# OTC Modeling Committee Update
# OTC and MANE-VU Stakeholder's Meeting
# September 21, 2022

OTC Modeling Committee Update

Chairs, Kevin Civerolo and Margaret LaFarr, NYS DEC





OZONE TRANSPORT COMMISSION

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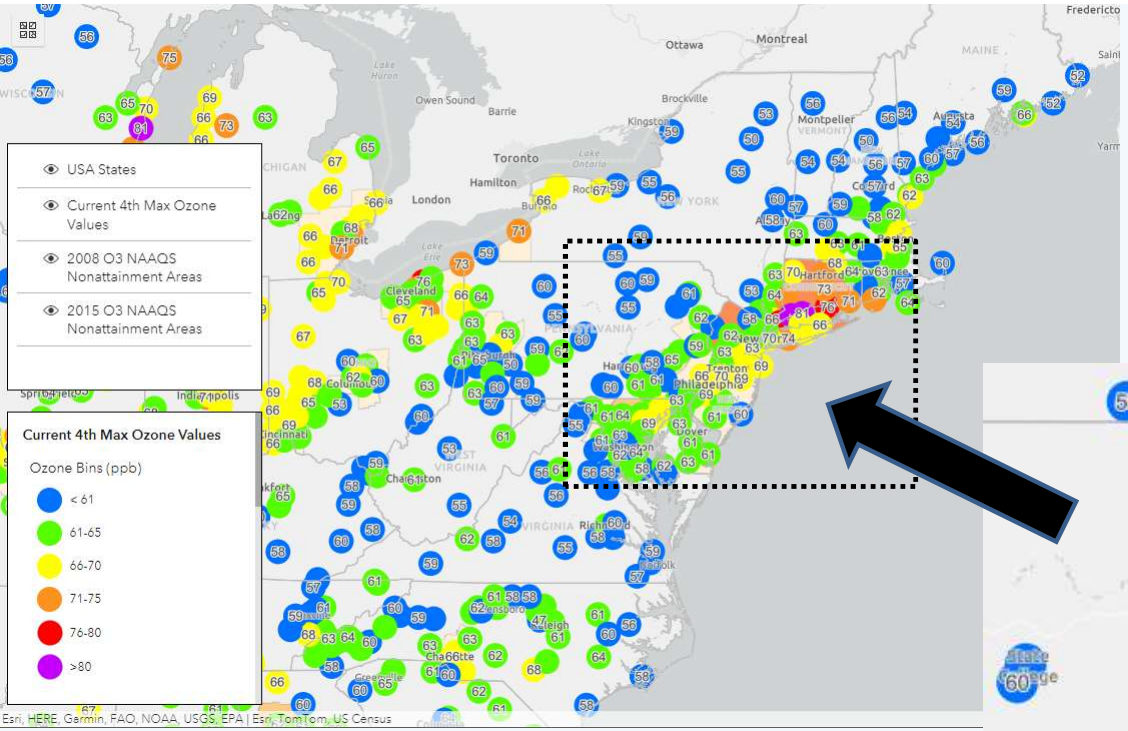
# Accomplishments

- Tracking OTR $O_3$ levels and preliminary attainment status through the current $O_3$ season
- Completed 2016 & 2023 simulations with CMAQ and CAMx – V1 emissions platform
- Tagged emissions contribution modeling with CAMx
- 2018/19 episodic modeling on high electric demand days (HEDD)

