



**QUARTERLY REPORT ON THE ELECTRICITY GENERATOR  
EMISSIONS LIMITS PROGRAM (310 CMR 7.74):  
THIRD QUARTER 2023**

**Prepared for:**

**Massachusetts Department of Environmental Protection on behalf of the  
Commonwealth of Massachusetts**

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## A. INTRODUCTION AND SUMMARY

The Massachusetts Department of Environmental Protection (“MassDEP”) implemented its program to limit CO<sub>2</sub> emissions from electricity generators in January 2018. This report provides background on relevant aspects of the program, a summary of market activity through the third quarter of 2023, an overview of emissions and allowance holdings patterns, and discussion of the results of our market power screens.

- CO<sub>2</sub> Emissions versus the Annual Caps: Emissions have fallen dramatically since the program began, and large numbers of allowances were banked after each year.
  - ✓ In 2021, the cap was 8.28 million allowances compared to 5.92 million metric tons of emissions. The cap is not scheduled to fall below this level until 2032.
  - ✓ In 2022, the cap was 8.06 million allowances compared to 6.44 million metric tons of emissions. The cap is not scheduled to fall below this level until 2030.
  - ✓ In 2023, the cap is 7.84 million allowances, and January to September emissions went down 0.95 million metric tons in 2023 compared to the same months of the previous year. Emissions totaled 5.49 million metric tons over the 12-month period ending September 2023. The cap is not scheduled to fall below this level until 2034.
- Load, Generation, and Emissions Trends: Emissions from covered generation have fallen compared to 2018. Also, 2023 is on track to have lower emissions than 2021 and 2022.
  - ✓ Generation from covered units decreased by 19.3 percent through August 2023 from the first eight months of previous year, reflecting lower electricity demand.
- CO<sub>2</sub> Allowance Prices and Trading Activity: Trading has been very limited in 2023.
  - ✓ Prices averaged \$12.98 per metric ton for 191k allowance transfers in 2023 with the highest priced transaction occurring in February ahead of the compliance deadline.
  - ✓ The vast majority of allowance purchases were made through the auctions rather than the secondary market. The six auctions for 2023 vintage allowances cleared:
    - 391,784 allowances for \$4.00/metric ton in Auction 2022-3 in June 2022,
    - 391,784 allowances for \$7.51/metric ton in Auction 2022-4 in September 2022,
    - 1,175,351 allowances for \$14.20/metric ton in Auction 2023-1 in December 2022,
    - 1,175,351 allowances for \$12.05/metric ton in Auction 2023-2 in March 2023,
    - 1,536,084 allowances for \$9.40/metric ton in Auction 2023-3 in June 2023, and
    - 1,536,083 allowances for \$3.00/metric ton in Auction 2023-4 in September 2023.

- ✓ The four offerings of 2024 vintage cleared:
  - 380,590 allowances for \$6.03/metric ton in Auction 2023-1 in December 2022,
  - 380,590 allowances for \$5.85/metric ton in Auction 2023-2 in March 2023,
  - 380,590 allowances for \$6.53/metric ton in Auction 2023-3 in June 2023, and
  - 380,590 allowances for \$3.00/metric ton in Auction 2023-4 in September 2023.
- ✓ The spread between current vintage and future vintage clearing prices decreased in each of the auctions from December 2022 to September 2023. A small price spread is expected when there is a substantial surplus of current vintage allowances that can be banked and used in subsequent years.

We evaluate information on the holdings and 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 anti-competitive conduct in the secondary market for allowances, and we find that firms have generally sought to acquire or sell allowances consistent with their expected needs for first nine months of 2023.

## B. BACKGROUND

Regulation 310 CMR 7.74 created a cap-and-trade program to reduce carbon dioxide emissions from electricity generating facilities located in Massachusetts beginning in 2018.<sup>1</sup> Cap-and-trade programs work by setting an aggregate emissions limit for a particular class of emitters and requiring them to acquire a number of allowances sufficient to cover their emissions. Firms that hold allowances can decide whether it is more profitable to use them to cover their emissions or to sell them to an emitter that can use them more efficiently.

