
REGI Inc.



**REPORT ON THE SECONDARY MARKET
FOR REGI CO₂ ALLOWANCES: FOURTH QUARTER 2021**

Prepared for:

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

Prepared By:

**POTOMAC
ECONOMICS**

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The Regional Greenhouse Gas Initiative (RGGI) was the first mandatory market-based regulatory initiative in the U.S. to reduce greenhouse gas emissions. The Regional Greenhouse Gas Initiative (RGGI) is a cooperative effort of Eastern states of the US 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 AND SUMMARY

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 2021 and discusses the results of our market power screens.

- *Secondary Market Activity:* The volume of trading in the secondary markets increased in the fourth quarter, which is typical as compliance entities ensure that they possess enough allowances to meet the interim compliance deadline for 2021 emissions and as the benchmark contracts expire at the end of December. The volume of trading increased from the prior year reflecting the increased size of RGGI with the addition of Virginia.
 - ✓ Physical allowance transfers between unaffiliated firms totaled 86 million in the fourth quarter of 2021, which was ten times greater than in the third quarter, and 34 percent higher than in the fourth quarter of 2020.
 - ✓ The volume of trading of RGGI futures was 169 million CO₂ allowances in the fourth quarter of 2021, which was twice the volume in the third quarter of 2021.
 - ✓ Open interest in RGGI futures and options decreased from 115 million allowances in the previous quarter to 87 million allowances by the close of the fourth quarter. This reduction in open interest typically occurs at the end of the year since the benchmark RGGI allowance futures contract reaches delivery at the end of each December.
 - ✓ Increased futures trading and open interest in the past two quarters has coincided with increasing participation of money managers and swap dealers in the futures market.
- *CO₂ Allowance Prices:* Price increases over the last two quarters have coincided with increased futures trading activity and increased participation by investors. After rising rapidly during October and early-November, prices settled into a range between the Cost Containment Reserve (“CCR”) for 2021 of \$13.00 and the CCR for 2022 of \$13.91. The CCR tends to reduce price volatility by increasing allowance supply when auction clearing prices exceed specific thresholds.

- ✓ Prices rose steeply from around \$11/ton in October to about \$12.50 by the end of the month. Prices then remained steady in November hovering between \$13 and \$13.50 through early December. In the last three weeks of December, prices stepped higher and settled around \$13.60.
- ✓ Auction 54 took place on December 1st and cleared at \$13.00/ton. The price was set at the Cost Containment Reserve and was consistent with the market prices observed in November leading up to the auction. Since Auction 54, prices have settled into a range that is near the CCR of \$13.91 that will be used in Auction 55, which will occur in March 2022.
- ✓ The strike prices for call options have ranged from \$7 and \$20/ton during the fourth quarter with a median strike price \$12/ton, and option-implied price volatility increased substantially from the third quarter.
- CO₂ Allowance Holdings – At the end of the fourth quarter of 2021:
 - ✓ There were 192 million CO₂ allowances in circulation.
 - ✓ Compliance-oriented entities held approximately 90 million of the allowances in circulation (47 percent).
 - ✓ Approximately 99 million of the allowances in circulation (52 percent) are believed to be held for compliance purposes.

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. Allowances transferred must be usable for compliance in the vintage year of the futures contract. One standard futures contract equals 1,000 RGGI allowances.¹ These contracts are listed by an exchange with simple standardized terms to promote liquidity.
- *Forwards* – These are like futures contracts, but a forward contract typically requires that all financial settlement occur at expiration. These contracts can be made off an exchange between two parties, allowing the parties to agree to less standardized terms.
- *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 the expiration date. For example, suppose a firm holds a call option with \$5 strike price, and December 2021 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 below \$5, the firm would let the option expire without exercising it. One standard options contract can be exercised for 1,000

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.

RGGI allowances. Currently, call option contracts listed on both ICE and Nodal Exchange are European style, meaning that they cannot be exercised before the expiration date.

- *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. Currently, put option contracts listed on both ICE and Nodal Exchange are European style, meaning that they cannot be exercised before 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 forward contracts, they generally require less financial security since they do not obligate the holder to exercise the contract if its value declines, which could make 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.

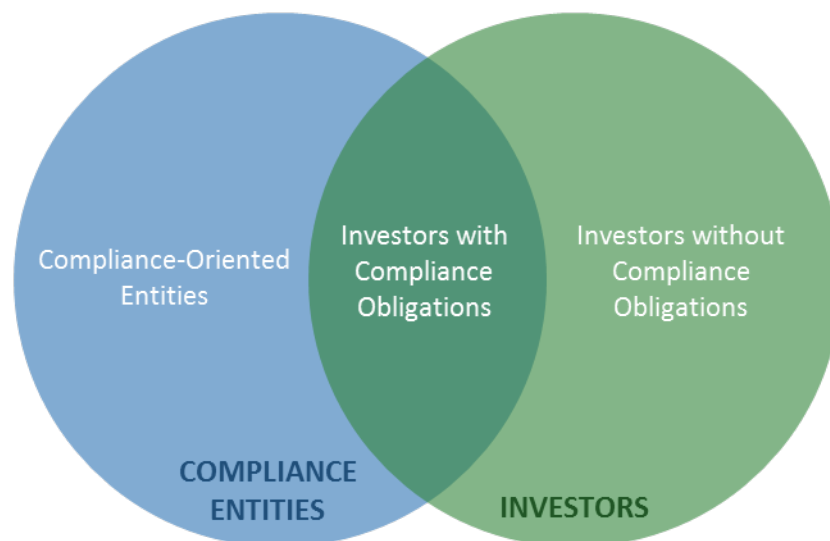
The volatility of a CO₂ allowance refers to the expected standard deviation of the distribution of allowance prices one year in the future. For example, if the expected value of the price one year

in the future is \$1 and the option-implied volatility is 25 percent, this implies that the probability that the price will be within 25 percent of \$1 (i.e., between \$0.75 and \$1.25) is 68.2 percent assuming that the price is distributed log-normally. Option-implied volatility refers to volatility estimates that are derived by analyzing the price and other terms of an option contract compared with the price of CO₂ allowances.

