RGGI Inc.

REPORT ON THE SECONDARY MARKET FOR RGGI CO_2 ALLOWANCES: SECOND QUARTER 2010

Prepared for:

RGGI, Inc., on behalf of the RGGI Participating States

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POTOMAC ECONOMICS

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The Regional Greenhouse Gas Initiative (RGGI) is a cooperative effort by participating states to reduce emissions of carbon dioxide (CO_2), a greenhouse gas that causes global warming.

RGGI, Inc. is a non-profit corporation created to provide technical and administrative services to the CO_2 Budget Trading Programs of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

A. Introduction

The primary market for RGGI CO_2 allowances consists mainly of the auctions where allowances are initially sold. Once an allowance is purchased in the primary market, it can then be resold in the secondary market. The secondary market for RGGI CO_2 allowances comprises the trading of physical allowances and financial derivatives, such as futures and options contracts.

The secondary market is important for several reasons. First, it gives firms an ability to obtain CO_2 allowances at any time during the three months between the RGGI auctions. Second, it provides firms a way to protect themselves against the potential volatility of future auction clearing prices. Third, it provides price signals that assist firms in making investment decisions in markets affected by the cost of RGGI compliance.

This report provides a summary of activity in the secondary market in the second quarter of 2010 and discusses the results of our market power screens. Several patterns have emerged in this period in the secondary market:

- CO_2 allowance prices were relatively stable and averaged $2.12 prior to the announcement of the results of the June auction. Following the announcement, allowance prices fell significantly and averaged $1.90 during the remainder of the second quarter.

- Futures trading declined substantially as the volume of trading decreased 47 percent from the first quarter of 2010 to 11 million allowances in the second quarter. All of the trading volume was for 2009 vintage or 2010 vintage allowance contracts.

- The majority of allowances are held by firms that acquired them through the auctions, although there are some firms that have acquired most of the allowances they hold through the secondary market. 3.1 million allowances were exchanged between unaffiliated firms during the second quarter of 2010.

- Participation in the market for RGGI CO_2 allowance derivatives fell as the numbers of firms maintaining significant positions in contracts related to each vintage were lower than 20 throughout the second quarter of 2010.

We evaluate information on the holdings of CO_2 allowances and allowance derivatives as well as the demand for allowances to identify firms that may have acquired a position that raises

competitive concerns. We find no evidence of anticompetitive conduct; however, we will continue to evaluate the competitiveness of the market.

B. Background

The secondary market for RGGI CO_2 allowances comprises the trading of physical allowances and financial derivatives, such as futures and options contracts. A physical allowance trade occurs when the parties to the transaction register the transfer of ownership in RGGI's CO_2 Allowance Tracking System ("COATS"). Futures, options, and other financial derivatives are called "exchange-traded" when they are traded on a public exchange, and are called "over-the-counter" ("OTC") when they are not traded on one of the public exchanges. Many financial derivatives eventually result in the transfer of physical allowances (i.e., the transfer is registered in COATS), but this may occur months or years after the parties enter into a transaction.

Standard futures and options contracts for RGGI CO_2 allowances are traded on the Chicago Climate Futures Exchange ("CCFE"). Three categories of standard contracts are traded:

- Futures – Under these contracts, two parties agree to exchange a fixed number of allowances of a certain vintage year at a particular price at a specific point in the future (called the "delivery month"). At the end of the delivery month, the contracted number of allowances must be physically transferred to the buyer's account in the COATS registry and funds must be transferred to the seller. The vintage year refers to the compliance year of the allowance that is to be transferred. One standard futures contract equals 1,000 RGGI allowances. [1]

- Call Options – Call options give the purchaser the option to buy a fixed number of allowances of a certain vintage year at a particular strike price at any time prior to the expiration date. For example, suppose a firm holds a call option with a 2009 vintage year, $5 strike price, and June 2009 expiration date. If the price of the corresponding futures contract rose to $5.75, the firm could exercise the option to buy allowances at $5 and immediately sell them at $5.75. Alternatively, if the price of the futures contract

[1] More precisely, a futures contract requires parties with an open interest to post financial assurance in an account with the exchange until the contract reaches expiration. The exchange continually withdraws and deposits funds according to changes in the prices of the contracts in which the party has interest. For example, if a firm buys a contract for 1,000 allowances at $3.50/allowance, the purchasing firm (firm with a long position) must put $3,500 in an account (or whatever share of the entire liability the exchange requires). If the futures price declines to $3/allowance, the exchange transfers $500 from the account of a firm with a long position to the account of a firm with a short position (firm that sold a contract), and the firm with a long position is only required to keep $3,000 in the account. At the end of the delivery month, allowances are exchanged for funds according to the closing price on the last day of the month.

stayed below $5, the firm would let the option expire without exercising it. One standard options contract can be exercised for 1,000 RGGI allowances.

