Modeling Committee Update

OTC Stakeholder Meeting

April 10th, 2014

Washington, DC

Overview

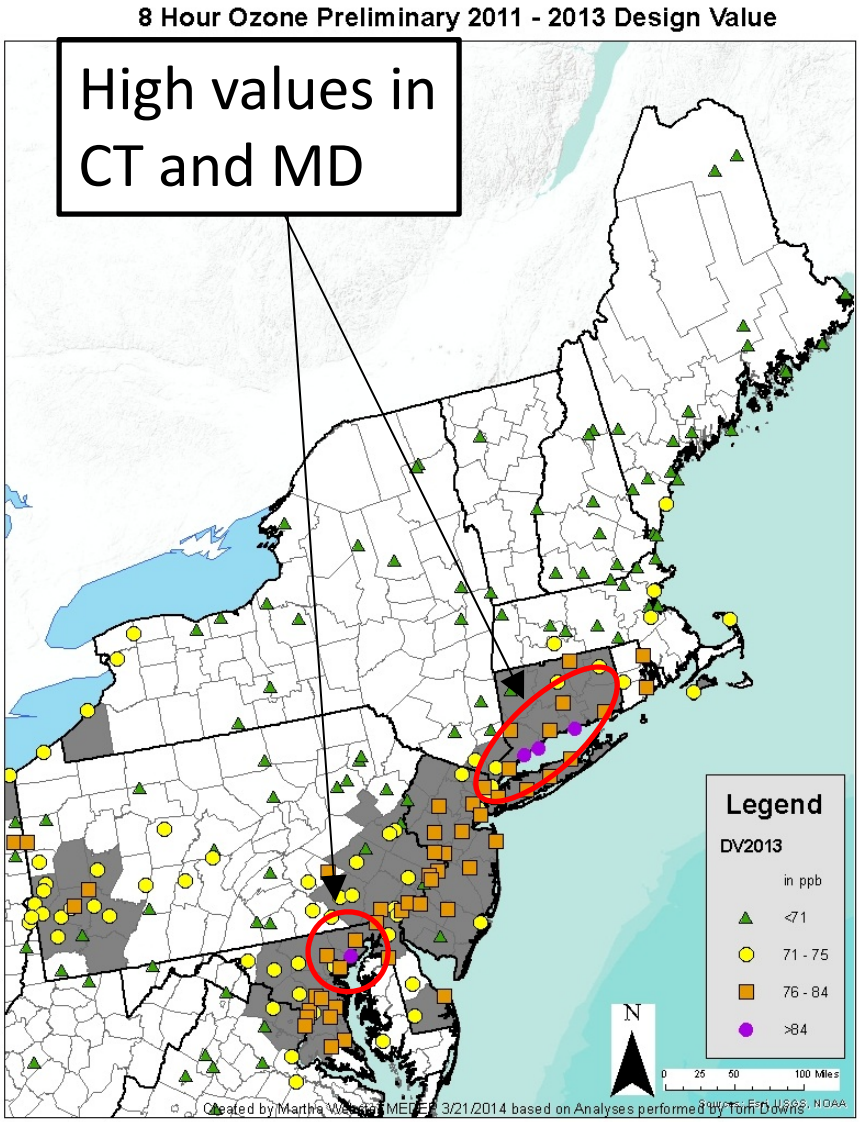
1. 2013 Ozone Season
2. Inter-Regional Technical Coordination
3. Level 3 Screening Runs
4. Emission Inventory Update

Preliminary 2013 Ozone Design Values

3-Year average of the 4th high concentration for 2011, 2012, 2013

- > 84 ppb
- 76 - 84 ppb
- 71 - 75 ppb
- < 71 ppb

- Unclassified /Attainment
- Nonattainment

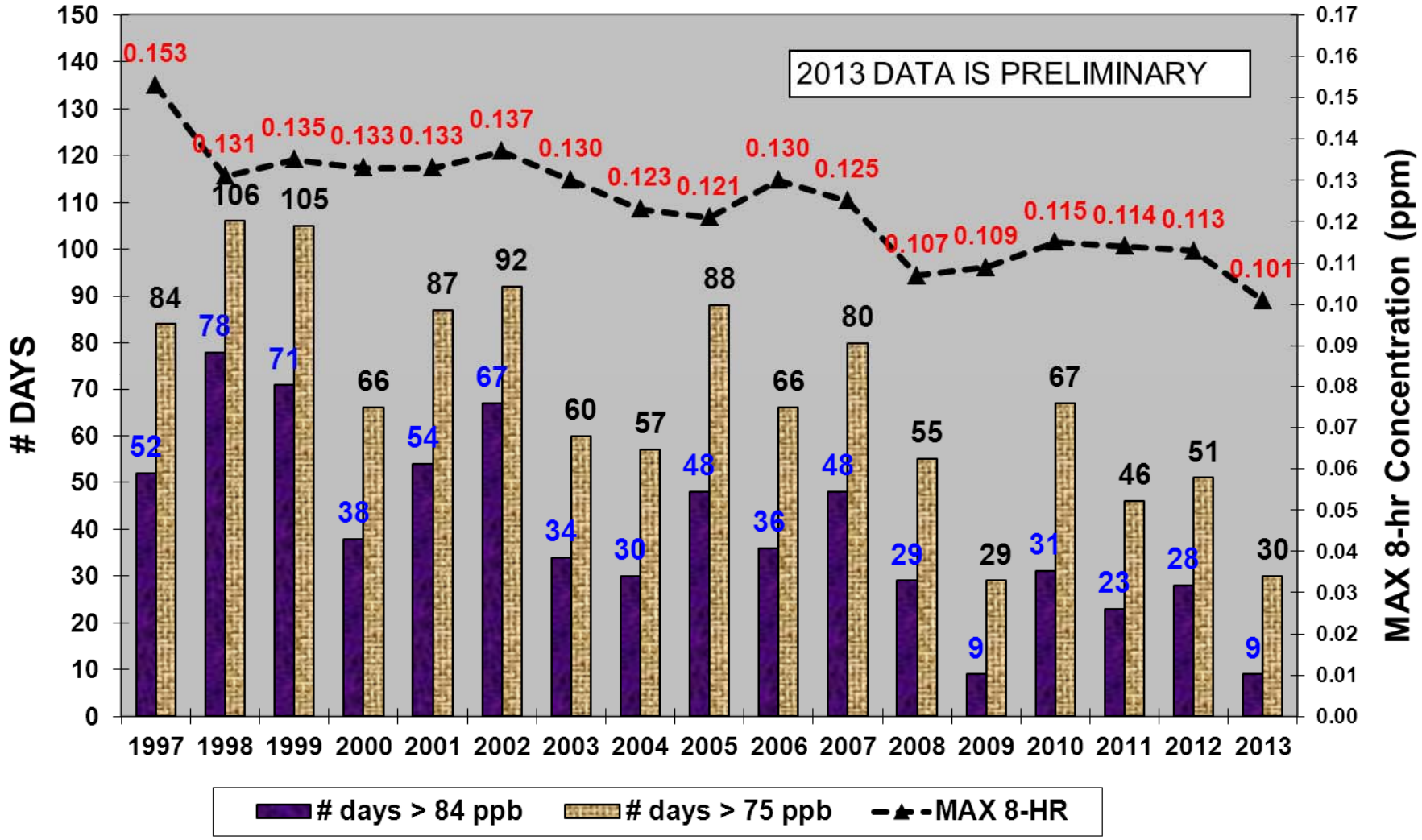


Ozone Maximum Monitor by State

State	2013 4th High	2011-13 DV	State	2013 4th High	2011-13 DV
CT	90	89	NJ	74	84
DE	72	77	NY	78	81
DC	66	79	PA	78	80
ME	76	75	RI	79	78
MD	72	85	VT	62	62
MA	78	75	VA (OTR)	67	79
NH	69	69			