Covered compliance entities and emissions are consistent with the Regional Greenhouse Gas Initiative (RGGI) regulation, implemented as 310 CMR 7.70 in Massachusetts. Under 310 CMR 7.74, compliance periods are annual. The Massachusetts Carbon Allowance Registry (“Registry”) is used to track the ownership of allowances. Once an allowance is allocated or purchased in the auction, it can be resold in the secondary market. Participation in the market for allowances is limited to regulated electricity generating facilities.

The secondary market is important for several reasons. First, it gives firms an ability to obtain allowances at any time, while the auctions are relatively infrequent. Second, it provides firms a way to protect themselves against unexpected swings in future prices. Third, it provides price signals that assist firms in deciding how much electricity to produce and in making investment decisions that are affected by the costs of compliance.

The market for Massachusetts allowances has several key elements, which are discussed in this section: the emissions cap, allocations, auctions, banking, program participation, and compliance.

### *Annual Emissions Cap*

The program’s annual emissions cap was set at 9,149,979 metric tons for 2018, which was the first year of program implementation. The annual cap fell to 8,731,175 metric tons in 2019, 8,507,299 metric tons in 2020, and it declines by 223,876 metric tons in each subsequent year,

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<sup>1</sup> <https://www.mass.gov/guides/electricity-generator-emissions-limits-310-cmr-774>

eventually reaching 1,791,019 metric tons in 2050.<sup>2</sup> The 2023 cap is 7,835,671, and the 2024 cap is 7,611,795.

### *Allowance Allocations*

One hundred percent of the 2018 vintage allowances were allocated to individual generators, including new facilities. Starting with the 2019 compliance year, the MassDEP began to transition from allocating allowances directly to using auctions as the primary mechanism for distributing allowances.<sup>3</sup> For the 2019 and 2020 compliance years, the MassDEP distributed a number of allowances equal to 75 and 50 percent of the cap through direct allocation. As of the 2021 compliance year, all allowances are distributed by auction, subject to the banking adjustment described below.

### *Banking of Allowances*

In August 2018, the MassDEP adopted changes to the provisions for banked allowances (i.e., allowances held by covered entities after the compliance deadline for a given year) stating that if the number of banked allowances after a particular year exceeds 223,875, the number of allowances distributed in the subsequent year will be adjusted downward by the difference between the number of banked allowances and 223,875. As the cap declines by 223,876 metric tons each year, this approach ensures that each year's emissions are less than the previous year's cap.

For instance, after 2021 compliance obligations were satisfied, 2,652,320 allowances were held in facility accounts on April 1st, 2022. Thus, the number of allowances to be distributed for the 2022 compliance year was adjusted down by 2,428,445 (which equals the 2,652,320 allowances held after 2021 minus the limit of 223,875 allowances). Consequently, the adjusted emissions

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<sup>2</sup> 310 CMR 7.74(5)(a)

<sup>3</sup> In this report, the term "allowance" refers to allowances that can be used to comply with 310 CMR 7.74 only. These allowances cannot be used to comply with requirements of the Regional Greenhouse Gas Initiative, which is implemented in Massachusetts pursuant to a different regulation, 310 CMR 7.70.7

cap for the 2022 compliance year was 8,283,422 metric tons (including 2,652,320 banked allowances and 5,631,102 vintage 2022 allowances sold in auctions 2022-1 through 2022-4).

The same calculation was used to determine the adjusted emissions cap for 2023 and the number of 2023 allowances to be sold in Auctions 2023-3 and 2023-4. In 2023, the post-compliance holdings amount was 1,853,109, so the number of allowances to be auctioned for the 2023 compliance year was adjusted down by 1,629,234 (which equals the 1,853,109 allowances held after 2022 minus the limit of 223,875 allowances).

### ***Auctions***

Twenty percent of the 2024 vintage allowances were auctioned in Auction 2023-1 through 2023-4. The MassDEP plans to distribute the rest of allowances for the 2024 compliance year through four quarterly auctions:

- On December 13, 2023: 10 percent of the 2024 unadjusted emissions limit will be offered (761,180 allowances).
- In March 2024: 10 percent of the total 2024 unadjusted emissions limit will be offered (761,180 allowances).
- In June 2024: 50 percent of the allowances remaining after the first two auctions and the adjustment for allowances banked after 2023 will be offered. Publication of the final amount will occur following the adjustment for banking, which will occur during the 2023 compliance process in March 2024.
- In September 2024: All remaining 2024 allowances will be offered for sale.