Categories of Firms Participating in the RGGI Market

Participation in the RGGI market involves many different firms with various interests in RGGI allowances. Some participate in order to satisfy compliance obligations, others have investment interests, and still others participate for both purposes. To more effectively track the activity of different participants, we use several classifications for participant firms. Figure 1 summarizes the relationship between these classifications.

Figure 1: Classifications of Participant Firms in the RGGI Marketplace



- *Compliance-oriented entities* are compliance entities that appear to acquire and hold allowances primarily to satisfy their compliance obligations.
- *Investors with Compliance Obligations* are firms that have compliance obligations, but which hold a number of allowances that exceeds their estimated compliance obligations by a margin suggesting they also buy for re-sale or some other investment purpose. These firms often transfer significant quantities of allowances to unaffiliated firms.
- *Investors without Compliance Obligations* are firms without any compliance obligations.

These three categories form the basis for two overlapping groups.

- *Compliance Entities* – All firms with compliance obligations, and their affiliates.² Combines the first and second of the above categories.
- *Investors* – All firms which are assessed to be purchasing primarily for investment rather than compliance purposes. Combines the second and third of the above categories.

The assessment of whether a compliance entity holds a number of allowances that exceeds its compliance obligations by a margin that suggests they are also buying for re-sale or some other investment purpose is based on: (a) the entity’s forecasted share of the total compliance obligations for the entire RGGI footprint through 2026, (b) the total number of allowances in circulation, and (c) consideration of the pattern of the entity’s allowance transfers to unaffiliated firms versus affiliated firms. Since the designation of a compliance entity as an investor is based on a review of its transactions and holdings, the designation of a particular firm may change over time as more information becomes available. Therefore, some of the quantities in this report may not match previous reports because of changes in the classification of particular firms.

The number of allowances that are believed to be held for compliance purposes includes 100 percent of the allowances held by compliance-oriented entities and a portion of allowances held by other compliance entities (i.e., entities with compliance obligations that are not included in the compliance-oriented category).

² Affiliates are firms that: (i) have a parent-subsidiary relationship with a compliance entity, (ii) are subsidiaries of a parent company that has a large interest in a compliance entity, (iii) have substantial control over the operation of a budget source and/or responsibility for acquiring RGGI allowances to satisfy its compliance obligations.

C. SUMMARY OF PRICES

This section summarizes prices in the secondary market for RGGI CO₂ allowances in the fourth quarter of 2021. Figure 2 summarizes 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”) and Nodal Exchange. Figure 3 analyzes the trading of options for RGGI allowance futures which firms use to hedge exposure to fluctuations in allowance prices.

Key observations regarding RGGI CO₂ allowance prices:

- Prices rose steeply from approximately \$11/ton in October to about \$12.50 by the end of the month, and then prices remained steady in November hovering between \$13 and \$13.50 through early December. In the last three weeks of December, prices stepped higher and settled near \$13.60. The price increases have coincided with increased futures trading activity and increased participation by investors.
- Prices of COATS transfers were generally consistent with futures prices during the quarter.
- The clearing price in Auction 54 (on December 1) was set at the CCR trigger price level of \$13.00. This was consistent with secondary market prices at the time. Since Auction 54, prices have generally hovered just below the CCR of \$13.91 that will be used in the March 2022 auction.
- Twenty-seven call options and four put options were traded with strike prices between \$7.00 and \$20.00. Most of these trades were for settlement in December of 2021; however, seven were for contracts that expire in December 2022. Option trading patterns indicate that expectations of allowance price volatility increased in the fourth quarter relative to the third quarter.

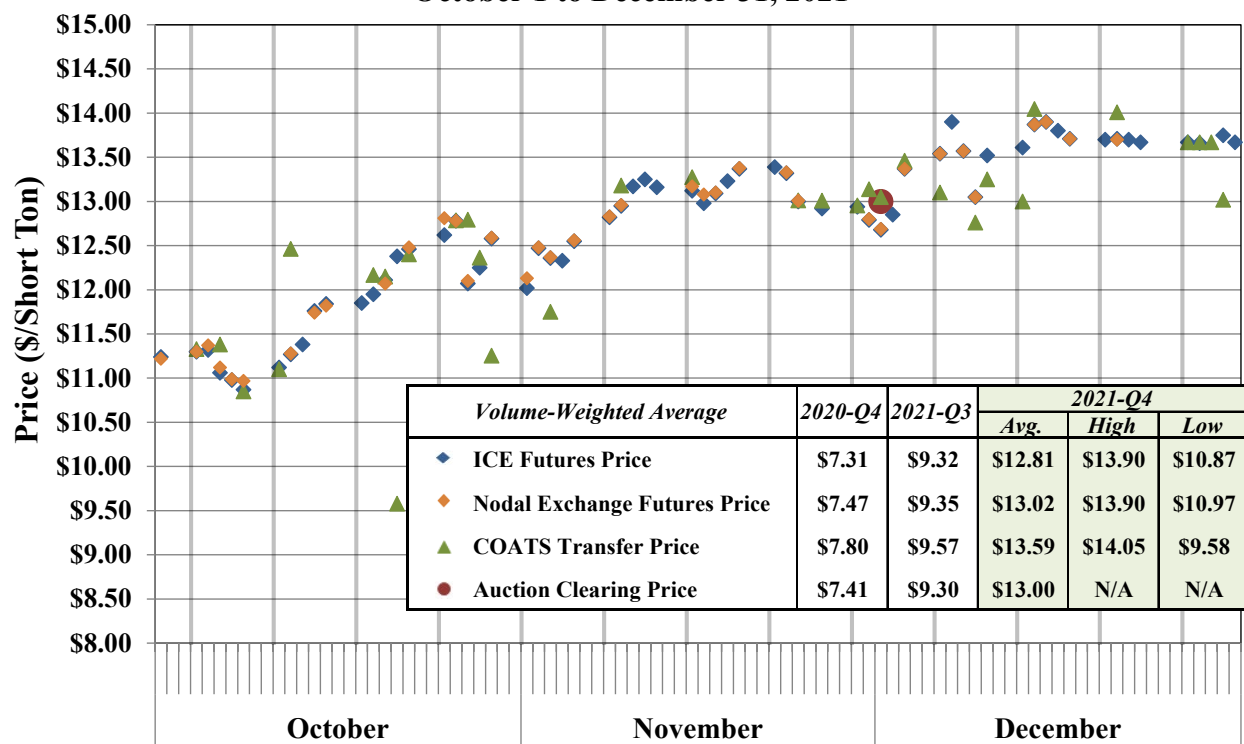
Prices of CO₂ Allowances and Allowance Derivatives