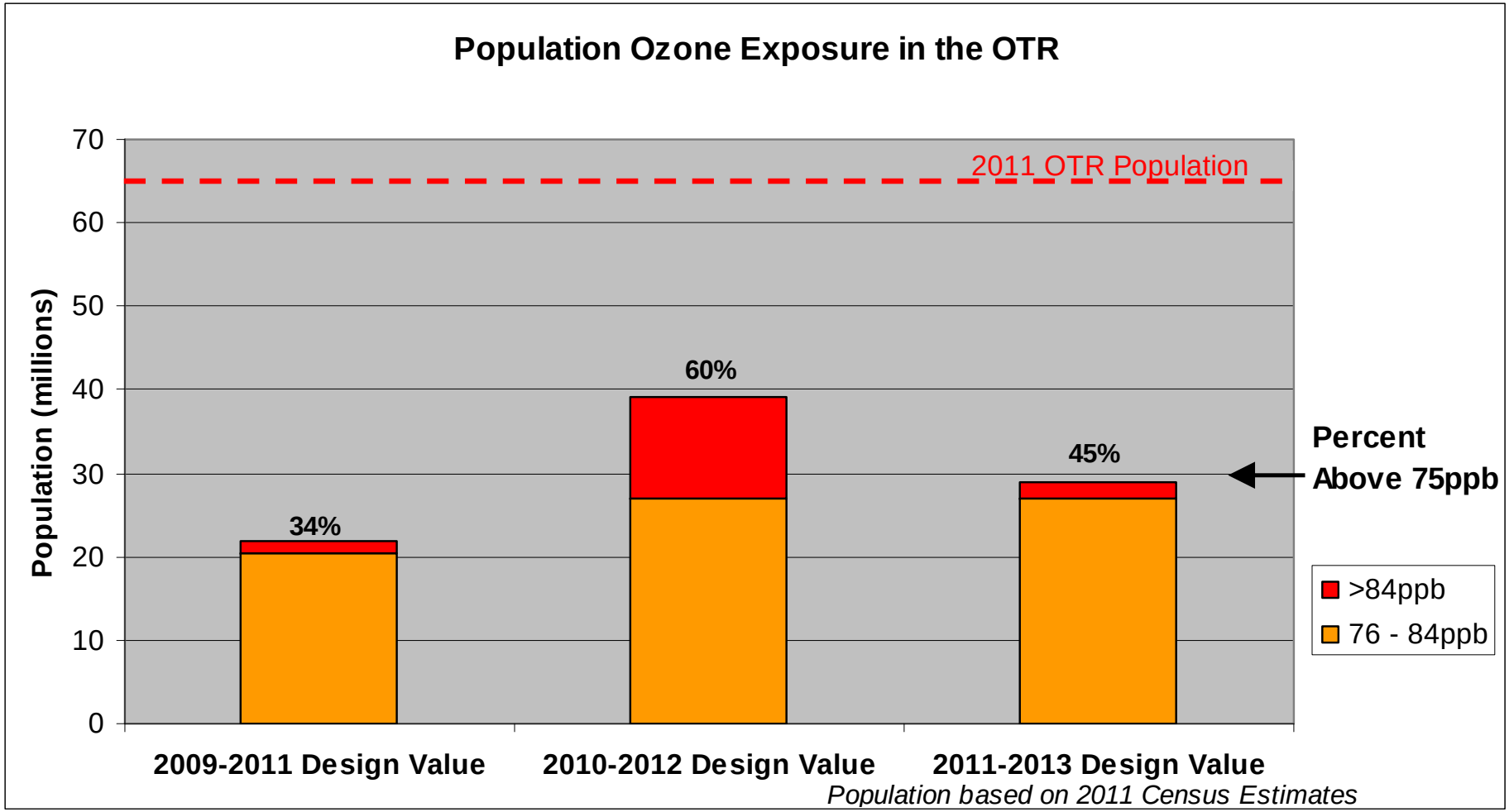
2013 Preliminary Data (updated 3/20/2014)

Ozone Trend Days 1997-2013
(OTR)



Updated 3/20/2014 – Tom Downs MEDEP

Ozone Population Exposure



Inter-Regional Technical Coordination

Inter-Regional Technical Coordination

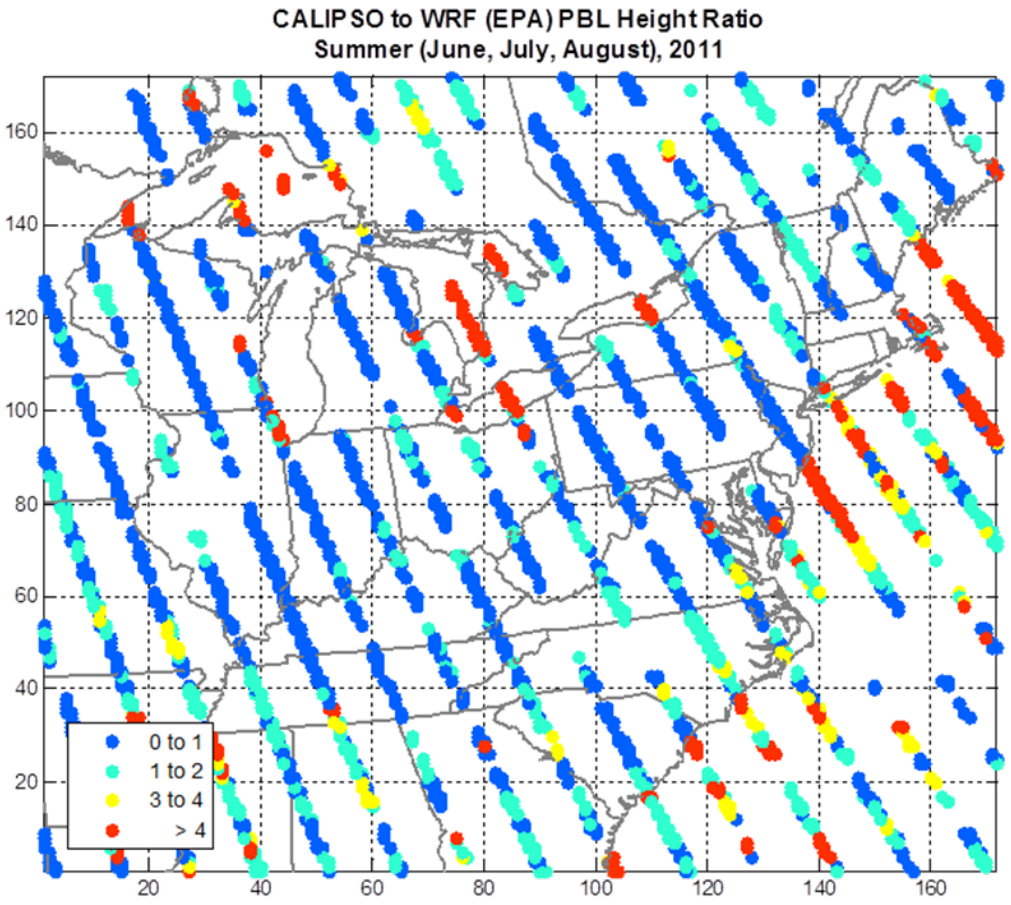
- Planning and Building of the
  "Next Modeling Platform"
- Coordination with other regions, states, and EPA
  - Sharing ideas and data
  - Analysis of data
- Goals
  - Commonality of modeling data where ever possible
    - Modeling domain
    - Meteorology
    - Emission inventories
- Start with EPA generated 2011 modeling files
  - Improve as needed

Inter-Regional Technical Coordination

- **Spring 2014** – Review of EPA version 1 2011 Modeling Inventory, 2018 projected inventories, and version 2 WRF modeling files
- **Mid-summer** - IPM 2018 projected EGU emissions replaced by ERTAC generated emissions
- **Late summer** - early state baseline modeling begins
- **Late 2014** – collaborative modeling scenarios conducted
- **Ongoing** – meteorological and emission inventory improvements – building toward SIP quality

