



**REPORT ON THE SECONDARY MARKET  
FOR RGGI CO<sub>2</sub> ALLOWANCES: SECOND QUARTER 2014**

**Prepared for:**

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

**Prepared By:**



August 2014

---

This report was prepared by Potomac Economics (the contractor) in the course of performing work contracted for and sponsored by RGGI, Inc. on behalf of the RGGI Participating States (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont). The opinions expressed in this report do not necessarily reflect those of RGGI, Inc. or any of the Participating States, and reference to any specific product, service, process, or method does not constitute an implied or expressed recommendation or endorsement of it. Further, RGGI, Inc., the Participating States, and the contractor make no warranties or representations, expressed or implied, as to the fitness for particular purpose or merchantability of any product, apparatus, or service, or the usefulness, completeness, or accuracy of any processes, methods, or other information contained, described, disclosed, or referred to in this report. RGGI, Inc., the Participating States, and the contractor make no representation that the use of any product, apparatus, process, method, or other information will not infringe privately owned rights and will assume no liability for any loss, injury, or damage resulting from, or occurring in connection with, the use of information contained, described, disclosed, or referred to in this report.

The Regional Greenhouse Gas Initiative (RGGI) is a cooperative effort of Northeast and Mid-Atlantic states to reduce emissions of carbon dioxide (CO<sub>2</sub>) from the power sector.

RGGI, Inc. is a non-profit corporation created to provide technical and administrative services to the states participating in the Regional Greenhouse Gas Initiative.

## A. INTRODUCTION

The primary market for RGGI CO<sub>2</sub> allowances consists mainly of the auctions where allowances are initially sold. Once a CO<sub>2</sub> allowance is purchased in the primary market, it can then be resold in the secondary market. The secondary market for RGGI CO<sub>2</sub> 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<sub>2</sub> 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 2014 and discusses the results of our market power screens. Several patterns have emerged in this period in the secondary market:

- *CO<sub>2</sub> Allowance Prices* – The average transfer price of CO<sub>2</sub> allowances in COATS during the second quarter of 2014 was \$4.51, approximately 17 percent higher than in the prior quarter and 33 percent higher than the second quarter of 2013. The clearing price in Auction 24, held on June 4 was \$5.02, which was consistent with the rise in secondary market prices leading up to the auction.
- *Secondary Market Activity* – Although volumes decreased from the previous two quarters, volumes have risen considerably from the second quarter in 2013. Increased activity is a natural market response as compliance entities seek to manage the increased CO<sub>2</sub> allowance price volatility that is expected under the new CO<sub>2</sub> emissions cap.
  - ✓ The volume of CO<sub>2</sub> allowance transfers between unaffiliated firms was 18.3 million. This volume was comparable to the number of allowances acquired by firms in Auction 24.
  - ✓ The open interest in RGGI futures remained relatively flat during the study period, starting and ending the quarter at approximately 22 million.
- *CO<sub>2</sub> Allowance Holdings* – The share of CO<sub>2</sub> allowances that were held by compliance entities and their affiliates at the end of the second quarter of 2014 was approximately 77 percent out of 364 million allowances in circulation.

We evaluate information on the holdings of CO<sub>2</sub> allowances and allowance derivatives as well as the demand for allowances to identify firms that may have acquired a position that raises competitive concerns. In the current study period, we find no evidence of anticompetitive conduct.

## B. BACKGROUND

The secondary market for RGGI CO<sub>2</sub> allowances comprises the trading of physical allowances and financial derivatives, such as futures, forward, and option contracts. A physical allowance trade occurs when the parties to the transaction register the transfer of ownership in RGGI's CO<sub>2</sub> Allowance Tracking System ("COATS"). Financial derivatives include any contracts whereby parties agree to exchange funds and/or allowances at some future date, depending in many cases on factors such as the price of allowances at some future date. Many financial derivatives eventually result in the transfer of physical CO<sub>2</sub> allowances (i.e., the transfer is registered in COATS), but this may occur months or years after the parties enter into a financial transaction. These include the following types of transactions:

- *Futures* – Under these contracts, two parties agree to exchange a fixed number of CO<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> allowance that is to be transferred. One standard futures contract equals 1,000 RGGI allowances.<sup>1</sup>
- *Forwards* – These are like futures contracts, but a forward contract typically requires that all financial settlement occur at expiration.
- *Call Options* – Call options give the purchaser the option to buy a fixed number of CO<sub>2</sub> 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 \$5 strike price, and December 2014 expiration date. If the price of the corresponding forward contract rose to \$5.75, the firm could exercise the option to buy CO<sub>2</sub> allowances at \$5 and immediately sell them at \$5.75. Alternatively, if the price of the forward contract stayed below \$5, the firm

---

<sup>1</sup> 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.

