disclosure of prices together lead to greater price transparency.

5. **Expediency.** The standardization of contracts and the absence of counterparty risk (due to the clearinghouse function), along with the use of electronic platforms, allows exchange transactions to be executed in a matter of seconds and settled on a daily basis.

OTC and Exchange-Based Trading Compared

Dimensions	OTC transactions	Exchange-based transactions
Flexibility / propensity for customization	Contracts are shaped freely by transacting parties.	Contracts are standardized.
Transparency	The regulatory reporting of OTC transaction data is not systematically required, but could be, as it is in some instances (e.g. electricity purchase agreements). In other words, transparency can be improved through transaction reporting requirements.	Transaction data is accessible to the public and regulators.
Default protection	Counterparties are free to assume default risk as they see fit and cash collateral or clearing is not a systematic requirement.	All exchange-based transactions must be cleared. Clearinghouses bear all credit risk.
Accessibility to small or non-financial players	There are no prerequisites to carry out a bilateral transaction.	Participants must be members of the exchange or have an account with a member.
Oversight efficiency	Keeping track of a multiplicity of heterogeneous transactions for which there is no organized market is more costly than keeping track of transactions on an exchange, but not impossible.	The standardized nature of contracts and the centralized, digitized, and transparent nature of trading facilitate oversight.

OPTIONS FOR IMPROVING OVERSIGHT OF OTC AND EXCHANGE-BASED TRANSACTIONS

As illustrated above, both OTC and exchange-based markets have their strengths and weaknesses. This section touches upon several options lawmakers and regulators may have to improve oversight of both on- and off-exchange trading. They include the imposition of position limits, clearing and collateral requirements, reporting obligations, and restrictions on participation in certain types of transactions.

Position limits. Imposing limits on the maximum number of contracts or options that entities may hold at any given time is one option to curb excessive speculation. These limits would help to prevent a single participant or group of participants from amassing enough of a particular commodity to affect prices. Regulators would likely need to try to distinguish between allowance-based instruments held by emitters for compliance purposes and those held as investments.

Some industry participants have pointed out, however, that position limits act merely as "speed bumps" against excessive speculation rather than true, impermeable limits, as traders generally find creative ways of working around such rules. If regulators do choose to pursue this approach, limits should be applied to individual market participants and aggregated across all trading venues (exchanges and OTC markets). Placing limits only on regulated exchanges might actually exacerbate potential problems as more transactions could flow to the OTC markets or overseas trading venues.

Clearing and collateral requirements. As discussed above, while clearing is a built-in feature of exchange-based trading, OTC transactions are not systematically subject to clearing or credit risk management requirements (i.e., they do not ensure that counterparty risk is eliminated). Avoiding large cash collateral requirements, particularly where long-term transactions are involved, is a key rationale for not transacting on an exchange. While this avoids the potential locking-up of cash resources, it also comes at the cost of greater financial risk. As recent events have demonstrated, excessive risk-taking on a wide scale can have negative market spillover effects in asset and credit quality.

For this reason, some lawmakers have proposed that OTC transactions face clearing and/or collateral requirements. The Waxman-Markey bill for instance contains a clearing requirement for emissions allowances; the Treasury and Feinstein-Snowe proposals also tend to force trades through clearinghouses and exchanges through the imposition of clearing and collateral requirements on OTC trades.

As explained above, the use of a clearinghouse or cash collateral to back a transaction may reduce some of the advantages of trading OTC, as it would still force companies to divert working capital from infrastructure projects to non-interest bearing collateral accounts. On the other hand, requirements of this nature could greatly reduce excessive risk taking. This trade-off accounts for some of the differences in current market oversight proposals. For instance, one proposal would exempt end users (such as capped entities and offset developers) from clearing requirements if they can demonstrate appropriate capital or collateral.

Restrictions on participation. In light of the financial institutions' roles in the recent economic crisis and the size of the bailout targeted to these entities, certain lawmakers have aired the possibility of barring them from participating in carbon markets. Carbon trading could, for instance, be limited to entities that will be directly regulated under a federal cap-and-trade program. A constraint of this type would vastly reduce speculative trading of allowances and limit excessive risk-taking. However, curtailing financial institutions' participation in the carbon markets is also likely to severely constrain the amount of capital available to finance the development of critical low-carbon technologies. Furthermore, many carbon market participants would likely trade through banks. For example, while there are more than 5,000 regulated firms in the EU-ETS, less than 10 percent of these capped entities actually trade in the market, with the rest going through financial institutions.

Such restrictions could ultimately greatly reduce market liquidity, thereby making it more difficult for the regulated entities to procure allowances, which would in turn increase overall costs to the consumer. Other drawbacks include greater price volatility and fewer opportunities for price discovery, which would result in less market efficiency. The market should help prices converge toward a single, efficient price that generally reflects the fundamentals of supply and demand while allowing for a reasonable amount of speculation.

Reporting obligations. While exchanges make transaction price and volume information available to regulators and the public, data on OTC transactions are not systematically collected. Proposals such as those from Senators Feinstein and Snowe and the Treasury Department, which would allow limited trade in carbon derivatives to occur off-exchange and without the intermediation of clearing services, feature reporting obligations in connection with these trades. Parties to these transactions would have to report information on individual contracts to regulators, and the public would have access to aggregated data, which would increase overall transparency and may increase public confidence.

OTC versus Exchange—Summary Considerations

While exchanges are not a panacea and do not ensure the absence of excessive speculation or market manipulation, they do provide a fair trading platform for both market participants and regulators alike to see and access prices for carbon derivatives. The centralized, standardized, digitized, and rules-based nature of exchange-based trading lends itself to efficient and effective oversight, provided that exchanges are required to take preventive measures and regulators are authorized to protect markets from abuse. The high level of transparency associated with exchange-based trading facilitates regulatory market surveillance as well as price discovery and competitiveness.

Excessive speculation can be curbed to some degree through position limits. Daily cash settlement and clearing services lower the risk of default and limit the potential for negative ripple effects if default occurs. Moreover, exchanges facilitate the emergence of liquidity because they provide a central place to trade; it is typical for one exchange to attract the bulk of trading activity in a particular commodity and therefore have a deep and liquid market where orders of varying size can be executed in a timely and effective manner. However, as noted above, exchanges only offer standardized contracts, and have collateral requirements, which can make it difficult for some important market participants, such as utilities, to participate.

OTC markets nevertheless can provide an important complement to exchange-based trading, but are more challenging to regulate by virtue of their decentralization and traditional lack of transparency. That said, nothing technically prevents regulators from establishing position, clearing, reporting, participation, collateral, or other requirements for OTC trades. In the end it should be possible to maintain a role for OTC transactions while ensuring an appropriate level of regulatory oversight and efficient market operation.

In summary, both OTC and exchange-based systems can have roles to play in a federal carbon market. The challenge faced by lawmakers and regulators is to strike the right balance between market transparency and oversight, and the ability of market participants to structure contracts that best fit their specific circumstances.

KEY CAP-AND-TRADE DESIGN QUESTIONS

A number of factors will influence how and where carbon instruments trade, including:

- Should similar regulations 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?

- Should OTC transactions be permitted and, if so, should they be required to clear on exchanges and reported to regulators, or otherwise made available to market participants, government officials, and/or the general public?

- Should there be limitations on who is eligible to participate in carbon auctions and carbon trading?

- Should there be "position limits" that constrain the size of the positions that market participants can control across all trading venues?