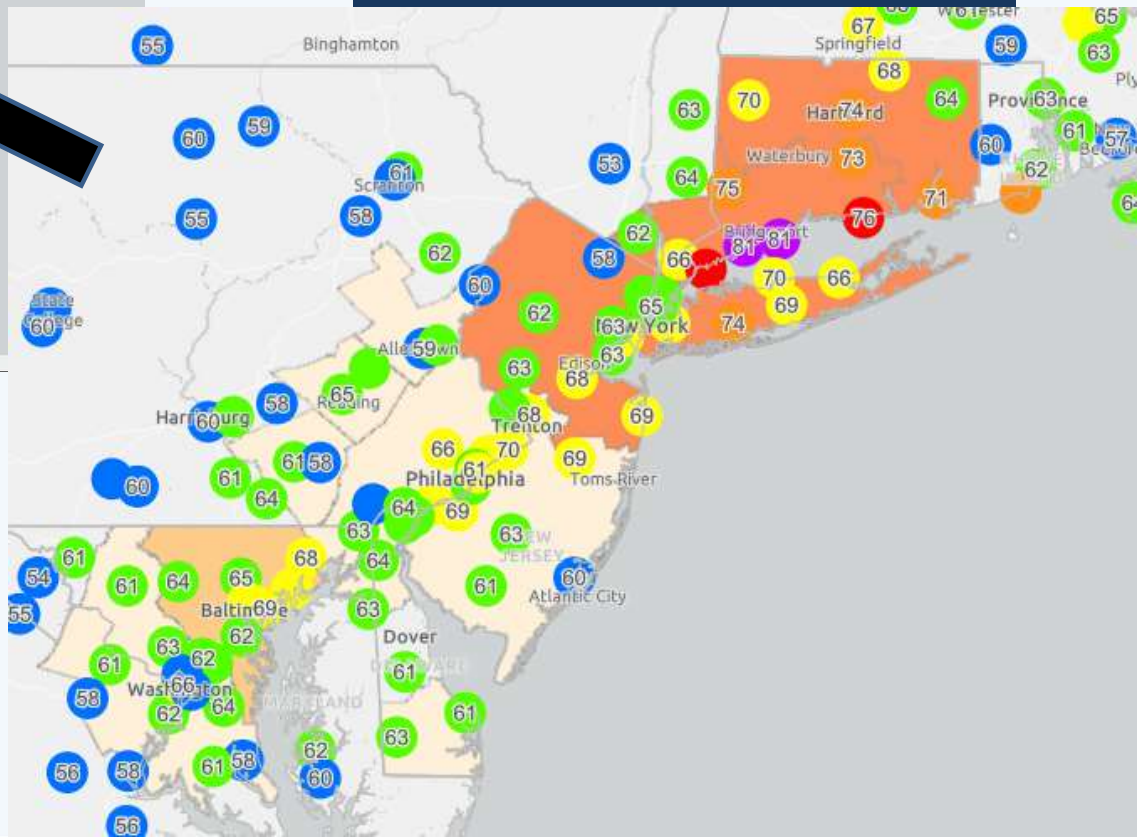
# Ongoing work

- $O_3$ season simulations (2016, 2023, 2026) with the V2 platform (with V3 updates to CMV & solvents) and ERTAC EGUs
- Update and review future design values with V2
- Nearing completion of draft modeling TSD (V1 platform)
- Discussions with SAS and MSC on possible additional sensitivity scenarios (urban VOC, MWC, ICI wood boilers)
- Following upcoming field campaigns (AEROMMA, CUPIDS…)

