# OTC / MANE-VU Stakeholders Webinar
# March 30, 2020

Francis Steitz, NJ DEP
Stationary & Area Sources Committee Chair





OZONE TRANSPORT COMMISSION

OZONE TRANSPORT COMMISSION

# Stationary & Area Sources (SAS) Committee - Overview

Summary of 2019 - 2020 SAS Activities

- OTC 184(c) Recommendation
- Top 25 $NO_x$ Emitters
- CSAPR Allowance Price Update
- 2019 SAS Charge & Workplan Progress

# Update on Status of OTC 184(c) Recommendation

- SAS 184(c) recommendation and responses to comment summary completed and provided to Directors.

- SAS work activity on 184(c) complete – any future activity will be led by OTC AD and Commissioners.

# Top 25 2019 Ozone Season OTR-Impacting State $NO_x$ Emitters

18 of 25 Units with SCR among Top Emitters, averaging 0.187 lb/mmBTU

| | State | Facility Name | Facility - Unit ID | Percent Operating Time | Avg. NOx Rate (lb/MMBtu) | $NO_x$ (tons) | SCR? | Best Observed Rate (lb/mmBTU) | Year | SCR Capability |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | KY | Paradise* | 1378-3 | 61% | 0.292 | 2,644 | Yes | 0.100 | 2005 | -56% |
| 2 | OH | Miami Fort Power Station | 2832-8 | 98% | 0.314 | 2,468 | Yes | 0.054 | 2007 | -45% |
| 3 | OH | Miami Fort Power Station | 2832-7 | 87% | 0.324 | 2,327 | Yes | 0.054 | 2007 | -40% |
| 4 | OH | W H Zimmer Generating Station | 6019-1 | 61% | 0.215 | 2,236 | Yes | 0.056 | 2006 | -54% |
| 5 | NC | Marshall | 2727-4 | 89% | 0.245 | 2,123 | | | | |
| 6 | WV | Fort Martin Power Station | 3943-2 | 96% | 0.268 | 1,956 | | | | |
| 7 | WV | Fort Martin Power Station | 3943-1 | 92% | 0.260 | 1,779 | | | | |
| 8 | PA | Keystone | 3136-1 | 97% | 0.154 | 1,778 | Yes | 0.042 | 2003 | -59% |
| 9 | WV | Mountaineer (1301) | 6264-1 | 98% | 0.090 | 1,774 | Yes | 0.039 | 2007 | -82% |
| 10 | PA | Conemaugh | 3118-2 | 91% | 0.170 | 1,719 | Yes | 0.063 | 2018 | -47% |
| 11 | NC | Belews Creek** | 8042-1 | 65% | 0.223 | 1,683 | Yes | 0.028 | 2007 | -39% |
| 12 | OH | Gen J M Gavin | 8102-2 | 87% | 0.109 | 1,593 | Yes | 0.055 | 2005 | -78% |
| 13 | OH | Gen J M Gavin | 8102-1 | 93% | 0.105 | 1,540 | Yes | 0.069 | 2004 | -80% |
| 14 | NC | Belews Creek | 8042-2 | 89% | 0.165 | 1,513 | Yes | 0.069 | 2004 | -73% |
| 15 | PA | Keystone | 3136-2 | 80% | 0.156 | 1,368 | Yes | 0.043 | 2008 | -60% |
| 16 | PA | Conemaugh | 3118-1 | 80% | 0.149 | 1,350 | Yes | 0.074 | 2017 | -56% |
| 17 | IN | Rockport*** | 6166-MB2 | 54% | 0.157 | 1,323 | | | | |
| 18 | WV | John E Amos | 3935-3 | 66% | 0.126 | 1,258 | Yes | 0.061 | 2012 | -79% |
| 19 | KY | Ghent | 1356-2 | 93% | 0.186 | 1,241 | | | | |
| 20 | IN | Rockport**** | 6166-MB1 | 67% | 0.114 | 1,232 | Yes | | | -67% |
| 21 | NC | Marshall | 2727-3 | 77% | 0.154 | 1,134 | Yes | 0.043 | 2011 | -42% |
| 22 | IN | Alcoa Allowance Management Inc | 6705-4 | 63% | 0.329 | 1,119 | Yes | 0.095 | 2007 | -23% |
| 23 | KY | Mill Creek | 1364-2 | 98% | 0.294 | 1,088 | | | | |
| 24 | KY | Ghent | 1356-3 | 99% | 0.177 | 1,042 | Yes | 0.027 | 2005 | -37% |
| 25 | KY | Mill Creek | 1364-1 | 97% | 0.295 | 1,038 | | | | |
| 26 | KY | East Bend | 6018-2 | 98% | 0.104 | 1,012 | Yes | 0.052 | 2006 | -75% |

| | |
|---|---|
| KY | * Retired February 2020 |
| NC | ** NG co-fire as of December 2019 |
| IN | *** SCR by June 1, 2020 |
| IN | **** Closing by 2028 |

