REPORT ON THE SECONDARY MARKET FOR RGGI CO_2 ALLOWANCES: THIRD QUARTER 2011

Prepared for:

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

Prepared By:

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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 a CO_2 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 third quarter of 2011 and discusses the results of our market power screens. Several patterns have emerged in this period in the secondary market:

- *CO_2 Allowance Transfers* – In the third quarter of 2011, 8.2 million CO_2 allowances were transferred between unaffiliated firms, down from 8.5 million in the previous quarter and up from 3.5 million in the third quarter of the previous year. The volume of CO_2 allowance transfers has been elevated since the May announcement that New Jersey will leave RGGI after the first control period.[1]

- *CO_2 Allowance Holdings* – The share of CO_2 allowances held by compliance entities and their affiliates was 99 percent at the end of the quarter.

- *Futures Prices* – CO_2 allowance prices remained stable in the third quarter of 2011, although trading volumes were relatively low. The volume-weighted average price of 2009 vintage allowances was $1.86 in the third quarter, consistent with the transaction prices reported in the CO_2 Allowance Tracking System and with the clearing price for first control period allowances in the September auction.

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.

[1] See "http://www.rggi.org/docs/New_Jersey_Letter.pdf".

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 CO_2 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 CO_2 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 CO_2 allowance that is to be transferred. One standard futures contract equals 1,000 RGGI allowances. [2]

- Call Options – Call options give the purchaser the option to buy a fixed number of CO_2 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 2011 expiration date. If the price of the corresponding futures contract rose to \$5.75, the firm could exercise the option to buy CO_2 allowances at \$5 and immediately sell them at \$5.75. Alternatively, if the price of the futures

[2] 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.

contract 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 CO_2 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.[3] Compliance entities may prefer to buy RGGI CO_2 allowances bundled with other goods and services from their fuel suppliers or plant 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.

The amount of *open interest* is the net amount of futures or options contracts that have been traded for a contract with a particular set of specifications (i.e., vintage year, delivery month,

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[3] 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.

etc.), but have not reached the time of delivery, expired, or been exercised. For example, if Firm A sells 100 contracts of a particular type 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 for the particular type of contract will be 100 contracts. Hence, the total open interest can be determined by summing across all of the long positions of market participants or by summing across all of the short positions.

C. Summary of Prices

This section of the report summarizes prices in the secondary market for RGGI CO_2 allowances during the third quarter of 2011. 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 CO_2 allowances. For context, Figure 1 shows prices through the first five trading days of the fourth quarter of 2011 when settlement was completed for futures contracts for September 2011 delivery, and the figure shows volume-weighted average prices in the third quarter of 2011 compared to the previous quarter and to the third quarter of the previous year.

Key observations regarding RGGI CO_2 allowance prices:

- CO_2 allowance prices were stable in the third quarter of 2011 as the daily closing price of 2009 vintage allowances remained between $1.85 and $1.89, very close to the auction reserve price of $1.89.
- CO_2 allowance prices were consistent with the previous quarter as the average daily closing price of 2009 vintage allowances fell just 2 percent from the second quarter of 2011.
- The prices of futures contracts were generally consistent with the clearing prices in the September 2011 auction and with the transaction prices recorded in COATS.

