



**REPORT ON THE SECONDARY MARKET
FOR RGGI CO₂ ALLOWANCES: FOURTH QUARTER 2013**

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 of Northeast and Mid-Atlantic states to reduce emissions of carbon dioxide (CO₂) 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 CO₂ allowances consists mainly of the auctions where allowances are initially sold. Once a CO₂ allowance is purchased in the primary market, it can then be resold in the secondary market. The secondary market for RGGI CO₂ 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 CO₂ 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 fourth quarter of 2013 and discusses the results of our market power screens. Several patterns have emerged in this period in the secondary market:

- *CO₂ Allowance Prices* – CO₂ allowance prices increased 2 percent from the prior quarter and 56 percent from the fourth quarter of 2012.¹ Secondary market prices were consistent with the auction clearing price in the fourth quarter of 2013:
 - ✓ CO₂ allowance futures prices averaged \$3.00; and
 - ✓ The clearing price in Auction 22 (held in December) was \$3.00.
- *Secondary Market Activity* – Volumes have increased in 2013 both for physical transfers of CO₂ allowances and for trading of CO₂ allowance futures and options. Increased activity is a natural market response as compliance entities seek to manage the increased risk of CO₂ allowance price volatility following the announcement of proposed rule changes from the 2012 Program Review.

¹ CO₂ allowance prices increased in 2013 due to anticipated changes in the RGGI program. On February 7, 2013, as part of the 2012 program review, the RGGI states announced plans to reduce the emissions cap 45 percent in 2014 and that allowances in circulation over the remainder of the decade would be adjusted to account for allowances held by market participants before the new cap is implemented. See “http://www.rggi.org/docs/PressReleases/PR130207_ModelRule.pdf”. On January 13, 2014, the states announced the completion of revisions to their state CO₂ Budget Trading Programs. See “http://www.rggi.org/docs/PressReleases/PR011314_AuctionNotice23.pdf”.

- ✓ The volume of CO₂ allowance transfers between unaffiliated firms was 29.8 million, up from 4.0 million in the prior quarter and 3.6 million in the fourth quarter of 2012.
- ✓ The open interest in RGGI futures increased from 8.2 million allowances at the end of the third quarter to 16 million at the end of the fourth quarter.
- ✓ The open interest in RGGI options increased from 10.7 million allowances at the end of the third quarter to 14.1 million at the end of the fourth quarter.
- CO₂ Allowance Holdings – The share of CO₂ allowances that were held by compliance entities and their affiliates at the end of 2013 was approximately 80 percent out of 319 million allowances in circulation.

We evaluate information on the holdings of CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ allowance that is to be transferred. One standard futures contract equals 1,000 RGGI allowances.²
- *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 CO₂ 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 December 2013 expiration date. If the price of the corresponding forward contract rose to \$5.75, the firm could exercise the option to buy CO₂ allowances at \$5 and immediately sell them at \$5.75. Alternatively, if the price of the forward contract stayed

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.

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 CO₂ 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 CO₂ allowances in the fourth quarter of 2013. Figure 1 shows transaction prices in the secondary market for CO₂ allowances, including the prices of allowance transfers registered in COATS³ and the prices of futures contract trades on the Intercontinental Exchange (“ICE”). The figure also shows volume-weighted average prices in the fourth quarter of 2013 compared to the previous quarter and the fourth quarter of the previous year. This section also discusses the market prices for option contracts.

Key observations regarding RGGI CO₂ allowance prices:

- CO₂ allowance prices gradually trended upward throughout the fourth quarter of 2013, rising from around \$2.70 in early October to around \$3.35 in late December. The average price of \$3.08 was 2 percent higher than in the prior quarter and 56 percent higher than the fourth quarter of 2012.
- The clearing price in Auction 22, held on December 4, was \$3.00, which was consistent with secondary market prices leading up to the auction. The auction clearing price increased 12 percent from Auction 21 (which was held in September), consistent with the trend in secondary market prices.