Inter-Regional Review of 2011 WRF Data

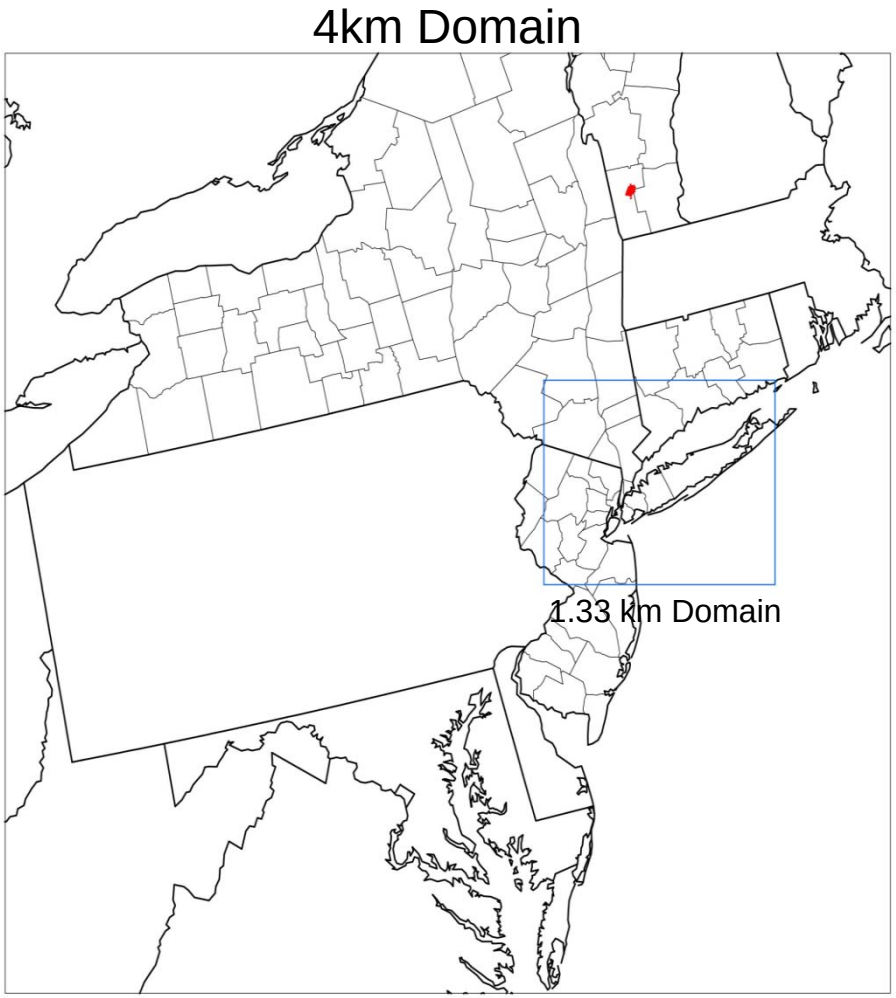
- Evaluating EPA's WRF modeling vs. actual reported data
- Generally performs well but improvement still needed
- EPA WRF version 2 now being evaluated



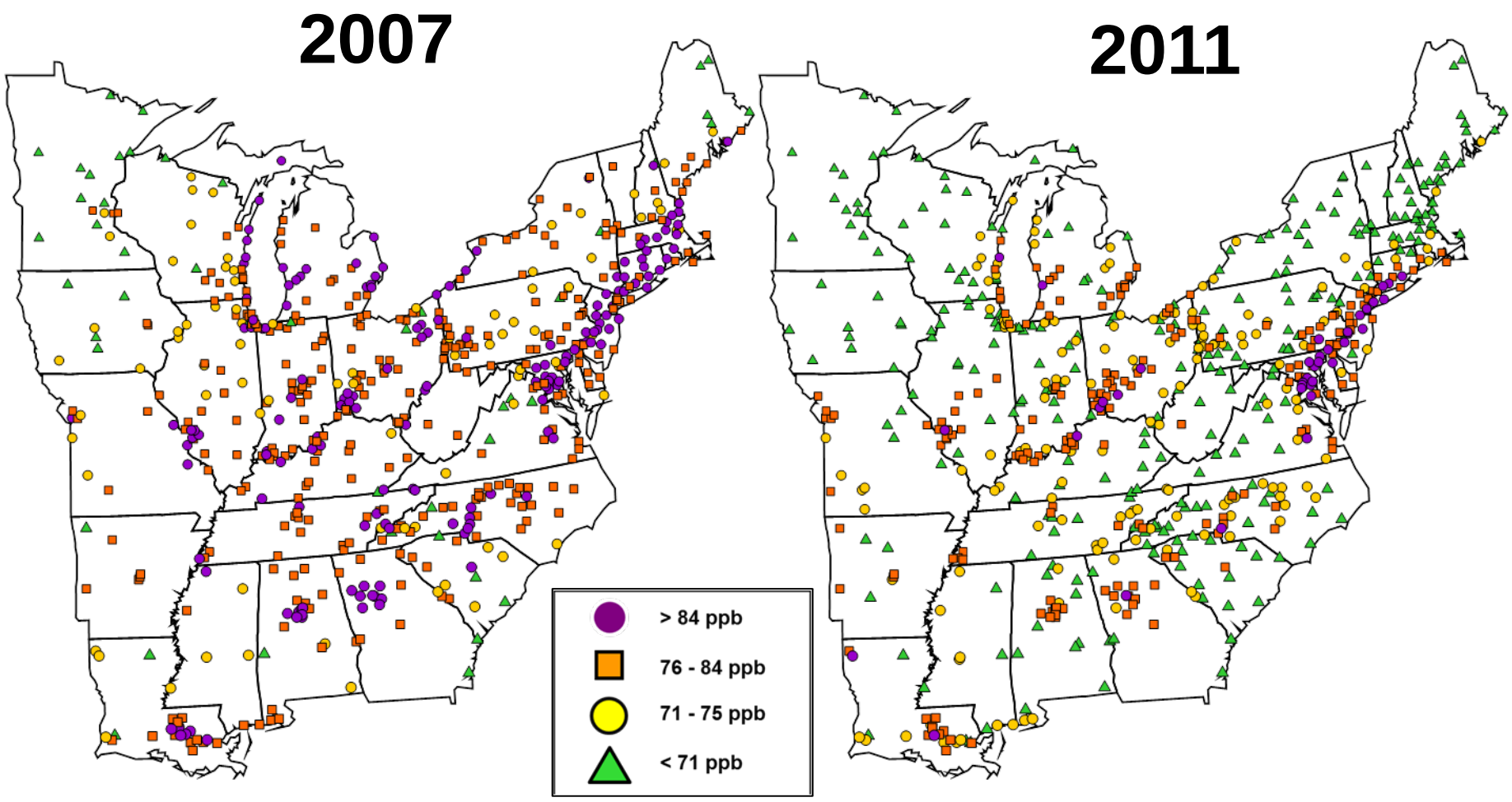
All errors are within acceptable performance standards
Performance improvement compared to previous WRF runs

Building Towards a 2011 Based SIP Modeling Platform

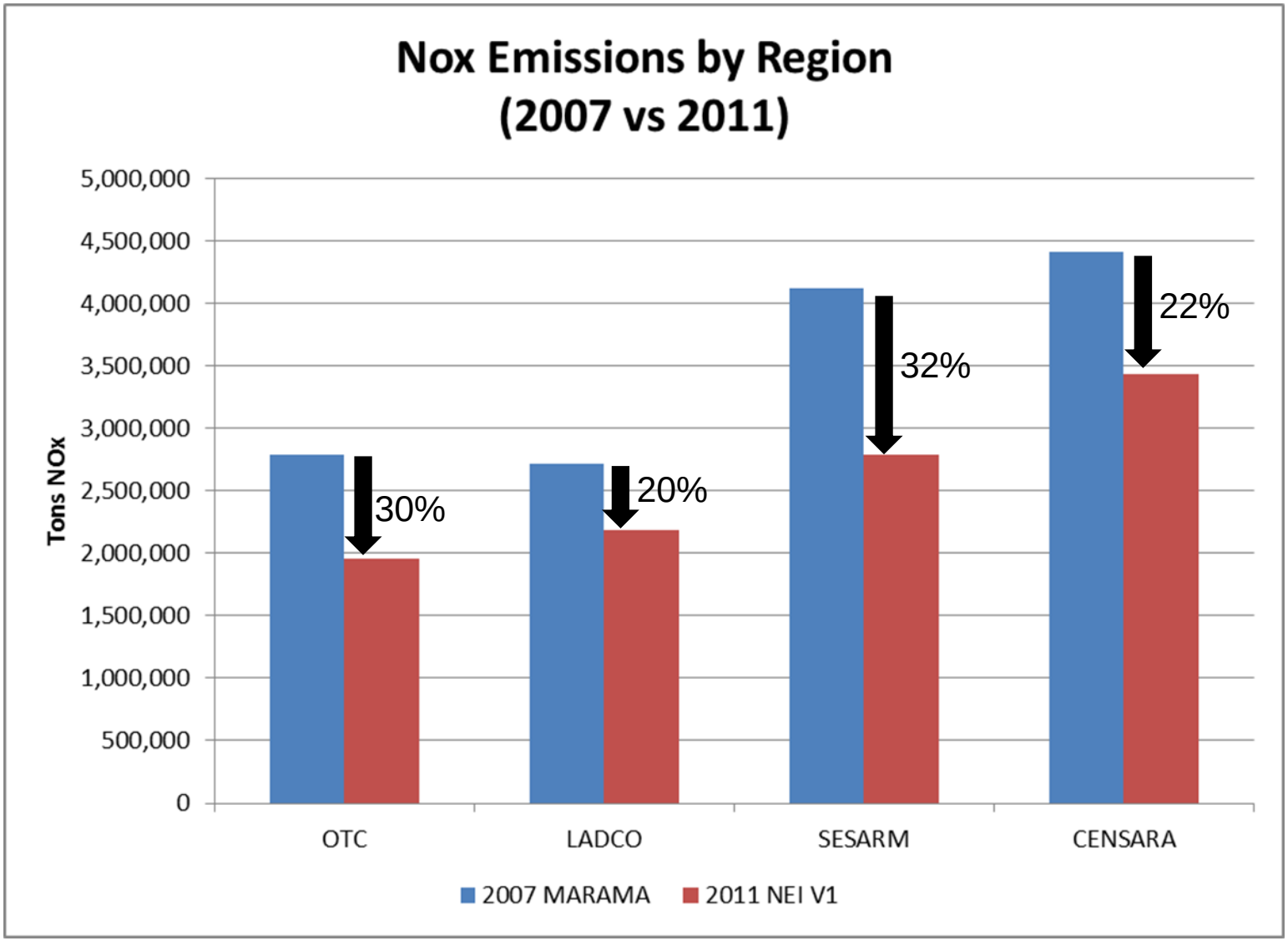
- Start with EPA data
- Improve emission inventories to SIP quality
- If needed, improve model performance in critical locations with:
  - 4km nested grid for all OTC nonattainment areas
  - 4km nested grid for Chesapeake Bay breezes
  - 1.33km nested grid for NYC region