In addition to 2024 vintage allowances, 5 percent of the 2025 annual cap (which equals 369,396 allowances for the 2025 vintage) will be offered in each of the four auctions listed above.

### ***Participants in the Program***

Participation in the program, including the auctions, is restricted to the owners and operators of covered facilities. The term “Regulated Entity” is used in the Registry to refer to the highest level of facility ownership, and in the case of shared ownership groups together several

facilities.<sup>4</sup> A list of facilities and associated regulated entities is available to the public at <https://macar.apx.com/> (select “Reports”).

### ***Compliance***

On March 1<sup>st</sup> of each year, every generating facility’s Registry account is required to hold sufficient allowances to satisfy obligations from the prior calendar year. Facilities that do not hold sufficient allowances may qualify for “emergency deferred compliance.” Under emergency deferred compliance, the compliance obligations from emissions that occurred during a MLCCP#2 designated period can be deferred to the following year.<sup>5</sup> However, those emissions are required to be offset on a two for one basis in that following year.<sup>6</sup> For example, if a facility deferred 1,000 allowances for 2021 compliance, they are required to hold a number of allowances for 2022 compliance equal to their 2022 emissions plus 2,000 additional allowances for their emergency deferred compliance from the previous year. This provision is intended to provide generators with additional flexibility when they may be needed for system reliability, while still discouraging generators from exceeding the cap in a given year. Thus, it is unlikely that facilities will use this option under normal circumstances. From January through September 2023, ISO New England has declared MLCCP#2 periods for a total of 60 hours.

By April 1<sup>st</sup>, the Department will deduct allowances from each generating facility’s registry account; first to address any deferred obligations, then to meet the facility’s obligations from the previous calendar year. For each year from 2018 to 2022, allowance deductions were carried out successfully and all facilities met their obligations without the use of emergency deferred compliance. The Registry tracks current holdings, allowance transfers, and allocations, as well as ownership and representation of each facility or regulated entity.

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<sup>4</sup> For example, Medway Station and Mystic receive allocations separately, but they are both owned by Exelon, so for tracking and market monitoring purposes their demand is aggregated.