Prices of CO₂ Allowances and Allowance Derivatives

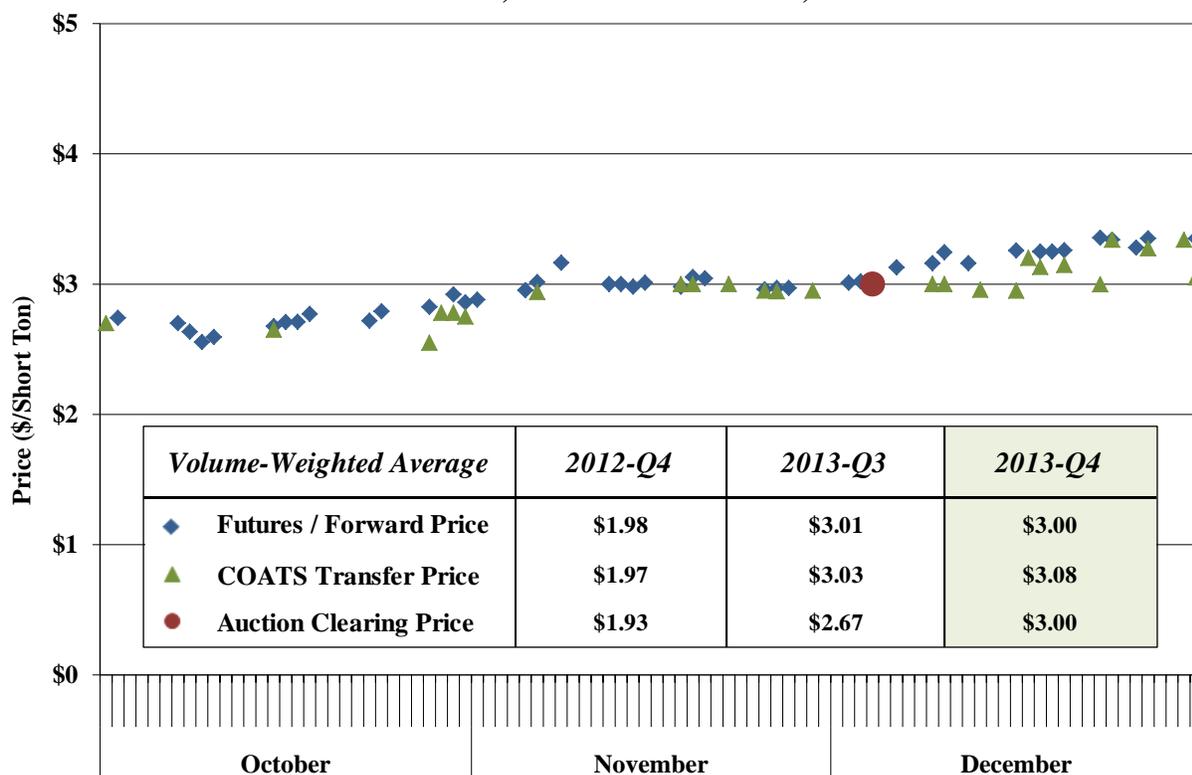
Figure 1 summarizes prices in the secondary market during the period. The blue diamonds show the prices of ICE futures trades on days with volume.⁴ The green triangles show the volume-weighted average prices of physical deliveries registered in COATS on days with transactions when the price was recorded (“COATS transactions”). The red circle shows the clearing price of

³ Parties are required to report the transaction price if there is an underlying financial transaction related to the transfer of allowances between accounts.

⁴ On October 16, 2012, ICE announced that, as a part of its efforts to implement Dodd-Frank regulations, it would convert existing positions in RGGI forward contracts to positions in futures contracts. See <https://www.theice.com/S2F.jhtml> for additional details. Since the settlement provisions of ICE’s forward contracts had been similar to the settlement provisions of futures contracts, the impact of the switch was limited.

the CO₂ allowances that were sold in RGGI Auction 22, which was held on December 4. Figure 1 also shows volume-weighted average prices for each category in the fourth quarter of 2013 compared to the previous quarter and the fourth quarter of the previous year. Volume-weighted average prices for first and second control period CO₂ allowances are calculated together since the compliance deadline for the first control period has passed and all CO₂ allowances are essentially interchangeable for compliance purposes.

**Figure 1: Prices in the Secondary Market for RGGI CO₂ Allowances^{5, 6}
October 1, 2013 to December 31, 2013**



Key observations regarding CO₂ allowance prices:

⁵ Sources: Auction clearing prices are available at www.rggi.org/market/co2_auctions/results, ICE futures prices are available at www.theice.com, and the prices of physical deliveries are based on information in COATS.

⁶ The chart does not include two COATS transactions that were reported on December 30, since the first transaction was inadvertently reported with an incorrect price and the second transaction was intended to reverse the first transaction.

