

Good Neighbor SIP Development, Modeling Results, and Next Steps

Midwest Ozone Group Presentation

17 November 2017

Good Neighbor Transport SIPs for Ozone NAAQS

- **Section 110(a)(2)(D)(i)(I)** – (the “good neighbor” provision) requires upwind states to implement a share of the emission reductions needed for downwind areas to attain and maintain the NAAQS
- **Outstanding good neighbor obligations for the 2008 ozone NAAQS**
 - CSAPR Update was a partial remedy for 21 eastern states (full remedy for TN).
 - AL, AR, IL, IN, IA, KS, KY, LA, MD, MI, MS, MO, NJ, NY, OH, OK, PA, TX, VA, WV, and WI
 - CSAPR Update Rule did not address 2008 transport obligations for western states
 - There are 24 states for which EPA does not have a pending SIP and continues to have a FIP obligation.
 - Kentucky – EPA is under a court-ordered deadline of June 30, 2018 for a full FIP; however, EPA can moot the FIP obligation if it fully approves a SIP from KY
 - For other states, EPA has statutory FIP deadlines ranging from August 2017 to March 2019.
 - EPA is currently developing updated interstate ozone transport modeling using an analytic year of 2023 and hosted conference calls with MJOs and states in August to discuss plans for this modeling.



Good Neighbor SIP Deadlines

2008 Ozone NAAQS

June 30, 2018 – Kentucky

August 2017 – March 2019 – other states

2015 Ozone NAAQS

October 1, 2018

EPA's 4 Step Process In 3 Steps

- Step 1 – Problem monitors (EPA Step 1)
- Step 2 – Contribution (EPA Steps 2 and 3)
- Step 3 – Cost effective controls (EPA Step 4)

Step 1 – Identification of Problem Monitors

- In addition to the traditional assessment of nonattainment or maintenance, state may wish to consider several other factors that may impact on whether there are downwind problem monitors with respect to either the 2008 or 2015 ozone NAAQS
 - International Emissions – §7509a(a). Reads as follows:

Notwithstanding any other provision of law, an implementation plan or plan revision required under this chapter shall be approved by the Administrator if—

 - (1) such plan or revision meets all the requirements applicable to it under the chapter other than a requirement that such plan or revision demonstrate attainment and maintenance of the relevant national ambient air quality standards by the attainment date specified under the applicable provision of this chapter, or in a regulation promulgated under such provision, and
 - (2) the submitting State establishes to the satisfaction of the Administrator that the implementation plan of such State would be adequate to attain and maintain the relevant national ambient air quality standards by the attainment date specified under the applicable provision of this chapter, or in a regulation promulgated under such provision, but for emissions emanating from outside of the United States.
 - Complex Meteorology— There is reason to conclude that the CAMx model may be poorly predicting ozone concentrations by selecting locations in the 12 km grid cells that are located over water. The results could show fewer problem areas avoid the need to move to the next step involving an assessment of contribution.
 - Additional emission reduction programs not modeled – It is very likely that the modeling data being generated does not take into consideration control programs that would be required of downwind states because they are in nonattainment. These legally mandated programs could be sufficient to bring a downwind monitor into attainment and eliminate the basis for imposing control on upwind states.

Step 2 – Significant Contribution

- APCA – Should it be necessary to determine significant contribution, states may wish to examine APCA source apportionment data favored by EPA to see if their state significantly contributes (1%) to any of the problem areas. If not, no further action on the part of those states is needed.
- OSAT – Should the APCA technique show significant contribution, states may wish to examine OSAT data to be available in the spring to see if less impact on problem monitors is shown by that technique. If so, states will want to contend that OSAT is the preferred technique since it accounts for anthropogenic emissions separately from biogenics in which case no further action on their part would be necessary.
- Alternative significance level – If a state is shown to have significant impact by both APCA and OSAT, a state may wish to offer an alternative significance level that EPA has not yet approved. The states of Tennessee, Georgia and North Carolina have already been advocating for a significance level of 1 ppb.
 - http://www.csg.org/aapca_site/events/documents/Johnston-CSAPR_Framework_TN_GA_NC_09-21-2017.pdf