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<sub>2</sub> allowances of a particular vintage year at a specified strike price any time prior to the expiration date.

Futures, forward, and option contracts allow firms to manage risks associated with unforeseen swings in commodity prices. Futures and forwards 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 and forwards, they usually require less financial security, making them more attractive to some firms.

The terms of futures, forward, and option contracts vary in the degree to which they are standardized. “Exchange-traded” contracts typically have the most standardized provisions, while the term “over-the-counter” (“OTC”) is applied to contracts with less standardized provisions. However, OTC contracts, once entered into, are often settled through a clearinghouse in order to protect the parties from the risk that the counterparty defaults.

The amount of *open interest* is the net amount of futures, forwards, or options that have been traded for a contract with a particular set of specifications (i.e., vintage year, delivery month, 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 summarizes prices in the secondary market for RGGI CO<sub>2</sub> allowances in the second quarter of 2014. Figure 1 shows transaction prices in the secondary market for CO<sub>2</sub> allowances, including the prices of allowance transfers registered in COATS<sup>2</sup> and the prices of futures contract trades on the Intercontinental Exchange (“ICE”). The figure also shows volume-weighted average prices in the second quarter of 2014 compared to the previous quarter and the second quarter of the previous year. This section also discusses the market prices for option contracts.

Key observations regarding RGGI CO<sub>2</sub> allowance prices:

- The average transfer price of CO<sub>2</sub> allowances in COATS during the second quarter of 2014 was \$4.51, approximately 17 percent higher than in the prior quarter and 33 percent higher than the second quarter of 2013. This continues the trend in CO<sub>2</sub> allowance prices, which have generally been rising since February 2013 when the Participating States concluded the 2012 Program Review and announced several reforms including a lower emissions cap going forward.<sup>3</sup>
- Prices in the secondary market began the second quarter of 2014 at around \$4.50, gradually rose during May, and reached approximately \$5.00 at the beginning of June, coinciding with the EPA’s publication of its “Clean Power Plan” on June 2 in which it proposes “Guidelines to Cut Carbon Pollution from Existing Power Plants.”<sup>4</sup>
- The clearing price in Auction 24, held on June 4 was \$5.02, which was consistent with secondary market prices leading up to the auction.
- Option trading increased in the second quarter of 2014, signaling that market participants are seeking to hedge the risk of future allowance price volatility.

---

<sup>2</sup> Parties are required to report the transaction price if there is an underlying financial transaction related to the transfer of allowances between accounts.

<sup>3</sup> See [http://www.rggi.org/docs/PressReleases/PR130207\\_ModelRule.pdf](http://www.rggi.org/docs/PressReleases/PR130207_ModelRule.pdf). Subsequently, each of the Participating States revised its CO<sub>2</sub> Budget Trading Program to be consistent with the updated Model Rule. See [http://www.rggi.org/docs/PressReleases/PR011314\\_AuctionNotice23.pdf](http://www.rggi.org/docs/PressReleases/PR011314_AuctionNotice23.pdf).