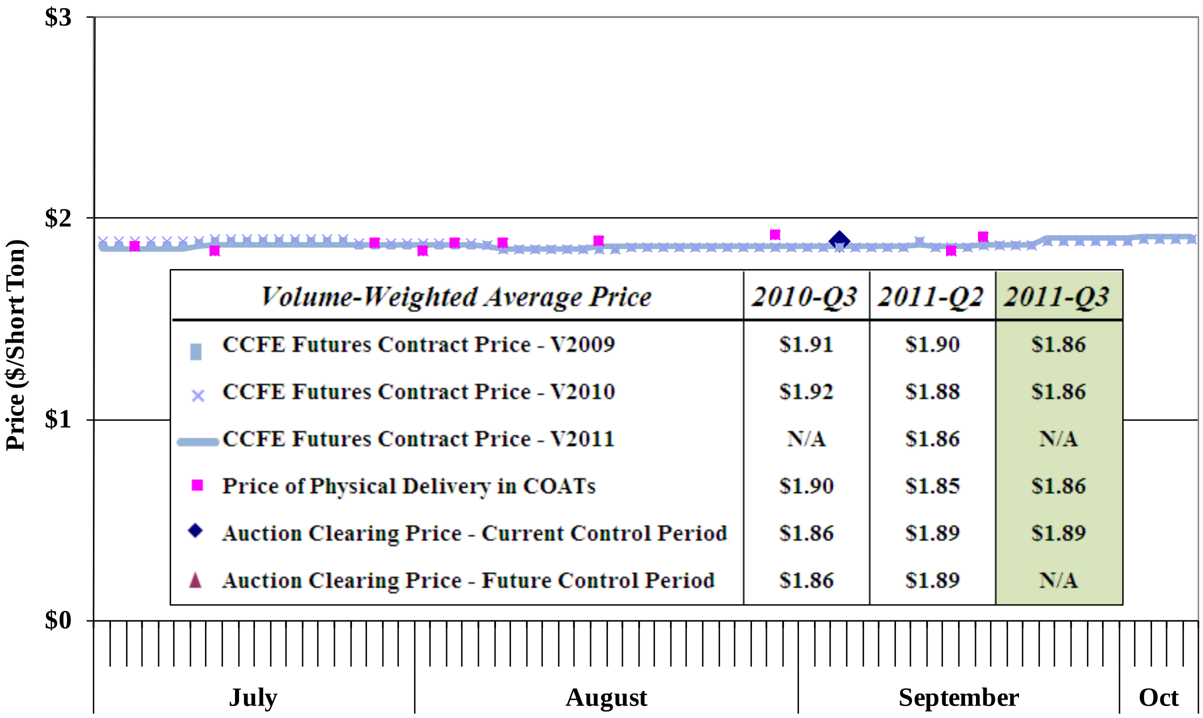
Prices of CO_2 Allowances and Allowance Derivatives

Figure 1 summarizes prices in the secondary market during the period. One light blue series shows the closing price on each trading day of the 2009 vintage CCFE futures contract with delivery at the end of the month.[4] A second light blue series shows the closing price of the 2010 vintage futures contract with delivery at the end of the month. A blue line shows the closing price of the 2011 vintage futures contract with delivery at the end of the month. The pink squares show the volume-weighted average price of physical deliveries in COATS on each day

[4] For instance, in August, the price of the futures contract for August 2011 delivery is shown.

when a transaction took place and where the parties recorded the transaction price.[5, 6] The blue diamond shows the clearing prices of CO_2 allowances sold in the RGGI auction held on September 7 for the current control period (i.e., 2009 through 2011). There were no CO_2 allowances sold in the September auction for the future control period. For comparison, Figure 1 also shows volume-weighted average prices for each category of prices in the third quarter of 2011, the previous quarter, and the third quarter of the previous year.

Figure 1: Prices in the Secondary Market for RGGI CO_2 Allowances[7]
July 1 to October 7, 2011



Volume-Weighted Average Price	*2010-Q3*	*2011-Q2*	*2011-Q3*
CCFE Futures Contract Price - V2009	$1.91	$1.90	$1.86
CCFE Futures Contract Price - V2010	$1.92	$1.88	$1.86
CCFE Futures Contract Price - V2011	N/A	$1.86	N/A
Price of Physical Delivery in COATs	$1.90	$1.85	$1.86
Auction Clearing Price - Current Control Period	$1.86	$1.89	$1.89
Auction Clearing Price - Future Control Period	$1.86	$1.89	N/A

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

6 Many of the transaction prices reported in COATS are associated with physical deliveries that result from the expiration of the previous month's CCFE futures contract. By the third business day following the expiration month of the futures contract, CO_2 allowances are exchanged for funds according to the closing price on the last day of the expiration month.

7 Sources: Auction clearing prices are available at "www.rggi.org/market/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 in COATS are based on information in COATS available at "https://rggi-coats.org/eats/rggi/".