Step 3 – Determination of Cost Effective Controls

- If a state is determined to be significantly contributing to downwind problem areas, that state will need to determine whether there are cost effective emission reductions available in 2023 for sources in their state that would bring the problem monitor into attainment or, if not, to eliminate that states significant contribution or otherwise.
 - Note in the case of Harford Maryland, while Kentucky's contribution to that monitor is 1.56 ppb, that monitor is only 0.50 ppb out of compliance. This raises the question of what responsibility other states will have to reduce their emissions to address this monitor.
- Once it is clear what air quality reduction are necessary, an upwind state may wish to consider whether it already has in places appropriate cost effective controls for its sources. If so, a state may wish to consider a submittal on that basis.
- If additional cost effective controls are available to state to address it responsibility for achieving its air quality reduction as described above, the state may wish to consider the imposition of those additional control requirements.

Original MOG GNS Modeling Plan

- Start with EPA 2023e1 NAAQS NODA platform
 - Augment with updated ERTAC EGU emissions
 - Modify other sectors based on obtainable info
 - RACT, boiler MACT, oil and gas production, etc.
- Process emissions at 12/4km and run CAMx/OSAT to generate 2023 results
- June 2018 SIP revision requires all work and documentation to be complete in January 2018

Final Plan Modification Highlights

- Based on comments received from EPA on draft modeling protocol and assistance from states and MJOs, decision made to change modeling plan
 - EPA expedited release of 2023en platform
 - Excludes CPP, includes compliance with CSAPR FIP budgets
 - Allows us to use data directly without modification
 - Updated version of models
 - Created problem with memory overhead and ability to run planned configuration in time for KY use
 - Revised domain, source apportionment technique, and methods
 - Eliminated 4km modeling from this run
 - Running APCA with KY as only source region

KY GNS Modeling Results*

- All sites identified in the final CSAPR update where Kentucky was identified as a significant contributor are predicted to be well below the 2008 ozone standard (75.9 ppb) by 2023

Monitor	State	County	2009-2013 Base Period Average Design Value (ppb)	2009-2013 Base Period Maximum Design Value (ppb)	2023 Base Case Average Design Value (ppb)	2023 Base Case Maximum Design Value (ppb)
390610006	OH	Hamilton	82.0	85	65.0	67.4
421010024	PA	Philadelphia	83.3	87	67.3	70.3
240251001	MD	Harford	90.0	93	71.4	73.8
360850067	NY	Richmond	81.3	83	71.9	73.4

- Based on these calculations, none of the problem monitors are predicted to be in nonattainment or have issues with maintenance in 2023 and therefore Kentucky is not required to estimate its contribution to these monitors
- Through this modeling analysis, the Commonwealth of Kentucky has demonstrated compliance with CAA Section 110(a)(2)(D)(i)(I) for the 2008 Ozone National Ambient Air Quality Standard

* http://www.midwestozonegroup.com/files/Ozone_Modeling_Results_Supporting_Kentucky_GN_SIP_Obligations_Final_Nov_2017_.pdf

EPA Modeling Results

- EPA also ran the 2023en platform and found corroborating results for KY as well as –

“The EPA’s updated modeling indicates that there are no monitoring sites, outside of California, that are projected to have nonattainment or maintenance problems with respect to the 2008 ozone NAAQS of 75 ppb in 2023”

- Steven Page memo* to Regional Air Directors, October 27, 2017

* https://www.epa.gov/sites/production/files/2017-10/documents/final_2008_o3_naaqs_transport_memo_10-27-17b.pdf

CSAPR FIP Budget Compliance

- Regarding the development of the EGU emissions projection used here, it is based on 2016 emissions that are reported to CAMD, with unit-level adjustments made to account for:
 - Announced retirements
 - Announced Post-combustion control retrofits
 - Announced coal-to-gas conversions
 - Announced combustion controls upgrades outside of CSAPR Update states
 - Firm new units
 - CSAPR Update compliance
 - Combustion controls upgrades
 - Optimizing existing SCR
 - State rules
 - Best Available Retrofit Technology (BART) requirements