# Top 25 $NO_x$ Emitters in States Impacting OTR Monitors in 2023 Modeling

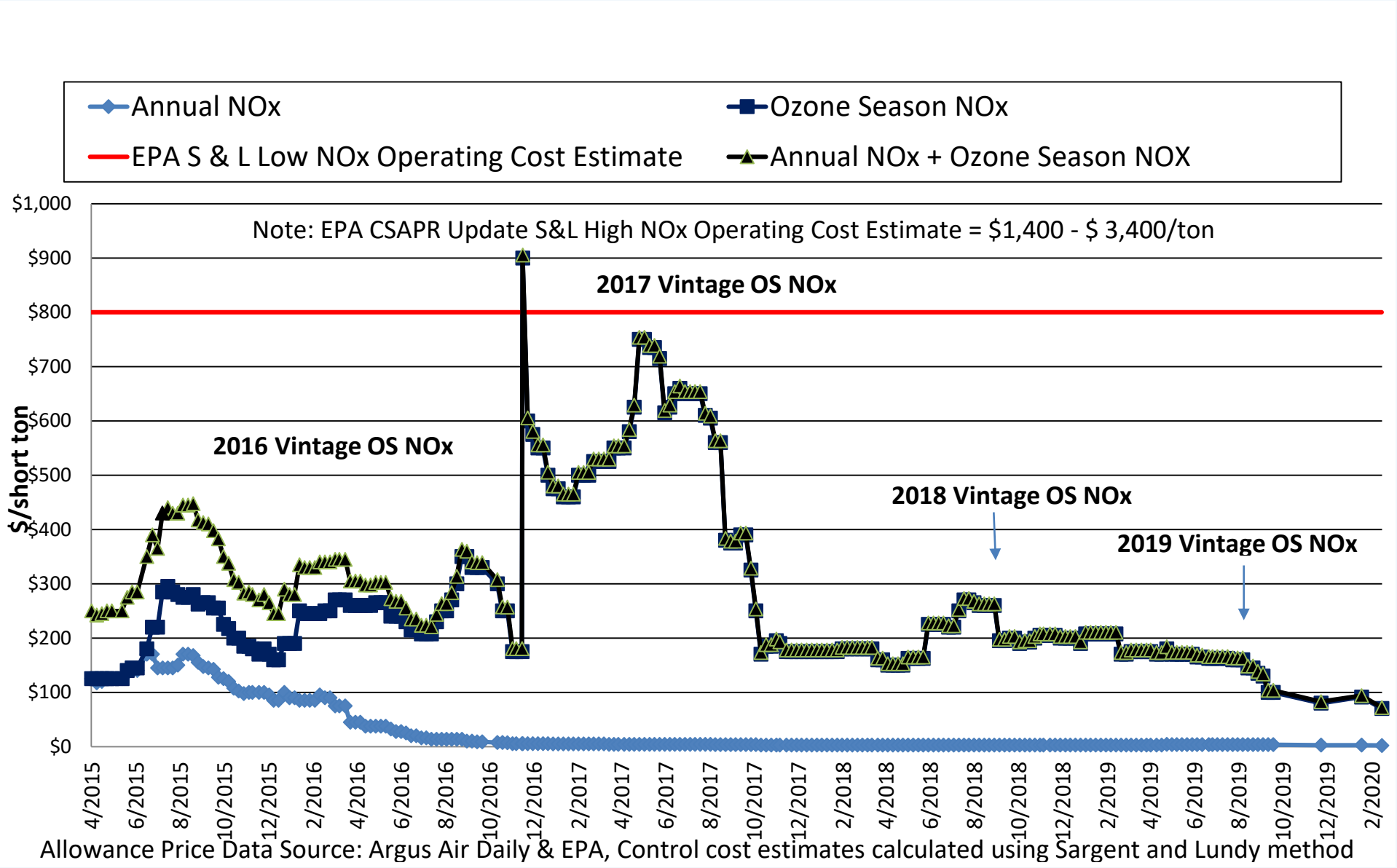
- SCR use curtailed to varying degrees (slightly to substantially)
  - Relative to BOR emissions, ~19,000 tons of lost $NO_x$ reduction
  - Avg. $NO_x$ reduction at BOR = 86%
  - Avg. 2019 $NO_x$ reduction = 56% (23 - 82% reduction range)
- Comparing 2019 emissions to 2014 (worst curtailment year) average $NO_x$ performance decreased (from 61% to 57%)
  - 4 units essentially equivalent performance, averaging 68% (2014) vs 69% (2019) reductions
  - 5 units improved performance, averaging 46% (2014) vs 66% (2019) reductions,
  - 7 units decreased performance: 1 in KY, 1 in IN, 2 in OH, 3 in NC, (67% then vs 45%)
  - 3 units installed SCR
- All units with SCR have wet scrubbers ($SO_2$ removal) except one
  - Wet scrubbers improve Hg removal but lower ammonia feed rates translates into higher $NO_x$ rates

# OTC State Actions to Address EGU NOx Emissions

OTC States have taken the following actions to address $NO_x$ emissions from Electric Generating Units (EGU):

- Prepared 184(c) recommendation and held two public hearings in 2019
- Filed CAA Section 126 petitions (e.g., CT, MD, NJ, NY)
- Pursued other separate litigation to reduce $NO_x$ emissions from EGUs

# CSAPR Allowance Prices (4/17/15 to 3/02/2020)




Allowance Price Data Source: Argus Air Daily & EPA, Control cost estimates calculated using Sargent and Lundy method

- Current $NO_x$ Allowance Price = $70/ton
- LOWEST price on record
- Cheaper to buy allowances than to run controls in most cases!

# OTC 2019 SAS Charge/Work Plan

- Collect updated data for development of high ozone day/peak day strategies based on daily limits
- Develop emissions inventories for high ozone day/peak day episodic modeling analysis
- Recommend RACT cost-effectiveness thresholds
- Develop refined cost-effectiveness tool based on daily emissions reductions
- Develop screening analysis to identify potential inside-the-OTR $NO_x$ reductions from RACT for 2015 ozone NAAQS

# OTC 2019 SAS Charge/Work Plan
## Data Collection

- Sector focus for collection of updated data for development of high ozone day/peak day strategies with daily limits
  - Optimization of existing EGU controls – **ONGOING**
  - Natural gas pipeline compressor prime movers – **COMPLETE**
  - Small EGUs – **ONGOING**
  - ICI boilers – **COMPLETE**
  - Municipal waste combustors (MWC) – **ONGOING**
  - Cement kilns - **COMPLETE**

# OTC 2019 SAS Charge/Work

## High Ozone Day Episodic Modeling Workgroup

- Develop emissions inventories to inform modeling
- Work coordinated with OTC Modeling Committee contacts
- Episodic Modeling Workgroup held calls to discuss draft proposal that defines modeling parameters:
  - Use ERTAC EGU version 16.1 2016 base year
  - Defines EGU “Peaking units” as
    - 15 MW or greater in size in the CAMD-AMPD database, and
    - operated less than 50% of the time during the 2016 ozone season
  - Modeling period: 7/15/2016 - 8/14/2016 episode
  - Possible analysis on 2020 and 2023

# OTC 2019 SAS Charge/Work
## Municipal Waste Combustor Workgroup

- Workgroup efforts focused on refining MWC source and unit specific emissions inventory database
  - Collected data using SCC codes and NAICS codes, and shared with states for review and comment
  - QA/QC-ing 2023 projected $NO_x$ data to eliminate non-MWC units
  - Collecting 2018 NOx data to assess emission changes since 2016
- Initial discussions potential $NO_x$ emission limits and control costs

# OTC 2019 SAS Charge/Work
## Small EGU Workgroup

- Initiated activity this quarter
- Work focused on:
    - Not assessing behind the meter generation, only assessing units that feed the grid
    - Reviewing background data
    - Discussing size cutoff for defining “small EGU”
    - Reviewing of additional data sources

