
# QUARTERLY REPORT ON THE ELECTRICITY GENERATOR EMISSIONS LIMITS PROGRAM (310 CMR 7.74): THIRD QUARTER 2020

**Prepared for:**

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

**Prepared by:**


**November 2020**

## A. Introduction and Summary

The Massachusetts Department of Environmental Protection ("MassDEP") implemented its program to limit $CO_2$ 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 2020, an overview of emissions and allowance holdings patterns, and discussion of the results of our market power screens.

- *$CO_2$ Emissions versus the Annual Caps*: Emissions have fallen dramatically since the program began, resulting in a large number of banked allowances (2.9 million) after the 2019 compliance deadline.
  - ✓ In 2018, the cap was 9.15 million allowances compared to 7.35 million metric tons of emissions. The cap will not fall below the 2018 level of emissions until 2026.
  - ✓ In 2019, the cap was 8.73 million allowances compared to 5.83 million metric tons of emissions. The cap will not fall below the 2019 level of emissions until 2032.
  - ✓ In 2020, the cap is 8.51 million allowances, and emissions through the first nine months of the year are down 310 thousand metric tons from the same portion of 2019.
- *Load, Generation, and Emissions Trends*: Emissions from covered generation have fallen since 2018, while electric load has fallen and electricity imports have risen.
  - ✓ Electric load fell significantly during the initial phase of the COVID-19 pandemic (March to May) from previous years. During this time generation from covered sources was 54 percent lower than the same period in 2019 and 62 percent lower than 2018. However, emissions and generation were higher during the summer of 2020 than in the same period in 2019 because above-normal temperatures more than offset the effects of the pandemic on load.
  - ✓ Generation from covered units fell from 10.9 TWh in the first eight months of 2019 to 9.7 TWh in the same portion of 2020. Lower combined cycle generation made up most of the decline, although the decrease was partially offset by an increase in combustion turbine production.
  - ✓ Electricity imports rose from 21.0 TWh in the first eight months of 2019 to 23.2 TWh in the same portion of 2020. Given the low levels of transmission congestion into Massachusetts from neighboring states, potential remains for higher levels of imports. These patterns are discussed further in Section D.
- *$CO_2$ Allowance Prices and Trading Activity*: Trading activity was extremely limited as most regulated entities were allocated sufficient allowances to satisfy their projected compliance obligations. Prices remain high given the large allowance surpluses,

signaling that regulated entities expect the gap between the cap and emissions to tighten significantly in the future.

- ✓ Prices averaged $7 per metric ton for 157k of allowance transfers during 2020. This includes an October 2020 transaction.
- ✓ An auction was conducted on September 22, 2020. The clearing price was $7.50 per metric ton for 502,503 allowances for the 2020 compliance year.
- ✓ Given the large surplus of allowances relative to 2020 emissions, the prices in 2020 were likely driven by expectations of tighter conditions in subsequent years.
- ✓ However, lack of liquidity in the secondary market for allowances have likely also contributed to higher prices. This is discussed further in Section C.

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.

## 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.[1] 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 another regulated entity 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,

[1] https://www.mass.gov/guides/electricity-generator-emissions-limits-310-cmr-774

8,507,299 metric tons in 2020, and it will decline by 223,876 metric tons in each subsequent year, eventually reaching 1,791,019 metric tons in 2050.[2]

### *Allowance Allocations*

One hundred percent of the 2018 vintage allowances were allocated to individual generators. 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.[3] 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. Beginning in the 2021 compliance year, the MassDEP will no longer distribute allowances by direct allocation. Instead, all allowances will be distributed through sale at auction..

Of the allocations in the first three years of the program, a portion was initially set aside for new facilities. The number initially allocated to new facilities was 1.5 million in 2018, 1.125 million in 2019, and 750 thousand in 2020. New facilities emitted only 318,993 metric tons of $CO_2$ in 2018 and 260,941 metric tons in 2019, so the 1,181,007 allowances remaining after 2018 and the 864,059 allowances remaining after 2019 were redistributed among other facilities in proportion to their initial allocations.[4] Likewise, any new facility allowances remaining after 2020 will be apportioned among the other facilities.

### *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). Under the new provisions, if the number of banked allowances after a particular year exceeds 223,875, the

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2 310 CMR 7.74(5)(a)

3 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.

4 310 CMR 7.74(5)(c)(2)

number of allowances distributed in the subsequent year will be adjusted downward by the difference between the number of banked allowances and 223,875.