EGU NOx Comparison (Key States)

State	EGU Ozone Season NOx Emissions				2023en as % of CSAPR Group 2 Budget	2023en as % of CSAPR Assurance Level
	2016 (tons)	2023en (tons)	CSAPR Group 2 Budget	CSAPR Assurance Level		
Alabama Total	11,612	9,027	13,211	15,985	68%	56%
Arkansas Total	13,223	8,551	9,210	11,144	93%	77%
Illinois Total	14,553	12,633	14,601	17,667	87%	72%
Indiana Total	34,636	20,819	23,303	28,197	89%	74%
Iowa Total	10,614	9,715	11,272	13,639	86%	71%
Kansas Total	7,508	7,165	8,027	9,713	89%	74%
Kentucky Total	25,402	16,907	21,115	25,549	80%	66%
Louisiana Total	19,615	19,411	18,639	22,553	104%	86%
Maryland Total	4,468	4,242	3,828	4,632	111%	92%
Michigan Total	17,601	13,716	17,023	20,598	81%	67%
Mississippi Total	7,325	6,522	6,315	7,641	103%	85%
Missouri Total	25,139	13,105	15,780	19,094	83%	69%
New Jersey Total	2,463	2,070	2,062	2,495	100%	83%
New York Total	6,533	6,157	5,135	6,213	120%	99%
Ohio Total	24,205	14,359	19,522	23,622	74%	61%
Oklahoma Total	12,761	10,652	11,641	14,086	92%	76%
Pennsylvania Total	31,896	18,718	17,952	21,722	104%	86%
Tennessee Total	9,774	6,146	7,736	9,361	79%	66%
Texas Total	54,435	51,131	52,301	63,284	98%	81%
Virginia Total	9,831	8,198	9,223	11,160	89%	73%
West Virginia Total	21,178	16,460	17,815	21,556	92%	76%
Wisconsin Total	7,946	7,462	7,915	9,577	94%	78%
22 State Region	372,717	283,164	313,626	379,488	90%	75%

Use of 2023en Modeling Platform

- “[W]e believe that states may be able to rely on the modeling (which includes the CSAPR Update FIP) as part of a demonstration of compliance with the good neighbor requirements. As noted in my earlier email, *we have not historically required states to adopt the specific modeled EPA compliance path EGU control assumptions from the platform (incl. optimization or new SCR installations) at the unit or facility level in their revision to make this case.* Because Kentucky is under the CSAPR Update FIP, one way the state could replace the FIP is to adopt the final EGU NO_x ozone season emission budgets into their SIP.”