- Put Options – Put options are similar to call options but they give the purchaser the option to *sell* a certain number of allowances of a particular vintage year at a specified strike price any time prior to the expiration date.

Futures and options contracts are important because they allow firms to manage risks associated with unforeseen swings in commodity prices. Futures allow firms to lock-in the prices of future purchases or sales. Options allow firms to limit their exposure to price volatility. Call options protect the purchaser if the price of the commodity increases, while put options protect the purchaser if the price of the commodity decreases. Although options provide less certainty than futures contracts, they usually require less financial security, making them more attractive to some firms.

Public exchanges are attractive to firms that need a simple way to trade standard products. Moreover, public exchanges effectively eliminate the risk of default by counter-parties, since the exchange constantly monitors the account holdings of each participant to ensure that they have posted sufficient financial security to meet their obligations.

OTC trading is attractive to firms that prefer contracts with non-standard provisions. Firms with on-going business relationships may have other ways to manage the risk of default by the other party.[2] Compliance entities may prefer to buy RGGI CO_2 allowances bundled with other goods and services from their fuel suppliers or operations service providers. The OTC market allows parties to create contracts specifically tailored to their needs. In general, much more information is available about trading on public exchanges than trading in the OTC market.

[2] For instance, firms may enter into forward contracts rather than futures contracts. The primary difference between a futures contract and a forward contract is that a futures contract typically requires parties with an open interest to post financial assurance which the exchange draws upon or adds to until the contract reaches expiration, while a forward contract requires that all financial settlement occur at expiration.

C. SUMMARY OF PRICES

This section of the report summarizes prices in the secondary market for RGGI CO_2 allowances during the second quarter of 2010. Figure 1 shows the transaction prices of actual CO_2 allowances and futures contracts for allowances on trading days. This section also summarizes the prices of options contracts for allowances. For context, Figure 1 shows prices through the first full week of the third quarter of 2010 when settlement was completed for futures contracts for June 2010 delivery.

In the second quarter of 2010, CO_2 allowance prices were relatively stable and averaged $2.12 before the announcement of the results of the June auction. Following the announcement, allowance prices fell and averaged $1.90 during the remainder of the quarter. The prices of futures contracts were consistent the transaction prices recorded in COATS throughout the second quarter.

Prices of CO_2 Allowances and Allowance Derivatives

Figure 1 summarizes prices in the secondary market during the period. One light blue line shows the closing price on each trading day of the 2009 vintage CCFE futures contract with delivery at the end of the month.[3] A second light blue line shows the closing price of the 2010 vintage futures contract with delivery at the end of the month. The squares show the volume-weighted average price of physical deliveries in COATS on each day when a transaction took place and where the parties recorded the transaction price.[4] For comparison, Figure 1 also shows the clearing prices of 2010 vintage and 2013 vintage allowances in the RGGI auction held on June 9.