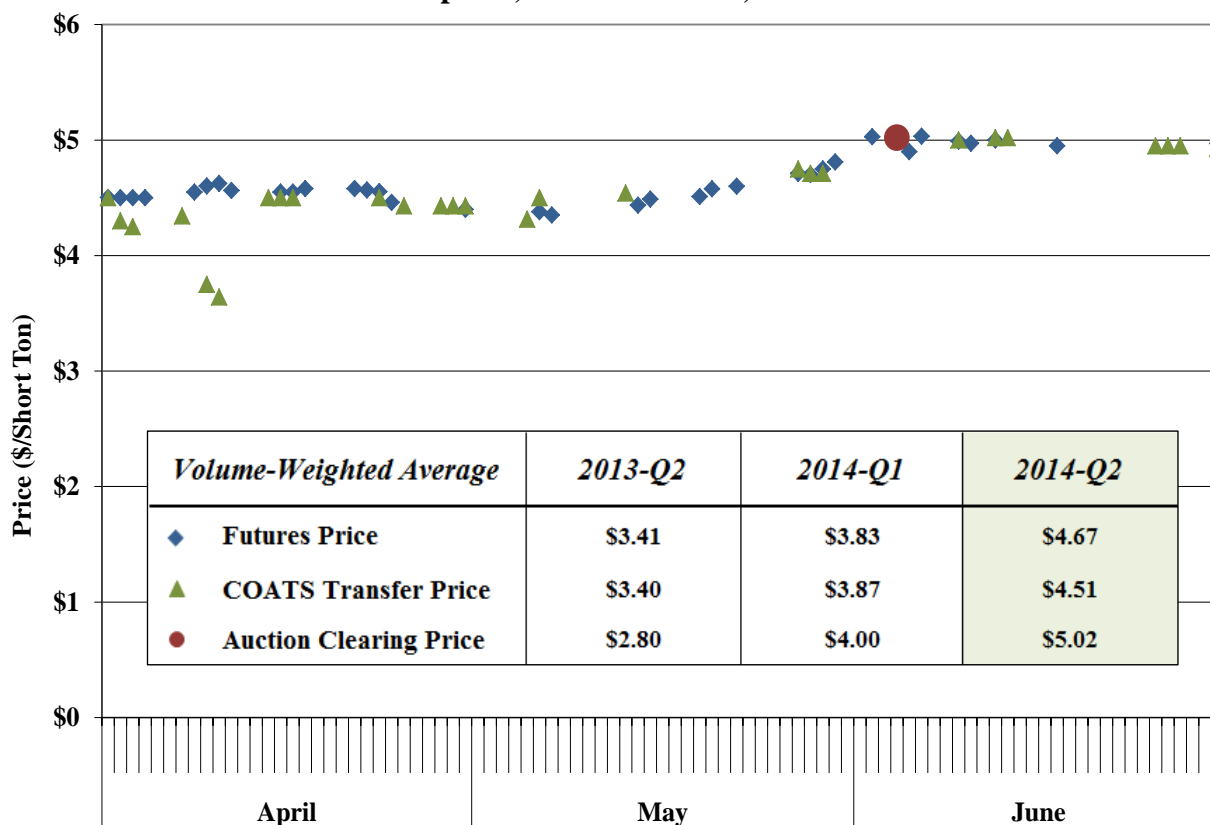
<sup>4</sup> See <http://yosemite.epa.gov/opa/admpress.nsf/Press%20Releases%20from%20Headquarters?OpenView>. The EPA identified market-based greenhouse gas emissions programs such as RGGI as “a proven, common sense approach.”

*Prices of CO<sub>2</sub> Allowances and Allowance Derivatives*

Figure 1 summarizes prices in the secondary market during the period. The blue diamonds show the prices of ICE futures trades on days with volume. The green triangles show the volume-weighted average prices of physical deliveries registered in COATS on days with transactions when the price was recorded (“COATS transactions”). The red circle shows the clearing price of the CO<sub>2</sub> allowances that were sold in RGGI Auction 24, which was held on June 4. Figure 1 also shows volume-weighted average prices for each category in the second quarter of 2014 compared to the previous quarter and the second quarter of the previous year. Volume-weighted average prices for first and second control period CO<sub>2</sub> allowances are calculated together since the compliance deadline for the first control period has passed and all CO<sub>2</sub> allowances are essentially interchangeable for compliance purposes.



**Figure 1: Prices in the Secondary Market for RGGI CO<sub>2</sub> Allowances<sup>5</sup>  
April 1, 2014 to June 30, 2014**



Key observations regarding CO<sub>2</sub> allowance prices:

- The average transfer price of CO<sub>2</sub> allowances in COATS during the second quarter of 2014 was \$4.51, approximately 17 percent higher than in the prior quarter and 33 percent higher than the second quarter of 2013. Prices started the quarter around \$4.50 in early April, remained relatively flat through the middle of May, and then increased to approximately \$4.75 in the week prior to Auction 24 on June 4. After the auction, CO<sub>2</sub> allowances in COATS remained around \$5.00 through the rest of the second quarter.
- The prices of ICE futures trades exhibited the same trend as COATS transaction prices during the quarter. The average futures price of \$4.67 was 22 percent higher than the average price in the prior quarter and 37 percent higher than in the second quarter of 2013.
- The clearing price in Auction 24, held on June 4, was \$5.02, which was consistent with secondary market prices leading up to the auction. The auction clearing price increased 26

<sup>5</sup> Sources: Auction clearing prices are available at [www.rggi.org/market/co2\\_auctions/results](http://www.rggi.org/market/co2_auctions/results), ICE futures prices are available at [www.theice.com](http://www.theice.com), and the prices of physical deliveries are based on information in COATS.

percent from Auction 23 (which was held in March), consistent with the trend in secondary market prices.