# Preliminary 2022 4th High 8-Hour Ozone

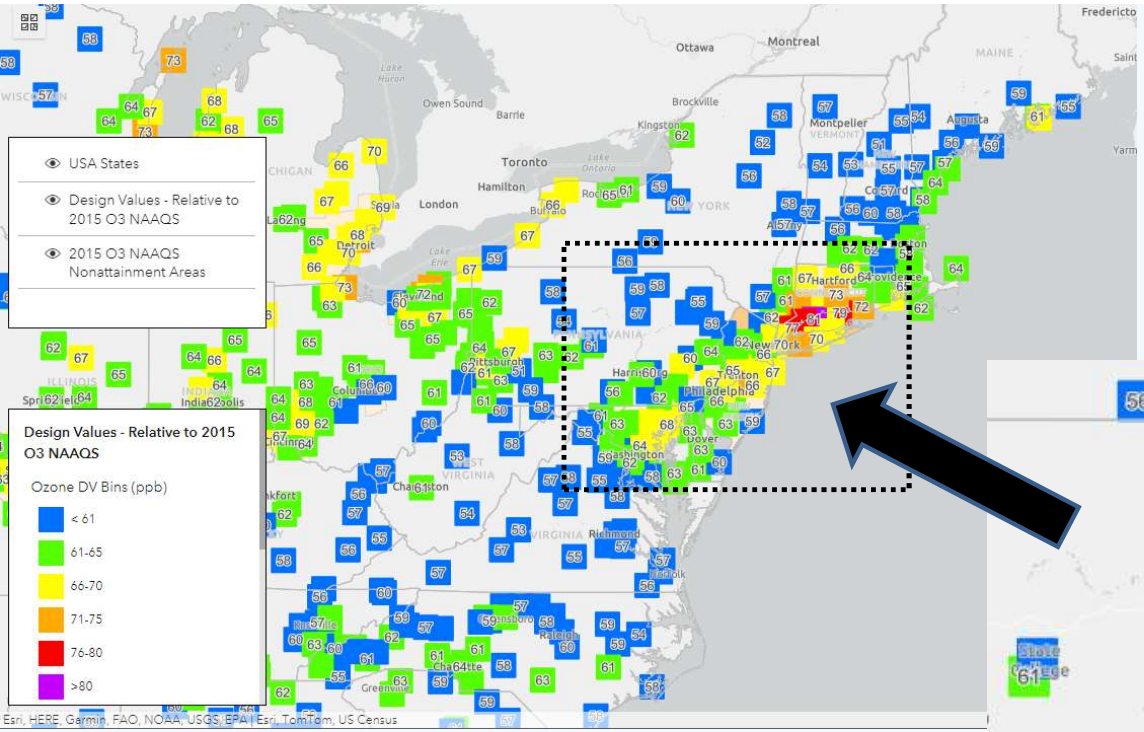


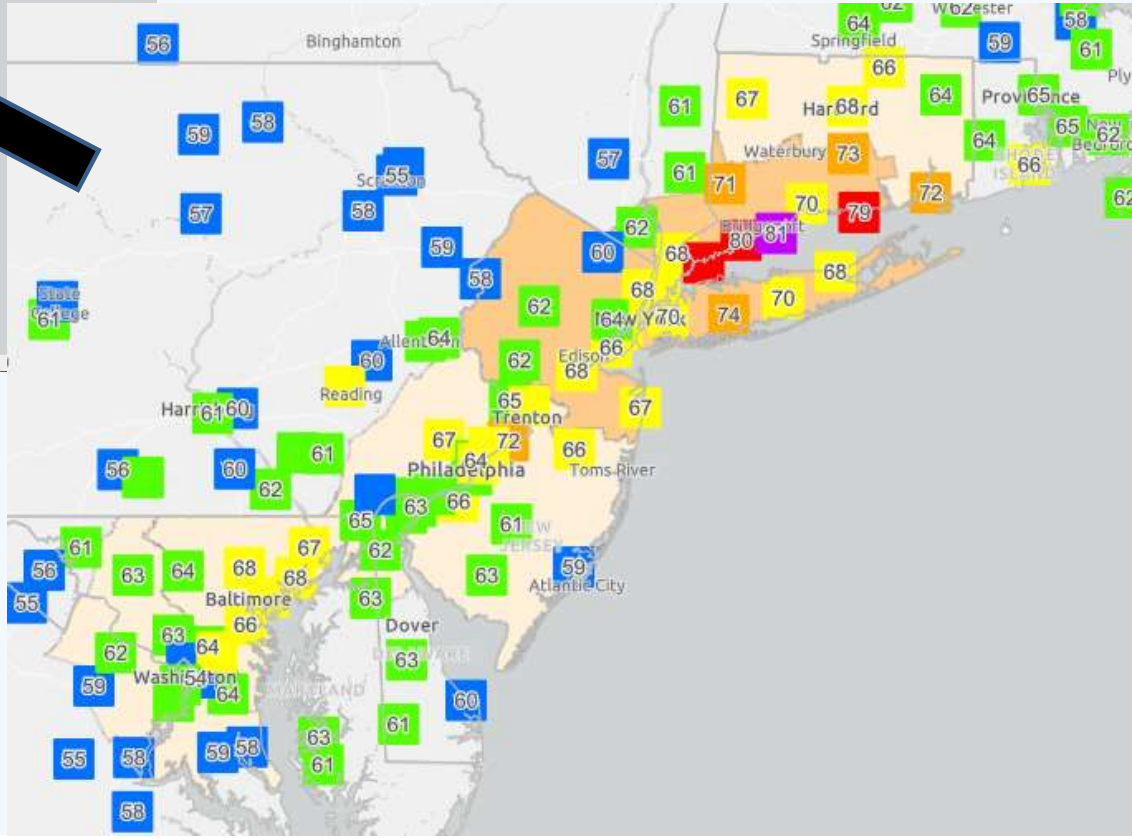

**"2022 Ambient Ozone Concentrations - Relative to the 2008 and 2015 8-Hr Ozone NAAQS" –**
https://experience.arcgis.com/experience/502feb600b32460caee6bbd10f8f4559/page/Current-4th-Max/




*Data through September 5, 2022*
*(Credit: Mark Prettyman and DE DNREC. Data available at*
https://experience.arcgis.com/experience/502feb600b32460caee6bbd10f8f4559/page/2015-O3-NAAQS---Prelim-DV/*)*