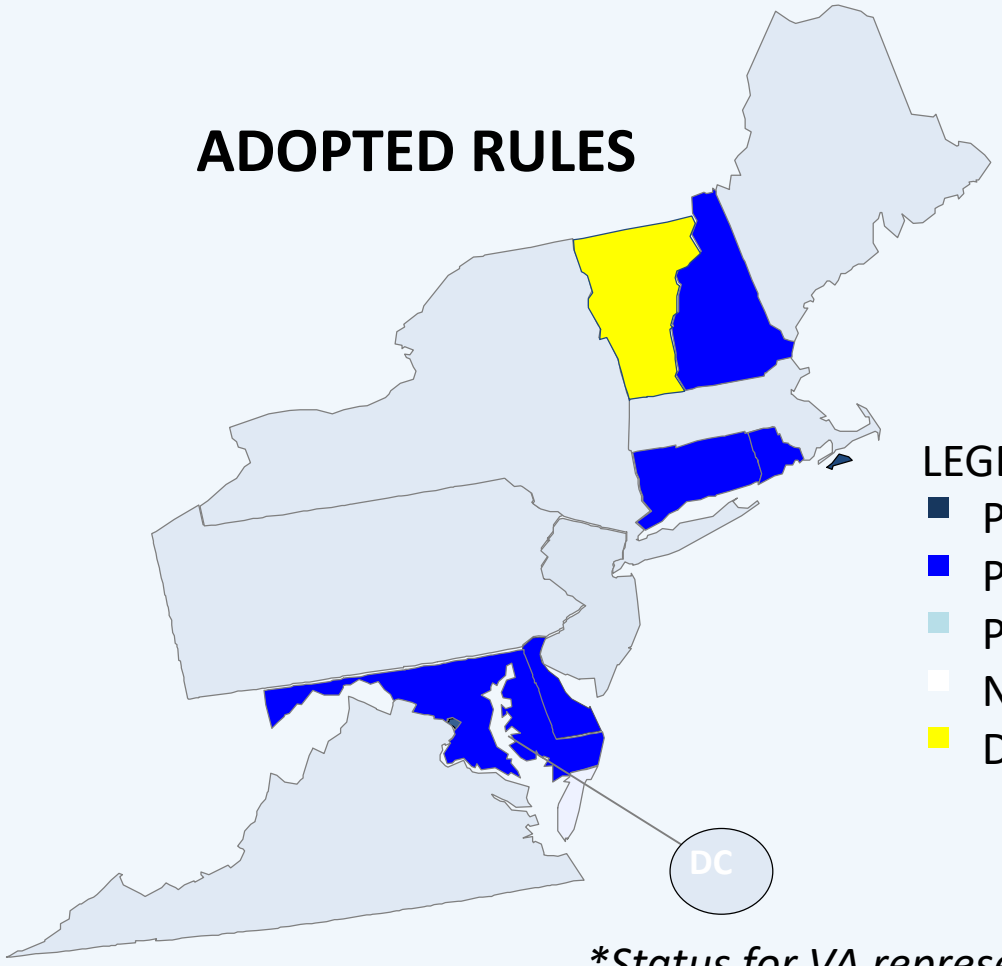
# OTC 2019 SAS Charge/Work

## Other SAS Sectors

- Existing EGU Control Optimization Workgroup
  - Collecting background materials
- Cost Effectiveness Workgroup
  - Collecting background materials
- Cement Kilns
  - QA/QC existing cement kiln data
- $NO_x$ RACT Requirements for 2015 Ozone NAAQS
  - Updating data on state $NO_x$ rules for stationary sources

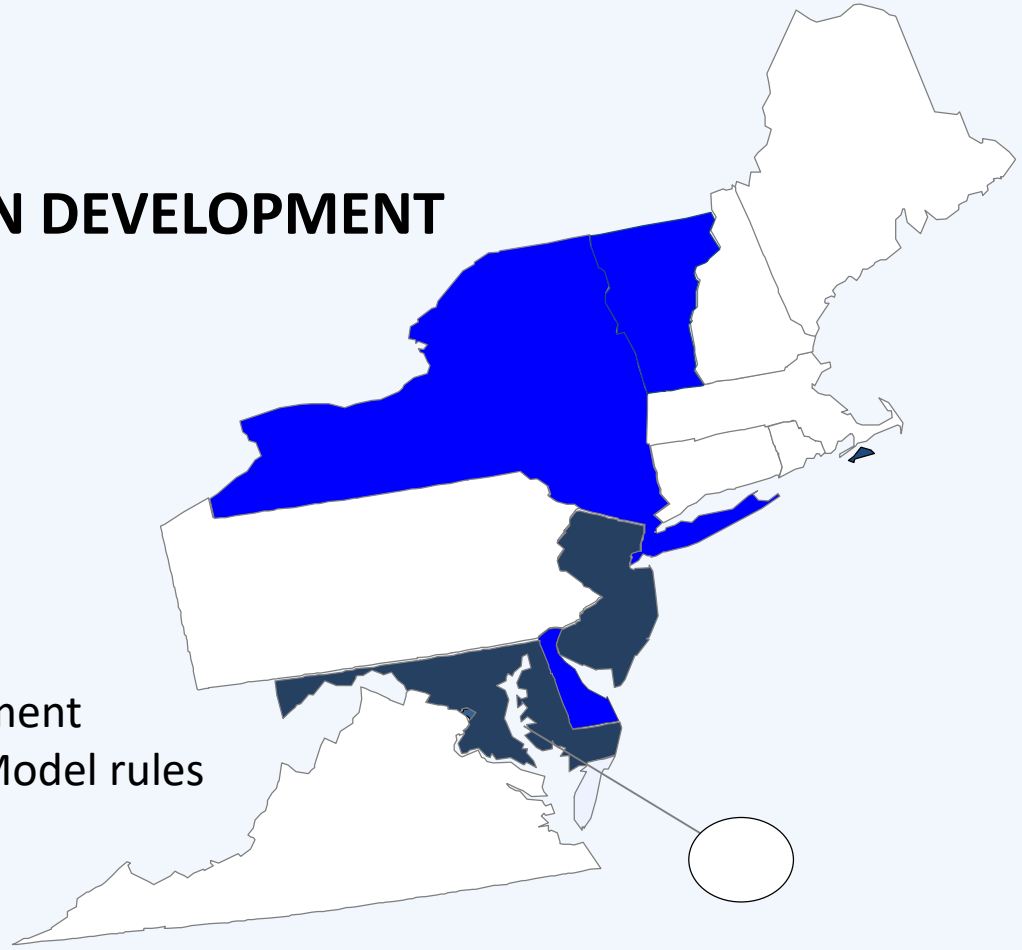
# Adoption of OTC Model Rule
# Consumer Products

## ADOPTED RULES




LEGEND
- Phase V
- Phase IV
- Phase II
- No rules in development
- Did not adopt OTC Model rules