Figure 2 summarizes prices in the secondary market during the period. The blue diamonds show the price of futures trades on ICE, and orange diamonds show futures trades on Nodal Exchange on days with trading 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

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

(“COATS transactions”). The red circle shows the clearing price of the CO₂ allowances that were sold in RGGI Auction 54, which was held on December 1. Figure 2 also shows volume-weighted average prices for each category in the fourth quarter of 2021 compared to the previous quarter and the fourth quarter of the previous year. Additionally, high and low values are presented for the daily volume-weighted average values. CO₂ allowances that are usable for compliance in the fifth control period are shown.

**Figure 2: Prices in the Secondary Market for RGGI CO₂ Allowances⁴
October 1 to December 31, 2021**



Key observations regarding CO₂ allowance prices:

- Prices rose steeply from approximately \$11/ton in October to about \$12.50 by the end of the month and then remained steady in November hovering between \$13 and \$13.50 through early December. In the last three weeks of December, prices stepped higher and settled at

⁴ Sources: Auction clearing prices are available [here](#), ICE futures prices are available [here](#), Nodal Exchange futures prices are available [here](#), and the prices of physical deliveries are based on information in COATS. Futures prices are shown for the prompt month contract settlement price even if the volume traded was for another contract. Average COATS Transfer Prices for previous quarters have been updated to reflect transactions reported after the compilation of data for previous quarterly reports.

around \$13.60 though prices reached \$14/ton on several days. Prices of COATS transfers were generally consistent with futures prices throughout the quarter with the exception of a few outliers. These instances can result when pricing terms are agreed to in advance of the actual transaction date.

- The clearing price in Auction 54 (December 1) was \$13/ton, which was relatively consistent with secondary market prices in the days leading up to and immediately following the auction. In Auction 54, the clearing price was set at the CCR trigger price.

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 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 CO₂ allowances:

- Thirty-one option trades were recorded on ICE in the fourth quarter, which was up from the previous quarter.
- Twenty-seven call options and four put options were traded with strike prices between \$7.00 and \$20.00 and a median price of \$12. Most of these trades were for settlement in December of 2021; however, seven were for settlement in December of 2022. This activity suggests that market participants are seeking protection from the risk of upward movements in RGGI allowance prices.

Volatility of CO₂ Allowance Prices

Market-based emissions reduction initiatives such as RGGI are designed to give firms efficient incentives to reduce or offset emissions. In the short-term, high-emitting generators will operate less frequently in favor of low-emitting generators. In the long-term, the market will affect the decisions of firms to develop offset projects, retire older inefficient generation, and perform maintenance that increases fuel efficiency and lowers carbon-intensity. Predictable CO₂ allowance prices decrease the risks associated with making long-term investments in reducing

CO₂ emissions. Since CO₂ allowance prices can be volatile, the availability of futures and options contracts allows firms to protect themselves from the risks of such investments.

Expected price volatility is affected by elements of RGGI that promote allowance price stability. Potential upward price movements are limited by the Cost Containment Reserve (“CCR”), which allows for the sale of a fixed number of allowances in addition to the cap if the auction clearing price reaches the CCR Trigger Price.⁵ Potential downward price movements are limited by the Reserve Price, which currently prevents allowances from being sold in the auction at a price below \$2.38, and the Emissions Containment Reserve (“ECR”), which withholds allowances from circulation if prices fall below established trigger prices.⁶

One measure of the volatility of CO₂ allowance prices is known as option-implied volatility, which measures the volatility that is implied by the trading of option contracts for CO₂ allowances. If a firm perceives that CO₂ allowance prices are volatile, the firm may be willing to pay a high price for an option contract that protects it from unforeseen allowance price fluctuations. Likewise, if a firm perceives that CO₂ allowance prices are relatively stable, the firm will be willing to pay relatively little for the same option contract. Figure 3 shows the option-implied volatilities of option trades over the most recent six-month period.

