

No. 16-1406 (and consolidated cases)

In the United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

STATE OF WISCONSIN, ET AL.,
PETITIONERS,

v.

ENVIRONMENTAL PROTECTION AGENCY AND
E. SCOTT PRUITT, RESPONDENTS

On Petition for Judicial Review of Final Agency Action of
the United States Environmental Protection Agency
81 Fed. Reg. 74,504 (Oct. 26, 2016)

SUPPLEMENTAL DEFERRED JOINT APPENDIX

JA 1479–JA 1503

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**SUPPLEMENTAL DEFERRED JOINT APPENDIX
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PUBLIC COMMENTS		
Docket No.	Submitter	Pages
EPA-HQ-OAR-2015-0500-0287	Comment submitted by Zachary M. Fabish, Staff Attorney, The Sierra Club et al. (Feb. 1, 2016)	JA 1479– JA 1501
EPA-HQ-OAR-2015-0500-0287 Appendix 1	Excerpt, Appendix 1 to Comment submitted by Sierra Club et al.	JA 1502– JA 1503



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Re: Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS, Docket ID No. EPA-HQ-OAR-2015-0500

The Sierra Club, Clean Air Task Force, National Parks Conservation Association, and Appalachian Mountain Club (collectively, “the Commenters”) submit these comments on EPA’s proposed Cross-State Air Pollution Rule Update (referred to herein as “CSAPR 2” or the “CSAPR Update”) for the 2008 National Ambient Air Quality Standard (“NAAQS”).¹ The Commenters applaud EPA for taking steps to reduce the massive quantities of nitrogen oxide (“NO_x”) pollution emitted by the energy sector, and to address the failure of states to satisfy their air transport obligations under the ozone NAAQS and the Clean Air Act. The Commenters strongly agree with EPA that NO_x reductions are best achieved by focusing on emissions from power plants, as such facilities are best able to install and maintain pollution controls in a way that is readily verifiable, inexpensive, and of far more consequence to long-range transport.²

¹ U.S. Environmental Protection Agency, 80 Fed. Reg. 75,706 (Dec. 2, 2015).

² Reductions from such large point sources are more readily realized than from mobile sources. Mobile source programs to reduce NO_x can cost multiple tens of thousands of dollars per ton of reduction. See, e.g., U.S. EPA. The Cost-Effectiveness of Heavy-Duty Diesel Retrofits and

However, as explained in more detail below, Commenters believe that the currently proposed CSAPR 2 suffers from significant problems that must be corrected before EPA finalizes the Update. First and foremost, the proposed CSAPR Update simply does not resolve—and is by EPA’s own admission not designed to resolve—EPA’s obligation to resolve interstate transport under the 2008 Ozone NAAQS. Rather than being built around the reductions in NO_x emissions necessary to decrease linkages to nonattainment and maintenance areas below the significance threshold, EPA has devised its allocations under the Update to simply reflect reductions that would occur if facilities actually operated the NO_x controls that they already have. The final rule must include emissions reductions necessary to resolve transport issues, not merely reductions that are readily achievable.

Second—and as EPA itself acknowledges—the vast number of emission credits likely to be left over from the three-years’ late implementation of CSAPR for the 1997 ozone NAAQS could well swamp the reductions in the Update. As an artifact of the three-year stay in implementing the first CSAPR, there may be hundreds of thousands of tons worth of NO_x emission credits flooding the system by ozone season 2017. Given the relatively moderate reductions contemplated under the draft Update, inclusion of these credits from the first CSAPR into CSAPR 2 could well mean that the Update has little to no impact on real-world emissions whatsoever. Leftover credits from the first CSAPR should not be incorporated into CSAPR 2.

Finally, the proposed Update suffers from a number of discrete technical issues in how ambient concentrations are calculated and addressed³ and in how allocations are distributed. These issues cause EPA to undercount pollution impacts, overestimate reductions, and to reward emitters who have dragged their feet on installing controls.

The Commenters urge EPA to correct these issues in the finalization of the CSAPR Update.

Other Mobile Source Emission Reduction Projects and Programs. Transportation and Regional Programs Division Office of Transportation and Air Quality. May 2007 *available at* <http://www3.epa.gov/otaq/stateresources/policy/general/420b07006.pdf> (reporting median findings of \$26,600/ton for employer trip reduction programs, \$50,300/ton for rideshare lot construction, and \$54,600/ton for modal subsidies and vouchers). In addition, as recent events have made plain, automotive pollution controls are far less verifiable than are controls at large industrial sources like EGUs, and may not actually be delivering the NO_x reductions they are supposed to. *See, e.g.,* U.S. EPA “EPA, California Notify Volkswagen of Clean Air Act Violations / Carmaker allegedly used software that circumvents emissions testing for certain air pollutants,” (Sept. 18, 2015), *available at* <http://yosemite.epa.gov/opa/admpress.nsf/a883dc3da7094f97852572a00065d7d8/dfc8e33b5ab162b985257ec40057813b!OpenDocument>.

³ Including EPA’s baffling insistence on “truncating” decimals instead of rounding where appropriate, such that 75.9 in EPA’s calculations is equal to 75, rather than being rounded to 76 (or just kept at 75.9). EPA’s approach is to effectively lop off as much as 0.90 parts per billion from ambient ozone concentration data; this is dismaying, given that 0.75 parts per billion is the significance threshold under the 2008 ozone NAAQS.

BACKGROUND

A. Ozone Is a Dangerous Pollutant that Threatens Human Health and the Environment

Exposure to ozone is connected to a wide range of significant human health impacts. Serious physiological effects result from both single incidents of exposure at high concentrations and from repeat exposures over time, even for healthy individuals and at relatively low concentrations. Adverse health effects including respiratory and cardiovascular morbidity, premature mortality, and central nervous system and developmental impacts have been demonstrated through controlled human exposure, epidemiologic, and toxicological studies.⁴ While the impacts of acute ozone exposure are better understood, there is a growing body of scientific evidence showing long-lasting adverse impacts of chronic ozone exposure, which may be more severe and less reversible.