# Preliminary 2020-22 Design Value

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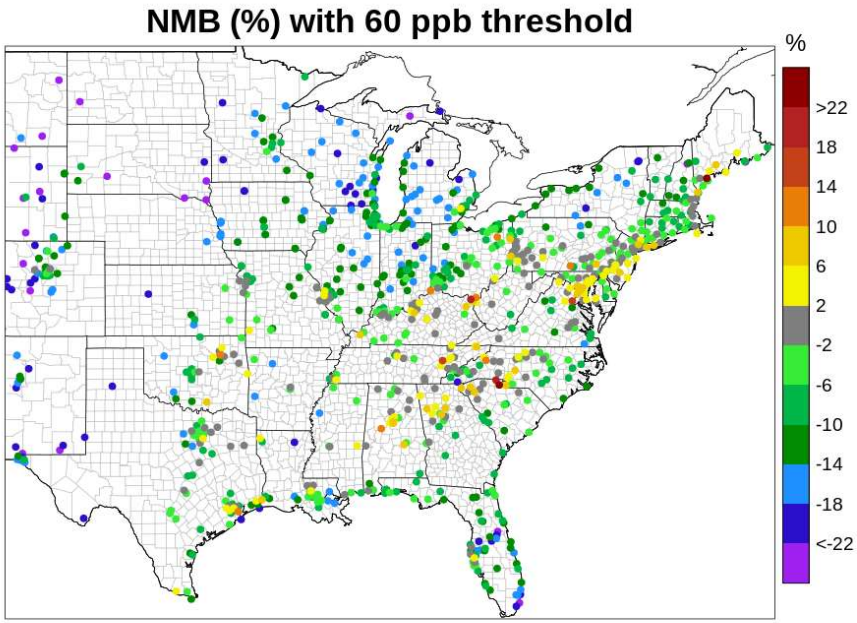
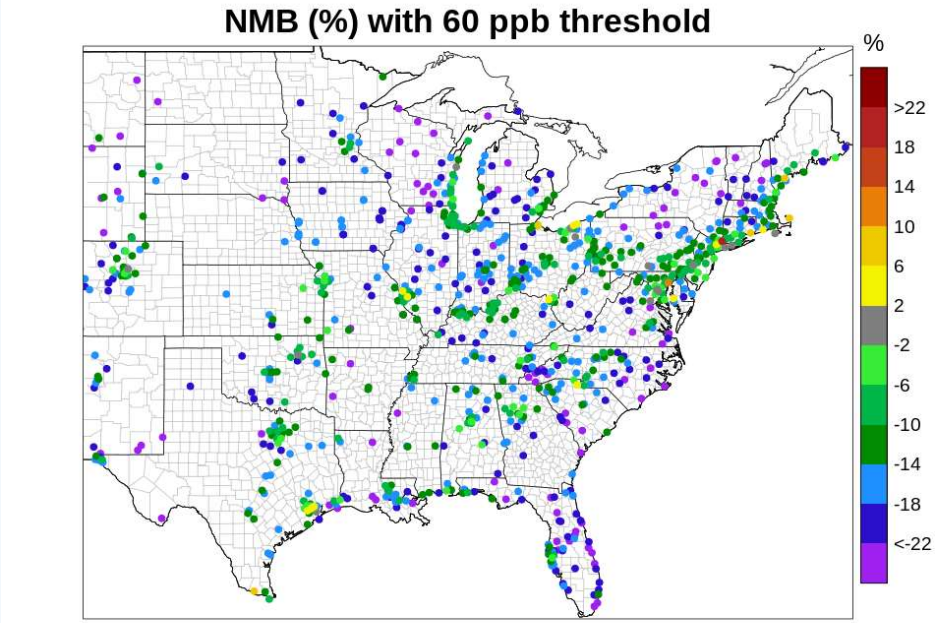
# V1 Model performance – Normalized Mean Bias

Average on days above 60 ppb, May to August 2016

## CAMx v7.10_cb6r5




## CMAQ v5.3.1_cb6r3

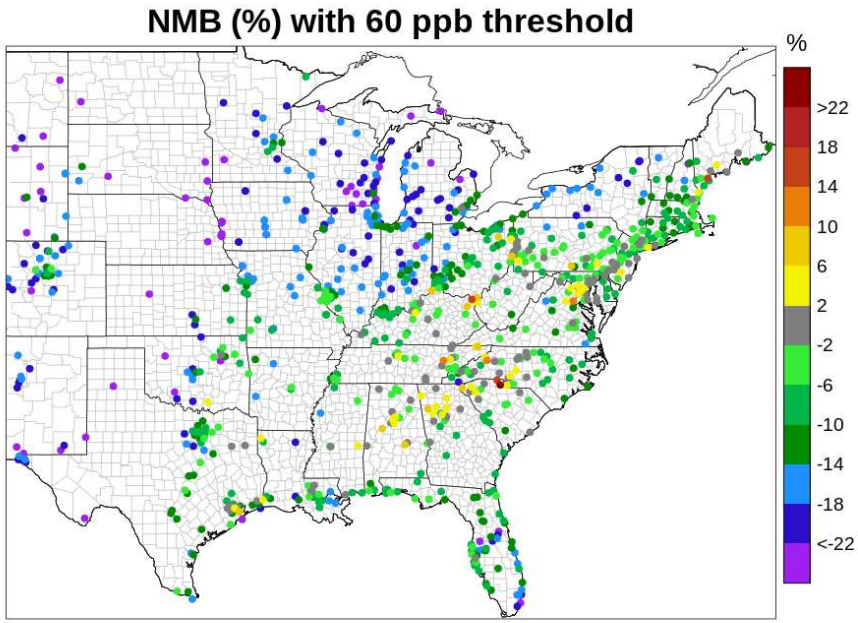



On average, CAMx predicts $O_3$ higher than CMAQ in the Northeast and the Southeast.