Key observations regarding CO_2 allowance prices:

- CO_2 allowance prices were stable in the third quarter of 2011 as the daily closing price of 2009 vintage allowances remained between \$1.85 and \$1.89, very close to the auction reserve price of \$1.89. Due to the stability of prices, the historic volatility of 2009 vintage futures prices was 6 percent in the third quarter of 2011, down from 10 percent in the third quarter of 2010 and 8 percent in the second quarter of 2011.[8]

- There were no significant differences between the prices of contracts for 2009 vintage, 2010 vintage, or 2011 vintage CO_2 allowances during the third quarter. This is to be expected, since they are interchangeable for compliance purposes in the RGGI program.

- CO_2 allowance prices were consistent with the previous quarter as the average daily closing price of 2009 vintage allowances decreased just 2 percent from the previous quarter.

- The daily closing price averaged \$1.88 in July, \$1.86 in August, and \$1.87 in September.

- The CO_2 allowances that were auctioned on September 7 for the current control period cleared at \$1.89, which was equal to the reserve price in the auction. This was slightly higher than the futures prices, which closed at \$1.86 on the day before the auction. No CO_2 allowances were sold in the September 7 auction for the future control period.

- The prices of physical deliveries reported in COATS have been generally consistent with the prices reported by the CCFE.

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.

8 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

Key observations regarding prices of options for CO_2 allowances in the third quarter of 2011:

- There was no trading of options contracts during the third quarter of 2011, and there has been only one trade of options contracts since August of 2010.

- The low volume of options trading may reflect that firms perceive little risk from variations in future CO_2 allowance prices. Since the auction reserve price of $1.89 is indexed to inflation, compliance entities are unlikely to be able to obtain CO_2 allowances at a lower price in the future. Prices in the futures market have remained very close to the auction reserve price, suggesting that firms perceive little risk that CO_2 allowances will fall below this level.

from a shorter period of time.

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 CO_2 allowances between unaffiliated parties as recorded in COATS. 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 CO_2 allowance transfers recorded in COATS and the net change in allowance ownership recorded in COATS.

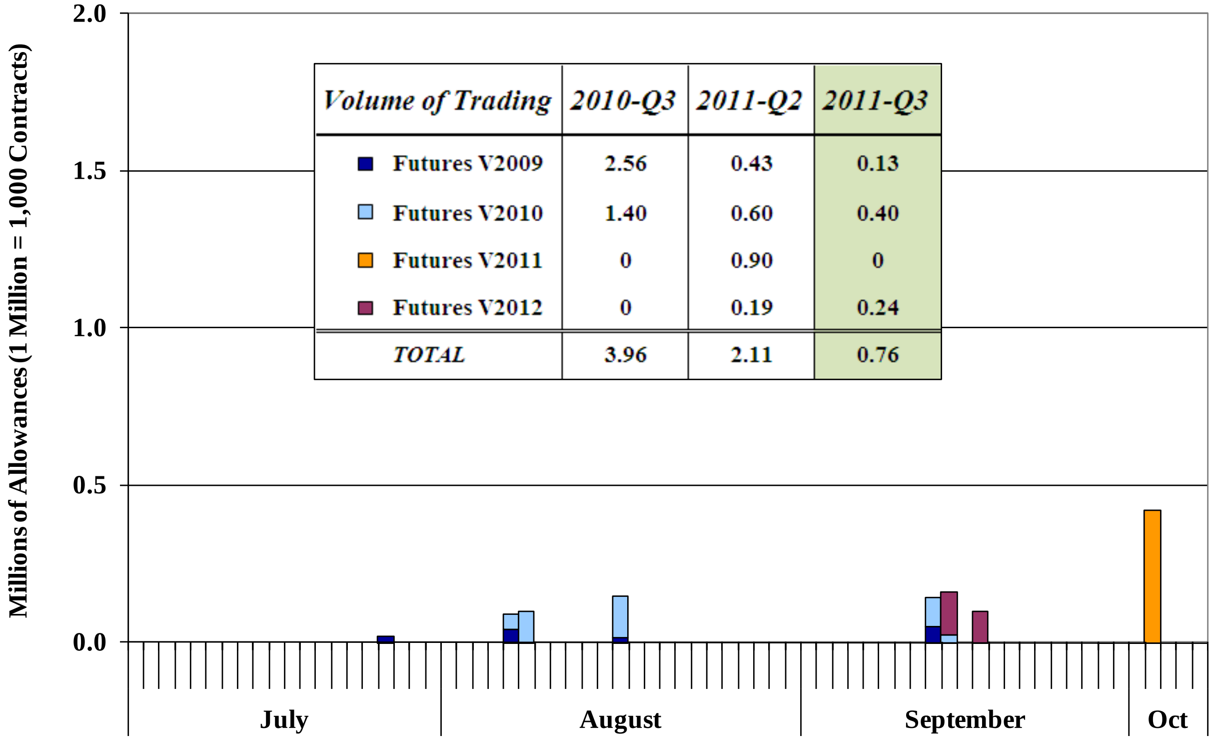
Key observations regarding trading volumes and open interest:

- The volume of futures trading decreased 64 percent to 0.8 million CO_2 allowances in the third quarter of 2011, down from 2.1 million allowances in the second quarter.
- CO_2 allowance transfers between unaffiliated firms totaled 8.2 million in the third quarter of 2011, down from 8.5 million in the second quarter, and up from 3.5 million in the third quarter of 2010.
- Seventy-one percent of the 8.2 million CO_2 allowances were transferred in July, which was relatively soon after the May announcement that New Jersey will leave RGGI after the first control period.
- Futures open interest decreased from 6.4 million CO_2 allowances at the end of the second quarter to 5.7 million CO_2 allowances at the end of the third quarter of 2011.
- The share of CO_2 allowances held by compliance entities and their affiliates was 99 percent following delivery of September 2011 contracts.
- 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.

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 according to the vintage year. The figure also shows the volume of trading for each product in the third quarter of 2011, in the previous quarter, and in the third quarter of the previous year. The volume of options trading is not shown in the figure, since there were no trades during the study period.

Figure 2: Volume of Trading of CCFE Futures Contracts[9]
July 1 to October 7, 2011



Key observations regarding the volume of CCFE futures trading:

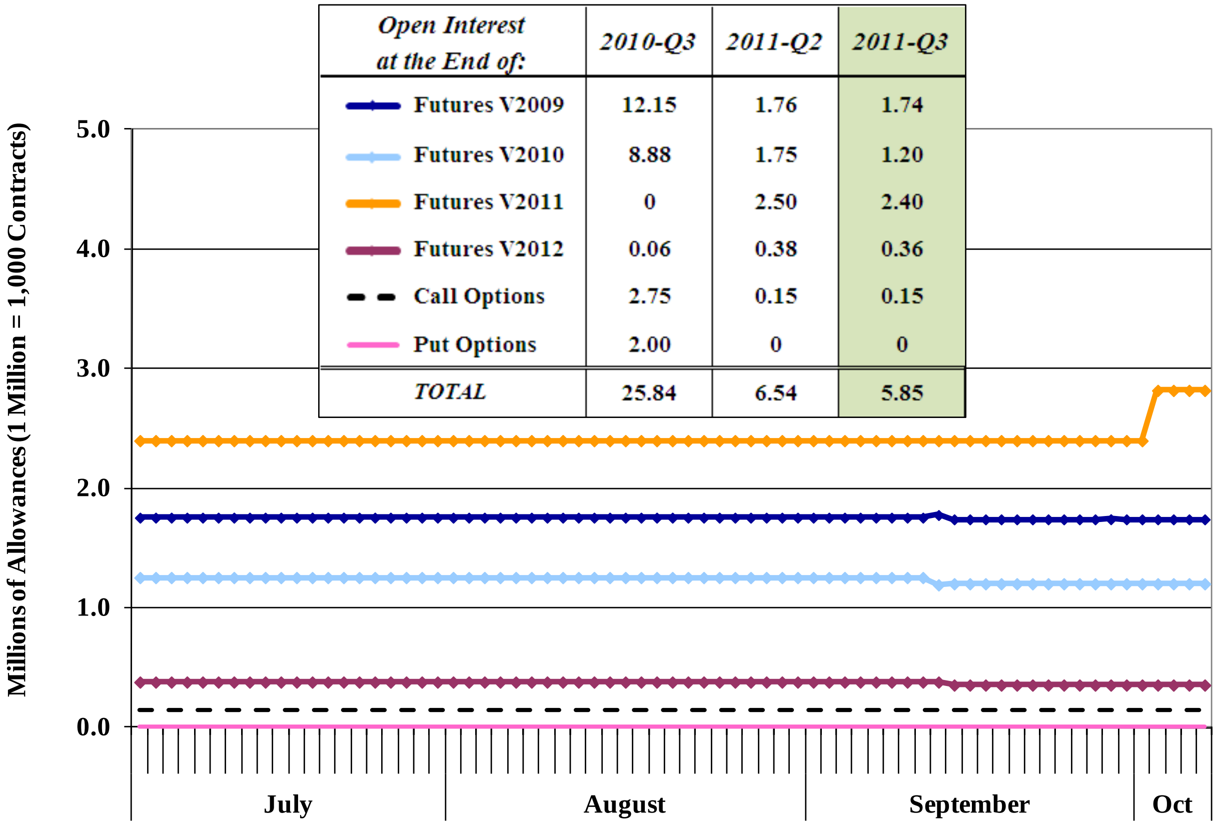
- The volume of futures trading decreased 64 percent to 0.8 million CO_2 allowances in the third quarter of 2011, down from 2.1 million allowances in the previous quarter and 4.0 million allowances in the third quarter of 2010.