### *Prices of Options for CO<sub>2</sub> Allowances*

The clearing prices of option contracts provide insight about how the market expects the price of the underlying commodity to move in the future. 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.

Key observations regarding the pricing of options for CO<sub>2</sub> allowances in the second quarter of 2014:

- Nineteen option trades were recorded on ICE during the second quarter of 2014, up from six trades in the prior quarter. The expiration dates for these contracts range from June 2014 to December 2016, with 74 percent of the volume for contracts with December 2014 expiration. The strike prices of the fourteen call options sold during the second quarter of 2014 ranged from \$4.00 to \$5.55, while five put options were sold at a strike price of \$4.00. These strike prices provide some indication of the market's expectations for the potential range of variation in allowance prices.

## D. VOLUMES AND OPEN INTEREST

This section evaluates the volume of CO<sub>2</sub> transactions (i.e., transfers of CO<sub>2</sub> allowances between unaffiliated parties as recorded in COATS) as well as the volume of trading and the level of open interest in exchange-traded futures and options. Figure 2 examines the volumes of transactions recorded in COATS and of futures trading. Figure 3 summarizes the level of open interest in exchange-traded RGGI futures and option contracts. Figure 4 evaluates the concentration of firms with open interest in exchange-traded RGGI futures and option contracts.

Key observations regarding trading volumes and open interest in the second quarter of 2014:

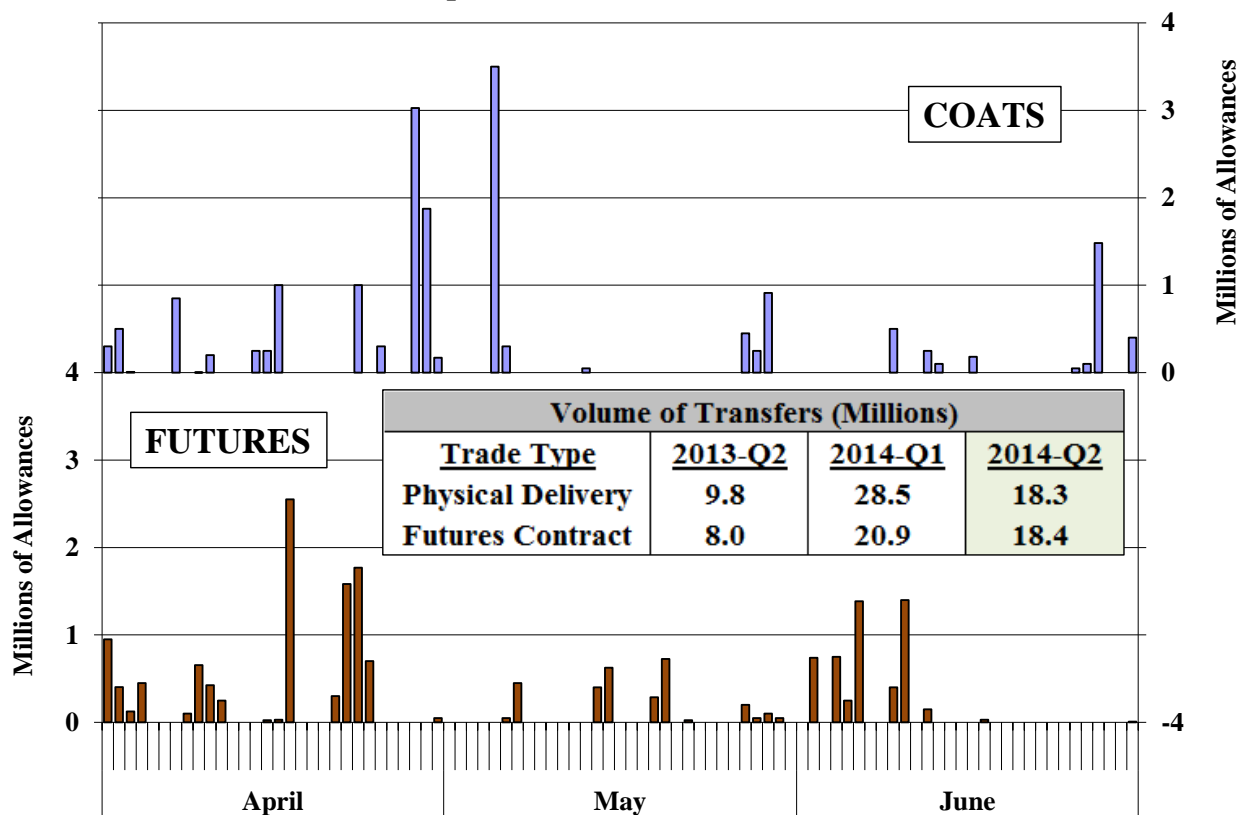
- Secondary market activity has increased dramatically over the past year as CO<sub>2</sub> allowance price volatility has increased. The volume of:
  - ✓ Trading of RGGI futures listed on ICE was for 18.4 million CO<sub>2</sub> allowances in the second quarter of 2014, up from 8.0 million in the second quarter of 2013; and
  - ✓ CO<sub>2</sub> allowance transfers between unaffiliated firms was 18.3 million, up from 9.8 million allowances in the second quarter of 2013.
- Approximately half of the volume of CO<sub>2</sub> allowance transfers in COATS between unaffiliated firms during the second quarter of 2014 was marked as exchange-traded, illustrating the importance of the futures market in facilitating trading.
- Open interest in RGGI futures remained relatively flat during the second quarter of 2014, starting and ending the period at approximately 22 million.
- Open interest in RGGI options increased 44 percent from approximately 18.3 million at the end of the first quarter of 2014 to 26.5 million at the end of the second quarter of 2014.
- The share of CO<sub>2</sub> allowances that were held by compliance entities and their affiliates at the end of the second quarter of 2014 was 77 percent (out of approximately 364 million allowances in circulation).