For instance, after 2019 compliance obligations were satisfied, 3,124,292 allowances were held in facility accounts on April 1st, 2020. Thus, the number of allowances to be distributed for the 2020 compliance year was adjusted down by 2,900,417 (which equals the 3,124,292 allowances held after 2019 minus the limit of 223,875 allowances). Consequently, the adjusted emissions cap for the 2020 compliance year will be 5,606,882 metric tons.

### *Auctions*

The MassDEP plans to distribute allowances for the 2021 compliance year through four quarterly auctions:

- On December 16, 2020: 20 percent of the 2021 unadjusted emissions limit will be offered (1,656,685 allowances).
- On March 11, 2021, 20 percent of the total 2021 unadjusted emissions limit will be offered (1,656,685 allowances).
- On June 9, 2021: 50 percent of the allowances remaining after the first two auctions and the adjustment for allowances banked after 2020 will be offered. Publication of the final amount will occur following the adjustment for banking, which will occur during the 2020 compliance process in March 2021.
- On September 15, 2021: All remaining 2021 allowances will be offered for sale.

### *Participants in the Program*

Participation in the program, including 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.[5] A list of facilities and associated regulated entities is available to the public at https://macar.apx.com/ (select "Reports").

[5] 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.

***Compliance***

On March 1st 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.[6] However, those emissions are required to be offset on a two for one basis in that following year.[7] For example, if a facility qualified for and deferred 1,000 allowances for 2019 compliance, they are required to hold a number of allowances for 2020 compliance equal to their 2020 emissions plus 2,000 additional allowances for their 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.

By April 1st, 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 2019, 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.

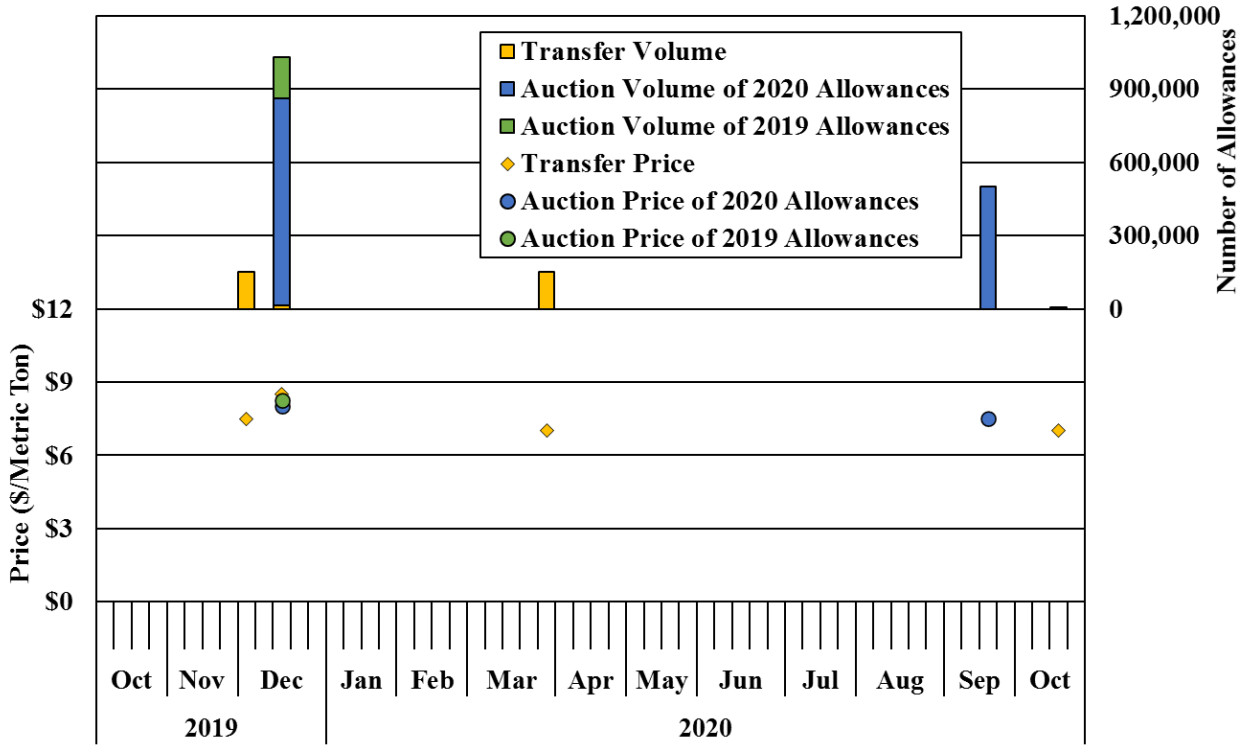
6 These are periods when ISO New England has triggered "Master Local Control Center Procedure No.2"

7 310 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[8]**




There were only two transfers between unaffiliated entities in 2020, one of which occurred in October after the end of the third quarter:

- Both transactions were priced at $7 per metric ton, and the total transaction volume was 157k.