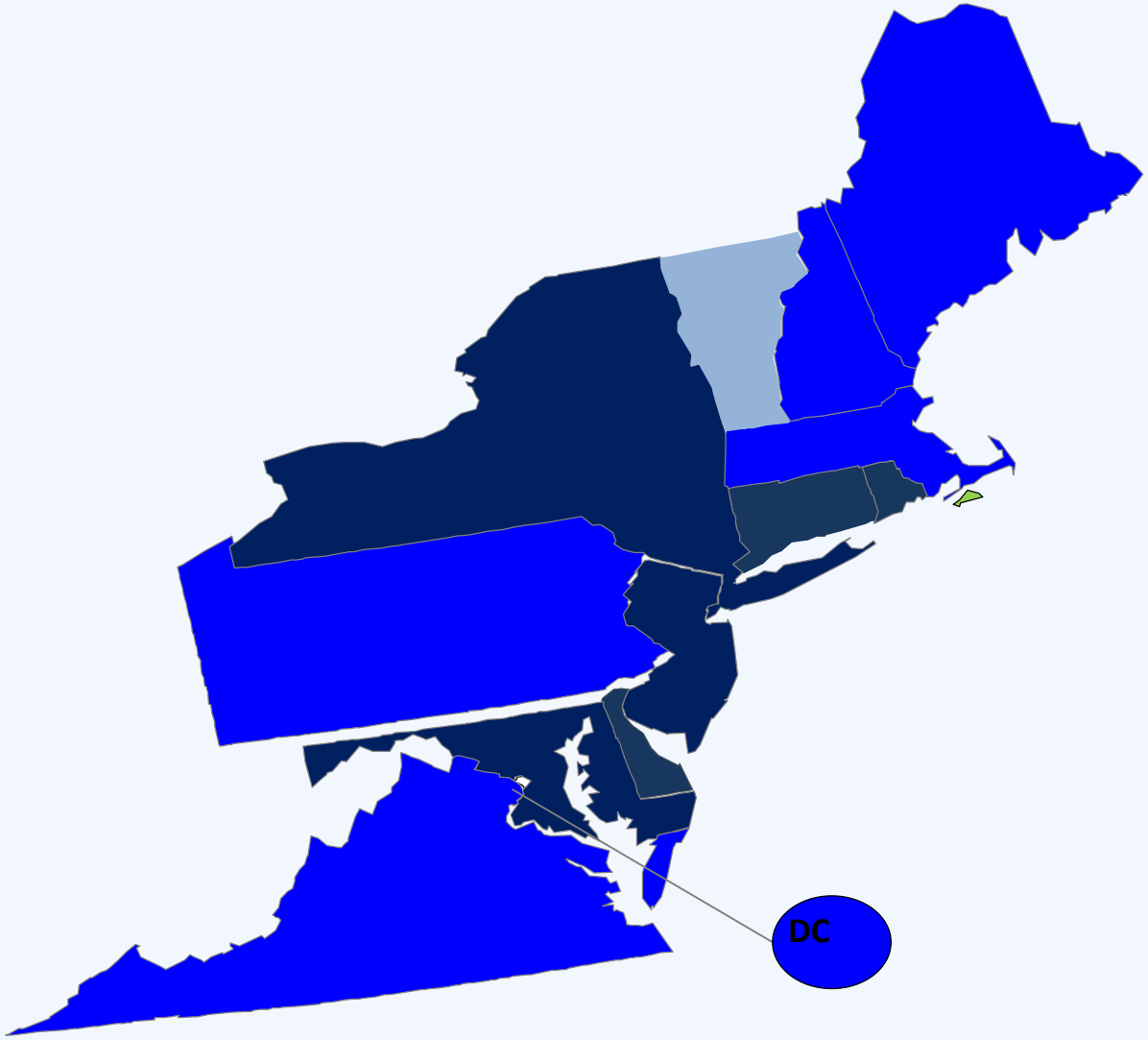
## RULES IN DEVELOPMENT



**Status for VA represents OTR portions of state only**

*Updated 3/2020*

# Adoption of OTC Model Rule
# AIM



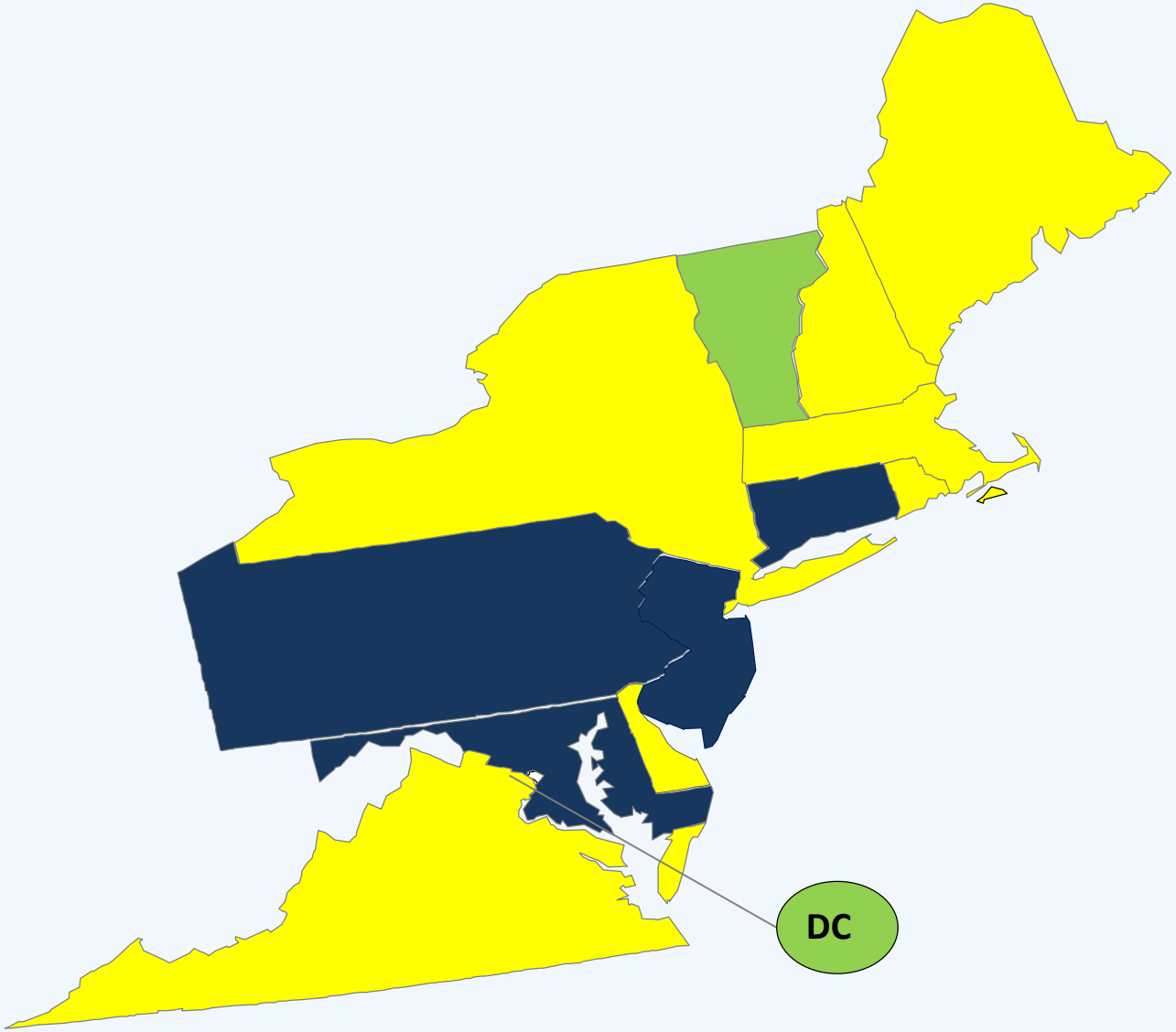

LEGEND

- Developing regulations AIM Phase I OTC Model rule
- Adopted AIMS Phase I OTC Model or equivalent rules
- Adopted Phase I and adopted/proposed AIMS Phase II OTC Model or equivalent