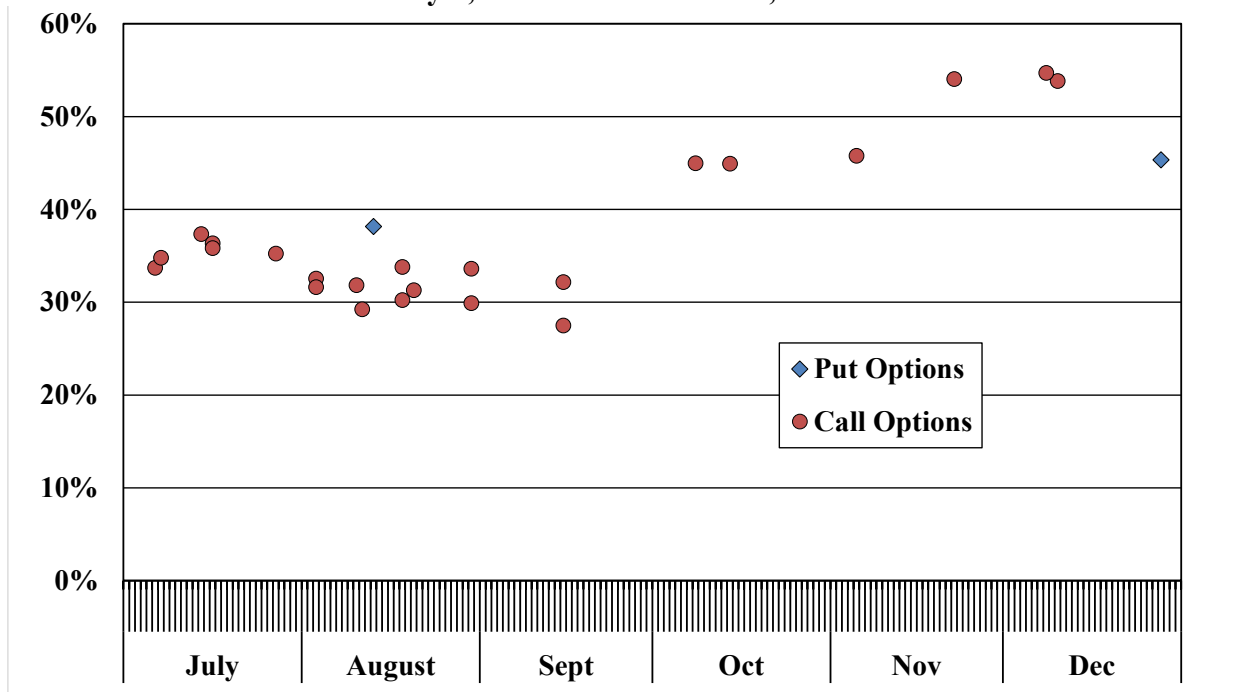
Observations regarding the option-implied volatility of CO₂ allowance prices shown in Figure 3:

- From late July through September, volatility remained mostly between 30 and 35 percent. In October, volatility rose to 45 percent, and then in December, it jumped to around 55 percent. This reflects expectations of increased allowance price uncertainty.
- Overall, option-implied volatility levels averaged 49 percent in the fourth quarter of 2021, compared to 33 percent in the previous quarter.
- As allowance prices approached the cost containment reserve trigger price, \$13/ton in 2021, futures price variations were reduced. The CCR trigger price is set to \$13.91 in 2022 and will continue to be an effective factor in reducing price volatility.

⁵ In 2021, the sizes of the CCR and the CCR trigger price was set in accordance with the 2017 Model Rule. The CCR trigger price was set at \$13.00 in 2021 and will rise 7 percent each year. Details are provided [here](#).

⁶ In 2021, the size of the ECR was set equal to 10 percent of the budgets of states implementing the ECR. The ECR trigger price for 2021 was \$6.00 and will rise 7 percent each year. Details are provided [here](#).

**Figure 3: Option-Implied Volatility of CO₂ Allowance Futures Prices
July 1, 2021 to December 31, 2021^{7,8}**



⁷ The data from July to September has been updated since the Third Quarter Secondary Market Report to include several trades which had been omitted.

⁸ Trades conducted within 90 days of a contract's expiration are excluded from the option-implied volatility calculation. While options typically expire on the third Friday of the expiration month, the 15th is used as a proxy for the expiration date. For example, a transaction date of September 15 with an expiration of December 15 of the same year would be excluded.

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 4 examines the volumes of transactions recorded in COATS and of futures trading. Figure 5 summarizes the level of open interest in exchange-traded RGGI futures and option contracts. Figure 6 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 fourth quarter of 2021:

- Futures trading volume was 169 million CO₂ allowances in the fourth quarter of 2021, up from 84 million in the third quarter of 2021 and 127 million in the fourth quarter of 2020.
- Physical allowance transfers between unaffiliated firms totaled 86 million in the fourth quarter of 2021, increased ten times from the previous quarter, and was 34 percent higher than the fourth quarter of 2020.
- Open interest in RGGI futures and options decreased from 115 million allowances at the end of the third quarter of 2021 to 87 million by the close of the fourth quarter of 2021. This reduction in open interest typically occurs at the end of the year since the benchmark RGGI allowance futures contract reaches delivery at the end of each December.
- Increased futures trading activity has coincided with increasing participation of money managers and swap dealers in the futures market.
- There were 192 million CO₂ allowances in circulation at the end of the quarter. Compliance-oriented entities held approximately 90 million of the allowances in circulation (47 percent). Approximately 99 million of the allowances in circulation (52 percent) are believed to be held for compliance purposes.