Exposure to ozone, both in the short-term (acute) and long-term (chronic), is known to cause or exacerbate respiratory impacts such as breathing discomfort (e.g., coughing, wheezing, shortness of breath, pain upon inspiration), decreasing lung function and capacity, and lung inflammation and injury. Research on the relationship between ozone exposure and respiratory effects is well-documented and in fact, EPA's ISA made a conclusive determination that short-term exposure to ozone is responsible for adverse respiratory effects.⁵ Studies have consistently demonstrated that exposure to relatively low concentrations of ozone is associated with lung function decrements, increases in respiratory symptoms, pulmonary inflammation in children with asthma, increases in respiratory-related hospital admissions and emergency department visits, and respiratory mortality. In addition, the ISA concludes there is a "likely causal" relationship between long-term exposure and adverse respiratory effects such as pulmonary inflammation and injury, new onset asthma, and respiratory mortality, and EPA finds an "overall strong body of evidence of adverse health effects."⁶

Ozone exposure is shown to result in respiratory tract inflammation and epithelial permeability. Inflammation can be considered evidence that injury has occurred.⁷ Acute ozone exposure initiates an inflammatory response throughout the respiratory tract that has been observed to persist for at least 18-24 hours following the exposure.⁸ This inflammation can evolve into a chronic inflammatory state and repeat episodes can alter the structure and function of tissues,

⁴ See generally U.S. EPA (2013). Integrated Science Assessment for Ozone and Related Photochemical Oxidants (EPA/600/R-10/076F) [hereinafter ISA].

⁵ *Id.* sec. 6.2.

⁶ *Id.* at 1-5; U.S. EPA (2014). Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards (EPA-452/R-14-006) 3-40 [hereinafter Policy Assessment].

⁷ ISA at 6-76.

⁸ See ISA sec. 6.2.3; A. Torres et al. (1997). Airway inflammation in smokers and nonsmokers with varying responsiveness to ozone, *Am. J. Respir. Crit. Care Med.*, 156(3): 728-736; I.S. Mudway & F.J. Kelly (2004). An investigation of inhaled ozone dose and the magnitude of airway inflammation in healthy adults, *Am. J. Respir. Crit. Care Med.*, 169(10): 1089-1095.

leading to a “scarring” or “stiffening” of the lung tissue, such as pulmonary fibrosis. Lung tissue (epithelium or lining) may thus experience damage from chronic exposure to even relatively low levels of ozone. Inflammation can also alter the body’s host defense response to inhaled microorganisms, particularly in sensitive groups, and responses to agents like allergens or toxins. Studies suggest that acute ozone exposure might impair lung host defense capability, resulting in a predisposition to bacterial infections in the lower respiratory tract.⁹

Short-term exposure to ozone results in bronchoconstriction—the tightening or narrowing of airways in the lungs—and in airway obstruction, causing coughing, wheezing, and shortness of breath. Ozone exposure has been shown to cause an increase in airway hyperresponsiveness, a condition in which the airways undergo enhanced bronchoconstriction.¹⁰ Ozone-induced airway hyperresponsiveness results in a predisposition for bronchial narrowing upon inhalation of a variety of ambient stimuli. Symptoms have been demonstrated in both asthmatics and healthy individuals, although asthmatics are at higher risk due to already having greater airway inflammation and bronchial reactivity.

Ozone exposure harms lung function. As controlled human exposure studies and panel studies demonstrate, respiratory responses to acute ozone exposure include decreased breathing capacity, rapid and shallow breathing, and painful inhalation. These changes are reported following exposures to relatively low ambient ozone concentrations, particularly in sensitive groups such as children and outdoor workers. Studies examining lung function decrements following outdoor activity show robust associations with ozone concentrations at 60 ppb and below¹¹ and even down to 40 ppb.¹² Early lung function deficits in children may lead to lower maximum lung function later in life, as well as to increased risk of respiratory disease, cardiovascular morbidity, and mortality.¹³ For adults, chronic ozone exposure is tied to lasting declines in lung function and other respiratory effects.¹⁴

⁹ See ISA sec. 6.2.5.5.

¹⁰ See ISA sec. 6.2.2; see also D.H. Horstman et al. (1990). Ozone concentration and pulmonary response relationships for 6.6-hour exposures with five hours of moderate exercise to 0.08, 0.10, and 0.12 ppm, *Am. J. Respir. Crit. Care Med.*, 142(5): 1158-1163; R. Jörres, D. Nowak, & H. Magnussen (1996). The effect of ozone exposure on allergen responsiveness in subjects with asthma or rhinitis, *Am. J. Respir. Crit. Care Med.*, 153(1): 56-64.

¹¹ B. Brunekreef, et al. (1994). Respiratory effects of low-level photochemical air pollution in amateur cyclists, *Am. J. of Resp. and Crit. Care Med.*, 150(4): 962-966; D.M. Spektor et al. (1988). Effects of ambient ozone on respiratory function in active, normal children, *Am. Rev. of Resp. Disease*, 137(2): 313-320; M.H. Gielen, S.C. van der Zee, J.H. van Wijnen, C.J. van Stehen, & B. Brunekreef (1997). Acute effects of summer air pollution on respiratory health of asthmatic children, *Am. J. Respir. Crit. Care Med.*, 155(6): 2105-2108.

¹² M. Brauer, J. Blair, & S. Vedal (1996). Effect of ambient ozone exposure on lung function in farm workers, *Am. J. of Resp. and Crit. Care Med.*, 154(4): 981-987.

¹³ R. Rojas-Martinez, et al. (2007). Lung Function Growth in Children with Long-Term Exposure to Air Pollutants in Mexico City, *Am. J. Respir. Crit. Care Med.*, 176(4): 377-384.