4th High 8-Hour Ozone
2007 vs 2011



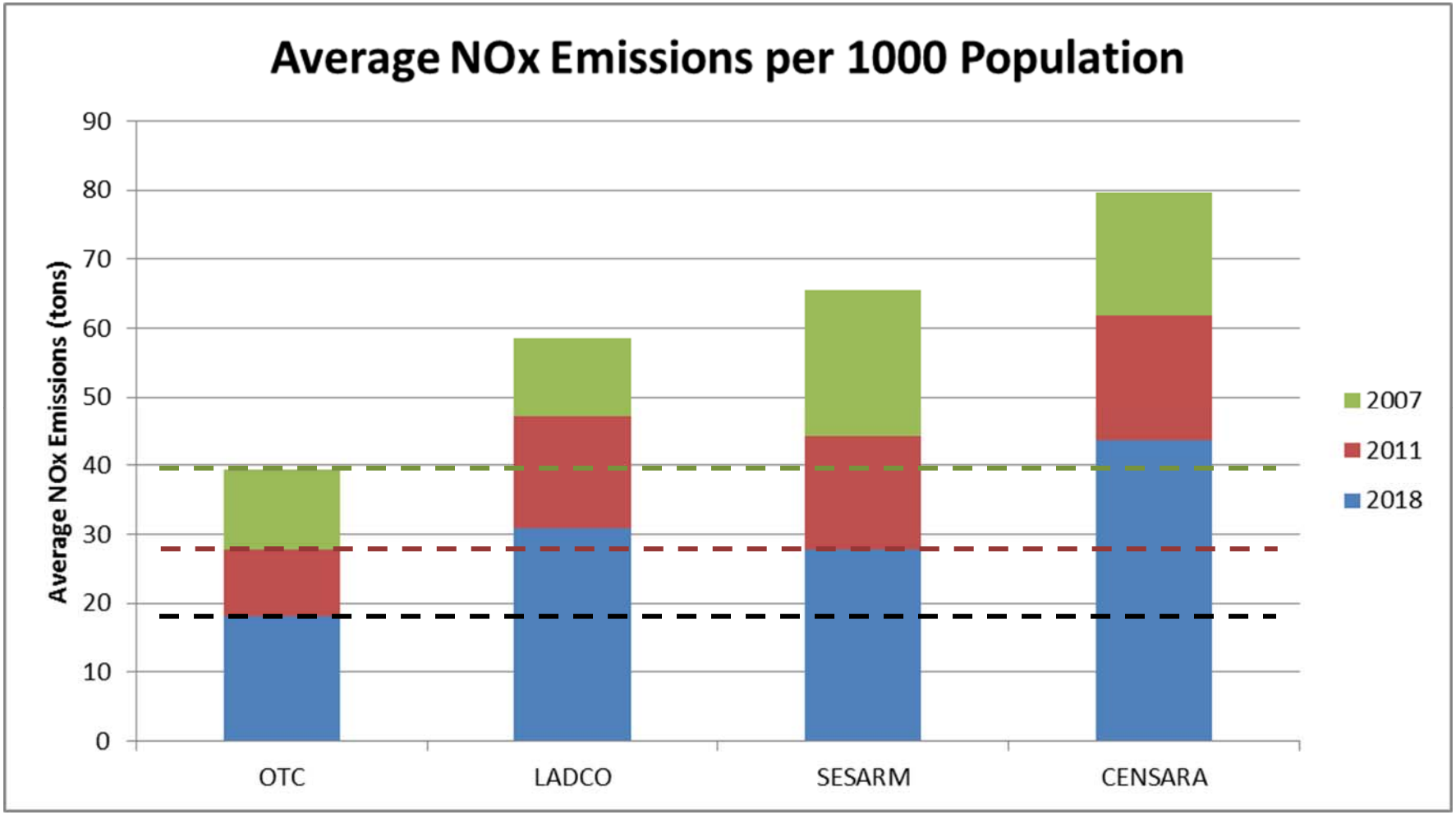
NOx Emissions
2007 vs 2011



Overall

26%

NOx Emissions per Population
2007 MARAMA & 2011 - 2018 NEI



Census 2010

Level 3 Screening Runs
(OTC 2007 Based Platform)

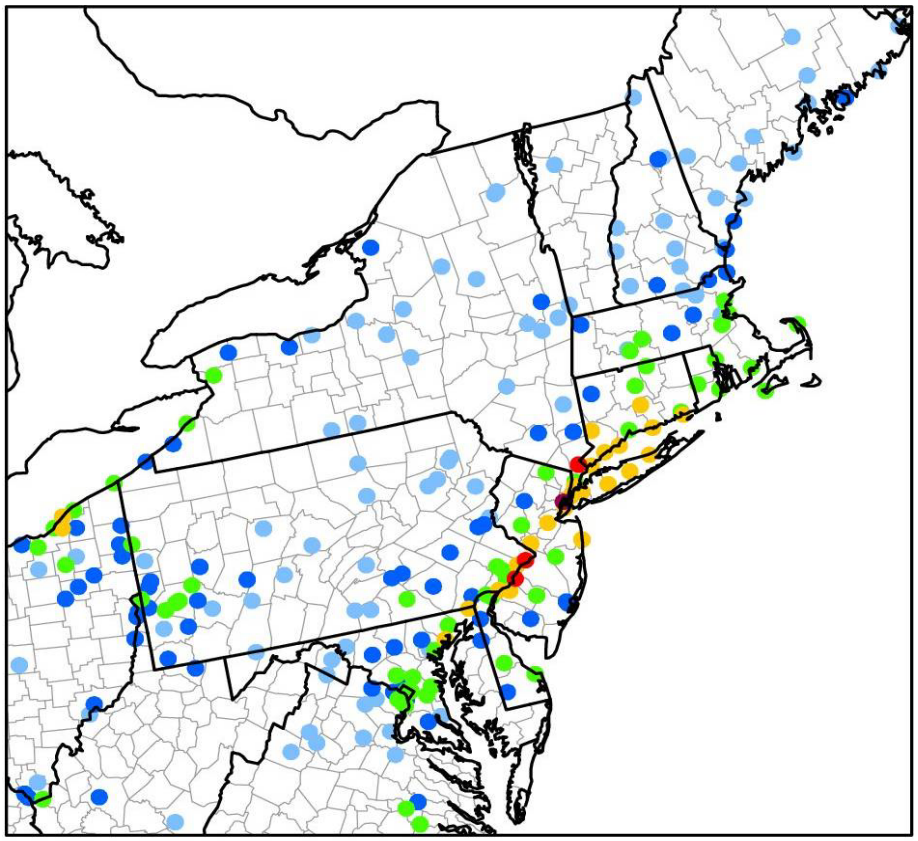
Level 3B Modeling Runs

1. Updated 2020 Base Case
   - ERTAC EGU Emissions (version 1.7)
   - Oil & Gas Estimate (2011 NEI)
   - ICI Boiler Projections