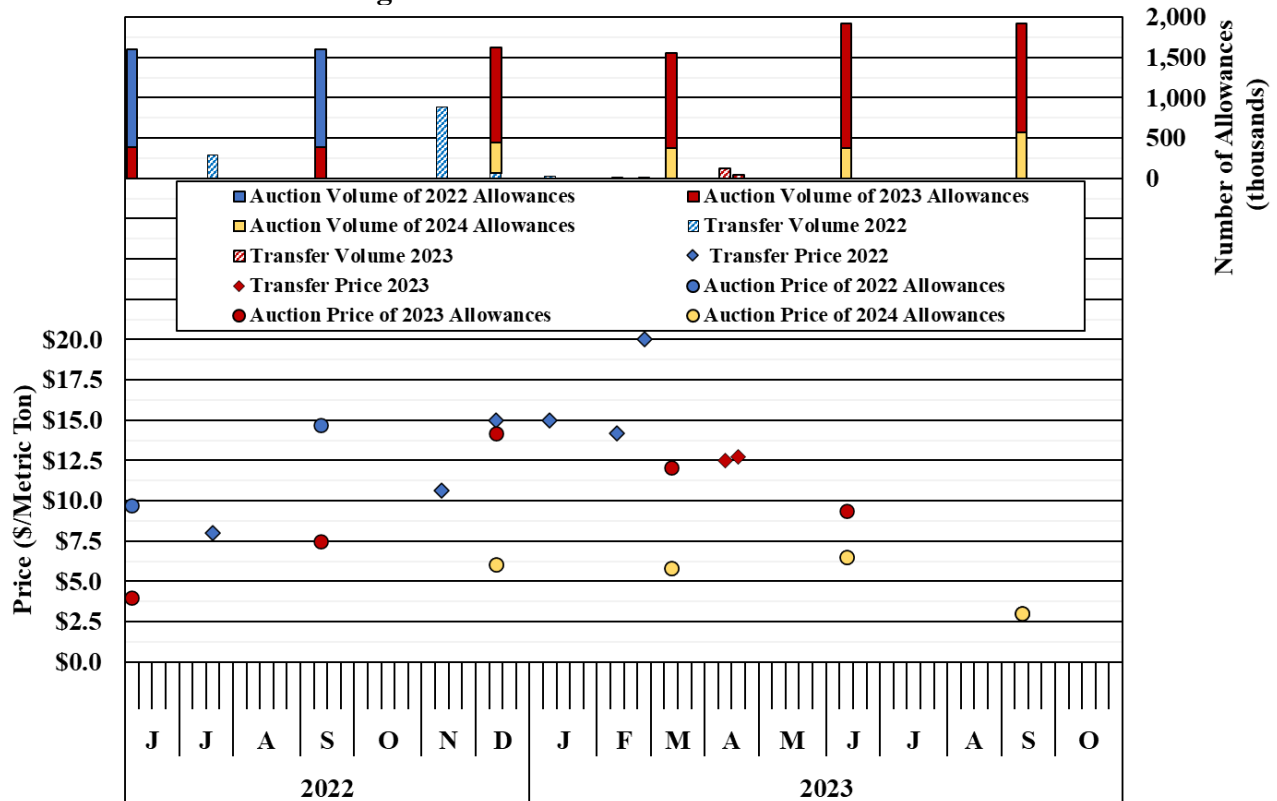
<sup>5</sup> These are periods when ISO New England has triggered “Master Local Control Center Procedure No.2”

<sup>6</sup> 310 CMR 7.74(6)(d)

C. SUMMARY OF PRICES AND TRADED VOLUMES

This section evaluates the available information regarding the purchase of allowances in the auctions and transfers in the secondary market for allowances. Figure 1 displays the weekly volumes of allowance transfers and weighted average prices as well as auction results.

Figure 1: Allowance Prices and Volumes<sup>7</sup>



There were six transfers between unaffiliated entities in 2023:

- In January, 30k allowances for the 2022 vintage were transferred at \$15 per metric ton. In February, 1,480 allowances for the 2022 vintage were transferred at an average of \$17.06 per metric ton. These transactions occurred at a premium as Regulated Entities sought allowances shortly before the compliance deadline for 2022, although the transaction quantities were very small relative to the quantities sold at auction.

<sup>7</sup> Figure 1 shows transfers reported to the registry by the end of October 2023, but since there is no prompt reporting requirement, other transactions may have occurred that have not yet been reported.



- In April, 160k allowances for the 2023 vintage were transferred at an average of \$12.56 per metric ton.

In the six allowance auctions held for 2023 vintage allowances:

- Auction 2022-3 (on June 10) cleared at \$4.00 per metric ton.
- Auction 2022-4 (on September 14) cleared at \$7.51 per metric ton.
- Auction 2023-1 (on December 14) cleared at \$14.20 per metric ton.
- Auction 2023-2 (on March 15) cleared at \$12.05 per metric ton.
- Auction 2023-3 (on June 14) cleared at \$9.40 per metric ton.
- Auction 2023-4 (on September 13) cleared at \$3.00 per metric ton.

In the four allowance auctions held for 2024 vintage allowances:

- Auction 2023-1 (on December 14) cleared at \$6.03 per metric ton.
- Auction 2023-2 (on March 15) cleared at \$5.85 per metric ton.
- Auction 2023-3 (on June 14) cleared at \$6.53 per metric ton.
- Auction 2023-4 (on September 13) cleared at \$3.00 per metric ton.

Figure 1 shows that prices have fluctuated considerably over the period shown and that there has been a relatively small number of allowance trades in the secondary market. Prices of 2022 and 2023 vintage allowances generally increased from June 2022 through February 2023 just before the compliance deadline. Since March 2023, prices have generally fallen. There has been a wide dispersion of bid prices in the auctions, reflecting considerable variation among regulated entities in their expectations regarding the value of allowances. This variation in expectations highlights (a) that relatively little information from trading in the secondary market has been available regarding the value of allowances and (b) that some generators earn high margins on the sale of electricity in some periods due to the wide distribution of hourly prices in the ISO New England market.