– Personal communication with David Risley, CAMD, EPA

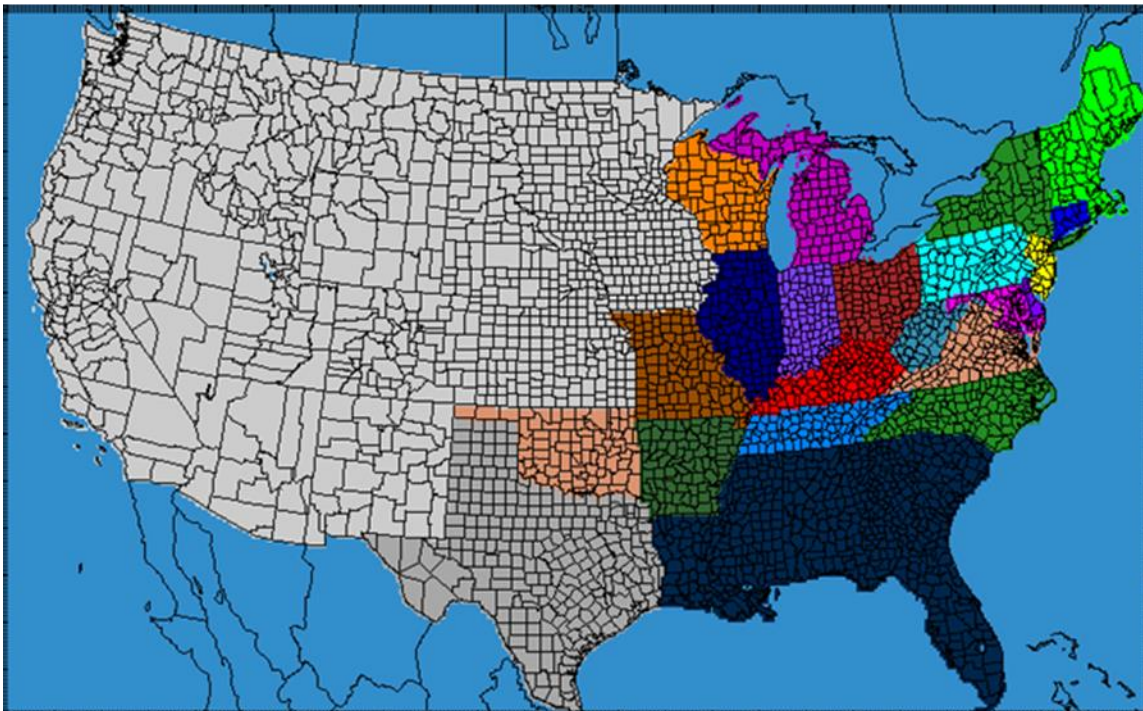
EPA Modeling Results (2)

- EPA also produced “No Water” calculations with updated 2023 DVs
 - Removed water cells (>50% water by area) from future year design value calculation

Site	St	County	2009-2013 Avg	2009-2013 Max	2023en "3x3" Avg	2023en "3x3" Max	2023en "No Water" Avg	2023en "No Water" Max	2014-2016
90019003	CT	Fairfield	83.7	87	72.7	75.6	73.0	75.9	85
361030002	NY	Suffolk	83.3	85	72.5	74.0	74.0	75.5	72
360850067	NY	Richmond	81.3	83	71.9	73.4	67.1	68.5	76
240251001	MD	Harford	90.0	93	71.4	73.8	70.9	73.3	73
90013007	CT	Fairfield	84.3	89	71.2	75.2	71.0	75.0	81
90099002	CT	New Haven	85.7	89	71.2	73.9	69.9	72.6	76
551170006	WI	Sheboygan	84.3	87	70.8	73.1	72.8	75.1	79
211110067	KY	Jefferson	85.0	85	70.1	70.1	70.1	70.1	74
360810124	NY	Queens	78.0	80	70.1	71.9	70.2	72.0	69
90010017	CT	Fairfield	80.3	83	69.8	72.1	68.9	71.2	80
260050003	MI	Allegan	82.7	86	69.0	71.8	69.0	71.7	75
261630019	MI	Wayne	78.7	81	69.0	71.0	69.0	71.0	72

GNS Modeling Beyond Kentucky

- MOG further intends to process entire 12km domain (incl. two 4km subdomains) with OSAT source apportionment calculations for all key eastern states and source categories