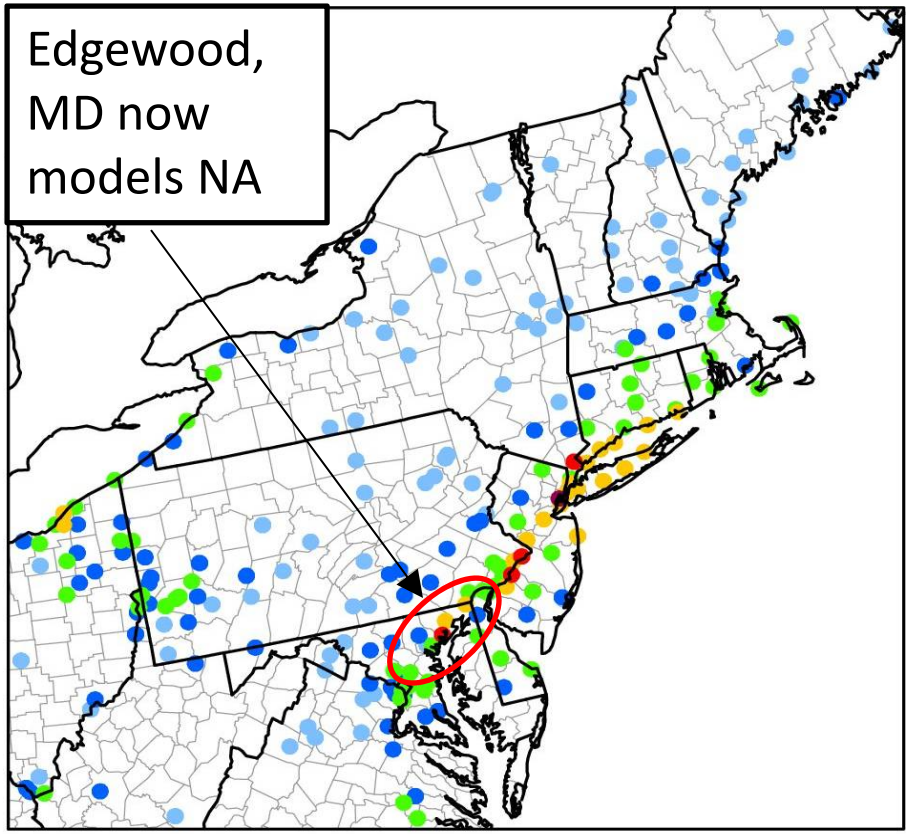
2. 2018 Base Case
   - 2018 ERTAC EGU Emissions (version 1.7)
   - Oil & Gas Estimate (2011 NEI)
   - Interpolation for Other Sectors

3. “Scenario 7” 2018 Optimistic Scenario
   - Tier 3 Adoption (OnRoad)
   - PJM Shutdown List (EGU)
   - Lower emitting ICI Boiler retrofits

2020 Ozone Differences from **Upgrading EGU Emissions**

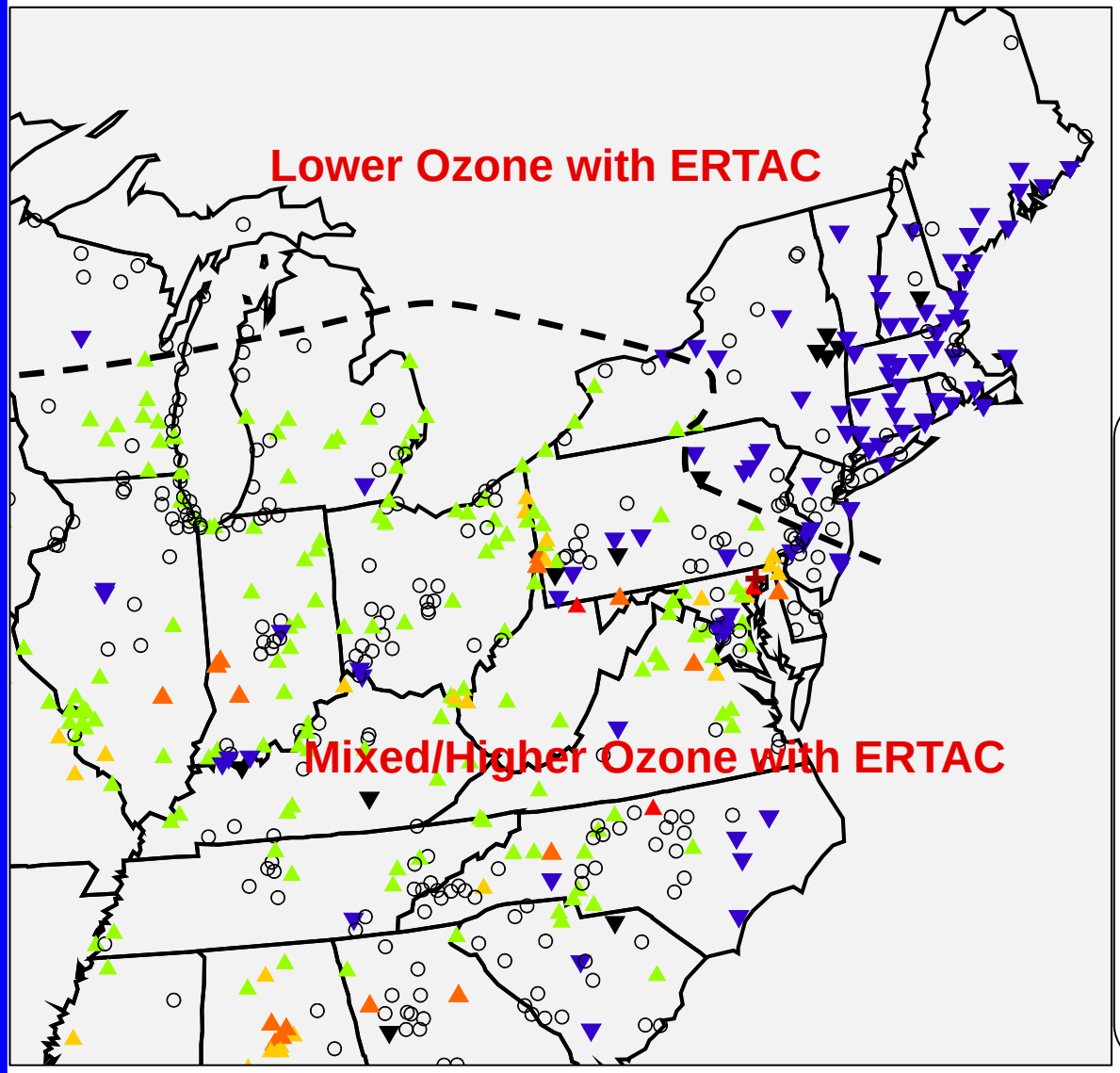


Level 3A (Proxy EGU from CSAPR)



Level 3B (ERTAC EGU v1.7)

2020 Ozone Differences from **Upgrading EGU Emissions**



Ozone Change (ppb)