**Status for VA represents OTR portions of state only**

*Updated 3/2020*

# Adoption of OTC NOx Regulatory Technical Guidelines
# Natural Gas Pipeline Compressor Prime Movers




LEGEND
- Adopted OTC or equivalent rules
- Did not adopt OTC model rule
- No applicable sources

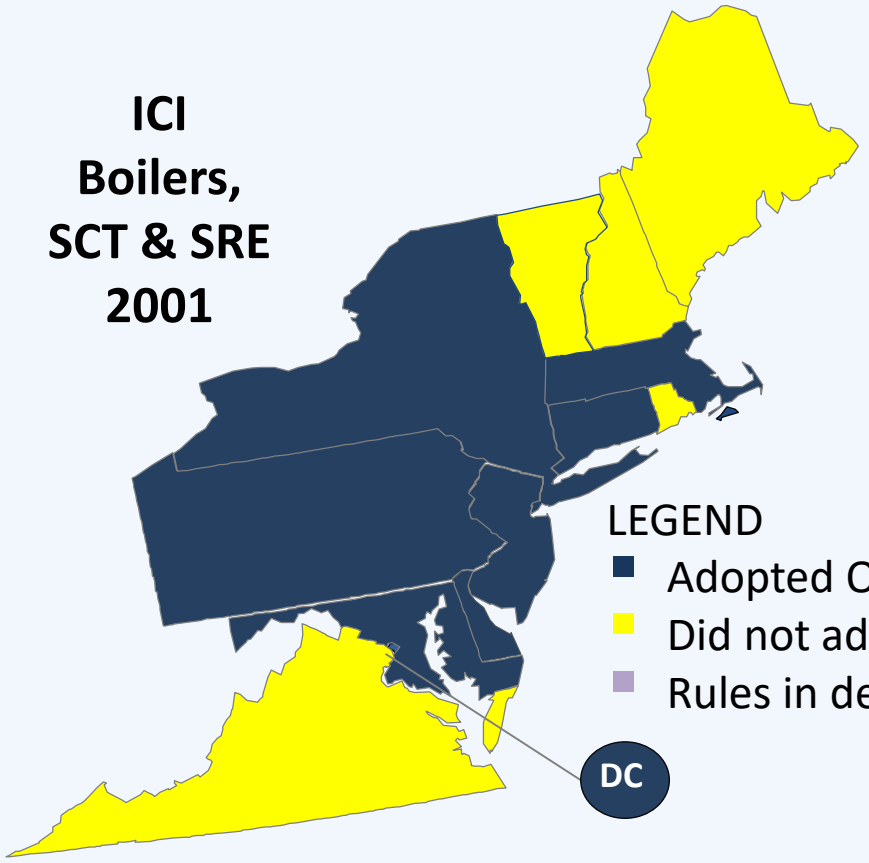
**No applicable sources in DC & VT**

**Status for VA represents OTR portions of state only**

*Updated 3/2020*

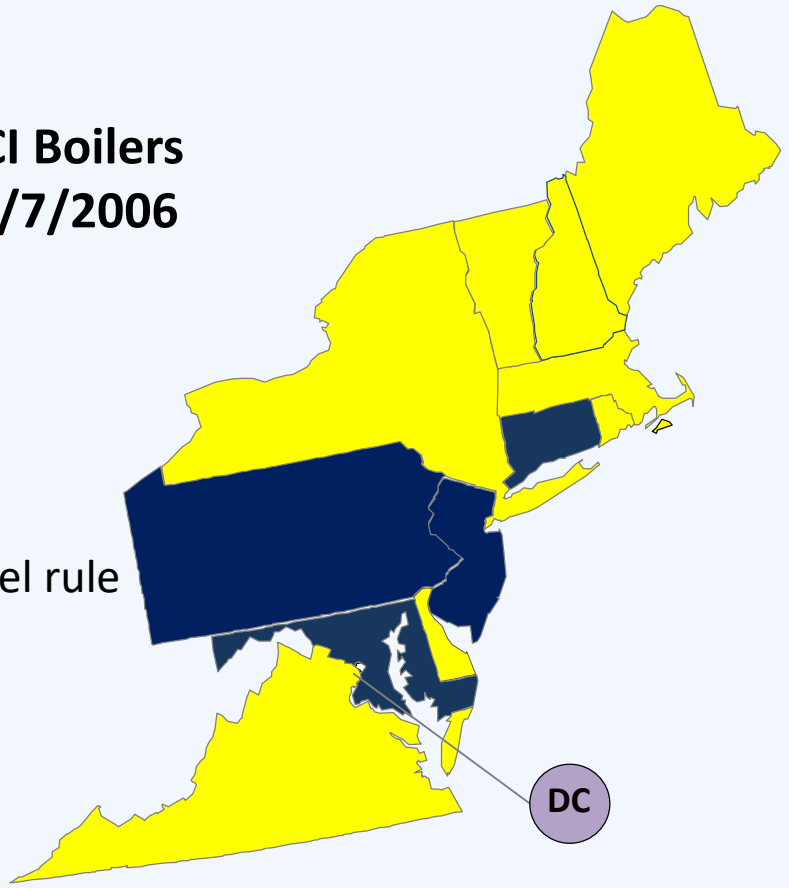
# Adoption of OTC NOx Model Rules
# ICI Boilers

**ICI Boilers, SCT & SRE 2001**




LEGEND
- Adopted OTC or equivalent model rule
- Did not adopt OTC Model rule
- Rules in development