¹⁴ A. Galizia & P.L. Kinney, Long-Term Residence in Areas of High Ozone: Associations with Respiratory Health in a Nationwide Sample of Nonsmoking Young Adults (1999). *Environ. Health Perspect.*, 107(8): 675-679; N. Künzli et al. (1997). Association between Lifetime

Not only is ozone exposure linked to the exacerbation of existing asthma, but also to new cases of the disease. Individuals with asthma are at greater risk for experiencing ozone-related health effects, especially children. Children living in areas with high ambient ozone concentrations were found in one study to be more likely to either have asthma or to experience asthma attacks compared to children living in areas with lower concentrations.¹⁵ The relationship between asthma and ozone exposure is supported by evidence of increases in respiratory asthma medication use and asthma-related hospital and emergency room visits following exposure. Evidence also points to long-term exposure causing new-onset asthma. For adults, studies show increased risk for developing asthma with each 10 ppb increase in annual mean ozone or 8-hour average.¹⁶ Not surprisingly, ozone is also connected to new onset asthma in children.¹⁷

Ground-level ozone additionally causes significant and negative impacts on the environment, including disruption of normal storage of nutrients and carbon and direct visible damage to foliage. These impacts directly translate to public welfare harm due to the effects on crop and forest productivity, resilience, scenic beauty, and ecosystem functioning. In terms of ecosystem services impacts include, but are not limited to, cultural (e.g. recreation) and product (e.g. agriculture) related services.

EPA acknowledges as much: the final 2013 ozone ISA documents the ecosystem effects that the Agency considers causal and likely casual, including:

- Visible injury to plants and tree foliage effects
- Reduced vegetation growth
- Reduced productivity in terrestrial ecosystems
- Reduced yield and quality of agricultural crops
- Alteration of below ground biogeochemical cycles
- Alteration of terrestrial ecosystem water cycling
- Reduced carbon sequestration in terrestrial ecosystems
- Alteration of terrestrial community composition

The latest science has advanced our understanding around ozone's role in disrupting below ground processes including carbon storage. This has important ramifications related to carbon

Ambient Ozone Exposure and Pulmonary Function in College Freshmen: Results of a Pilot Study, *Environ Res.*, 72(1), 8-23; I.B. Tager, et al. (2005). Chronic Exposure to Ambient Ozone and Lung Function in Young Adults, *Epidemiology*, 16(6): 751-759.

¹⁵ L.J. Akinbami, C.D. Lynch, J.D. Parker, & T.J. Woodruff (2010). The association between childhood asthma prevalence and monitored air pollutants in metropolitan areas, United States, 2001-2004, *Environ Res.*, 110(3): 294-301.

¹⁶ W.F. McDonnell, D.E. Abbey, N. Nishino, & M.D. Lebowitz (1999). Long-term ambient ozone concentration and the incidence of asthma in nonsmoking adults: the AHSMOG study, *Environ. Res.*, 80(2): 110-121; J. Greer, D.E. Abbey, & R.J. Burchette (1993). Asthma related to occupational and ambient air pollutants in nonsmokers, *J. Occup. Environ. Med.*, 35(9): 909-915.

¹⁷ See e.g., R. McConnell et al. (2002). Asthma in exercising children exposed to ozone: A cohort study, *Lancet*, 359(9304): 386-391.

sequestration and mitigation of greenhouse gas emissions. The causal effects defined above clearly show that when ozone is present in the ambient air there are significant and multiple costs to vegetation, and while some species are more sensitive than others it is also recognized that there is a cumulative impact for the ecosystem, wildlife habitat, and larger landscapes. This ubiquitous effect of ozone pollution must be addressed in setting the public welfare standard.

However, ozone not only harms vegetation, but also is a potent greenhouse gas. The ISA states that there is a “relationship between the changes in tropospheric O₃ concentrations and effects on climate.” While it is true, as outlined in the ISA, that there are a number of details related to ozone’s climate impacts that have not been resolved, the important facts are known. First, it is clear that ozone has a strong warming impact, especially in Northern mid-latitudes (where the United States is) and in the Arctic. Second, whatever its exact radiative forcing, ozone is the third strongest greenhouse gas. Third, it is well-established that ozone can be reduced through decreases in methane, carbon monoxide and VOCs. As EPA acknowledges, reducing these precursors would significantly benefit public health as well as climate.

B. The 1997 and 2008 Ozone NAAQS, and EPA’s Attempts at Transport Implementation

The Clean Air Act Amendments of 1970 first introduced the requirement to establish enforceable national ambient air quality standards (NAAQS). The amendments were intended to be “a drastic remedy to what was perceived as a serious and otherwise uncheckable problem of air pollution.” *Union Electric Co. v. EPA*, 427 U.S. 246, 256 (1976). The 1970 amendments “carrie[d] the promise that ambient air in all parts of the country shall have no adverse effects upon any American’s health.” 116 Cong. Rec. 42,381 (December 18, 1970).

The NAAQS drive the Clean Air Act’s requirements for controlling emissions of conventional air pollutants. Once EPA establishes a NAAQS, states and EPA identify those geographic areas that fail to meet the standards. 42 U.S.C. § 7407(d). Each state must prepare an “implementation plan” designed to control pollutant emissions in order to reduce the ambient concentrations of the pollutant to below the level of the NAAQS and to keep it there. One of the requirements for a state’s implementation plan is the “good neighbor” requirement: states are obligated to incorporate measures into their implementation plans to reduce emissions sufficiently to ensure that emissions from that state do not cause or contribute to nonattainment of the relevant NAAQS—or interfere with maintenance of that NAAQS—in a downwind state. Specifically, the implementation plan must

... prohibit[], consistent with the provisions of this subchapter, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will ... contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard.

42 U.S.C. § 7410(a)(2)(D)(i). Critically, although the Clean Air Act places the burden first upon the states themselves to create implementation plans discharging their NAAQS-implementation obligations (including the good neighbor obligation), if states fail to prepare and submit to EPA

adequate plans, EPA is directed to create a federal plan that resolves those obligations, “at any time within 2 years after the Administrator finds that a State has failed to make a required submission.” 42 U.S.C. §§ 7410(c)(1)(A), 7410(k)(1)(B).