- +5
- +4
- +3
- +2
- +1
- 0
- -1
- -2

Level 3A Proxy Base minus ERTAC V1.7 Base

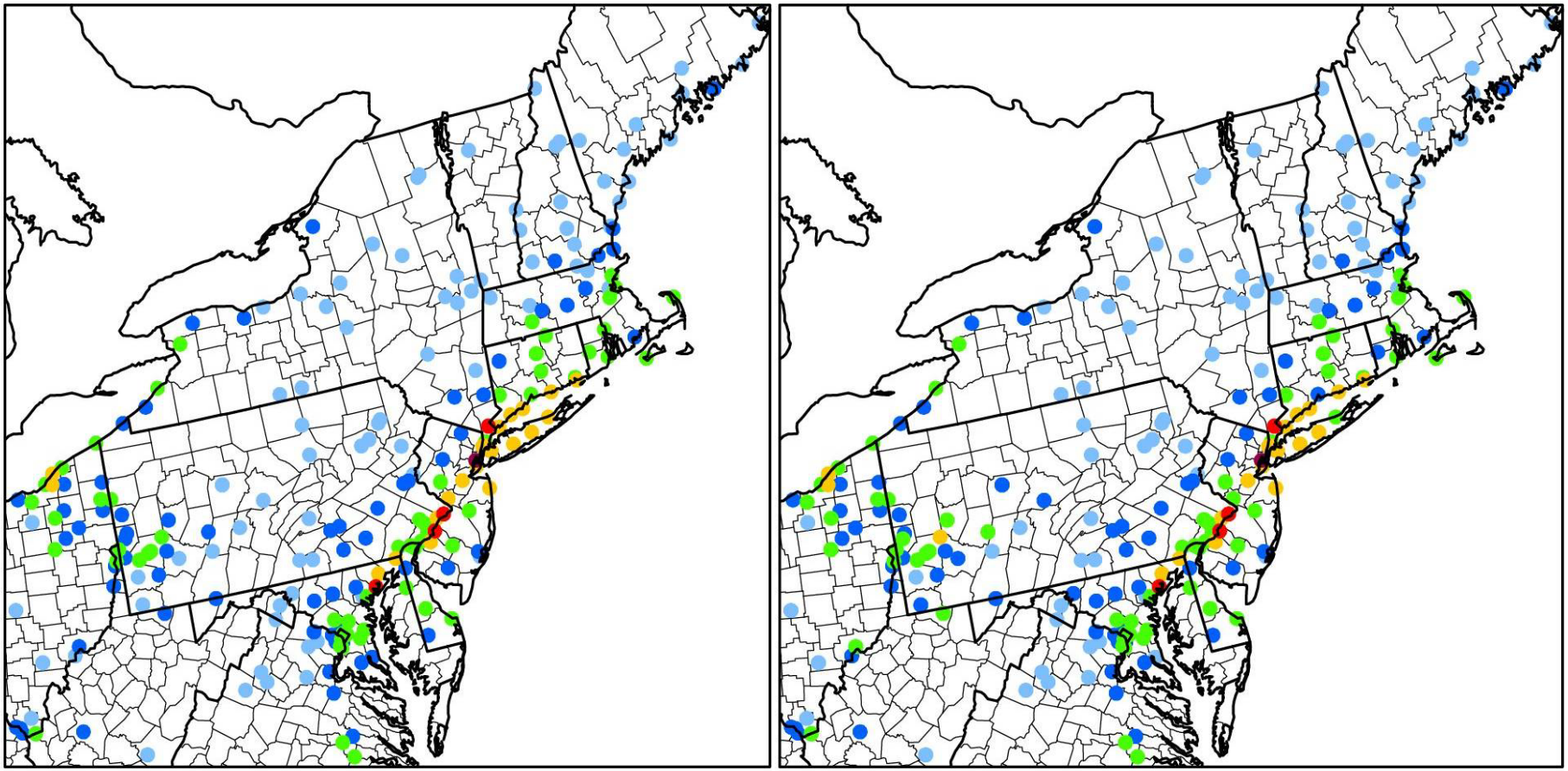
ICI Boiler and Oil & Gas Emissions Adjustments

- Significant changes in the ICI sector from
  - Pressures of compliance with boiler MACT
  - Low costs of natural gas

	ICI Unit Emissions	Δ ICI % of Total Emissions
NO_X	52%	2.3%
SO_2	76%	13.8%
Direct $PM_{2.5}$	82%	3.5%

- 2011 NEI Oil & Gas emissions applied for 2018 & 2020 base case projections
- States need to improve future year projections

2020 Ozone Differences from Updating
Effect of Oil & Gas and ICI Emission Updates



2020 Ozone Differences from Updating
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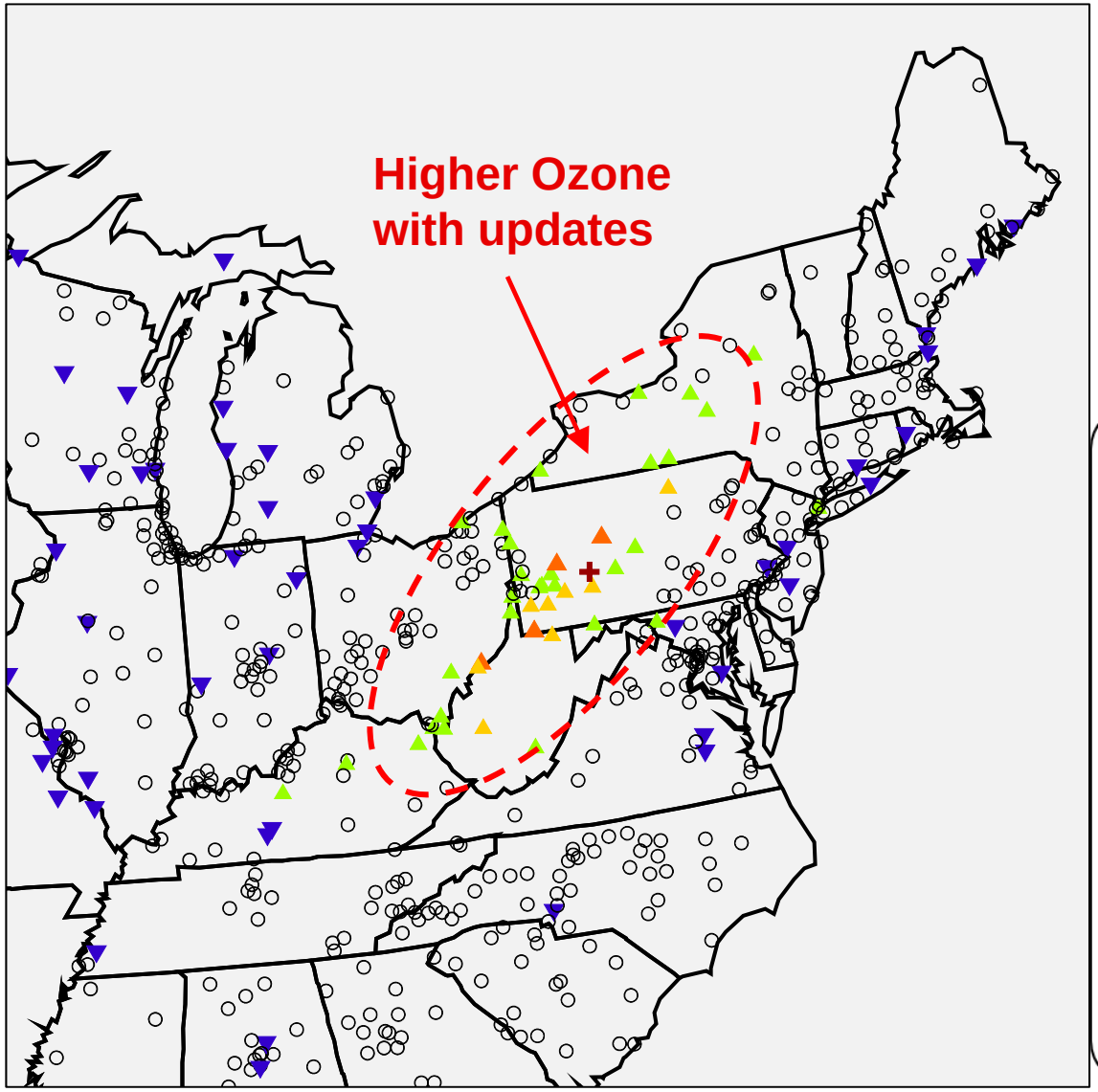
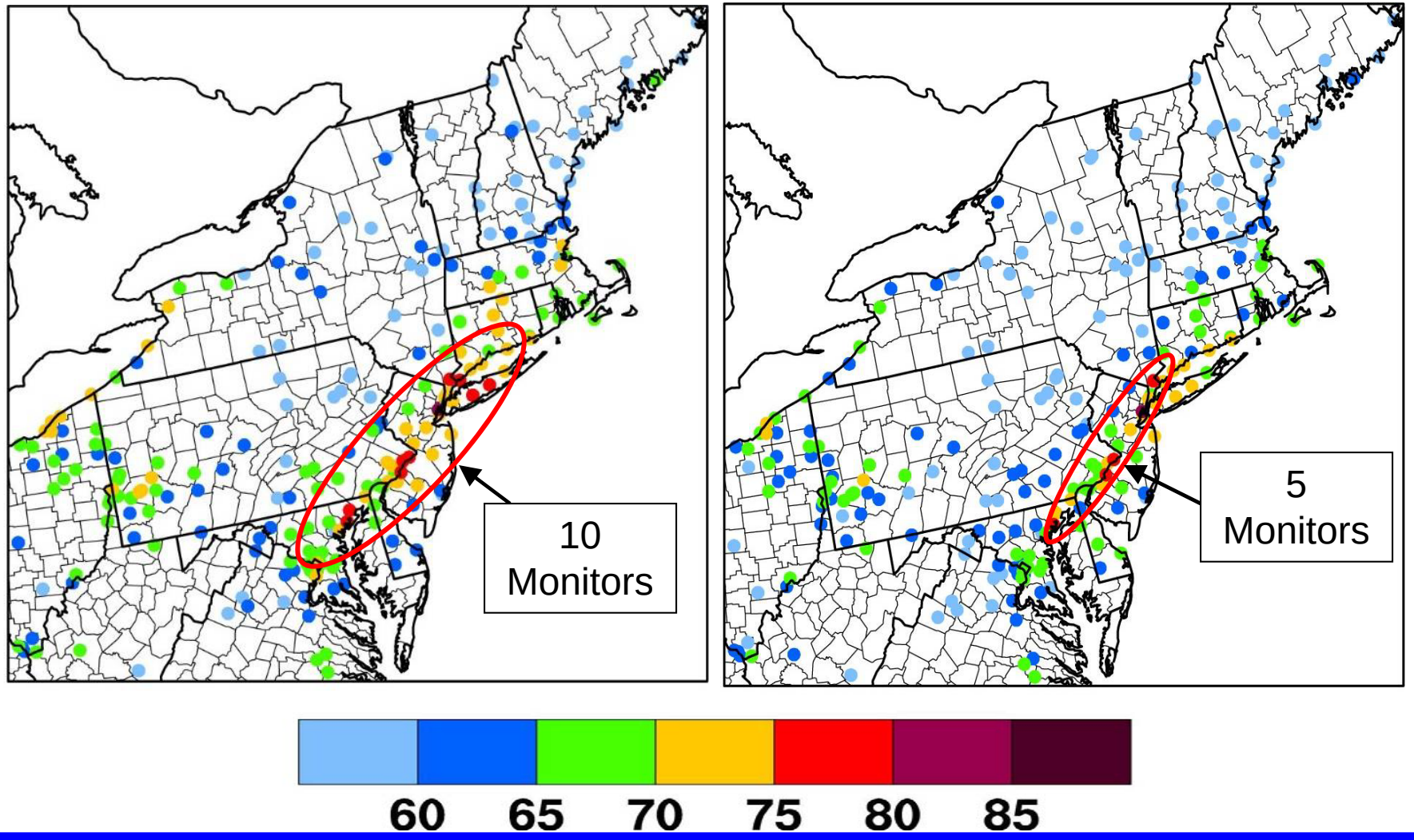