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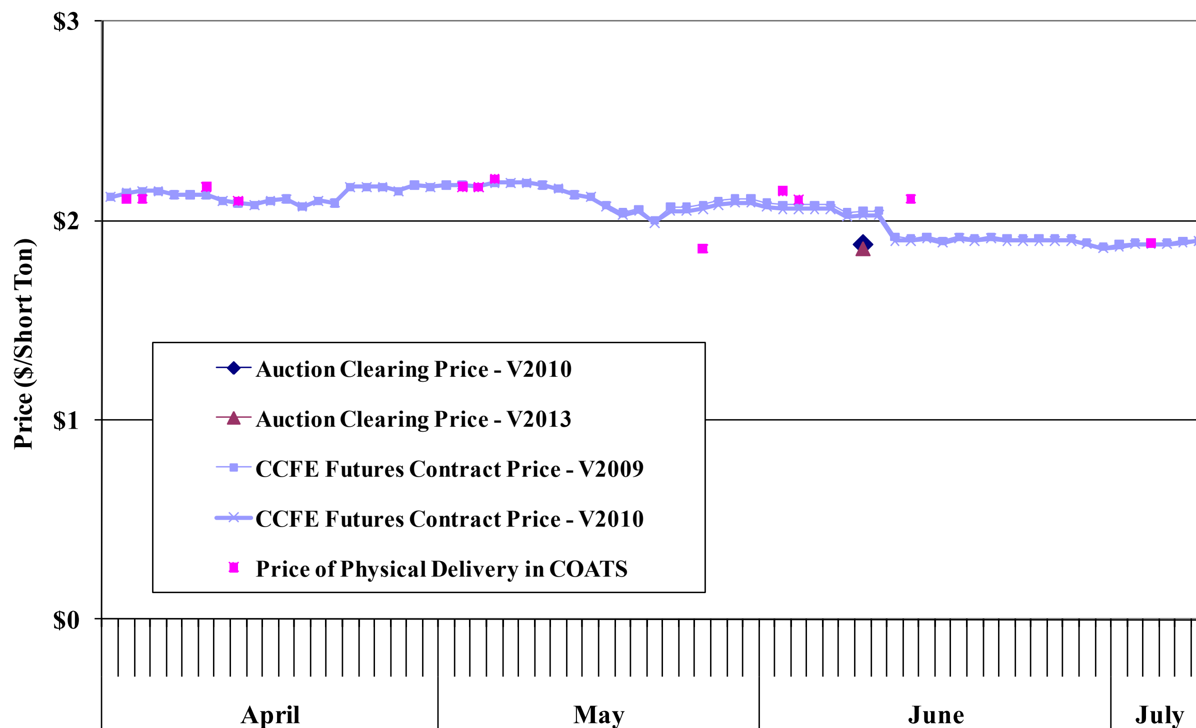
[3] For instance, in April, the price of the futures contract for April 2010 delivery is shown.

[4] Parties are required to report the transaction price if there is an underlying financial transaction related to the transfer of allowances between accounts.

Figure 1: Prices in the Secondary Market for RGGI Allowances
April 1 to July 9, 2010



Sources: Auction clearing prices are available at "www.rggi.org/co₂-auctions/results", CCFE futures contract prices are available at "www.ccfe.com/mktdata_ccfe/futuresSummary.jsf?symbol=rggi", and the prices of physical deliveries to COATS are based on information in COATS available at "https://rggi-coats.org/eats/rggi/".

Information about the value of RGGI CO_2 allowances comes from the trading of standard futures contracts on the CCFE. For 2009 vintage CCFE futures contracts, the daily closing price was relatively stable during the second quarter except that it fell significantly after the announcement of the results of the June auction. Prior to the announcement on June 11, the daily closing price ranged between $2.00 and $2.19 and averaged $2.12. Following the announcement, the daily closing price ranged between $1.87 and $1.92 and averaged $1.90.

There were no significant differences between the prices of contracts for 2009 vintage and 2010 vintage contracts during the second quarter. This is to be expected, since they are interchangeable for compliance purposes in the RGGI program.

The volatility of CCFE futures prices remained relatively low in the second quarter of 2010. The historic volatility of 2009 vintage futures prices was 22 percent in the second quarter of 2010,

which is generally consistent with 18 percent in the first quarter of 2010 and 23 percent in the second quarter of 2009.[5]

The clearing price in the June 9 auction offering for 2010 vintage allowances was significantly lower than the CCFE futures prices just before the auction. The auction clearing price was $1.88, while the futures price was $2.02 for 2010 vintage allowances at the close of the trading day on June 8. Following the announcement of the auction results, the futures price fell to $1.90 at the close of the trading day on June 11.

Figure 1 also shows the clearing price for the 2013 vintage allowances that were sold in the June 9 auction. The 2013 vintage allowances cleared at $1.86, equal to the reserve price in the auction.[6] The 2013 vintage allowances cleared at a one percent discount to the 2010 vintage allowances in the auction.

The prices of physical deliveries reported in COATS have been generally consistent with the prices reported by the CCFE. Many of the transaction prices reported in COATS are associated with physical deliveries that result from the expiration of the previous month's futures contract. Several business days after futures contracts reach expiration, allowances are exchanged for funds according to the closing price on the last day of the expiration month.[7, 8]

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5 Historic volatility is a measure of the standard deviation of the day-over-day percentage change in price. Volatility is normally expressed as an estimated standard deviation for a one year period, even if it is calculated from a shorter period of time.

6 Bids submitted in the auction must be priced at or above the auction reserve price, which was $1.86 in each of the first eight auctions.