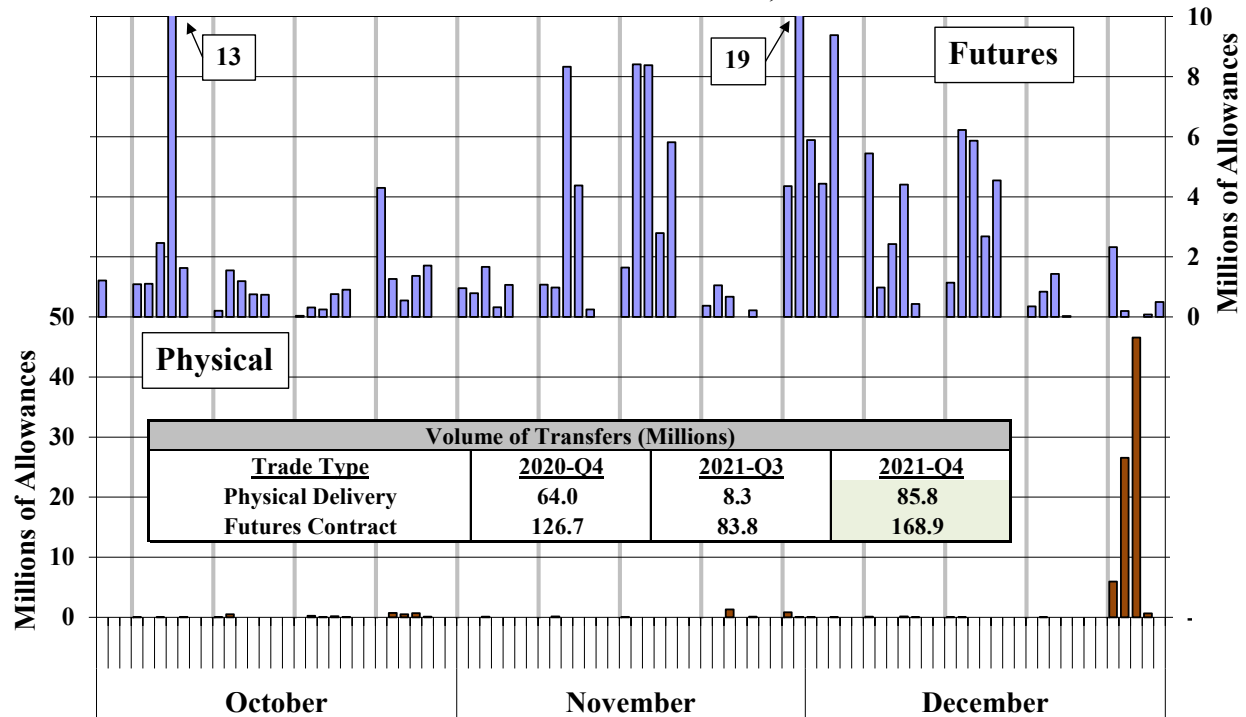
Volume of CO₂ Allowance Transfers, Futures, and Options

Figure 4 summarizes the volume of transfers of CO₂ allowances between the COATS accounts of unaffiliated firms and the volume of trading of RGGI futures listed on ICE and Nodal Exchange.⁹ The figure also shows the volume of transfers in the fourth quarter of 2021 compared to the previous quarter and to the fourth quarter of 2020. The volume of futures

⁹ Firms are categorized as affiliated based on available information. As a result, calculations provided in previous reports may be inconsistent with results in this report when new information becomes available. Furthermore, the COATS transfer totals from previous quarters have been revised from previous reports to reflect late-reported transactions.

trading and transfers of CO₂ allowances for each control period are shown together because all CO₂ allowances are interchangeable for compliance purposes.

**Figure 4: Volume of CO₂ Allowance Transfers Between Unaffiliated Parties
October 1 to December 31, 2021**



Key observations regarding physical CO₂ allowance transfers between unaffiliated firms:

- The volume of CO₂ allowance transfers between unaffiliated firms was 86 million, ten times higher than the previous quarter, and 34 percent higher than the fourth quarter of 2020.
- More CO₂ allowance transfers occurred in the last few business days of the month, particularly December, when futures contracts settle, reflecting that most result from settlement of futures contracts.

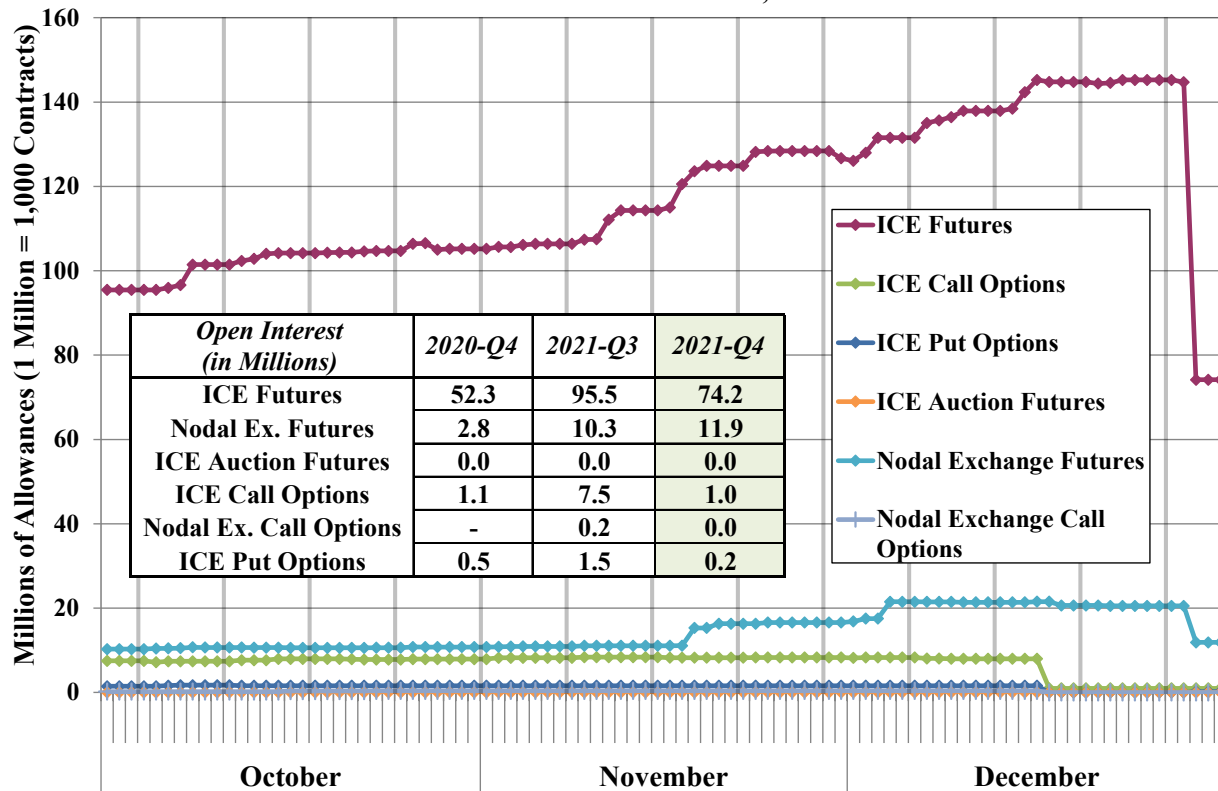
Key observations regarding the volume of trading of RGGI futures and options contracts:

- The total volume of RGGI futures trading was 169 million allowances in the fourth quarter, twice the third quarter volume, and 33 percent higher than the fourth quarter 2020 trading volume.
- Of futures trading volumes during the fourth quarter of 2021, approximately 60 percent was for contracts that settled in December 2021, and 35 percent was for contracts that settle in December 2022.

Open Interest in Exchange-Traded RGGI Futures and Options

Figure 5 summarizes the level of open interest in exchange-traded futures and options listed on ICE and Nodal Exchange during the fourth quarter of 2021. The red line shows the level of open interest in futures contracts on ICE. The teal line shows the level of open interest in futures contracts on Nodal Exchange. The green line shows the level of open interest in call options on ICE. The blue line shows the level of open interest in put options on ICE. The orange line shows the level of open interest in auction futures on ICE, while the purple line shows Nodal Exchange call options.

**Figure 5: Open Interest in RGGI Futures and Options
October 1 to December 31, 2021**



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

- The total open interest in RGGI futures on ICE increased from 96 million allowances at the end of the third quarter of 2021 to 74 million allowances by the close of the fourth quarter of 2021.
- Open interest in RGGI futures on Nodal Exchange increased from 10.3 million at the close of the third quarter to 11.9 million at the close of the fourth quarter.

- Open interest in RGGI put options on ICE decreased from 1.5 million in the third quarter to 200,000 million by the end of the fourth quarter of 2021, and open interest in call options on ICE decreased from 7.5 million to 1.0 million.
- RGGI Auction Futures¹⁰ had zero open interest throughout the quarter.
- Both open interest in call and put options on Nodal Exchange were zero at the end of the fourth quarter.
- Overall, the level of open interest across RGGI options and futures products decreased by 24 percent from the close of the third quarter of 2021 to the close of the fourth quarter of 2021.

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”)¹¹ for each week when greater than 20 firms have reportable positions in a particular product.

Figure 6 summarizes the concentration of open interest in 2021 and 2022 vintage ICE futures and options contracts reported during the quarter by the CFTC. The figure reports the net long positions in three categories: (i) the four firms with the largest long positions, (ii) the four firms with the largest long positions not including the Top 4, and (iii) all other long positions. The figure also reports the net short positions in three categories: (i) the four firms with the largest short positions, (ii) the four firms with the largest short positions not including the Top 4, and (iii) all other short positions.

Figure 7 summarizes the concentration of open interest by category of trader as defined by the CFTC: producers/merchants, swap dealers, money managers, spread, and other, which includes

¹⁰ RGGI Auction Futures are a product which converts to long or short RGGI futures contracts on the day of publication of the Market Monitor Report for a specific auction. Positions opened in the RGGI futures contract will be priced at the Auction Clearing Price as specified in the Market Monitor Report. The futures contract vintage will be the month and year in which the auction is held. For more information see [here](#).

¹¹ 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.

the CFTC’s categories of “Other” and “Non-reportable.” Producers/merchants represent the group of traders who use futures markets to hedge risks associated with their own production or ‘handling’ of RGGI allowances. This category most closely aligns with the compliance entity category used in this report but could potentially also include energy management companies that are not engaged directly with the generation of emissions but help others comply. A swap dealer is defined as an entity that deals primarily in swaps and may do so on the behalf of speculative traders or companies trying to reduce risk. In general, a money manager represents an entity that offers trading advice or manages futures trading for others. An investor without a compliance obligation would likely be classified as a money manager or potentially a swap dealer. In addition, if a trader has offsetting short and long positions, the associated quantity is included in a separate spread category. Finally, if a trader is not readily classified in a specific category, it is classified as “Other.” The assignment of an entity to a CFTC category may change over time depending on changing activities of the entity or new information.

Figure 8 shows the number of traders by the same CFTC trader categories described above except “Spread’ is included in “Other.” At least four entities must be included in a category for CFTC to report the number of traders in a category. For that reason, a category may appear in Figure 7 for a particular vintage but absent from Figure 8 if there are not at least four distinct traders in the category. The sum of the number of traders within the long and short categories will typically exceed the total number of traders since a single trader may have both long and short positions. For more refined descriptions of the CFTC classifications, see www.cftc.gov.

Figure 6: Concentration of Open Interest in ICE Futures and Options
October 1 to December 31, 2021