Ozone
Change
(ppb)

+5
+4
+3
+2
+1
0
-1
-2

ERTAC
V1.7 Base
minus
L3B Base

Level 3B 2018 Base vs 2020



Scenario 7
Optimistic 2018 Base Case

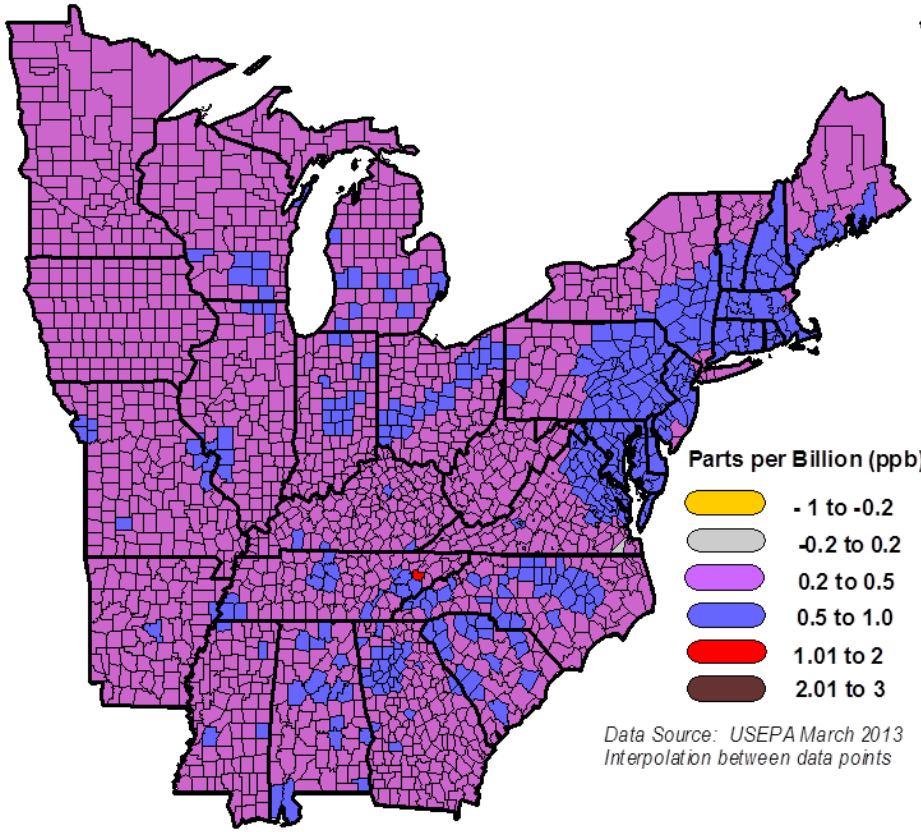
- **Tier 3:** Adds additional mobile source NOx and VOC reductions in the 2018 time frame from EPA's Proposed Tier 3 and Low Sulfur Fuel Rule

- **EGU:** ERTAC version 1.7 updated with;
  - PJM and other announced shutdowns
  - Other changes built into regional ERTAC projections like natural gas conversions
  - Assumptions about loss of capacity being replaced by natural gas generation

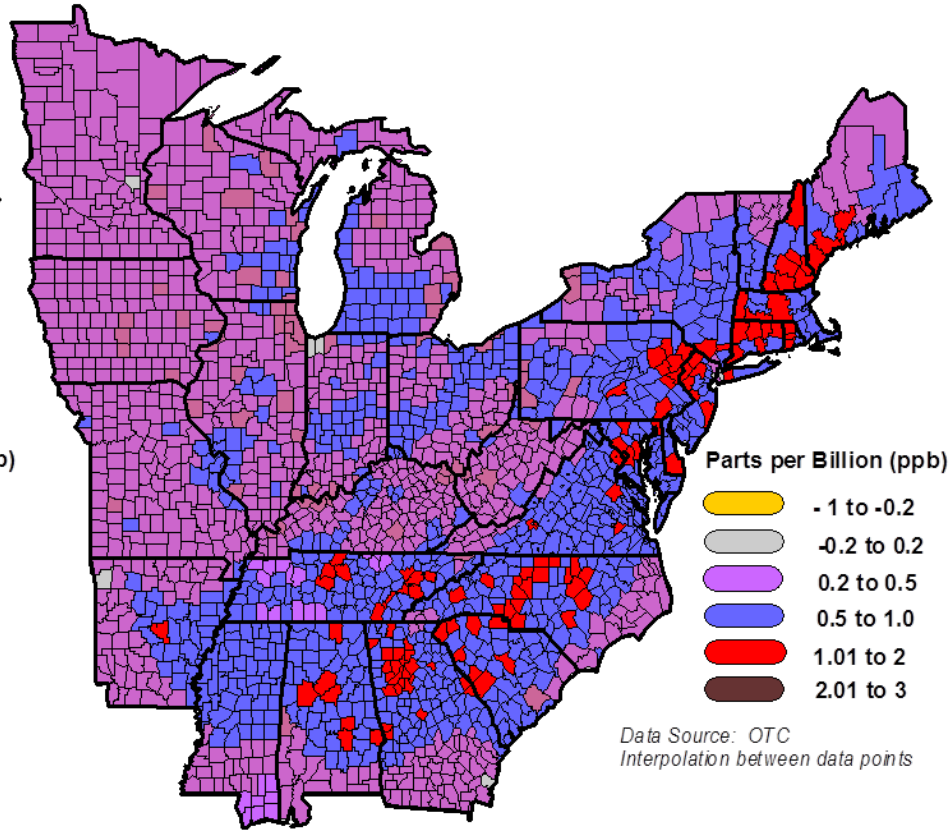
- **ICI Boiler:** Rates lower NOx rates for retrofitter boilers to meet MACT with natural gas