**ICI Boilers 6/7/2006**

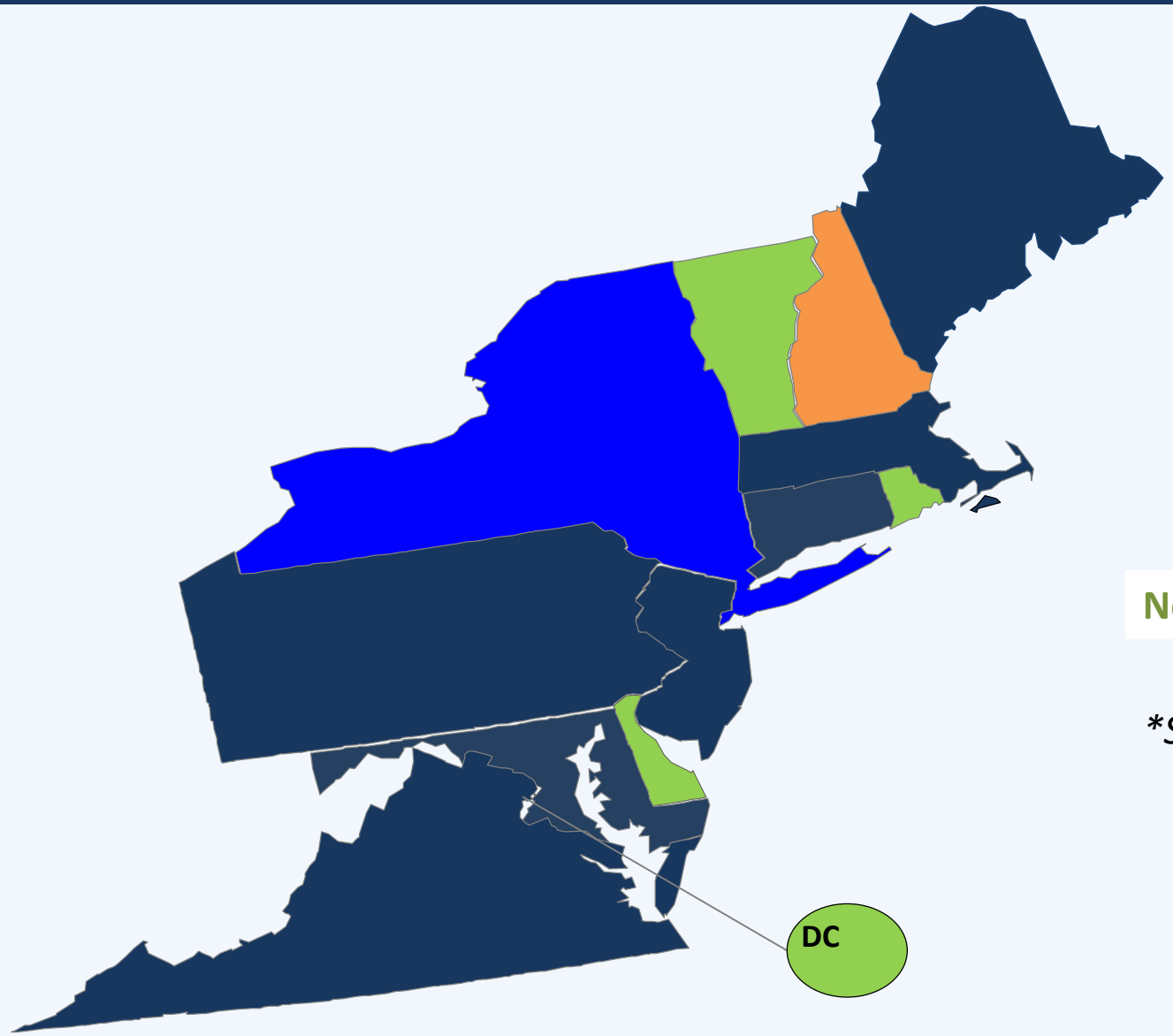



SCT - stationary combustion turbines
SRE – stationary reciprocating engines

**Status for VA represents OTR portions of state only**

*Updated 3/2020*

# State NOx Rules (No OTC Model Rule)
# Municipal Waste Combustors



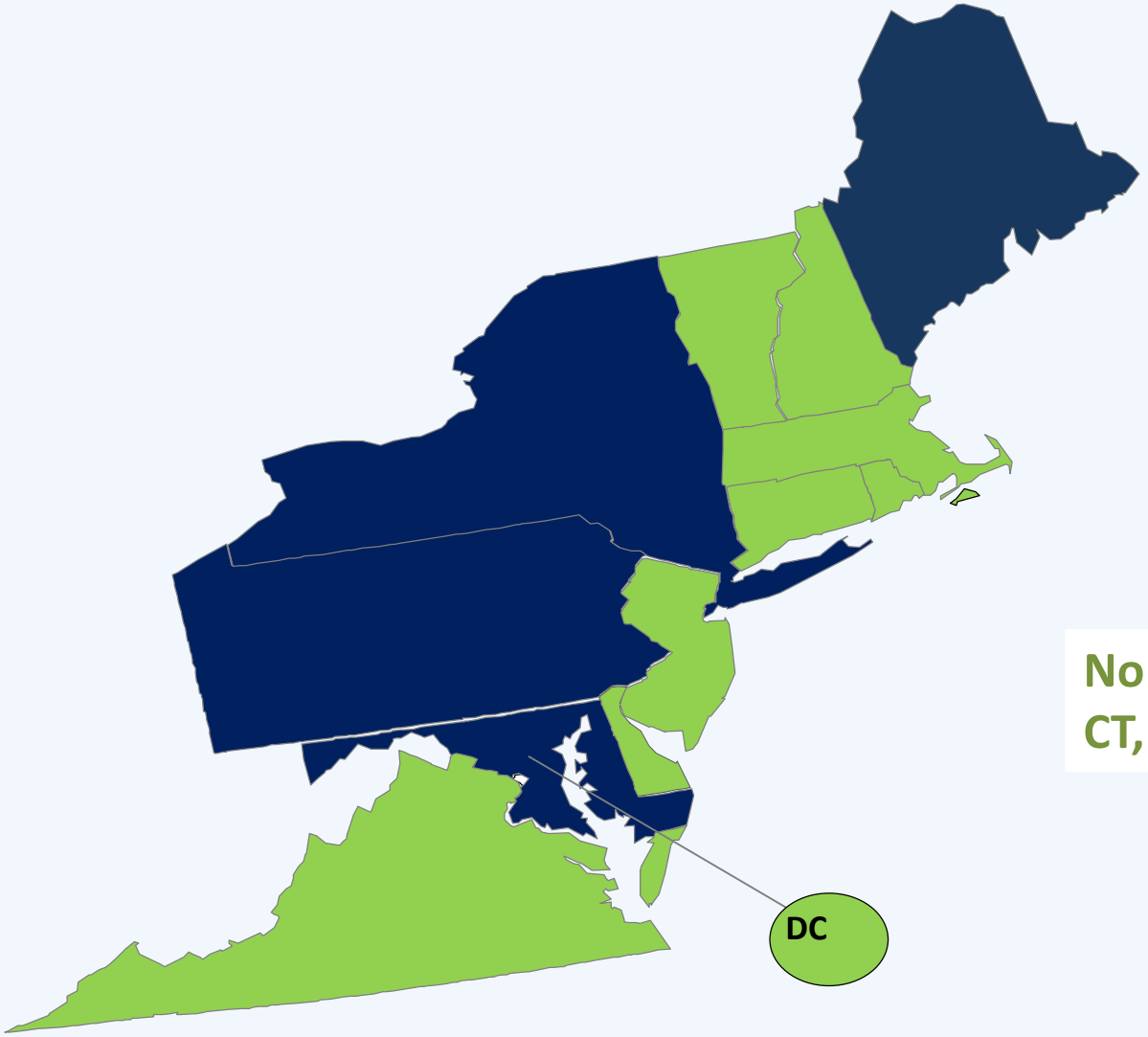

LEGEND
- Adopted State rules
- No SIP-approved State rules
- Under development
- No applicable sources