In the allowance auction held on September 22, 2020:

- 502,503 allowances for the 2020 compliance year were sold at $7.50 per metric ton.

[8] Figure 1 shows transfers reported to the registry by the end of October 2020, but since there is no prompt reporting requirement, other transactions may have occurred that have not yet been reported.

Although the prices have fallen modestly since early 2019, they have been relatively stable over the past year, and remain high relative to levels that would be expected based on:

- The analyses that were performed to support the implementation of the regulation – These suggested that prices would be much closer to $0 per metric ton and demand for allowances would be relatively price-elastic.[9]
- The supply of allowances compared to emissions from 2018 to 2020 – Section D of this report shows that emissions were below the emissions cap by approximately 20 percent in 2018 and 33 percent in 2019. Since emissions through the third quarter of 2020 are similar to 2019, the 2020 emissions level will likely be significantly lower than the cap.
- The supply of allowances compared to emissions after 2020 – The banking provisions encourage firms to hold allowances if they anticipate higher prices in the future. However, the annual emissions cap will not fall to the level of 2019 emissions until 2032.

We find that the high prices observed are at least partly attributable to lack of liquidity rather than an indication of the supply-demand balance. Just two transactions have been reported in 2020. Given the low volume of transactions to-date, regulated entities may anticipate difficulty obtaining additional allowances in the future without paying a significant premium. Regulated entities with long-term contractual obligations to deliver electricity in 2021 and beyond can 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 2020 allowances as a hedge for obligations in future years.

9 The most credible modeling results forecasted that BAU ("Business As Usual") emissions would not exceed the cap, suggesting that prices would be near $0/ton. To the extent that scenarios were run to evaluate price-elasticity (i.e., how prices might respond to unexpectedly high emissions), they suggested that prices might be expected to rise from $0 to $2 if emissions were reduced by 1 million below BAU emissions.

## 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 Figures 3 and 4 compare allowance holdings to emissions by regulated entity.

Table 1 summarizes electricity supply and emissions through part of 2020 compared to the same time periods in 2018 and 2019. 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: nuclear generation, 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.

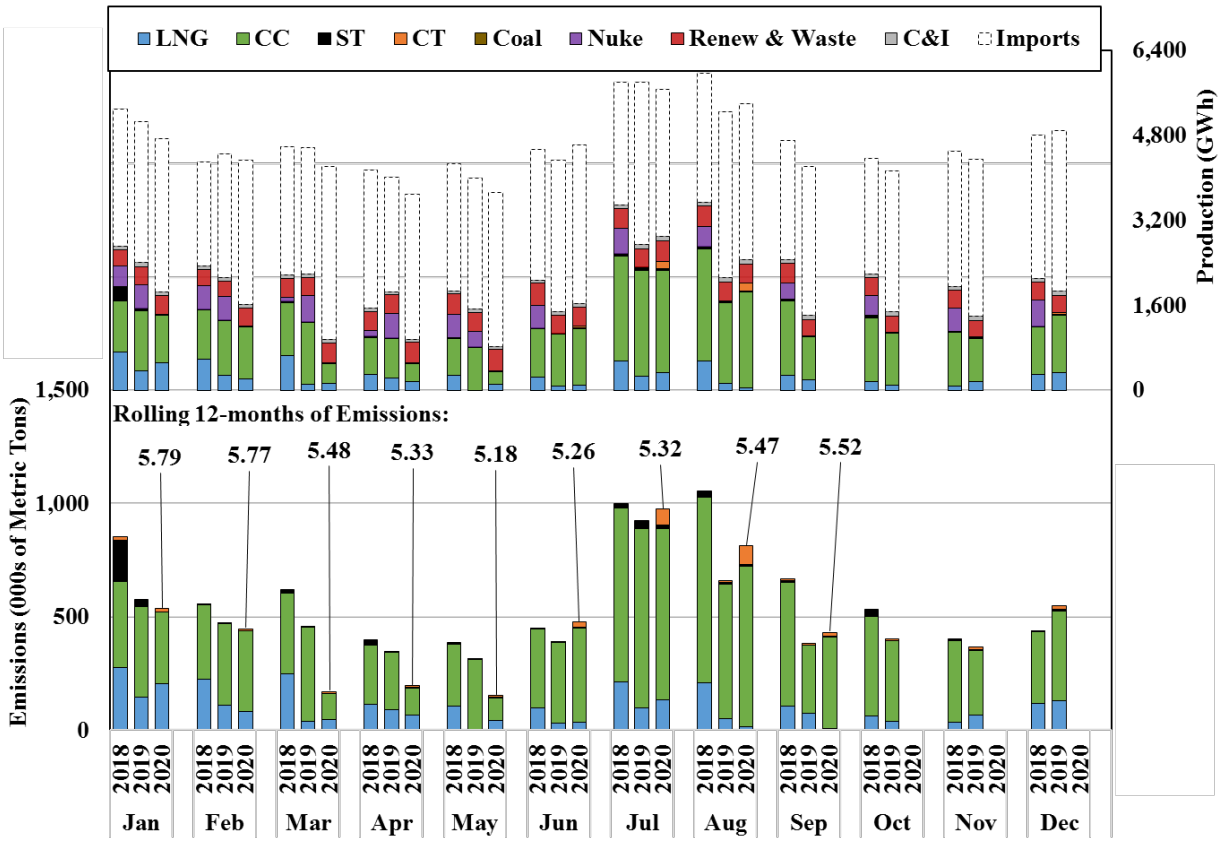
**Table 1: Electricity Supply[10] and Emissions[11]**