- CO₂ allowance prices gradually trended upward throughout the fourth quarter of 2013, rising from around \$2.70 in early October to around \$3.35 in late December. The average price of \$3.08 was approximately 2 percent higher than in the prior quarter and 56 percent higher than the fourth quarter of 2012.
- The prices of ICE futures trades exhibited the same trend as COATS transaction prices during the quarter. Although the futures prices were usually slightly higher than COATS transaction prices on individual days, the average futures price of \$3.00 was approximately equal to the average price in the prior quarter and 52 percent higher than in the fourth quarter of 2012. This is primarily because a larger share of the volume of COATS transactions occurred at the end of the quarter when secondary market prices were highest.
- The clearing price in Auction 22, held on December 4, was \$3.00, which was consistent with secondary market prices leading up to the auction. The auction clearing price increased 12 percent from Auction 21 (which was held in September), consistent with the trend in secondary market prices.

Prices of Options for CO₂ Allowances

The clearing prices of option contracts 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.

Key observations regarding the pricing of options for CO₂ allowances in the fourth quarter of 2013:

- The strike prices of call options sold during the fourth quarter of 2013 ranged from \$3.00 to \$3.25, while the strike prices of put options ranged from \$2.00 to \$2.75. The expiration dates for these contracts range from December 2013 to December 2015, with 29 of the 45 options trades during the period having an expiration date of December 2013. These strike prices provide an indication of the market's expectations for the potential range of variation in allowance prices through the end of 2014.

D. VOLUMES AND OPEN INTEREST

This section evaluates the volume of COATS transactions (i.e., transfers of CO₂ 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 volume of transactions recorded in COATS. Figure 3 summarizes the level of open interest in exchange-traded RGGI futures and option contracts.

Key observations regarding trading volumes and open interest in the fourth quarter of 2013:

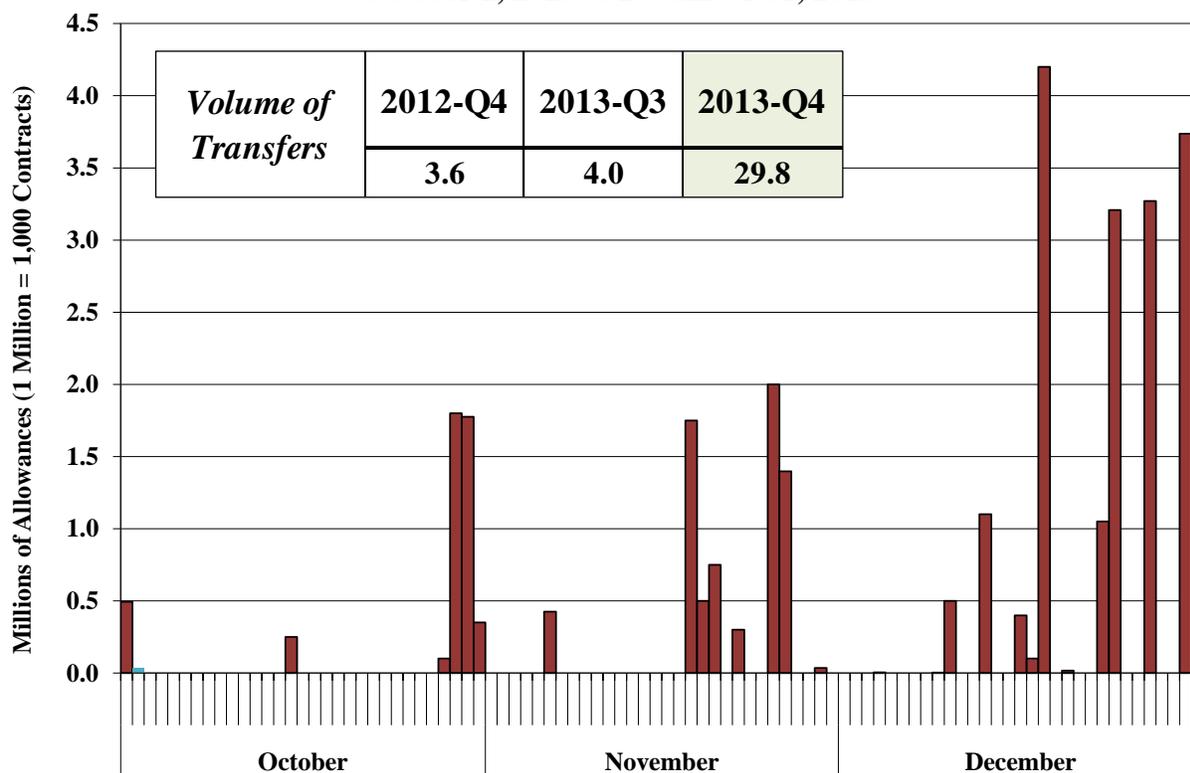
- Secondary market activity increased dramatically as the volume of:
 - ✓ CO₂ allowance transfers between unaffiliated firms was 29.8 million in the fourth quarter of 2013, up from 4.0 million in the prior quarter and 3.6 million in the fourth quarter of 2012. The majority of CO₂ allowances transferred during the quarter resulted from the settlement of ICE futures contracts (which occurs at the end of each month) and ICE option contracts (which occurs in the middle of the month).
 - ✓ ICE futures trading reached 51 million CO₂ allowances in the fourth quarter of 2013, up from the prior quarter when the volume was 8.9 million allowances.
- The open interest in RGGI futures increased from 8.2 million at the end of the third quarter to a high of 26.6 million on December 26, before dropping to 16 million at the end of the fourth quarter due to the settlement of a large number of contracts with December 2013 expiration. The total quarterly increase in the open interest in RGGI futures was 97 percent.
- The open interest in RGGI options increased from approximately 10.7 million at the end of the third quarter to a high of nearly 32 million on December 16, before dropping to approximately 14.1 million at the end of the fourth quarter due to the expiration of contracts with December 2013 expiration.
- The share of CO₂ allowances that were held by compliance entities and their affiliates at the end of 2013 was 80 percent (out of approximately 319 million allowances in circulation).