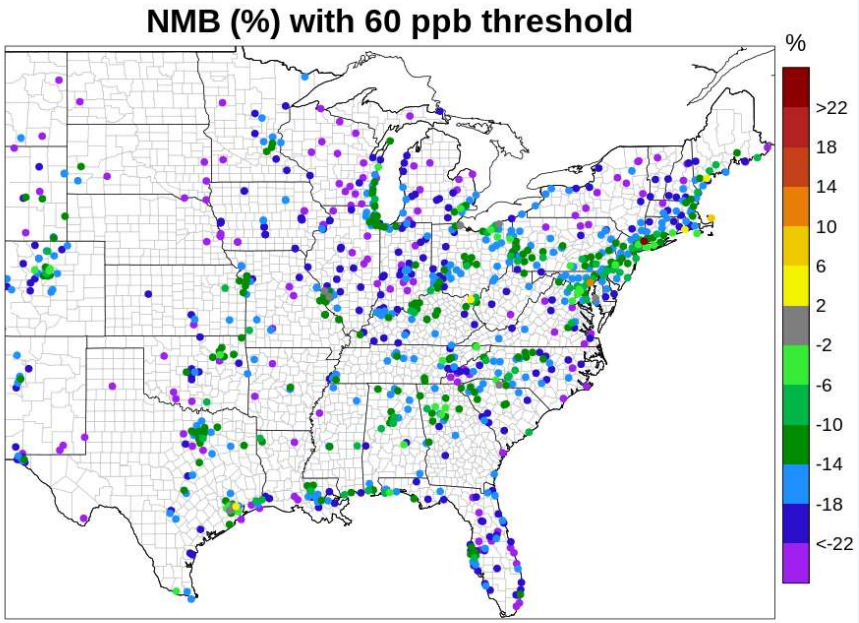
# V2/V3 Model performance – Normalized Mean Bias

Average on days above 60 ppb, May to August 2016

## CAMx v7.10_cb6r5




## CMAQ v5.3.3_cb6r3

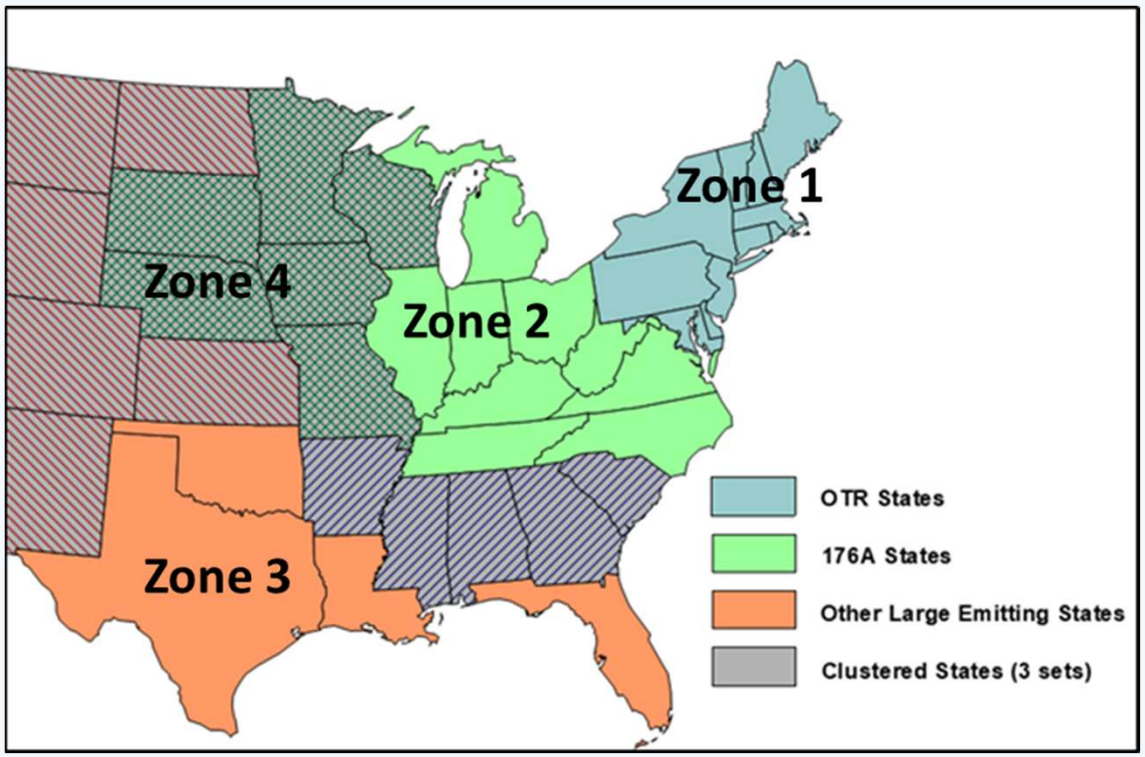



On average, CAMx predicts $O_3$ higher than CMAQ in the Northeast and the Southeast; both models predict lower $O_3$ with V2/V3 compared to V1