7 Physical deliveries in COATS generally occur on the third business day following the expiration day of the futures contract. For instance, contracts for May 2010 delivery resulted in transfers in COATS on June 3, 2010.

8 A futures contract requires parties with an open interest to post financial assurance in an account with the exchange until the contract reaches expiration. The exchange continually withdraws and deposits funds according to changes in the prices of the contracts in which the party has interest. For example, if a firm buys a contract for 1,000 allowances at $3.50/allowance, the purchasing firm (firm with a long position) must put $3,500 in an account (or whatever share of the entire liability the exchange requires). If the futures price declines to $3/allowance, the exchange transfers $500 from the account of a firm with a long position to the account of a firm with a short position(firm that sold a contract), and the firm with a long position is only required to keep $3,000 in the account.

Prices of Options for CO_2 Allowances

The clearing prices of options contracts are important because they can provide insight about how the market expects the price of the underlying commodity to behave. The price of an option depends on two factors: (i) the expected value of the underlying commodity relative to the strike price of the option, and (ii) the expected volatility of the underlying commodity over the period before the expiration date. When call option price decreases coincide with put option price increases, it signals a decrease in the expected price of the underlying commodity. Conversely, when call option prices and put option prices move in the same direction, it signals a change in the expected volatility of the underlying commodity price.

The trading of options contracts for RGGI CO_2 allowances remained infrequent in the second quarter of 2010. There were just three trades of options contracts during the second quarter of 2010, down from seven in the first quarter of 2010 and 80 in the second quarter of 2009. Of the options traded during the second quarter of 2010, one was a call option with a strike price of $2.20, and the remaining two were put options with strike prices of $2.20 and $2.25. All of the options were for 2009 vintage products and the volume of each trade was only one contract.

The low volume of options trading may reflect that firms perceive little risk from variations in future allowance prices. Since the auction reserve price of $1.86 is indexed to inflation, compliance entities are unlikely to be able to obtain allowances at a lower price in the future. Prices in the futures market have remained above the auction reserve price, suggesting that firms perceive little risk that allowances will fall below this level.

D. Volumes and Open Interest

This section evaluates the volume of trading and the open interest in exchange-traded futures and options as well as transfers of allowances between unaffiliated parties that are recorded in COATS.[9] Figure 2 summarizes the volumes of futures and options contracts traded on the CCFE, while Figure 3 shows the open interest. Figure 4 examines the volume of allowance transfers recorded in COATS as well as the total change in ownership of allowances recorded in COATS.

Futures trading declined substantially as the volume of trading decreased 47 percent from 22 million allowances in the first quarter of 2010 to 11 million allowances in the second quarter. The majority (72 percent) of the volume is associated with 2009 vintage contracts, and the trading of 2010 vintage contracts accounted for 28 percent of the volume in the second quarter.

Based on our review of allowance holdings, we find that the majority of CO_2 allowances are held by firms that acquired them through the auctions, although there are some firms that have acquired most of the allowances they hold through the secondary market. The number of allowances that were exchanged between unaffiliated firms was 3.1 million during the second quarter of 2010 and 5.2 million for the period from the beginning of the second quarter through the first week of July when final settlement occurred for derivatives contracts with June 2010 delivery.