Ozone implementation is handled somewhat differently than implementation for other NAAQS. Congress created a special set of sections of the Clean Air Act pertaining specifically to the timeline and requirements for attainment of ozone NAAQS. 42 U.S.C. §§ 7511-7511f. Under these ozone-specific requirements, areas are to achieve an ozone NAAQS “as expeditiously as practicable” but not later than the “Primary standard attainment date” delineated in a table for different severities of ozone attainment status. *See id.* § 7511c(a)(1), tbl. 1. Although this table sets specific dates relevant to the governing NAAQS at the time of the amendment creating the section, the D.C. Circuit has held that this timetable governs any revised primary ozone NAAQS. *See Am. Trucking Ass’n v. EPA*, 175 F.3d 1027, 1050 (D.C. Cir. 1999), *reh’g granted in part and denied in part*, 195 F.3d 4 (D.C. Cir. 1999). In applying this timetable in implementing the 1997 ozone NAAQS, EPA “filled the timing gap . . . by applying the same attainment periods established in Table 1 . . . but measured from the effective date of EPA’s designations for the 1997 NAAQS.” *Natural Resources Defense Council v. EPA*, 777 F.3d 456, 462 (D.C. Cir. 2014)

In 1997, EPA completed a NAAQS revision for ozone, setting a new standard of 80 parts per billion on an eight-hour average. 62 Fed. Reg. 38,856 (July 18, 1997). After several years of litigation, the D.C. Circuit upheld the standard against industry challenge. *Am. Trucking Ass’n v. EPA*, 283 F.3d 355 (D.C. Cir. 2002); *see also Am. Trucking Ass’n v. EPA*, 175 F.3d 1027 (D.C. Cir. 1999), *reh’g granted in part and denied in part*, 195 F.3d 4 (D.C. Cir. 1999), *aff’d in part and rev’d in part sub nom. Whitman v. Am. Trucking Ass’n*, 531 U.S. 457 (2001).

Although the Clean Air Act requires EPA to, every five years, review and update the NAAQS, EPA did not timely review this 1997 ozone NAAQS, leading to a lawsuit forcing it to carry out its mandatory duty under 42 U.S.C. § 7409(d). *Am. Lung Ass’n v. Whitman*, No. 03-CV-778 (D.D.C.). In the review process, the Clean Air Scientific Advisory Committee (CASAC), which is charged with reviewing the air quality criteria and NAAQS and making scientific recommendations on them, unanimously found that the primary NAAQS should be revised to a level between 0.060 and 0.070 ppm. In 2008, EPA disagreed with CASAC and set the primary standard at 0.075 ppm. 73 Fed. Reg. 16,436 (Mar. 27, 2008). EPA subsequently promulgated area designations under that NAAQS on May 21, 2012, effective July 20, 2012. 77 Fed. Reg. at 30,088.

As EPA was establishing the 2008 ozone NAAQS, it was also attempting to address the interstate transport implications of the 1997 NAAQS. This included the 2005 Clean Air Interstate Rule, or CAIR (70 Fed. Reg. 25,162), which was the subject of litigation and ultimately vacated (*see North Carolina v. EPA*, 531 F.3d 896, 921 (D.C. Cir. 2008) (*per curiam*)), but then subsequently left in place pending EPA resolution of problems in CAIR that the Court had identified. *North Carolina v. EPA*, 550 F.3d 1176, 1178 (D.C. Cir. 2008) (*per curiam*).

EPA’s next, and ultimately successful, attempt was the Cross State Air Pollution Rule, or CSAPR, finalized in August of 2011. CSAPR was intended to address NAAQS for particulate

matter and the 1997 ozone NAAQS, through a similar mechanism of assigning emissions allocations to emitters as employed in the proposed CSAPR Update. Under CSAPR, EPA employed an initial screening step, removing from the program states whose emissions to downwind nonattainment and maintenance areas constituted a contribution of less than 1% of the relevant NAAQS. *EPA v. EME Homer City Generation LP*, 134 S. Ct. 1584, 1596 (2014). Those states that contributed more than this 1% significance level were incorporated into CSAPR, and were required to reduce emissions based on modeling of cost-effective emissions necessary to resolve transport of the criteria pollutants. *Id.*

However, although CSAPR was originally intended to go into effect in 2012, upwind emitting states and transport pollutant-heavy industrial sources filed litigation to block implementation before the D.C. Circuit. While ultimately unsuccessful, the litigation did achieve delaying implementation of CSAPR by three full years.

While the aspect of CSAPR addressing the 1997 ozone NAAQS went into effect in 2015, EPA has yet to address ozone transport under the 2008 NAAQS.¹⁸ The D.C. Circuit, in considering EPA's 2008 ozone NAAQS implementation rule, vacated that rule because it granted a longer attainment period than the deadlines that would flow from 42 U.S.C. 7511. *See NRDC v. EPA*, 777 F.3d at 469 (rejecting EPA's attempts to "delay . . . the trigger date for the fixed attainment periods to the end of the calendar year"). EPA subsequently revised the implementation rule to require attainment by July of 2018, or six years after area designations under the NAAQS were effective. *See* 80 Fed. Reg. 12,264, 12,268 (Mar. 6, 2015)

SUBSTANTIVE COMMENTS

A. The Proposed CSAPR Update Improperly Fails to Fully Resolve Interstate Contributions under the 2008 Ozone NAAQS

1. The Clean Air Act Mandates that the CSAPR Update Fully Resolve Interstate Contributions, and Not Simply Include Those Reductions EPA Assumes Can Be Achieved with Minimal Effort

As EPA itself acknowledges, the NO_x emission allocations in the proposed CSAPR Update "may not be sufficient to fully address [] states' good neighbor obligations." 80 Fed. Reg. at 75,714. This is because, in preparing the proposed Update, EPA "has not attempted to quantify the ozone season NO_x reductions that may be necessary to eliminate all significant contribution to nonattainment and interference with maintenance in other states." *Id.* at 75,715. Instead, EPA examined potential NO_x mitigation strategies, excluding those that EPA felt could not be adopted industry-wide by ozone season 2017; as a result, EPA's proposed CSAPR Update is largely limited to reductions available from power plants operating existing NO_x-reduction controls—such as selective catalytic reduction ("SCR") or selective non-catalytic reduction ("SNCR") systems. Specifically, EPA stated that

¹⁸ EPA did promulgate area designations under the 2008 ozone standard, however, in May of 2012, effective July 20, 2012. *See* U.S. EPA, Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards, 77 Fed. Reg. 30,088 (May 21, 2012).