**No applicable sources of this type in DC, DE, RI or VT**

**Status for VA represents OTR portions of state only**

*Updated 3/2020*

# Adoption of OTC NOx Model Rule
# Cement Kilns




LEGEND
- Adopted OTC Model or equivalent rules
- No applicable sources

**Status for VA represents OTR portions of state only**

**No applicable sources of this type in:**
**CT, DC, DE, MA, NH, NJ, RI, VA (OTR portion) & VT**

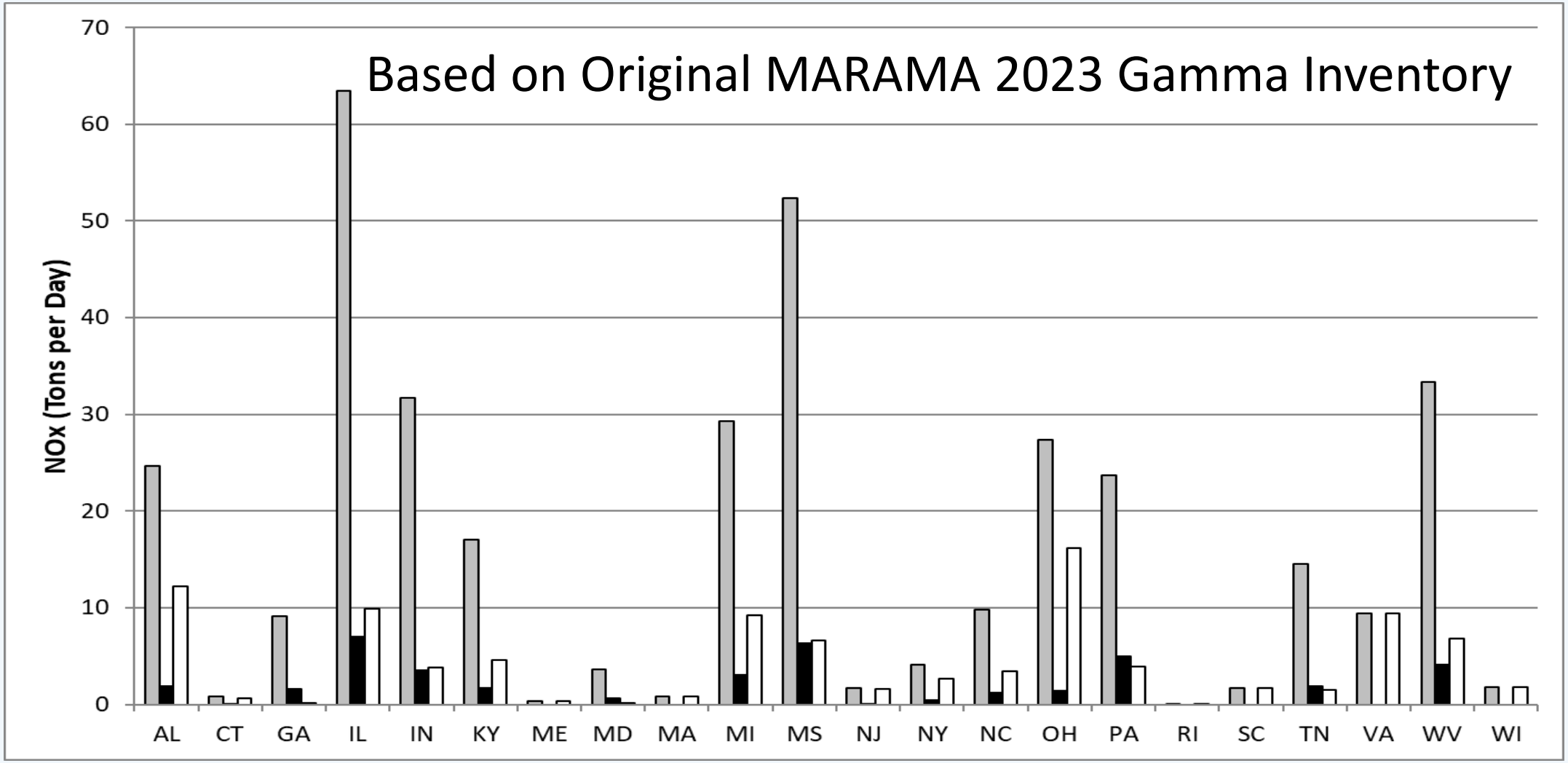
*Updated 3/2020*

# Summary & Conclusions

- Continuing work on OTC 2019 SAS Charge focus on
  - MWC
  - Small EGU
  - Episodic modeling
- Allowances
  - CSAPR Ozone Season NOx allowance price - lowest ever price
  - Cheaper to buy allowances than run controls
  - Using allowances rather than use of NOx controls during ozone season can/does impact downwind state monitors
  - Estimated $NO_x$ reduction loss = 19,000 tons from “top 25 emitters”
- OTC States using regulatory/legal actions to address EGU NOx emission
- SAS revisiting charge to inform priorities for 2020 work – survey to states