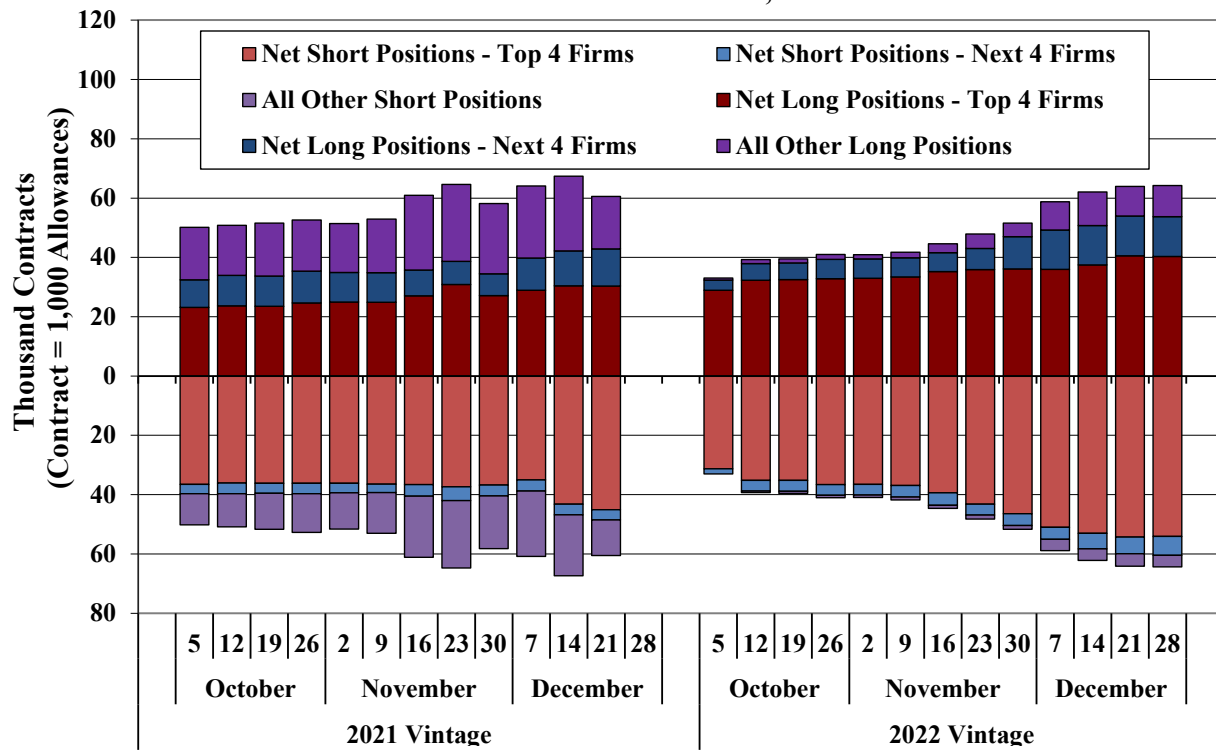
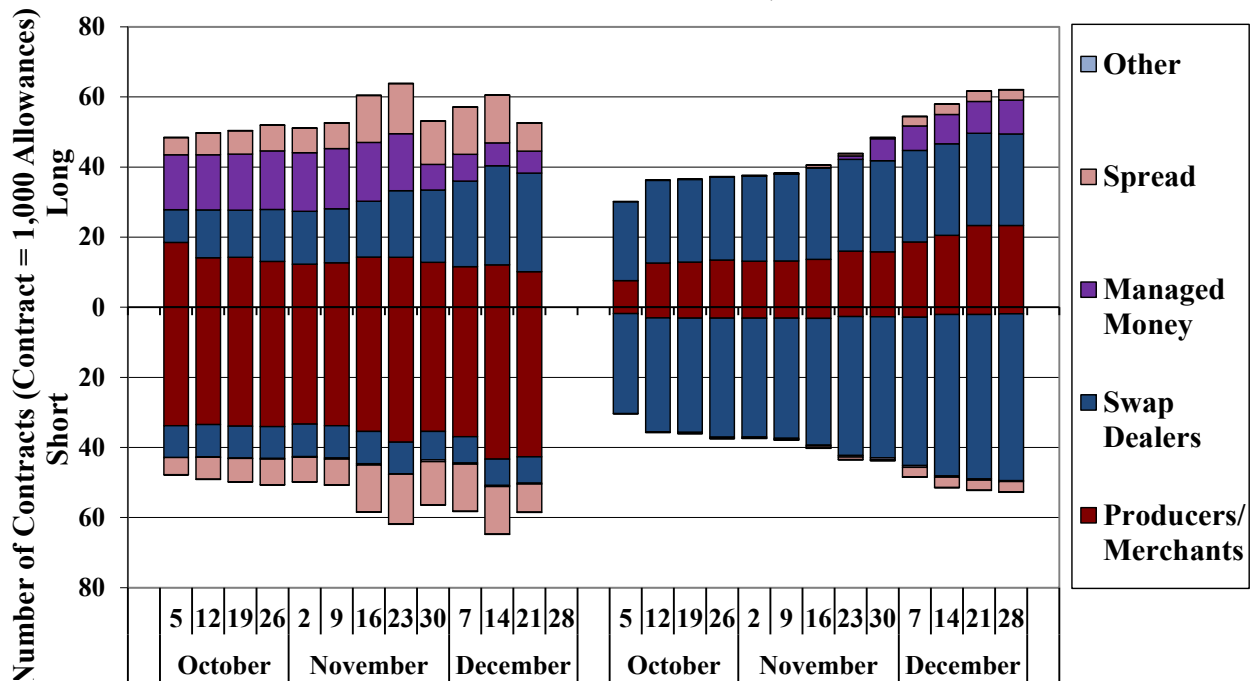
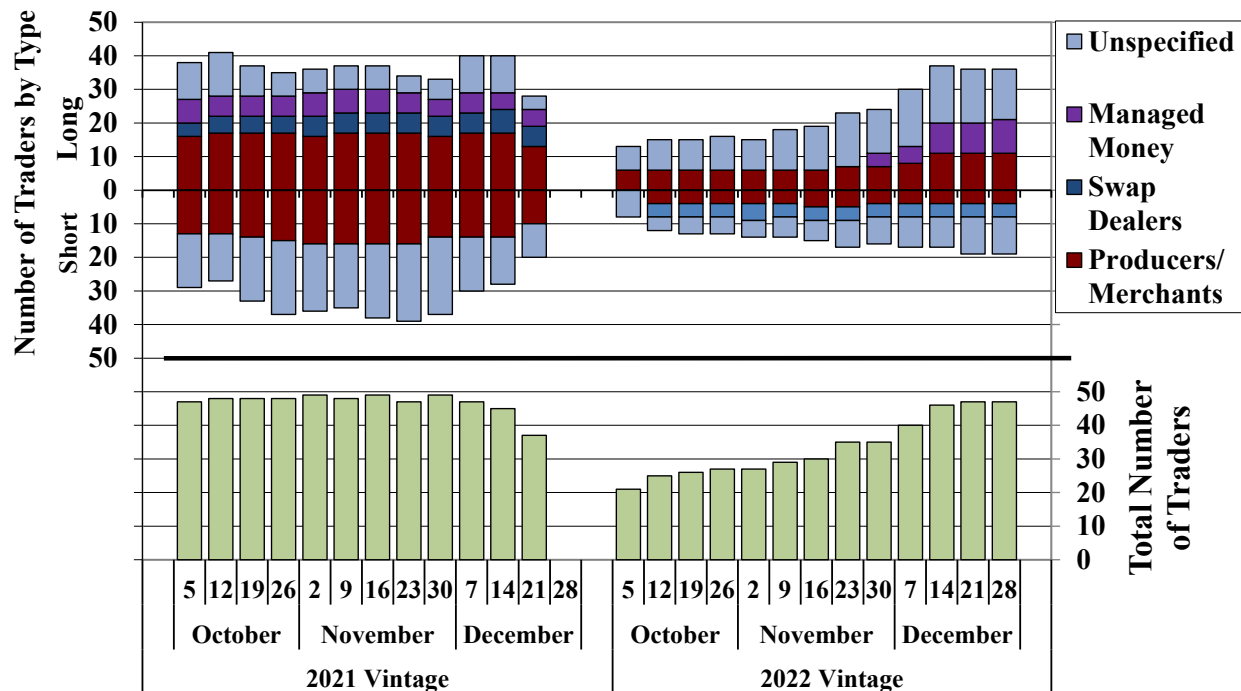