In the first three auctions in which allowances have been sold for both 2023 and 2024 vintages, there has been a substantial premium on the clearing price of the current vintage over the future vintage. However, the clearing price of 2023-4 auction was the same for both vintages (\$3.00 per metric ton), reflecting that before the auction Regulated Entities needed relatively few

additional allowances to satisfy their compliance obligations for 2023. So, the majority of allowances were purchased by firms that will likely use them for compliance in 2024 or subsequent years and/or sell them in the secondary market.

This pattern of fluctuation may also result from the fact that some regulated entities have long-term contractual obligations to deliver electricity in a future year and seek to hedge their exposure to fluctuations in input prices. For example, firms are able to hedge exposure to fluctuations in natural gas prices and RGGI (CMR 7.70) allowance prices through liquid futures markets, but no comparable financial hedges exist for Massachusetts (CMR 7.74) program allowances. Consequently, some regulated entities may be setting aside current vintage allowances as a hedge for obligations in future years. Therefore, the sale of future vintage allowances gives Regulated Entities opportunities to buy allowances for hedging, thereby reducing demand for current vintage allowances.

**D. EMISSIONS AND ALLOWANCE HOLDINGS**

Allowance prices are generally driven by the fundamentals of supply and demand, which we evaluate by reviewing patterns of emissions, allocations, and forecasted holdings of firms. Table 1 and Figure 2 evaluate emissions and electricity supply over the last three years, while Figure 3 compares allowance holdings to emissions by regulated entity.

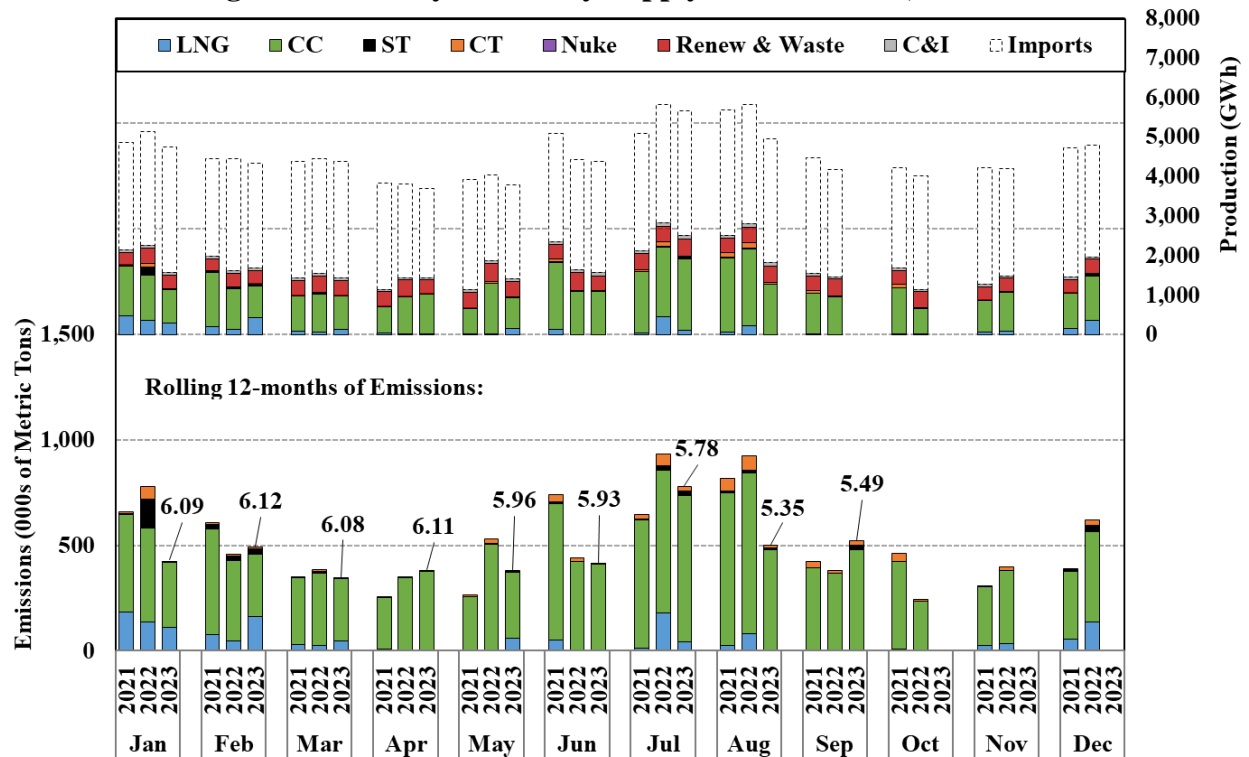
Table 1 summarizes electricity supply and emissions through part of 2023 compared to the same time periods in 2021 and 2022. Data is provided for regulated facilities by type: combined cycle units running on liquified natural gas (“LNG”), all other combined cycle units (“CC”), gas/oil-fired steam turbines (“ST”), and combustion turbine peaking units (“CT”). The table shows the supply of electricity from other non-regulated sources, including: other non-program units such as renewables and waste burners, and net generation from the commercial and industrial sectors (“C&I”). Two different time horizons are specified for generation and emissions due to data availability issues. Generation data is provided through August of each year while emission estimates extend through September. Figure 2 summarizes the same categories of information as Table 1 but on a monthly basis. The figure also reports emissions for entities subject to the cap under 310 CMR 7.74.