Volume of CO₂ Allowance Transfers, Futures, and Options

Figure 2 summarizes transfers of CO₂ allowances between the COATS accounts of unaffiliated firms during the fourth quarter of 2013. The figure also shows the volume of transfers in the

fourth quarter of 2013 compared to the prior quarter and to the fourth quarter of 2012.⁷ 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 CO₂ allowances are essentially interchangeable for compliance purposes.

**Figure 2: Volume of CO₂ Allowance Transfers Between Unaffiliated Parties^{8,9}
October 1, 2013 to December 31, 2013**



Key observations regarding the volume of transfers of CO₂ allowances in COATS between unaffiliated firms:

⁷ 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.

⁸ Source: CO₂ allowance transfers are based on information in COATS.

⁹ The chart does not include two COATS transactions that were reported on December 30, since the first transaction was inadvertently reported with an incorrect price and the second transaction was intended to reverse the first transaction.

- The volume of CO₂ allowance transfers between unaffiliated firms was 29.8 million, an increase from 4.0 million allowances in the prior quarter and from 3.6 million allowances in the fourth quarter of 2012. Most CO₂ allowances transferred at the end of a particular month result from the settlement of ICE futures contracts that have an expiration in that month. Likewise, many CO₂ allowances transferred in the middle of a particular month result from the exercise of ICE option contracts that have an expiration in that month.
- Fifty-five percent of the volume of CO₂ allowance transfers between unaffiliated firms occurred in the last half of December. Most of these transfers resulted from the final settlement of RGGI futures contracts that expired at the end of 2013.
- The share of CO₂ allowances that were held by compliance entities and their affiliates at the end of 2013 was 80 percent (out of approximately 319 million allowances in circulation).

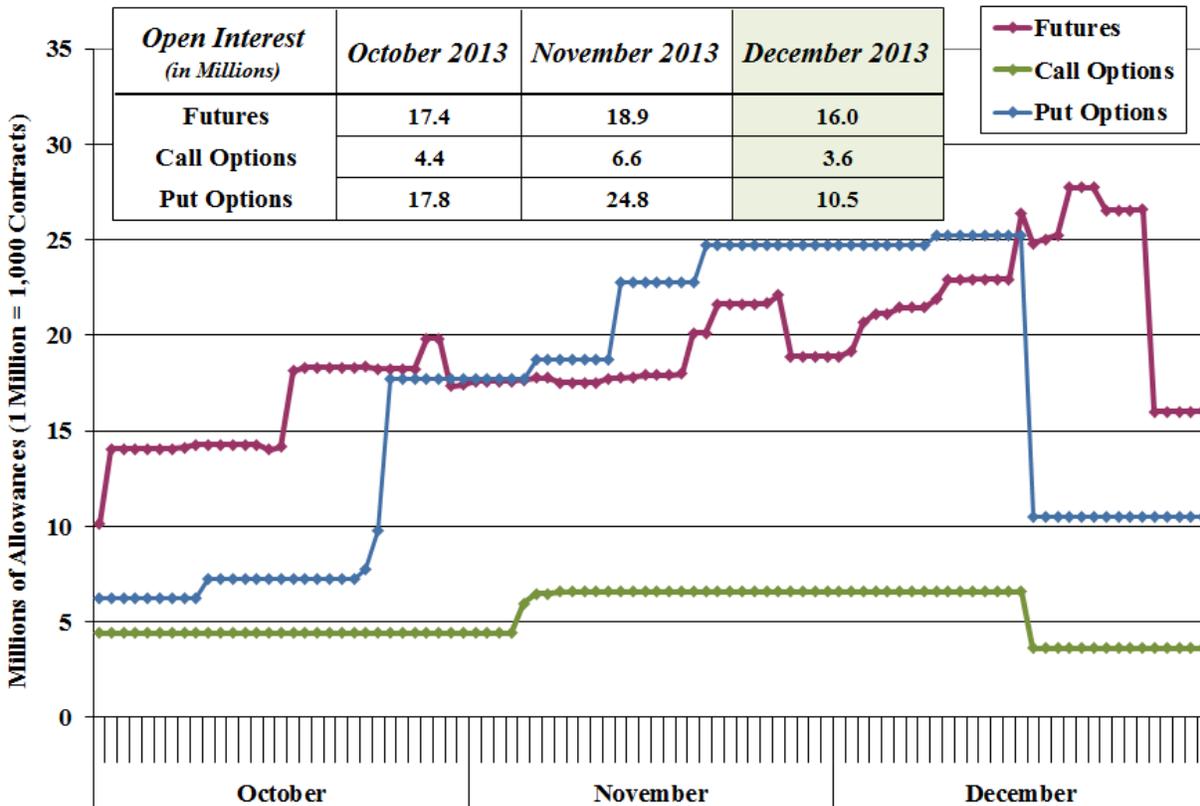
We also review patterns in the market for exchange-traded futures and options. Key observations regarding the volume of trading of RGGI futures and options contracts:

- The volume of trading of RGGI futures listed on ICE was over 51 million CO₂ allowances in the fourth quarter of 2013, up considerably from the prior quarter when the volume was 8.9 million allowances. This is also much higher than the fourth quarter of 2012 when there was virtually no trading of RGGI futures contracts.
- There were 45 option trades reported on ICE in the fourth quarter of 2013, an increase from 15 trades in the prior quarter. These option contracts had expiration dates of December 2013, December 2014, and December 2015. The increased option trading suggests that market participants are increasingly interested in protection from CO₂ allowance price volatility.
- The total volume of options traded in the fourth quarter of 2013 was 22.4 million, which was up 356 percent from 4.9 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 fourth quarter of 2013. 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 CO₂ 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
October 1, 2013 to December 31, 2013**



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

- The open interest in RGGI futures increased from 8.2 million at the end of the third quarter to a high of 26.6 million on December 26, before dropping to 16 million at the end of the fourth quarter due to the settlement of a large number of contracts with December 2013 expiration. The total quarterly increase in the open interest in RGGI futures was 97 percent.
- 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 open interest in RGGI put options increased from approximately 6.3 million at the end of the third quarter to more than 25 million on December 16 just before the expiration of December 2013 contracts. Subsequently, open interest dropped to approximately 10.5 million at the end of the fourth quarter.
- The open interest in RGGI call options increased from approximately 4.4 million at the end of the third quarter to approximately 6.6 million on December 16 just before the expiration of December 2013 contracts. Subsequently, open interest dropped to 3.6 million by the end of the fourth quarter.

Commitments of Traders Reports

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”)¹⁰ for each week when greater than 20 firms have reportable positions.

Key observations regarding the concentration of open interest in futures and options contracts by individual firms:

- The number of participants in the market for RGGI CO₂ allowance derivatives increased from the prior quarter, as the COT report was published for two weeks in November and two weeks in December. This is the first time that positions have been reported since December of 2010.
- For the four weeks that were reported, 20 firms had significant positions in RGGI Futures contracts.
- Commercial firms account for the majority of long and short positions. The shares held by Commercial firms during the fourth quarter of 2013 ranged from 67 to 71 percent of long positions and 82 to 89 percent of short positions in the weeks when information was published.
- Many firms have open interest in RGGI CO₂ allowance futures and options, although a small number of firms account for a large share of the net long and short positions. The net long positions of the top four firms accounted for an average of 42 percent of the total long positions for the weeks shown during the quarter. The net short positions of the top four firms also accounted for an average of 42 percent of the total short positions for each of the weeks shown during the quarter.

¹⁰ 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.

E. DISCUSSION OF MARKET MONITORING

As the RGGI Market Monitor, we monitor trading in the secondary CO₂ allowance market in order to identify anticompetitive conduct. Additionally, the Commodity Futures Trading Commission (“CFTC”) evaluates trading in the secondary CO₂ 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 CO₂ allowances. Hence, we screen information on the holdings of CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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.