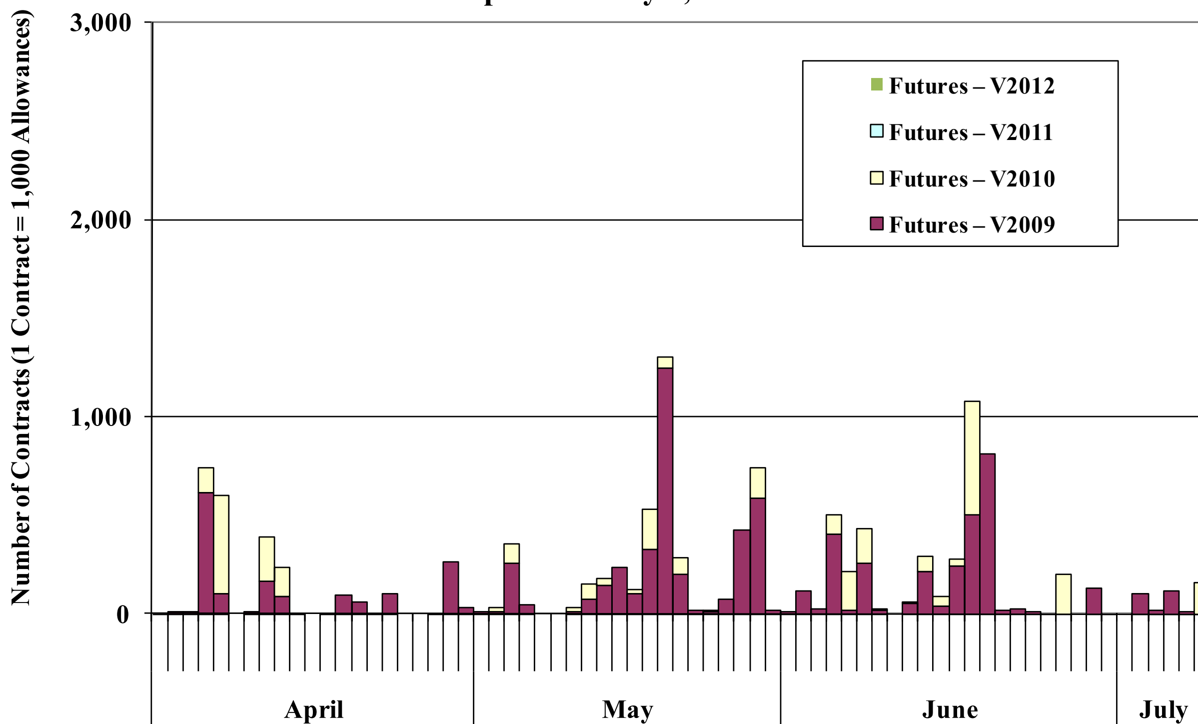
Volume and Open Interest in CCFE Futures and Options Contracts

Figure 2 shows the volume of trading on the CCFE each day for futures contracts. Futures volumes are divided into three categories: (i) contracts for 2009 vintage allowances, (ii) contracts for 2010 vintage allowances, and (iii) contracts for 2012 vintage allowances. The volume of

[9] Open interest is the net amount of futures or options contracts that have been traded, but have not reached the time of delivery, expired, or been exercised. For example, if Firm A sells 100 contracts to Firm B, Firm A will have a short position of 100 contracts, Firm B will have a long position of 100 contracts, and the total open interest will be 100 contracts. Hence, the total open interest can be determined by summing

options trading is not shown in the figure, although three trades occurred during the quarter with a total volume of 3 million allowances.

Figure 2: Volume of Trading of CCFE Futures Contracts
April 1 to July 9, 2010



Sources: Options volumes are available at "www.ccfe.com/mktdata_ccfe/options Summary.jsf?symbol=rggi" and futures volumes are available at "www.ccfe.com/mktdata_ccfe/futuresSummary.jsf?symbol=rggi".

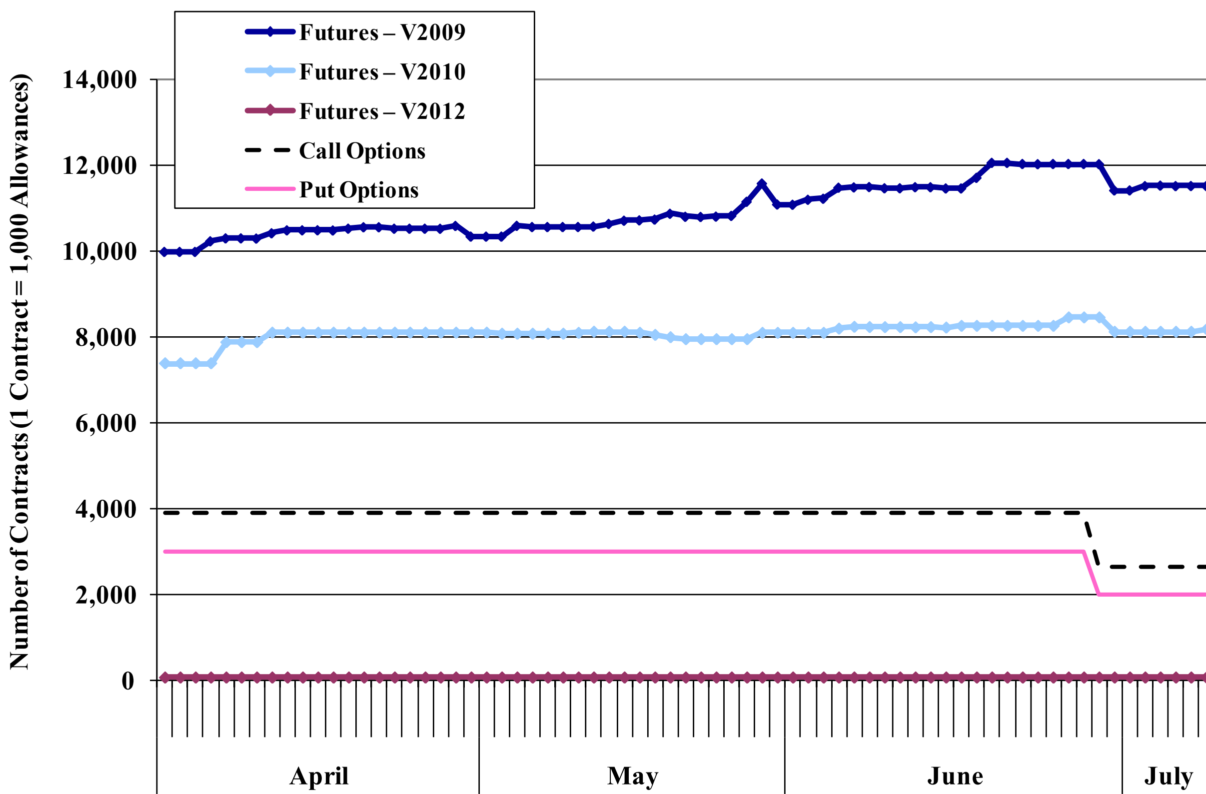
The volume of trading in futures contracts dropped substantially in the second quarter of 2010. The total volume of futures trading decreased from 22 million allowances in the first quarter of 2010 to 11 million allowances in the second quarter of 2010.