- Trading volume decreased from the previous quarter for vintage 2009, vintage 2010, and vintage 2011 CO_2 allowances. The share of the total volume related to 2010 vintage CO_2 allowances was the highest, accounting for 53 percent of the volume during the third quarter of 2011.

Figure 3 shows the open interest on each day for the futures contracts shown in the previous figure as well as for options contracts. For comparison, Figure 3 also shows the total open interest for each product at the end of the third quarter of 2011, the previous quarter, and the third quarter of the previous year.

[9] Sources: Options volumes are available at "www.ccfe.com/mktdata_ccfe/optionsSummary.jsf?symbol =rggi" and futures volumes are available at "www.ccfe.com/mktdata_ccfe/futuresSummary.jsf?symbol =rggi".

Figure 3: Open Interest in CCFE Futures and Options[10,11]
July 1 to October 7, 2011



Open Interest at the End of:	*2010-Q3*	*2011-Q2*	*2011-Q3*
Futures V2009	12.15	1.76	1.74
Futures V2010	8.88	1.75	1.20
Futures V2011	0	2.50	2.40
Futures V2012	0.06	0.38	0.36
Call Options	2.75	0.15	0.15
Put Options	2.00	0	0
TOTAL	25.84	6.54	5.85

Key observations regarding the open interest in CCFE futures and options contracts:

- Futures open interest decreased from 6.4 million CO_2 allowances at the end of the second quarter to 5.7 million CO_2 allowances at the end of the third quarter of 2011.

- At the end of the third quarter of 2011, open interest in 2011 vintage futures contracts accounted for 41 percent of the total open interest in futures and options contracts.

10 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/futures Summary.jsf?symbol=rggi".

11 The table in the figure reports the open interest at the end of each quarter just prior to the delivery or expiration of contracts at the end of the quarter.