**Table 1: Electricity Supply<sup>8</sup> and Emissions**

Year	Generation By Type, January-August (TWh)							
	LNG	CC	ST	CT	Renew & Waste	C&I	Imports	Total
2021	1.0	10.0	0.07	0.29	2.9	0.52	22.5	37.2
2022	1.2	10.1	0.30	0.45	3.3	0.52	22.0	37.9
2023	1.1	8.4	0.10	0.11	3.1	0.58	22.5	35.9
	Carbon Dioxide Emissions, January-September (Million Metric Tons)							
2021	0.4	4.1	0.05	0.18	-	-	-	4.76
2022	0.5	4.2	0.21	0.26	-	-	-	5.18
2023	0.4	3.6	0.08	0.08	-	-	-	4.23

<sup>8</sup> Generation is based on EIA Form 923 data, and Real-Time Load is from the ISO-NE website. Form 923 data for 2023 is not final, so values for 2023 may change in future reports. Form 923 data was not available for September 2023 when this report was produced, so generation is shown for January to August only.

Figure 2: Monthly Electricity Supply and Emissions, 2021-2023

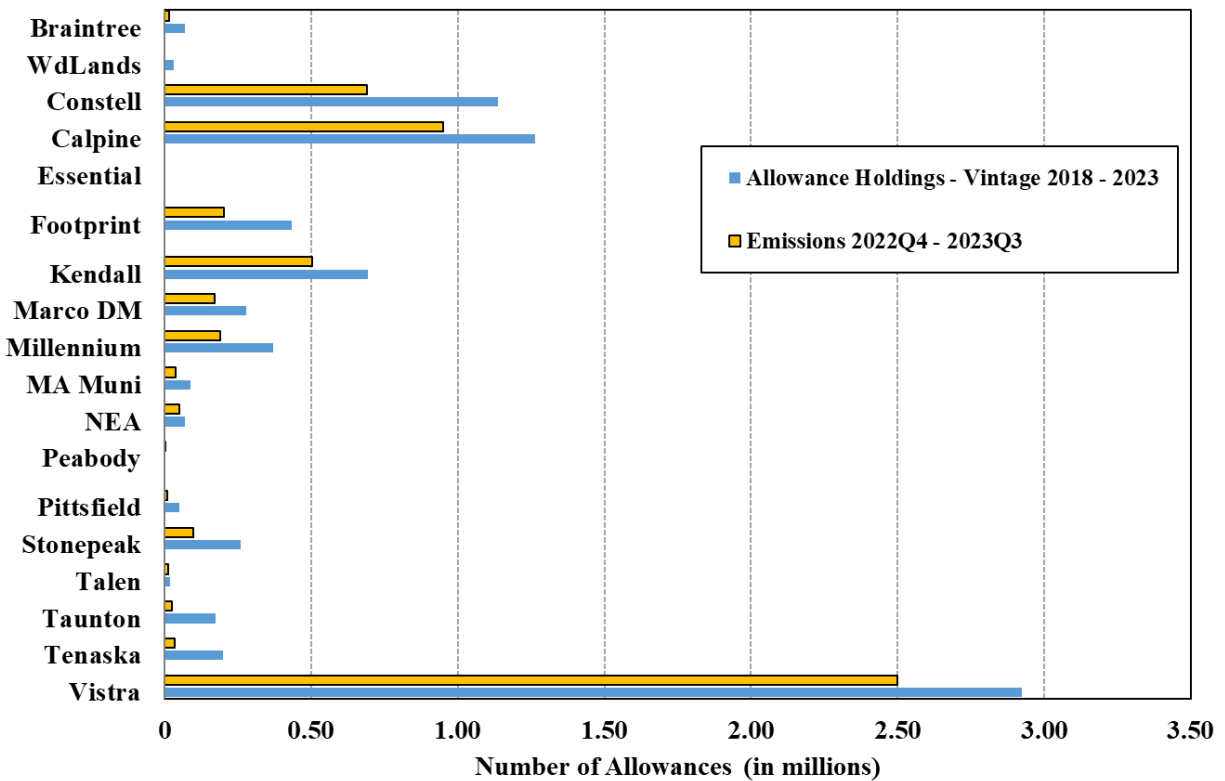


2023 emissions have decreased from both 2021 and 2022. Twelve month-rolling-average emissions decreased to 5.49 million metric tons in September 2023, which is down from annual emissions of 6.44 million metric tons in 2022. This decrease in emissions reflected:

- Load levels decreased 3 percent,
- More imports in 2023 compared to the same period in 2022, and
- Emissions from combined cycle units decreased by 595 thousand metric tons from 2022 to 2023 in the months of January to September. At the same time, emissions from combustion turbines and steam turbines decreased by 304 thousand metric tons.

Figure 3 shows, for each regulated entity, its 12-month total emissions from October 2022 to September 2023 compared to its estimated holdings of allowances that are usable for 2023 compliance. This is composed of the sum of allowances banked from previous years and vintage 2023 allowances acquired.

Figure 3: Allowance Holdings for 2023 and Emissions by Regulated Entity <sup>9</sup>