# Preliminary 2023 Design Values, V1 platform

| | | | 2023 CMAQ 5.3.1 | | | 2023 CAMx 7.10 | |
|---|---|---|---|---|---|---|---|
| **AQS Code** | **SITE** | **2014-18 DVB** | **3x3** | **3x3 no water** | | **3x3** | **3x3 no water** |
| 090019003 | Westport, CT | 82.7 | 80 | 75 | | 78 | 76 |
| 090010017 | Greenwich, CT | 79.3 | 71 | 78 | | 74 | 74 |
| 090013007 | Stratford, CT | 82 | 74 | 75 | | 75 | 75 |
| 090099002 | Madison, CT | 79.7 | 71 | 70 | | 71 | 72 |
| 090110124 | Groton, CT | 74.3 | 67 | 71 | | 67 | 68 |
| 360850067 | Susan Wagner HS, NY | 76 | 74 | 70 | | 71 | 70 |
| 420170012 | Bristol, PA | 79.3 | 69 | 69 | | 71 | 71 |

# 2023 Tagged Emissions Modeling - CAMx




**State Emission Sectors**

- Area-nonpoint
- EGU-ERTAC
- EGU-Peaking
- NonEGU
- NonRoad-diesel
- NonRoad-nondiesel
- OnRoad-diesel
- OnRoad-nondiesel
- Oil & Gas-point
- Oil & Gas-nonpoint
- Commercial Marine Vehicles
- Rail
- Airport/Airplane up to 3000’

**Domain-wide Sectors:**

- Agriculture
- Offshore CMV
- Offshore rigs
- Prescribed fire
- Biogenic
- Canada
- Mexico
- Boundary conditions
- Initial conditions
- Other

# 2023 Tagged Emissions Modeling Summary

## Top Emission Sectors (almost always significant in OTR):

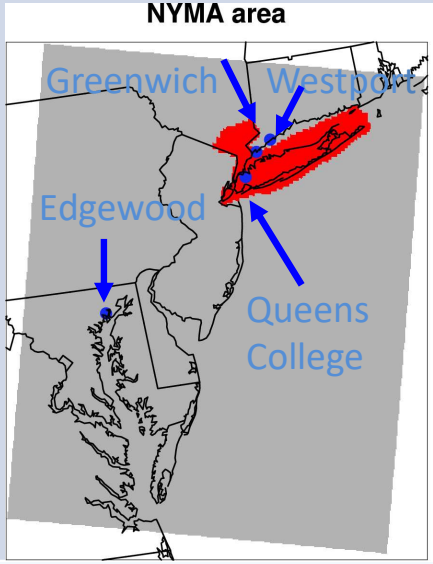
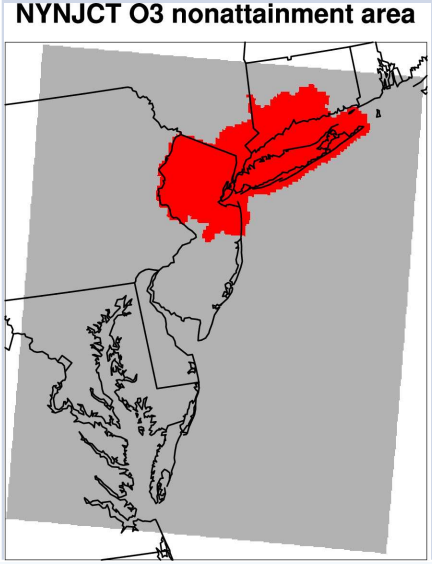
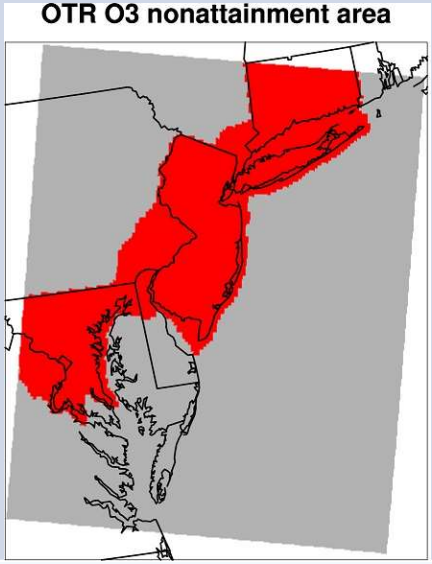
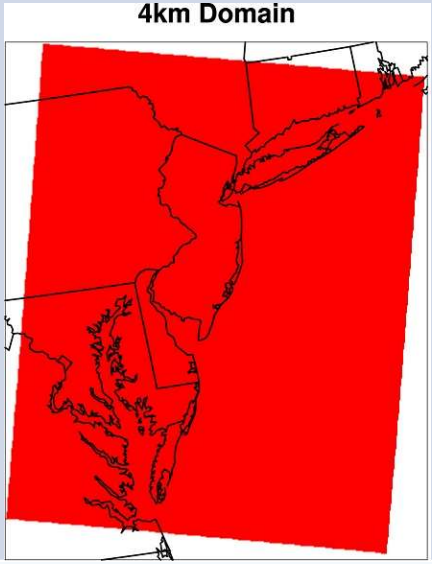
- Area
- OnRoad – NonDiesel
- OnRoad – Diesel
- NonRoad – NonDiesel
- NonRoad – Diesel
- EGU
- NonEGU
- Oil & Gas
- Rail
- Airport