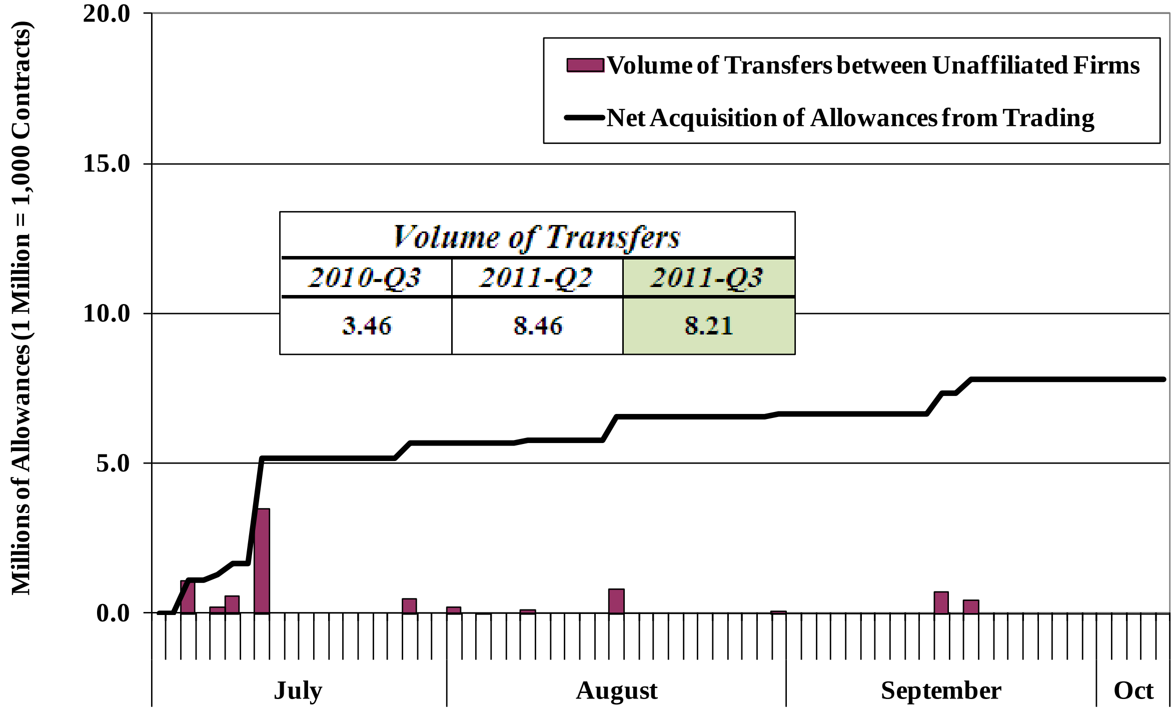
CO_2 Allowance Transfers Registered in COATS

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 and the net amount of CO_2 allowances that have been acquired as a result of transactions between unaffiliated firms during the third quarter of 2011.[12] The figure shows data through the first five trading days of October in order to include transfers that result from the delivery of futures and forward contracts with a September 2011 delivery month. The figure also shows the volume of transfers in the third quarter of 2011 compared to the previous quarter and to the second quarter of the previous year.

The net amount of CO_2 allowances that were 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 CO_2 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.

[12] 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 third quarter of 2011.

Figure 4: Net Acquisition of CO_2 Allowances from Trading[13]
July 1 to October 7, 2011



Key observations regarding the transfer of CO_2 allowances in COATS between unaffiliated firms:

- CO_2 allowance transfers between unaffiliated firms totaled 8.2 million, down from 8.5 million in the second quarter.
- Seventy-one percent of the 8.2 million CO_2 allowances were transferred in July following the May announcement that New Jersey will leave RGGI after the first control period. This is well above the monthly average of about one million CO_2 allowances in the year preceding the May announcement (excluding January 2011).
- The net amount of CO_2 allowances acquired through the secondary market during the period shown in Figure 4 (7.8 million) is smaller than the total number of allowances exchanged between unaffiliated firms (8.2 million) because some firms both purchased and sold allowances during the period.

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13 Source: CO_2 allowance transfers are based on information in COATS.

E. Open Interest of Individual 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").[14]

Participation in the market for RGGI CO_2 allowance derivatives remained low as the numbers of firms maintaining significant positions in each vintage continued to be lower than 20 throughout the third quarter of 2011. 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 third 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.

[14] 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 CO_2 allowances. Hence, we screen information on the holdings of CO_2 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 CO_2 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 CO_2 allowances that will ultimately be available in the first compliance period (from 2009 to 2011) is more than 560 million. Given that only 408 million CO_2 allowances are circulating in the secondary market,[15] 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 CO_2 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 CO_2 allowances in the auction at a discount if the bidding in the auction were influenced by the depressed futures

[15] 384 million CO_2 allowances have been dispersed in the first thirteen auctions, and 24 million allowances have been allocated by the States.

price. 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 CO_2 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 CO_2 allowances for their future compliance needs help limit the effectiveness of a strategy to depress prices below the competitive level. Given current price levels relative to the floor price for CO_2 allowances, firms would have a strong incentive to make additional purchases if a firm deliberately attempted to depress the futures price. Nevertheless, the CFTC has access to confidential transaction data, which allows it to monitor for evidence of manipulative conduct.