Tier 3 Program Ozone Benefits

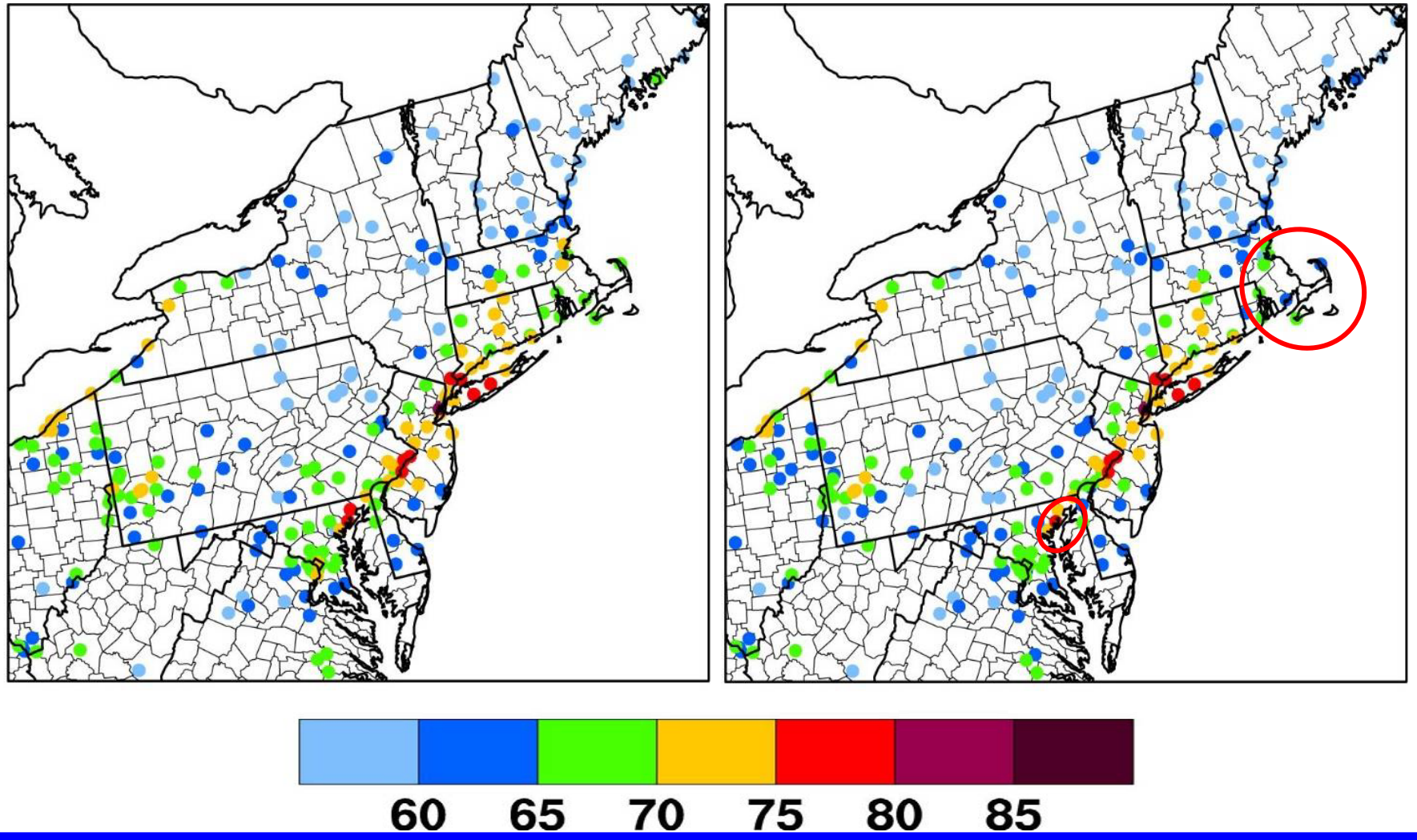
EPA 2017



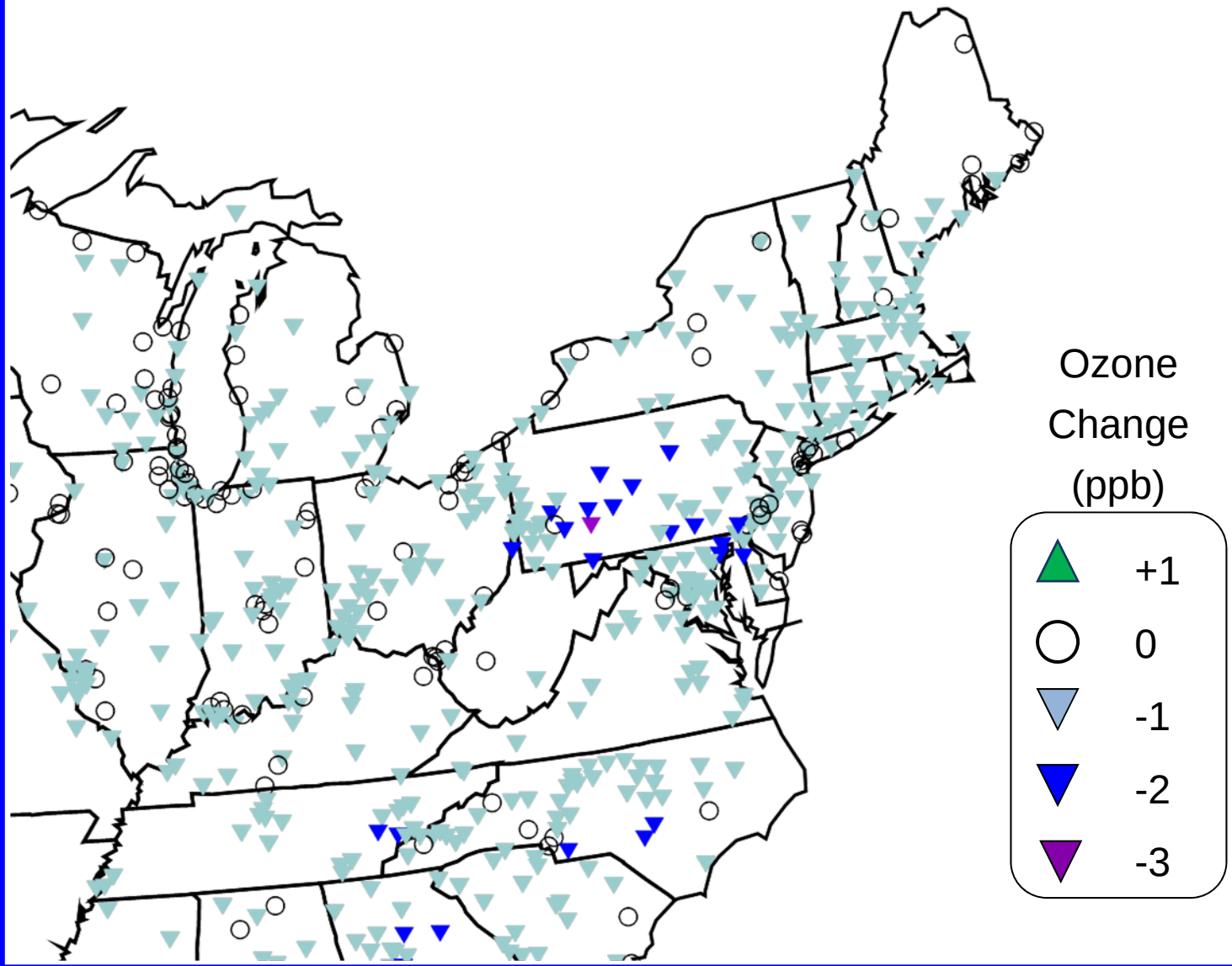
OTC 2020 Estimate



Scenario 7
Optimistic 2018 Base Case



Ozone Changes
Scenario 7 from 2018 Base Case



Scenario 7 Screening Modeling Results
High Values by OTR State

State	2007 Base Design Value	2018 Scenario 7 "Optimistic"	State	2007 Base Design Value	2018 Scenario 7 "Optimistic"
CT	89	76	NJ	88	85
DE	81	69	NY	88	77
DC	85	70	PA	91	79
ME	80	65	RI	81	66
MD	91	76	VT	71	57
MA	88	72	VA (OTR)	85	70
NH	78	62			

Emission Inventory Update

Questions

- Committee Chair:
  - Jeff Underhill (NH)
    jeffrey.underhill@des.nh.gov (603) 271-1102
- Modeling Lead:
  - Mike Ku (NY)
    mku@dec.state.ny.us (518) 402-8402
- Emissions Inventory Lead:
  - Julie McDill (MARAMA)
    jmcdill@marama.org (443) 901-1882
- OTC Committee Lead:
  - Joseph Jakuta
    jjakuta@otcair.org (202) 508-3839