## Sometimes Significant Emission Sectors

- Commercial Marine Vessels
- EGU Peakers

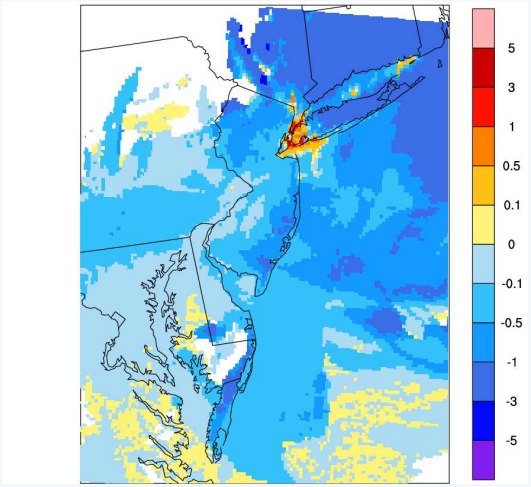
# NOx/VOC sensitivity modeling

30% reduction of anthropogenic emissions in NOx (**N30**) or VOC (**V30**) over 4 regions

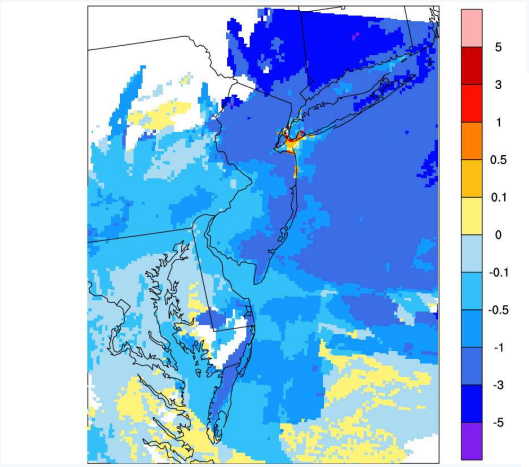
| NYMA | NY-NJ-CT $O_3$ non-attainment area (NAA) | OTR $O_3$ non-attainment areas (NAAs) | Whole domain |
|---|---|---|---|
|  |  |  |  |