The majority (72 percent) of futures trading volume in the second quarter of 2010 was of contracts for 2009 vintage allowances, although trading of 2010 vintage futures contracts was also substantial. Trading of contracts for 2010 vintage allowances accounted for 28 percent of the futures trading volume in the second quarter of 2010. There was no trading of 2011 vintage or 2012 vintage allowances in the second quarter of 2010.

across all of the long positions of market participants or by summing across all of the short positions.

Figure 3 shows the open interest on each day for the futures contracts shown in the previous figure as well as for options contracts.

Figure 3: Open Interest in CCFE Futures and Options
April 1 to July 9, 2010



Sources: Open interest in options is available at "www.ccfe.com/mktdata_ccfe/optionsSummary.jsf?symbol=rggi", and open interest in futures is available at "www.ccfe.com/mktdata_ccfe/futuresSummary.jsf?symbol=rggi".

The open interest in RGGI futures contracts rose modestly during the second quarter of 2010 as the reductions in open interest following the delivery of futures contracts were exceeded by new open interest resulting from trading. For 2009 vintage contracts, open interest rose 14 percent from 10.0 million on the first day of the quarter to 11.4 million on the first day following the quarter. For 2010 vintage contracts, open interest rose 10 percent from 7.4 million on the first day of the quarter to 8.1 million on the first day following the quarter. The majority of open interest is in 2009 vintage contracts, although the share related to 2010 vintage contracts is also substantial, accounting for 41 percent on the first day following the quarter.

The open interest in options contracts opened the second quarter of 2010 at 3.0 million allowances for put options and 3.9 million allowances for call options. Open interest remained constant until the end of June when a substantial share of the options contracts expired. The open interest in options contracts closed the second quarter at 2.0 million allowances for put options and 2.7 million allowances for call options.