Categories

Biogenic/Fires

Onroad Mobile

Nonroad/Area

EGU Point

Non-EGU Point

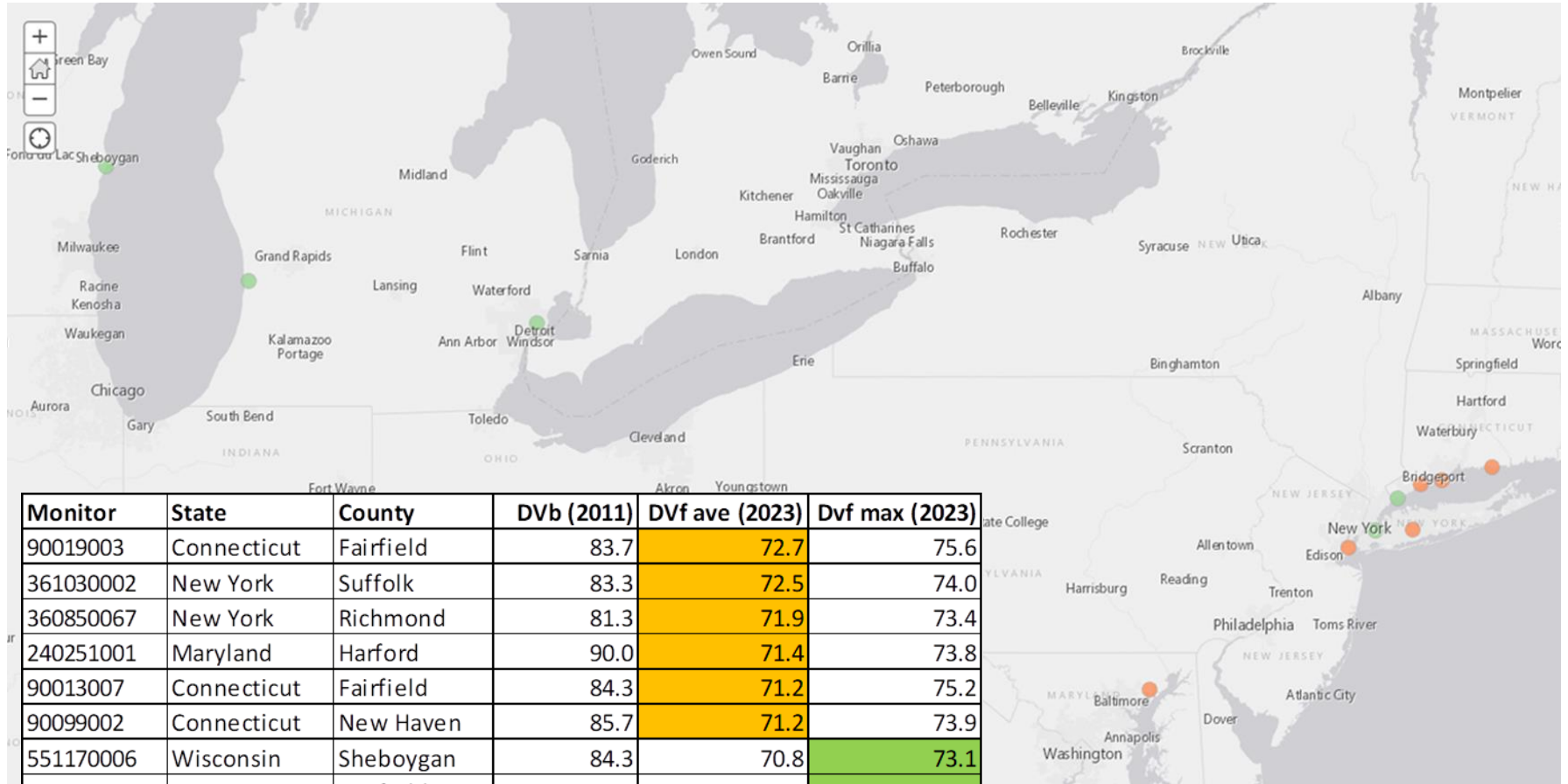
Boundary/Initial

Canada/Mexico/Water

Additional Modeling Information

- 12/4km CAMx/OSAT began in early November
 - Earliest source apportionment and significant contribution results available spring 2018
- Results will be useful for 2015 ozone NAAQS analysis and GNS demonstrations
 - Results of KY modeling indicates eleven (11) “problem” monitors left in eastern U.S.
 - Monitors that would be initially classified as nonattainment or maintenance based on modeling alone