Figure 7: Concentration of Open Interest in ICE Futures and Options by Type
October 1 to December 31, 2021



**Figure 8: Number of Traders in ICE Futures and Options by Type
October 1 to December 31, 2021**



Key observations regarding the concentration of open interest:

- Although many firms have open interest in RGGI CO₂ allowance futures and options, a small number of firms account for large shares of the net long and short positions in 2021 and 2022 Vintage contracts.
- Open interest in 2021 Vintage contracts increased by 21 percent compared to the start of the quarter; although the peak volume occurred prior to December settlement:
 - ✓ The “Top Four” Firms’ concentration for net long positions in 2021 Vintage contracts increased from 46 percent at the beginning of October to 50 percent at the end of December, and concentration in net short positions increased slightly from 73 to 74 percent.
 - ✓ The biggest increase in “Top Four” concentration occurred in the fourth week of November when swap dealers appeared to be more active in the markets. In the following weeks, swap dealers continued to increase share of open interest while the money manager portion declined.
 - ✓ On a weekly basis, the “Top Four” Firms accounted for an average of 47 percent (not weighted by volume) of the total net long positions in 2021 Vintage contracts during the quarter, while 64 percent of the total net long positions were held by eight firms.
 - ✓ On a weekly basis, the “Top Four” Firms accounted for an average of 66 percent (not weighted by volume) of the total net short positions in 2021 Vintage contracts during the quarter, while 73 percent of the total net short positions were held by eight firms.

- However, both the “Top Four” and the “Next Four” (inclusive of the “Top Four”) achieved 74 and 80 percent of total interest by the end of December, the maximum weekly share in the quarter.
- ✓ The “Next Four” largest short firms accounted for a small amount (between 5 and 7 percent) of net short open interest, indicating that some of these firms also hold long positions in 2021 vintage contracts. For example, if a compliance entity with a long position for the prompt month does not have an immediate need to hold allowances, the firm may sell futures for the prompt month while buying futures for settlement in a month that is closer to the compliance deadline.
 - The open interest of 2022 Vintage contracts increased steadily from 33 million to 64 million by the end of the quarter, and the number of traders with reportable positions increased as well from 21 to 47 traders.
 - ✓ The “Top Four” Firms in combination with the next four firms (top eight) accounted for nearly all of the long open interest at the beginning of the quarter. By the end of the quarter, their collective share falls to 84 percent, as money managers become more active in the latter part of the quarter. While money managers increased long positions in Vintage 2022 contracts, they simultaneously reduced their long positions in Vintage 2021 contracts.
 - The concentration of 2021 Vintage open interest long positions held by investment-oriented categories – money managed and swap dealers – rose from 50 percent at the beginning of the quarter to 57 percent by the end.
 - ✓ Swap dealers positions account for all of the growth in investment-oriented positions while money managed positions fell over the time period. There were five money managed traders at the end of the quarter (compared to seven at the start) while the number of swap dealers increased from four to six.
 - ✓ The swap dealer 2021 Vintage open interest rose by over 200 percent, while merchant/producers and money managed net long positions declined by 45 and 60 percent, respectively, during the quarter.
 - ✓ The increase in swap dealer open interest accounted for 180 percent of the overall increase in total open interest during the quarter.
 - The concentration of 2022 Vintage open interest long positions held by investment-oriented categories – money managed and swap dealers – fell from 68 percent at the beginning of the quarter to 57 percent by the end as merchant/producers increased activity by the end of the quarter.
 - The concentration of 2022 Vintage open interest short positions held by swap dealers is large, 74 percent, nearly 48 million allowances, at the end of the quarter, and only four traders are in this category.
 - 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 net long and net short positions of individual firms. Combined with firm-specific information about CO₂ 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 CO₂ allowances, which is discussed further in Section E.

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. 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.