# MDA8 $O_3$ differences from Base 2023: 30% reductions of NOx (Avg 3-month, 2023, Base2016 MDA8 $O_3$ ≥60ppb)

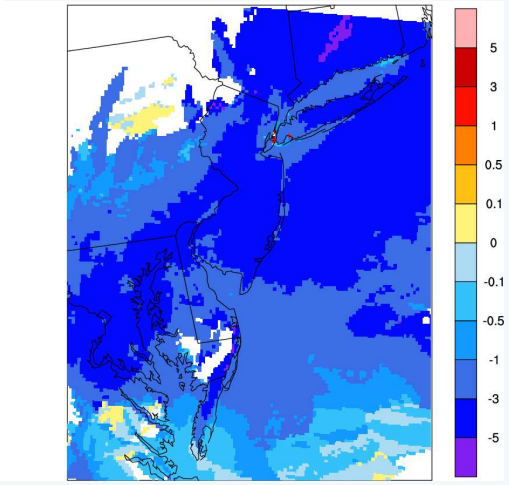
**NYMA** 30% $NO_X$ reduction



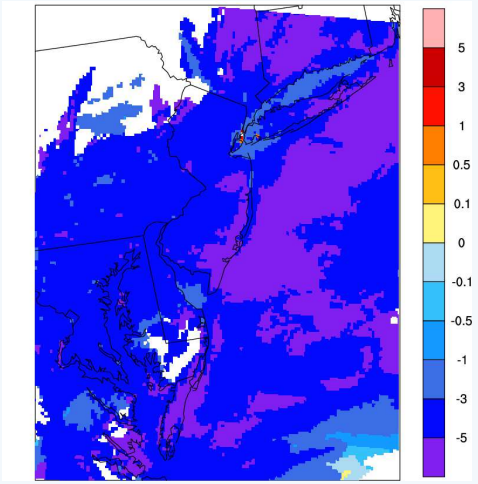

**NYNJCT** 30% $NO_X$ reduction




**OTR** 30% $NO_X$ reduction



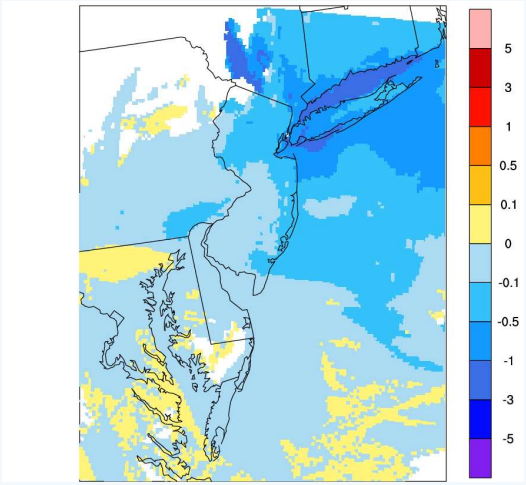

**ALL** 30% $NO_X$ reduction




- Since most of the modeling domain is NOx-limited (outside of NYC), regional NOx emissions will lead to $O_3$ reductions

# MDA8 $O_3$ differences from Base 2023: 30% reductions of VOC (Avg 3-month, 2023, Base2016 MDA8 $O_3$ ≥60ppb)

**NYMA** 30% VOC reduction

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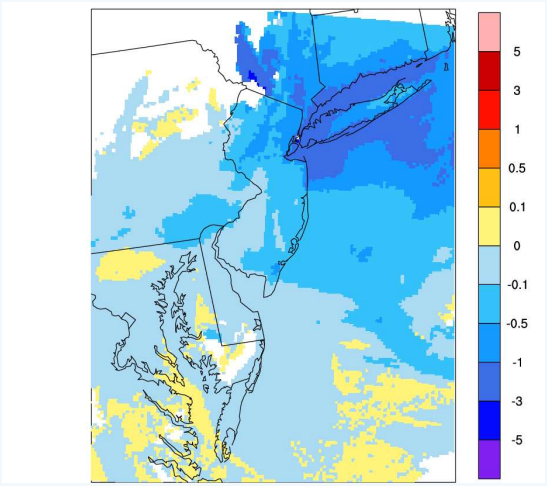
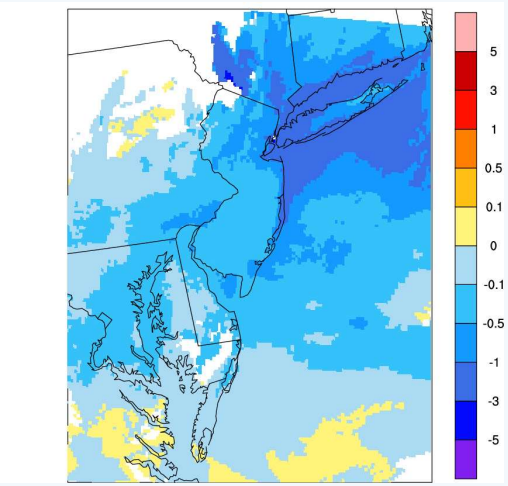
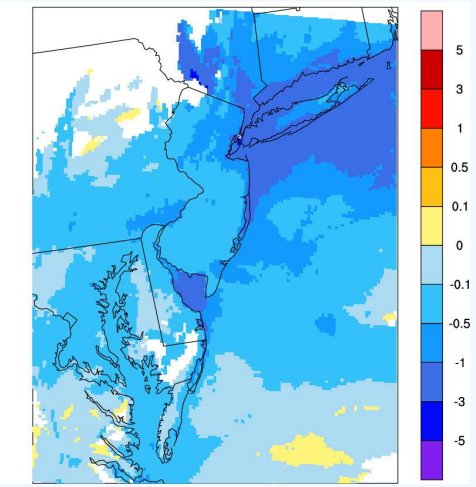



**OTR** 30% VOC reduction




**ALL** 30% VOC reduction




- Targeted VOC reductions in the NYC region will also help
- May not provide much “bang for the buck” outside of NYC

# Thank you!

Model Committee Chairs

- Kevin Civerolo and Margaret LaFarr, NYSDEC (kevin.civerolo@dec.ny.gov and margaret.lafarr@dec.ny.gov)

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