EPA determined that the power sector could implement all of these NO_x mitigation strategies, **except installation of new SCRs or SNCRs**, between finalization of this proposal in summer of 2016 and the 2017 ozone season. As to the installation of new SCRs or SNCRs, the amount of time from contract award through commissioning for retrofit with new SCR or SNCR exceeds 18 and 12 months, respectively. For both technologies, conceptual design, permitting, financing, and bid review require additional time. **It would therefore not be feasible to retrofit new SCR or SNCR to achieve EGU NO_x reductions in the 2017 ozone season.**

80 Fed. Reg. at 75,731 (emphasis added).

This approach fundamentally misunderstands EPA's obligations under the 2008 ozone NAAQS, and accordingly fails to carry the burden placed on EPA by the Clean Air Act to resolve interstate transport. It is unlawful and arbitrary for EPA to claim that its own delay excuses it from compliance with the Clean Air Act. *Cf. Portland Cement Ass'n v. EPA*, 665 F.3d 177, 187-88 (D.C. Cir. 2011) ("It takes a certain amount of chutzpah for EPA to claim it had no time to be careful—after ten years of work on NESHAP—when it waited to propose a CISWI definition until after the NESHAP comment period had closed."). Yet this is precisely what EPA now argues. EPA has delayed in preparing a rule to resolve interstate transport under the 2008 ozone NAAQS, and thus now says that the lateness of the hour in which the CSAPR Update is proposed means that there is no time to require the NO_x reductions necessary under the NAAQS. Besides being, as explained in more detail below, factually inaccurate, such arguments are little comfort to the millions of Americans in downwind parts of the country suffering from high ozone levels due to transport the CSAPR Update, in its currently-proposed incarnation, fails to resolve. Whether or not running out of time to require controls enables EPA to propose a half measure to be implemented by 2017, it does *not* excuse EPA from crafting a full measure.

In fact, EPA's approach runs afoul of both the Clean Air Act and the D.C. Circuit's ruling in *NRDC v. EPA*. Under the Clean Air Act, the schedule by which implementation of the NAAQS is laid out in the timeline in Table 1. *See* 42 U.S.C. § 7511(a)(1), tbl. 1. EPA already attempted to grant itself a longer period for implementation in the earlier, rejected version of its 2008 ozone NAAQS implementation rule, expanding the attainment period from that set forth in the statute, and this attempt was rejected by the D.C. Circuit. *NRDC v. EPA*, 777 F.3d at 469. Accordingly, full resolution of significant contributions by upwind states to downwind states under the NAAQS is to be accomplished by July of 2018. Yet the proposed CSAPR Update rule would not do this.

EPA's arguments to the contrary to the effect that attainment cannot be demonstrated partway through an ozone season, and so the July 2018 date must mean ozone season 2017, and that since there simply is not time to easily achieve attainment by 2017 EPA's proposed Update need not ensure resolution of interstate transport on any timeline, thus misses the point. Resolution of significant contributions to ozone transport is legally required to occur by a certain deadline, and EPA may not use that deadline as an excuse to fail in the substance of its obligations. This situation is the very one Congress amended the Clean Air Act in 1990 to rectify: Congress

sought to “abandon the discretion-filled approach of two decades prior in favor of more comprehensive regulation” of criteria pollutants like ozone, including a prescribed timeline for achieving attainment. *NRDC v. EPA*, 777 F.3d at 460. In fact, EPA’s approach here in abandoning resolution of transport by July 2018 in favor of inadequate reductions in 2017 *with no plan in place for achieving the rest of the necessary reductions by any date* is even less in keeping with the Clean Air Act than the attainment by December 2018 approach it espoused in the implementation rule vacated by the *NRDC v. EPA* Court.

Accordingly, the proposed CSAPR Update must be revised before finalization to ensure that—in keeping with the *NRDC v. EPA* decision, the timeline in 42 U.S.C. § 7511(a)(1), tbl. 1, and indeed EPA’s own implementation rule—significant contributions to ozone transport are fully resolved as expeditiously as practicable.

In the alternative to fully resolving interstate transport by ozone season 2017, EPA could include as part of the finalization of the CSAPR Update a second implementation phase to go into effect after ozone season 2017—in ozone season 2018, or 2019, for example. This phase could call for further decreases in NO_x emissions from EGUs, reflecting the incorporation of control technology that could be installed during that time. Indeed, although SCR is increasingly prevalent among coal-fired generators, with 327 coal units having installed SCR or having announced plans to install SCR (representing nearly 42% of units 100 MW or larger and over 177 GW or 56% of coal capacity),¹⁹ significant further progress is achievable: there are still 451 coal units accounting for 140 GW of capacity that lack SCR or plans to install SCR.

Such a second phase (a “CSAPR 2.5” to the Update’s CSAPR 2) would be in keeping with the two-phase approach of the original CSAPR with its different sets of emissions allocations for the third and subsequent years following the initial two.

Either way, EPA must revise the Update proposal to ensure that it actually fully resolves interstate transport of ozone under the 2008 NAAQS.