### *Volume of CO<sub>2</sub> Allowance Transfers, Futures, and Options*

Figure 2 summarizes the volume of transfers of CO<sub>2</sub> allowances between the COATS accounts of unaffiliated firms and the volume of trading of RGGI futures listed on ICE. The figure also shows the volume of transfers in the second quarter of 2014 compared to the prior quarter and to

the second quarter of 2013.<sup>6</sup> The volume of transfers of allowances for the first and second control periods are shown together because the compliance deadline for the first control period has passed and all CO<sub>2</sub> allowances are essentially interchangeable for compliance purposes.

**Figure 2: Volume of CO<sub>2</sub> Allowance Transfers Between Unaffiliated Parties<sup>7</sup>  
April 1, 2014 to June 30, 2014**



Key observations regarding the volume of transfers of CO<sub>2</sub> allowances in COATS between unaffiliated firms:

- The volume of CO<sub>2</sub> allowance transfers between unaffiliated firms was 18.3 million, down from 28.5 million allowances in the prior quarter, but up from 9.8 million allowances in the second quarter of 2013. Most CO<sub>2</sub> allowances transferred at the end of a particular month result from the settlement of ICE futures contracts that have an expiration in that month.

<sup>6</sup> Firms are categorized as affiliated based on available information. As a result, calculations provided in previous reports may be inconsistent with ones in this report when new information becomes available.

<sup>7</sup> Source: CO<sub>2</sub> allowance transfers are based on information in COATS.

- Forty-seven percent of the volume of CO<sub>2</sub> allowance transfers between unaffiliated firms occurred in the last three trading days of each month. Most of these transfers resulted from the final settlement of monthly RGGI futures contracts.
- The share of CO<sub>2</sub> allowances that were held by compliance entities and their affiliates at the end of the first quarter of 2014 was 77 percent (out of approximately 364 million allowances in circulation).