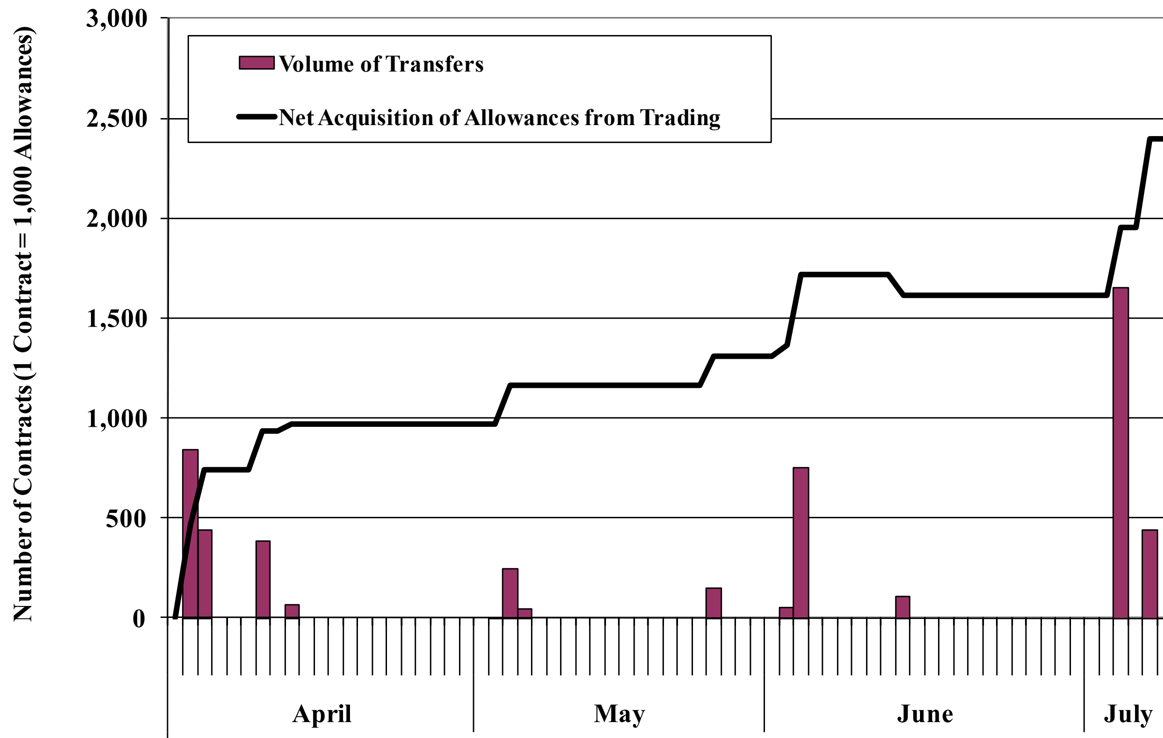
CO_2 Allowance Transfers Registered in COATS

Figure 4 summarizes transfers of CO_2 allowances between the COATS accounts of unaffiliated firms. The figure shows the volume of COATS transfers between unaffiliated firms. The figure also shows the net amount of allowances that have been acquired as a result of transactions between unaffiliated firms during the second quarter of 2010.[10] The figure shows data through the first full week of July in order to include transfers that result from the delivery of futures and forward contracts with a June 2010 delivery month.

The net amount of CO_2 allowances that have been acquired from transactions is smaller than the gross volume of transactions between unaffiliated firms because the net acquisition offsets sales against purchases for each firm. For example, if Firm A purchases 100,000 allowances but then sells 20,000 allowances, the figure would show a net acquisition by Firm A of 80,000 allowances even though the volume of transfers would be 120,000 allowances. This is an important distinction because the net amount of allowances that have been acquired from trading since RGGI allowances have been in circulation was 29.7 million as of July 9, 2010, while the gross volume of transfers between unaffiliated firms was nearly 55 million allowances.

[10] This excludes the majority of allowances, which are held by firms that purchased them directly in the auction, received them through allocations by one of the Participating States, or acquired them as a result of a transaction prior to the second quarter of 2010.

Figure 4: Net Acquisition of Allowances from Trading
April 1 to July 9, 2010



Source: Allowance transfers are based on information in COATS.

The figure shows that 5.2 million CO_2 allowances were exchanged between unaffiliated firms during the period shown in the figure (i.e., from the beginning of the second quarter of 2010 through the first full week in July). The majority (2.9 million) of allowance transfers between unaffiliated firms occurred on April 5 and 6 and on July 6 following the delivery of futures and forward contracts with March 2010 and June 2010 delivery months.

The net acquisition of allowances as a result of transactions between unaffiliated firms during the second quarter increased from zero on April 1 to 0.7 million on April 6 and to 2.4 million by July 9. The net amount of allowances acquired through the secondary market (2.4 million) is smaller than the total number of allowances exchanged (5.2 million) because some firms both purchased and sold allowances during the period shown in the figure. The figure shows that firms have been able to acquire a substantial number of CO_2 allowances through the secondary market, which is important because some firms prefer to obtain allowances through the secondary market rather than in the quarterly auctions.

The sum of (i) the current open interest in futures contracts, and (ii) the net amount of allowances acquired in COATS accounts as a result of trading since trading began in October 2008 provides a sense of the total financial interest in RGGI CO_2 allowances that firms have acquired through the secondary market.[11] The sum of these two quantities rose to 49 million allowances by July 9 following the delivery of June 2010 contracts.[12] This sum is substantial, but still modest compared with the 257 million allowances that have been acquired from RGGI auctions through June 2010. Hence, the auctions are still the principal means by which most firms have acquired control of RGGI allowances.