2. Even Adopting EPA’s Approach of Limiting NO_x Reductions to Those Easily Achievable in 2017, Far Greater Emissions Reductions Are Available

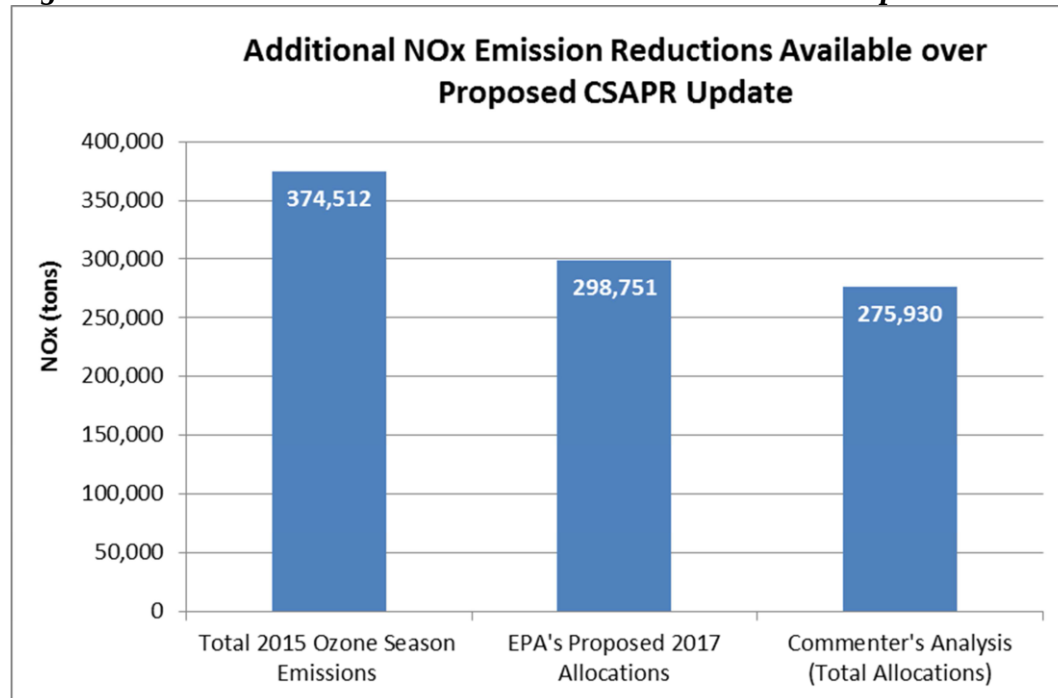
As explained above, EPA fails to discharge its obligation to resolve interstate transport under the 2008 ozone NAAQS if the CSAPR Update is limited to just emissions reductions that are easily achievable by 2017. However, even operating under EPA’s incorrect approach there are several categories of further pollution reductions that are available:

- SCR controls can achieve greater reductions than EPA assumes
- There is greater availability of redispatch than EPA assumes
- Many of the units to which EPA grants allocations are retired or retiring
- Some controls can be installed between now and ozone season 2017
- Increasing numbers of zero-NO_x emitting generators are coming online

¹⁹ Compiled using data from Energy Information Agency Form 860 and EPA’s Air Markets Program Data, *available at* ampd.epa.gov/ampd/.

Each area is discussed in detail below; if applied to EPA's assessment of NO_x reductions available by ozone season 2017, the resulting set of allocations is significantly lower than that contemplated in the CSAPR Update proposal. Indeed, simply by using lower, more realistic NO_x emission rates from control-equipped units, considering available opportunities for redispatch, and removing allocations given to retired units, the overall allocations drop by roughly 8 percent, for a total decrease of over 26 percent from 2015 ozone emissions in the proposed CSAPR Update-covered states. This decrease would enable EPA to help close the gap between the Update as proposed and the reductions required under the Clean Air Act.

Figure 1: Additional NO_x Emission Reductions Available over Proposed CSAPR Update



The above figure compares actual 2015 NO_x emissions from the states included in the proposed CSAPR Update with the allocations in the proposed update and with the still lower level of NO_x emissions that would result if controls were operated at realistic levels (yet still more effectively than EPA proposes), if uncontrolled coal plants saw their generation redispatched to SCR-equipped coal units, and if plants retiring in 2017 or sooner simply had their proposed allocations zeroed out. See CSAPR Update Coal Plant Analysis *attached hereto* as Appendix 1.

Specifically, in this analysis, all the coal plants larger than 25 megawatts in the states EPA proposes to include in the CSAPR Update were examined for their actual 2015 generation and NO_x emissions. SCR-equipped plants then had their NO_x emissions scaled back to be consistent with either an emission rate of 0.065 lbs/MMBtu or their historical emission rate, whichever is lower; SNCR-equipped plants were similarly addressed with an emission rate of 0.25 lbs/MMBtu or their actual emission rate if it was lower. Generation from coal plants lacking SCR or SNCR was then shifted to the SCR-equipped units until those units hit a ceiling of an 85% ozone-season capacity factor. Finally, facilities retiring in 2017 or earlier were removed from the analysis, and their emissions removed with them, yielding the final emissions figure for the coal portion of the

fleet. The new coal emission figures for each state were then added to the non-coal allocations EPA proposes for each state, yielding the lower total allocation depicted above in Figure 1.²⁰

This analysis is conservative in important ways. First, no redispatch from coal plants to low-emitting gas plants or to zero-emitting renewable generation was considered, despite the fact that such redispatch is undeniably possible (and indeed, ongoing). Second, as the analysis demonstrates, 0.065 lbs/MMBtu is a conservative estimate of what SCR-equipped units should achieve—many units can and do achieve better, even without the added incentive of freeing up NOx emission allocations for trading. Finally, using historical (in this case, 2015) emissions and generation data fails to capture the significant changes ongoing in the generation fleet: economics, technological change, and increasing regulatory efforts to ensure that dirty fossil power internalizes the costs of its pollution means that greater and greater opportunities to achieve reductions in NOx emissions from the generating sector as a whole are available every year, even as trends in energy efficiency and demand response render such high NOx-emitting generation less important in the first place. In short, the future power grid can be less reliant on NOx-emitting generation, and calculations based on historical emissions will tend to undercount such gains.²¹

SCR Control Efficacy. EPA assumes that SCR-equipped coal units would achieve an ozone-season NOx emission rate of 0.075 lbs/MMBtu. However, 0.075 lbs/MMBtu is actually a rather conservative estimate for SCR efficacy—with a five-month averaging period, SCR-equipped coal-fired power units can readily achieve average emission rates of 0.065 lbs/MMBtu or lower, as Table 1 below demonstrates.