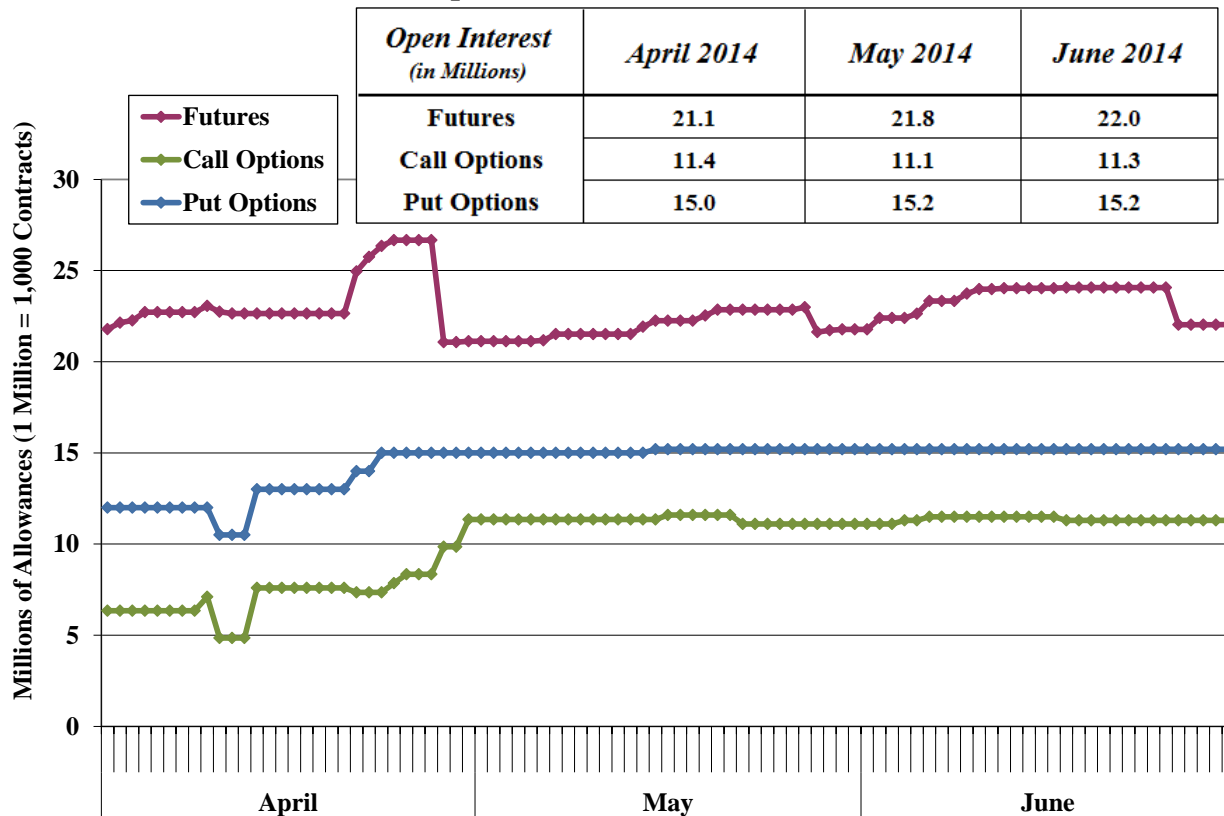
Key observations regarding the volume of trading of RGGI futures and options contracts:

- The volume of trading of RGGI futures listed on ICE was 18.4 million CO<sub>2</sub> allowances in the second quarter of 2014, down from 20.9 million in the prior quarter, but up from 8.0 million in the second quarter of 2013.
- Approximately 58 percent of the volume of trading of RGGI futures listed on ICE during the second quarter of 2014 was for contracts that were delivered in the current quarter, while approximately 42 percent of the volume was for contracts that will be delivered in December 2014. Thus, a large portion of the futures trading resulted in allowance transfers that were reflected in COATS during the second quarter, while the remainder are likely to result in allowance transfers at the end of 2014.
- There were nineteen option trades reported on ICE in the second quarter of 2014, up from six trades in the prior quarter.
- The total volume of options traded in the second quarter of 2014 was for 12.4 million CO<sub>2</sub> allowances, which was an increase from 5 million in the prior quarter.

#### *Open Interest in Exchange-Traded RGGI Futures and Options*

Figure 3 summarizes the level of open interest in exchange-traded futures and options listed on the ICE during the second quarter of 2014. The red line shows the level of open interest in futures contracts. As in Figure 2, the level of open interest in futures contracts for the first and second control period are shown together since all CO<sub>2</sub> allowances are essentially interchangeable for compliance purposes. The green line shows the level of open interest in call options. The blue line shows the level of open interest in put options.