| Year | Generation By Type, January-August (TWh) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LNG | CC | ST | CT | Nuclear | Renew & Waste | C&I | Imports | Total |
| 2018 | 3.9 | 9.3 | 0.34 | 0.06 | 2.8 | 2.9 | 0.53 | 19.1 | 38.9 |
| 2019 | 1.4 | 9.4 | 0.10 | 0.03 | 2.2 | 2.7 | 0.59 | 21.0 | 37.5 |
| 2020 | 1.6 | 7.6 | 0.05 | 0.43 | 0.0 | 2.9 | 0.52 | 23.2 | 36.4 |
| | Carbon Dioxide Emissions, January-September (Million Metric Tons) | | | | | | | | |
| 2018 | 1.6 | 4.1 | 0.3 | 0.04 | - | - | - | - | 5.98 |
| 2019 | 0.6 | 3.8 | 0.1 | 0.02 | - | - | - | - | 4.51 |
| 2020 | 0.6 | 3.3 | 0.0 | 0.2 | - | - | - | - | 4.20 |

[10] Generation is based on EIA Form 923 data and Real-Time Load from the ISO-NE website. Form 923 data for 2020 is not final, so values for 2020 may change in future reports. Form 923 data was not available for September 2020 when this report was produced, so generation is shown for January to August only.

[11] Emissions are estimated through the end of the third quarter (January through September) for each year.