Table 1: SCR-Equipped Plants Achieving 0.065 lbs/MMBtu or Better in Ozone Season 2015²²

State	Facility Name	Unit ID	2015 Ozone Season Avg. NOx Rate (lb/MMBtu)	Fuel Type (Primary)
KY	Robert Reid	R1	0.0150	Coal
MI	Eckert Station	3	0.0302	Coal
PA	Gilberton Power Company	32	0.0339	Coal Refuse
PA	Gilberton Power Company	31	0.0343	Coal Refuse
MI	J H Campbell	2	0.0366	Coal

²⁰ The different Case 1 and Case 2 figures represent the difference between running controls on the one hand and running controls combined with redispatch on the other. See CSAPR Update Coal Plant Analysis.

²¹ Other conservative aspects to the analysis include ignoring coal-fired power plants with the capability of burning lower-NOx fuels, such as gas (for example, the Brunner Island coal plant in Pennsylvania, a 1.4 gigawatt facility lacking any sort of postcombustion control for NOx, will have the ability to burn either gas or coal by ozone season 2017; such a facility could dramatically decrease emissions by burning gas in place of coal, and neither the analysis presented here nor EPA's proposed CSAPR Update allocations analysis considers such gains), and ignoring potential control operation on gas plants.

²² Data taken from EPA's Air Markets Program Data, available at <http://ampd.epa.gov/ampd/>.

WI	Manitowoc	9	0.0368	Petroleum Coke
WI	Edgewater (4050)	5	0.0392	Coal
MD	Morgantown	2	0.0397	Coal
TX	Sandy Creek Energy Station	S01	0.0397	Coal
LA	Brame Energy Center	1-Mar	0.0406	Petroleum Coke
KY	Trimble County	2	0.0407	Coal
TX	W A Parish	WAP7	0.0407	Coal
MI	J H Campbell	3	0.0414	Coal
WY	Dry Fork Station	1	0.0419	Coal
MD	Morgantown	1	0.0425	Coal
WY	Wygen III	1	0.0437	Coal
VA	Chesterfield Power Station	6	0.0442	Coal
MI	Dan E Karn	2	0.0443	Coal
VA	Chesterfield Power Station	5	0.0452	Coal
LA	Brame Energy Center	2-Mar	0.0453	Petroleum Coke
TX	J K Spruce	**2	0.0456	Coal
AL	Barry	1	0.0465	Coal, Pipeline Natural Gas
NV	TS Power Plant	1	0.0479	Coal
FL	Northside	2A	0.0480	Coal
MO	Iatan	2	0.0480	Coal
AR	John W. Turk Jr. Power Plant	SN-01	0.0487	Coal
TX	W A Parish	WAP8	0.0487	Coal
MI	Dan E Karn	1	0.0488	Coal
CO	Pawnee	1	0.0494	Coal
PA	Northeastern Power Company	31	0.0496	Coal
FL	Seminole (136)	2	0.0505	Coal
WI	Weston	2	0.0509	Coal
KS	Jeffrey Energy Center	1	0.0512	Coal
MO	James River	3	0.0512	Coal
MD	AES Warrior Run	1	0.0514	Coal
TX	W A Parish	WAP6	0.0516	Coal
FL	Northside	1A	0.0519	Coal
NC	Cliffside	6	0.0519	Coal
AL	Barry	2	0.0522	Coal, Pipeline Natural Gas
IL	Dallman	4	0.0532	Coal
IA	Lansing	4	0.0537	Coal
MI	Monroe	2	0.0540	Coal
PA	Kimberly-Clark Tissue Company	35	0.0540	Coal
NJ	Mercer Generating Station	2	0.0544	Coal
WI	Weston	4	0.0545	Coal
MN	Boswell Energy Center	3	0.0546	Coal

IA	Walter Scott Jr. Energy Center	4	0.0549	Coal
WI	Elm Road Generating Station	2	0.0549	Coal
MD	Herbert A Wagner	3	0.0552	Coal
IL	Archer Daniels Midland Co.	FBC9	0.0556	Coal
FL	Crystal River	5	0.0557	Coal
GA	Wansley (6052)	1	0.0558	Coal
WI	Elm Road Generating Station	1	0.0558	Coal
WY	Wygen II	1	0.0559	Coal
LA	Nelson Industrial Steam Company	2A	0.0566	Petroleum Coke
WI	Valley (WEPCO)	4	0.0567	Coal, Pipeline Natural Gas
IN	Edwardsport Generating Station	CTG2	0.0576	Coal
WI	Valley (WEPCO)	3	0.0576	Coal, Pipeline Natural Gas
KY	H L Spurlock	3	0.0577	Coal
GA	Wansley (6052)	2	0.0580	Coal
GA	Bowen	2BLR	0.0581	Coal
LA	Nelson Industrial Steam Company	1A	0.0582	Petroleum Coke
NE	Nebraska City Station	2	0.0582	Coal
IN	Merom	2SG1	0.0587	Coal
IN	Edwardsport Generating Station	CTG1	0.0590	Coal
FL	Seminole (136)	1	0.0593	Coal
GA	Bowen	4BLR	0.0596	Coal
WI	South Oak Creek	7	0.0603	Coal
VA	Chesterfield Power Station	4	0.0608	Coal
WI	South Oak Creek	8	0.0608	Coal
FL	Crystal River	4	0.0611	Coal
MO	Iatan	1	0.0613	Coal
GA	Bowen	1BLR	0.0618	Coal
AZ	Coronado Generating Station	U2B	0.0622	Coal
TX	W A Parish	WAP5	0.0622	Coal
VA	Virginia City Hybrid Energy Center	1	0.0622	Coal
MI	Monroe	1	0.0626	Coal
WI	Pleasant Prairie	1	0.0630	Coal
KY	D B Wilson	W1	0.0633	Coal
MI	Monroe	3	0.0633	Coal
GA	Scherer	1	0.0634	Coal
IN	Merom	1SG1	0.0636	Coal
VA	Virginia City Hybrid Energy Center	2	0.0636	Coal
TN	Kingston	7	0.0643	Coal
TN	Kingston	1	0.0645	Coal
TN	Kingston	4	0.0646	Coal
CO	Comanche (470)	3	0.0647	Coal