**Figure 3: Open Interest in RGGI Futures and Options  
April 1, 2014 to June 30, 2014**



Key observations regarding the level of open interest in RGGI futures and options:

- The open interest in RGGI futures remained relatively flat for the period, peaking near 27 million on April 23, but closing the second quarter just one percent higher than at the end of the first quarter.
- The level of open interest in RGGI futures typically increases throughout each month, then decreases at the end of the month due to the final settlement of the current month contract. The decrease in levels of open interest in RGGI futures on April 28, May 28, and June 26 were due to the settlement of contracts with expiration dates at the end of those months.
- The open interest in RGGI put options increased from 12 million at the end of the first quarter of 2014 to more than 15 million at the end of the second quarter of 2014.
- The open interest in RGGI call options increased from approximately 6 million at the end of the first quarter of 2014 to over 11 million at the end of the second quarter of 2014.

### *Concentration of Open Interest*

Additional information about the trading of futures, forwards, and options is available in the weekly Commitments of Traders (“COT”) reports, which are published by the Commodity

Futures Trading Commission (“CFTC”)<sup>8,9</sup> for each week when greater than 20 firms have reportable positions in a particular product.

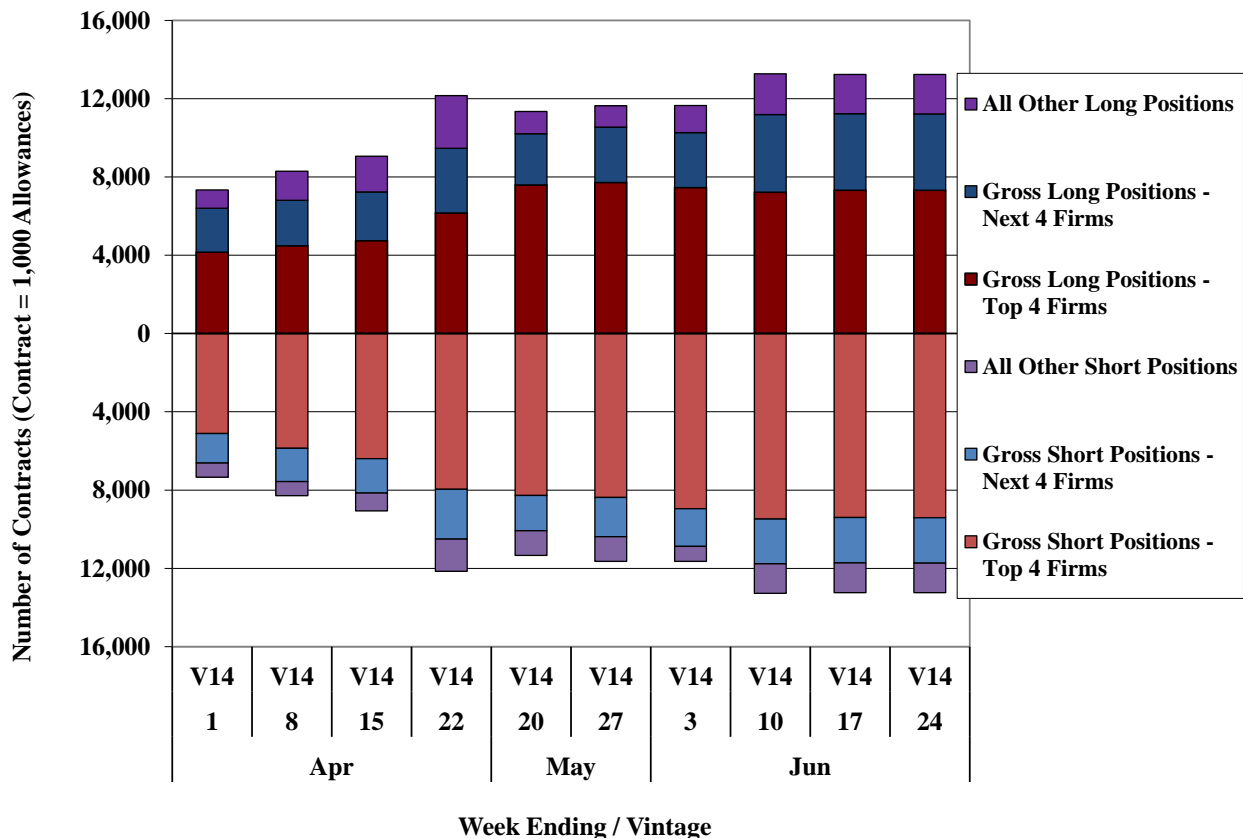
Figure 4 summarizes the concentration of open interest in 2014 vintage ICE futures and options contracts. The figure reports the gross long positions in three categories: (i) the four firms with the largest long positions (see “Top 4 Firms”), (ii) the four firms with the largest long positions not including the Top 4 (see “Next 4 Firms”), and (iii) all other long positions. The figure also reports the gross short positions in three categories: (i) the four firms with the largest short positions (see “Top 4 Firms”), (ii) the four firms with the largest short positions not including the Top 4 (see “Next 4 Firms”), and (iii) all other short positions.