The figure shows that nearly all regulated entities already hold sufficient allowances to meet their compliance obligations if 2023 emissions are similar to emissions over the 12-month period ending in September 2023. If conditions change significantly in the last quarter of 2023, causing a regulated entity’s emissions to rise above the number of allowances it holds for 2023, the regulated entity will be able to satisfy its compliance obligations through some combination of:

- Allowance purchases in the secondary market
- Moderating their emissions
- Emergency deferred compliance

Thus, all regulated entities should be able to satisfy their 2023 compliance obligations.

<sup>9</sup> Holdings and allocations are shown as of November 2, 2023. Emissions reporting available at the time of report creation covered the first three quarters of 2023.

## E. DISCUSSION OF MARKET MONITORING

As the Massachusetts Carbon Allowance Program Market Monitor, we monitor trading and holdings amongst regulated entities in order to identify anticompetitive conduct. This section discusses two types of anti-competitive conduct for which we monitor in the secondary market. In the current period 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 production inputs. Hence, we screen information on the holdings of CO<sub>2</sub> allowances and the demand for allowances to identify firms that might acquire a position that raises competitive concerns.

Another potential concern is that a firm expecting to purchase CO<sub>2</sub> allowances in the auction might sell a large number of allowances below the competitive level. Such a firm might profit from buying a larger number of CO<sub>2</sub> allowances in the auction at a discount if the bidding in the auction were influenced by the depressed transfer price. For this to be a profitable strategy, the firm would need to be able to substantially depress the current 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. Firms that are looking for an opportunity to sell excess allowances 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.