[11] For example, if a firm acquires 5 million allowances in its COATS account as a result of trading in the secondary market and it purchases futures contracts for 3 million allowances, the firm has a total financial interest in 8 million allowances.

[12] This is based on the open interest in CCFE futures contracts (including all vintages as reported in Figure 3) of 19.5 million allowances plus the net acquisition of allowances from trading as registered in COATS since RGGI allowances have been in circulation of 29.5 million allowances. However, this sum does not consider: (i) open interest in OTC contracts, and (ii) that some firms may also have short positions that effectively reduce their total net financial interest in allowances.

E. Open Interest of Firms in Futures and Options Contracts

This section discusses additional information about the firms trading CCFE futures and options from the weekly Commitments of Traders ("COT") reports, which are published by the Commodity Futures Trading Commission ("CFTC").[13]

Participation in the market for RGGI CO_2 allowance derivatives fell as the numbers of firms maintaining significant positions in each vintage were lower than 20 throughout the second quarter of 2010. The CFTC does not publish information from the COT reports for a particular vintage at times when fewer than 20 firms have reportable positions, so no specific information was published during the second quarter.

Although firm-level information on open interest is not available, the information shown in Figure 3 provides an indication of the upper limits of the net long and net short positions of individual firms. Combined with firm-specific information about allowance holdings from COATS, the information on open interest that is shown in Figure 3 is useful for evaluating the potential for a firm to hoard RGGI allowances, which is discussed further in Section F.

[13] Each day, firms with an open interest of 25 contracts or more are required to report their positions to the CFTC. The CFTC categorizes each firm as Commercial if it engages in trading primarily to supply its own need for allowances or Non-Commercial if it trades for another purpose. Hence, compliance entities are generally designated as Commercial and non-compliance entities are frequently designated as Non-Commercial. Each Tuesday, the CFTC publishes the COT report, which is a summary of the long and short positions of participants in the market.

F. DISCUSSION OF MARKET MONITORING

As the RGGI Market Monitor, we monitor trading in the secondary CO_2 allowance market in order to identify anticompetitive conduct. Additionally, the Commodity Futures Trading Commission ("CFTC") evaluates trading in the secondary CO_2 allowance market consistent with its role as the regulator of futures and option markets in the U.S. This section discusses two types of anti-competitive conduct for which we monitor. As in previous reports on the secondary market, we find no evidence of anti-competitive conduct.

In any commodity market, one potential concern is that a firm could hoard a substantial share of the supply of a commodity to influence prices or to prevent a competitor from obtaining allowances. Hence, we screen information on the holdings of allowances and allowance-derivatives and the demand for allowances to identify firms that might acquire a position that raises competitive concerns. At this stage, hoarding is not a significant concern for the RGGI allowance market because the amount of allowances in circulation and the open interest in allowance derivatives is small relative to the total supply of allowances. The total supply of allowances that will ultimately be available in the first compliance period (from 2009 to 2011) is more than 560 million. Given that only 274 million allowances are circulating in the secondary market,[14] that the auction rules limit the amount of allowances that can be purchased by a single party or group of affiliated parties to 25 percent, and that the net transfers of CO_2 allowances between parties in the secondary market have been modest thus far, it is not yet possible for the holdings of any participant to raise potential hoarding concerns.

Another potential concern is that a firm expecting to purchase allowances in the auction might sell a large number of futures contracts in an effort to push the futures price below the competitive level. Such a firm might profit from buying a large number of allowances in the auction at a discount if the bidding in the auction were influenced by the depressed futures price.

[14] 257 million allowances have been dispersed in the first six auctions, and 17 million allowances have been allocated by the States.

For this to be a profitable strategy, the firm would need to be able to substantially depress the futures price with a relatively small amount of sales—an amount smaller than the amount of allowances it planned to buy in the auction. The best protection against this strategy is a market where other firms respond by making additional purchases. Firms that are looking for an opportunity to reduce their short positions or to purchase allowances for their future compliance needs help limit the effectiveness of a strategy to depress prices below the competitive level. Hence, it is encouraging that there are a large number of firms with compliance obligations that far exceed the largest possible long position in the futures market. Nevertheless, the CFTC has access to confidential transaction data, which allows it to monitor for evidence of manipulative conduct.