2023en Platform “Problem” Monitors

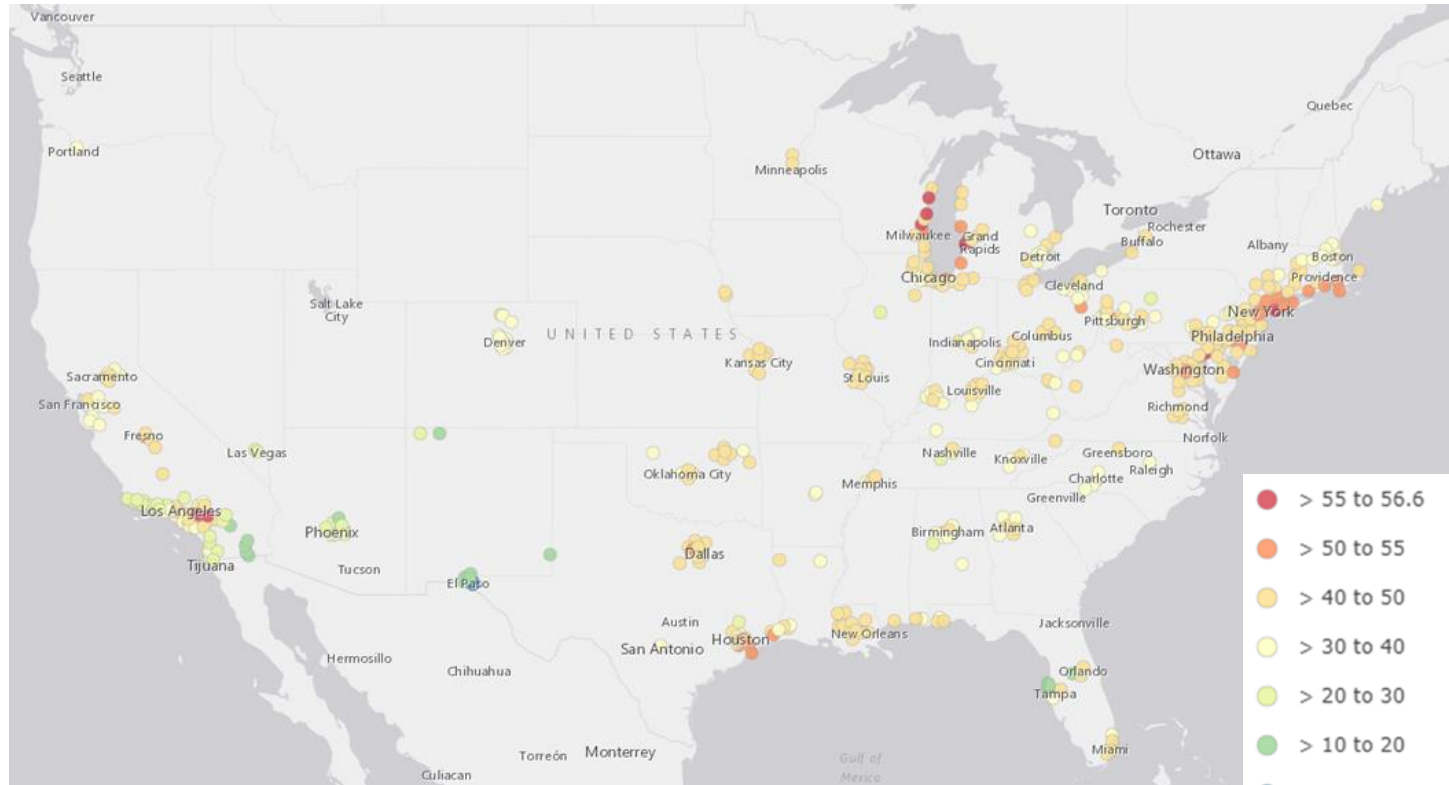


“But For” Contribution Calculation

No Monitor > 56.6 ppb

2023en Final
CSAPR MDA8
DV (ppb)
without
“Boundary”
Contributions

[BC/IC/Can/Mex]



- International contribution, wildfires, and natural background emissions play an ever increasing role in modeled ozone
- We need a better understanding and quantification of the impact of these sources on regional air quality and better tools and policies to account for their presence

MOG GNS Open Policy Issues

- But for international emissions, there would be attainment with 2008 and 2015 ozone NAAQS
- Identification of existing control programs that have not yet been modeled which could result in attainment
- Identification of legally mandated controls to be imposed by downwind states in 2023 which could result in attainment
- An alternate approach to addressing maintenance areas
- APCA v. OSAT to determine significant contribution without the influence of biogenics