---

<sup>8</sup> 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 other entities are frequently designated as Non-Commercial. Each Tuesday, the CFTC issues the COT report, which is a summary of the long and short positions of participants in the market.

<sup>9</sup> The CFTC does not publish information from the COT reports for weeks when fewer than 20 firms have reportable positions in a given product, which is why no information is shown for the first two weeks of May or for any vintage contract other than 2014 (each vintage is reported separately).

Figure 4: Concentration of Open Interest in CCFE Futures and Options<sup>10</sup>  
April 1 to June 30, 2014



Observations regarding the concentration of open interest:

- Many firms have open interest in RGGI CO<sub>2</sub> allowance futures and options, although a small number of firms account for large shares of the gross long and short positions in 2014 vintage contracts.
  - ✓ The “Top Four” Firms accounted for an average of 58 percent of the total long positions for the weeks shown during the quarter, while 86 percent of the total long positions were held by eight firms.
  - ✓ The “Top Four” Firms accounted for an average of 72 percent of the total short positions for the weeks shown during the quarter, while 90 percent of the total long positions were held by eight firms.
  - ✓ It is possible for a single firm to be in the “Top 4” or “Next 4” Firms in both the long and the short categories.

<sup>10</sup> Source: The CFTC’s Commitment of Traders reports which are available at [www.cftc.gov/MarketReports/CommitmentsofTraders/HistoricalCompressed/index.htm](http://www.cftc.gov/MarketReports/CommitmentsofTraders/HistoricalCompressed/index.htm).



- The CFTC does not publish firm-level information on open interest, although the information they publish provides an indication of the upper limits of the gross long and gross short positions of individual firms. Combined with firm-specific information about CO<sub>2</sub> allowance holdings from COATS, the information on open interest that is published by the CFTC is useful for evaluating the potential for a firm to hoard RGGI CO<sub>2</sub> allowances, which is discussed further in Section E.

## E. DISCUSSION OF MARKET MONITORING

As the RGGI Market Monitor, we monitor trading in the secondary CO<sub>2</sub> allowance market in order to identify anticompetitive conduct. Additionally, the Commodity Futures Trading Commission (“CFTC”) evaluates trading in the secondary CO<sub>2</sub> allowance market consistent with its role as the regulator of derivative 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<sub>2</sub> allowances. Hence, we screen information on the holdings of CO<sub>2</sub> allowances and allowance-derivatives and the demand for allowances to identify firms that might acquire a position that raises competitive concerns. During the first control period, hoarding was not a significant concern for the RGGI CO<sub>2</sub> allowance market because the amount of allowances that were available through the auctions was more than sufficient to satisfy the demand for allowances. During the second control period, which began in January 2012, the ability of an individual firm to hoard is limited by the substantial private bank of CO<sub>2</sub> allowances that has been accumulated and also by the market rules, particularly the auction rules that limit the amount of allowances that can be purchased by a single party or group of affiliated parties in a single offering to 25 percent.

Another potential concern is that a firm expecting to purchase CO<sub>2</sub> allowances in the auction might sell a large number of futures contracts in an effort to push the price of the contracts below the competitive level. Such a firm might profit from buying a large number of CO<sub>2</sub> allowances in the auction at a discount if the bidding in the auction were influenced by the depressed futures 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<sub>2</sub> 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<sub>2</sub> allowances for their future

compliance needs help limit the effectiveness of a strategy to depress prices below the competitive level. Nevertheless, the CFTC has access to confidential transaction data, which allows it to monitor for evidence of manipulative conduct.