# BONUS SLIDES

# OTC 2019 SAS Charge/Workplan – NG Pipeline Prime Movers

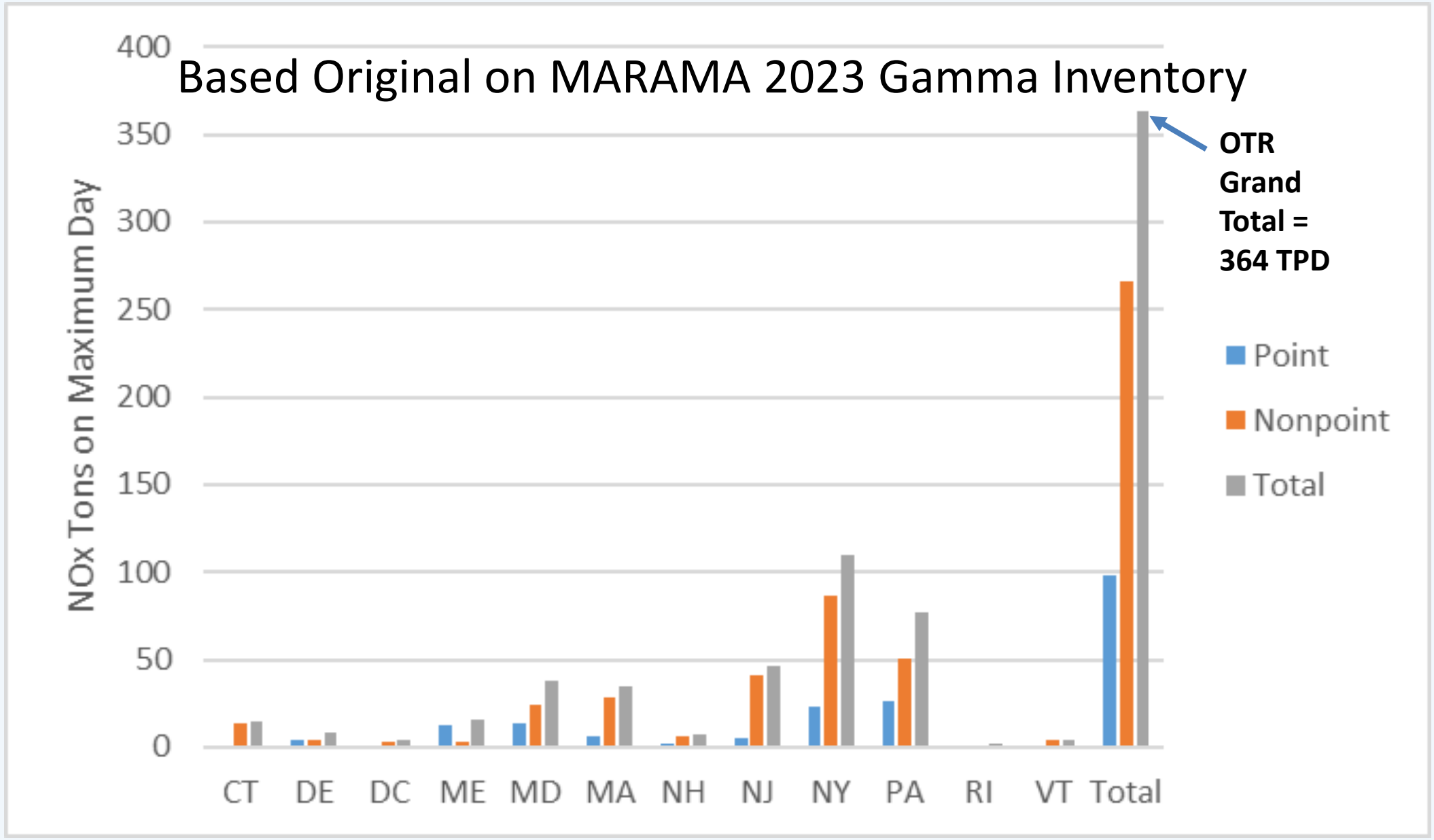



Grey = State total emissions, OTR total = 35 TPD

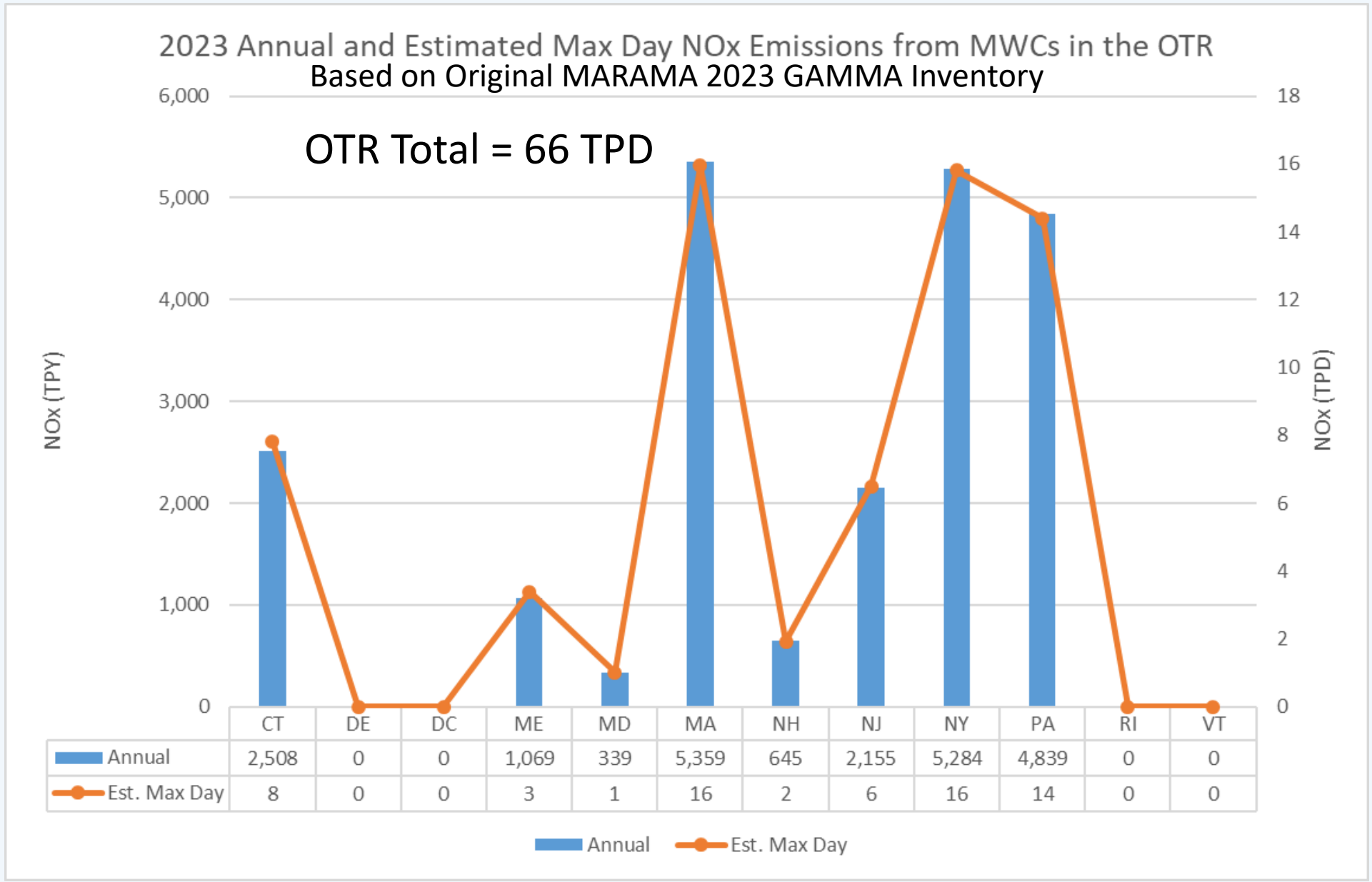
Black = Emissions remaining after applied reductions from proposed OTC MR limits, OTR total = 6 TPD

White = Emissions from units where a confident comparison with permit data could not be made, OTR total = 10 TPD

# OTC 2019 SAS Charge/Workplan – ICI Boilers



# OTC 2019 SAS Charge/Workplan - MWCs



# OTC 2019 SAS Charge/Workplan – Cement Kilns

Based on Original MARAMA 2023 GAMMA Inventory

| | | 2023 | 2023 |
|---|---|---|---|
| **FIPS** | **State** | **Annual (TPY)** | **Max Day (TPD)** |
| 09 | CT | 0 | 0 |
| 10 | DE | 0 | 0 |
| 11 | DC | 0 | 0 |
| 23 | ME | Need add. info. | Need add. Info. |
| 24 | MD | 4,145 | 12 |
| 25 | MA | 0 | 0 |
| 33 | NH | 0 | 0 |
| 34 | NJ | 0 | 0 |
| 36 | NY | 434 | 1 |
| 42 | PA | 3,683 | 11 |
| 44 | RI | 0 | 0 |
| 50 | VT | 0 | 0 |
| **Total** | | **8,262** | **24** |