**Figure 2: Monthly Electricity Supply and Emissions, 2018-2020**



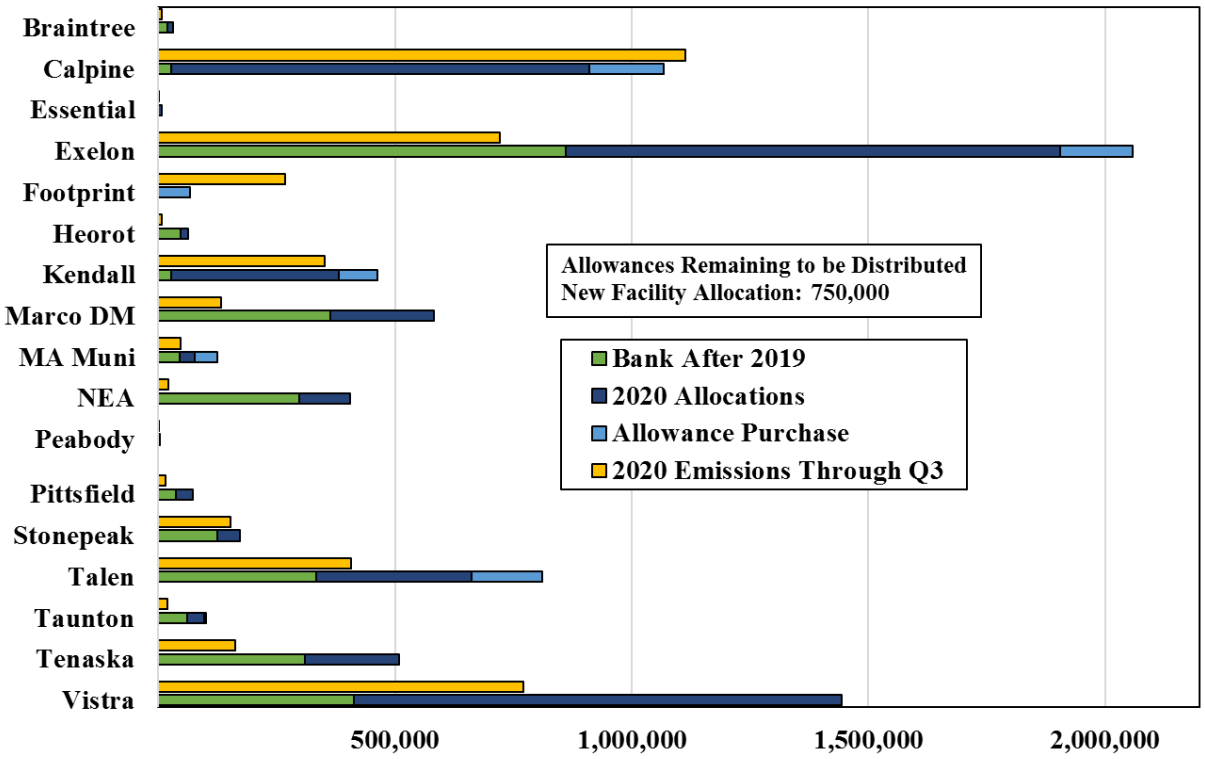

Emissions fell significantly from 2018 to 2019, and they also fell slightly from 2019 to 2020 (over the first-three-quarters of the year). Twelve month-rolling-average emissions through the first three quarters fell from 5.66 million metric tons in 2019 to 5.52 million metric tons in 2020. This decline in emissions reflected:

- The impact of a reduction in energy generation and load levels following initial measures to reduce the spread of COVID-19. This contributed to very low generation from March through May. Combined cycle emissions during these months were 65 percent lower than in 2019 despite very low natural gas prices.
- Although the effects of the response to COVID-19 had a downward effect on electricity consumption during the summer of 2020, hotter-than-average temperatures led to increased electricity consumption, generation, and emissions.
- Emissions from LNG-supplied generation has been very low in 2019 and 2020 partly due to pipeline gas prices being low relative to prices of imported LNG.

- Emissions from combustion turbines increased by 219 thousand metric tons from 2019. This increase is at least partially related to the operational status of new facilities.

Figure 3 shows, for each regulated entity, its reported emissions over the three quarters of 2020 compared to its estimated holdings to-date, which is comprised of the sum of allowances banked from 2019 ("Bank After 2019"), its 2020 allocations, and allowance purchases (including both transfers and auction purchases).

**Figure 3: Allowance Holdings and Emissions through 2020-Q3 by Regulated Entity [12]**




The figure shows that most regulated entities have a number of allowances for 2020 that exceeds their compliance obligations over the first three quarters and is likely to remain larger than their ultimate compliance obligations, while just one participant currently holds a number that is lower than its emissions over the first three quarters. Regulated entities whose emissions for 2020 are

12 Holdings and allocations are shown as of November 2, 2020. Emissions reporting available at the time of report creation covered the first three quarters of 2020.

trending above their allowance holdings will be able to satisfy their obligations through some combination of:

- Allowances reallocated from new facilities – In 2020, the new facility allocation is 750k. New facilities used less than 300k of the new facility allocation in 2019. In 2020, new peaking facilities have been operating at higher levels, and pipeline gas has been significantly cheaper than LNG for much of the year, so it is likely that a smaller percentage of the new facility allocation will available to other facilities.
- Reduced emissions relative to recent patterns of operation – Emissions fell 41 percent from 2017 to 2019. There is relatively little transmission congestion into Massachusetts from neighboring states, which could allow additional electricity imports if fossil-fuel generators in Massachusetts reduce generation further.
- Allowance purchases in the secondary market – Based on Figure 3, most regulated entities already have sufficient allowances to satisfy their likely compliance obligations in 2020, suggesting that they may be willing to sell some. However, some regulated entities may prefer to bank a significant number of allowances for 2021.

Thus, it appears that regulated entities will have options for satisfying their 2020 compliance obligations.

## 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 $CO_2$ 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 $CO_2$ 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 $CO_2$ 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 $CO_2$ allowances it planned to buy in the auction. Firms that are looking for an opportunity to sell excess allowances or to purchase $CO_2$ allowances for their future compliance needs help limit the effectiveness of a strategy to depress prices below the competitive level.