GA	Scherer	2	0.0647	Coal
MD	Brandon Shores	1	0.0647	Coal
TN	Kingston	3	0.0649	Coal
TN	Kingston	6	0.0652	Coal
SC	Cross	4	0.0653	Coal
KY	H L Spurlock	4	0.0654	Coal
TN	Kingston	8	0.0654	Coal
TN	Kingston	9	0.0654	Coal

The potential of low NO_x emission rates at SCR-equipped units is even more apparent when looking at 30-day averages historically achieved. As of 2013, for example, over 150 different SCR-equipped coal-fired units achieved 30-day averages *lower* than 0.065 lbs/MMbtu, many quite significantly so. See U.S. SCR-Equipped Coal Lowest 30-Day Average NO_x Rate, attached hereto as Appendix 2.

SCR controls are, in fact, designed to achieve better than 90% reductions in NO_x emissions, allowing plants to emit NO_x at very, very low rates on short-term averaging periods.²³ For a five-month averaging period, like that contemplated in the CSAPR Update proposal, achieving those rates is even easier.

While it is true that many units equipped with SCR nonetheless fail to achieve such a level of emissions reduction, this is more a reflection of operational choices by the facilities themselves. As EPA is well-aware, while much of the coal fleet has SCR installed, many of those controls are poorly or irregularly operated. Research has shown that SCR control operation and efficacy in many cases tracks economics—when NO_x emission credits are cheap and plentiful, SCR-equipped units achieve markedly worse NO_x emission rates.²⁴ Thus, the historical achievements of the SCR-equipped fleet tend to understate the ability of those units to reduce NO_x emissions.

Greater Availability of Redispatch. In nearly every state addressed by the proposed CSAPR Update, there is a mix of controlled and uncontrolled coal units, generally with a good deal of slack capacity in the fully-controlled units. Plainly, on a five-month ozone season average, there

²³ See, e.g., June 20, 2000 Correspondence from DEP to Linda A. Boyer, PPL Electric Utilities Corporation Re: Plan Approval Application #OP-47-0001D, at 2 (attached hereto as Exhibit 1) (noting that operation of SCR controls at a coal-fired EGU “will control the nitrogen oxides emissions from Unit #1 and, when operating, will reduce the nitrogen oxides emissions by up to 90% from the level which currently exists,” thereby achieving “nitrogen oxides emission rate[s] . . . as low as .04 pounds per million BTU of heat input”).

²⁴ See, e.g., Thomas F. McNevin (2016) Recent increases in nitrogen oxide (NO_x) emissions from coal-fired electric generating units equipped with selective catalytic reduction, *Journal of the Air & Waste Management Association*, 66:1, 66-75, DOI: 10.1080/10962247.2015.1112317 (documenting that “in recent years . . . the degree of usage of installed SCR technology has been dropping significantly at individual plants” resulting in higher NO_x emission rates). EPA acknowledges as much: “Recent power sector data reveal that some SCR and SNCR controls are being underused. In some cases, controls are not fully operating . . . [i]n other cases, controls have been idled for years.” 80 Fed. Reg. at 75,731.

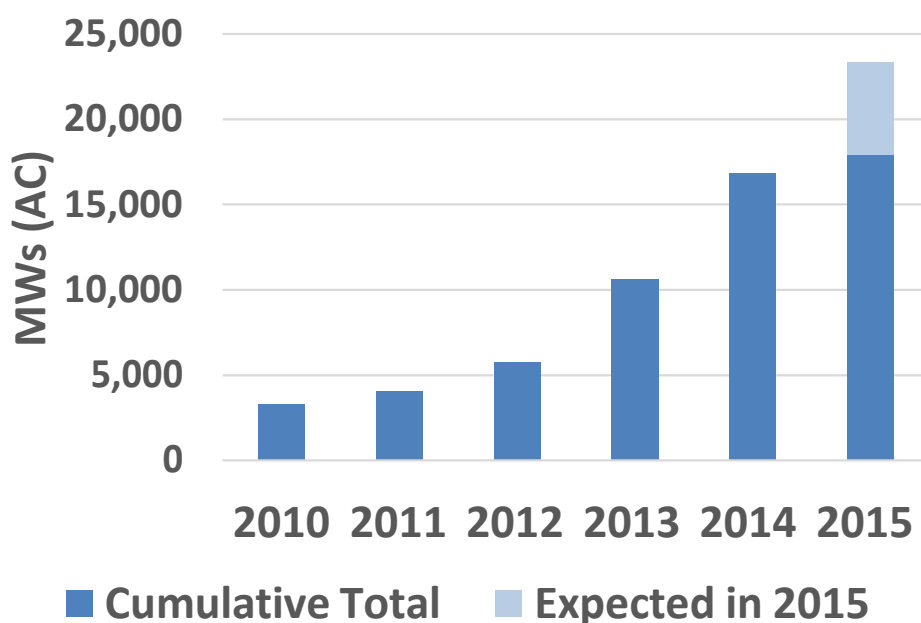
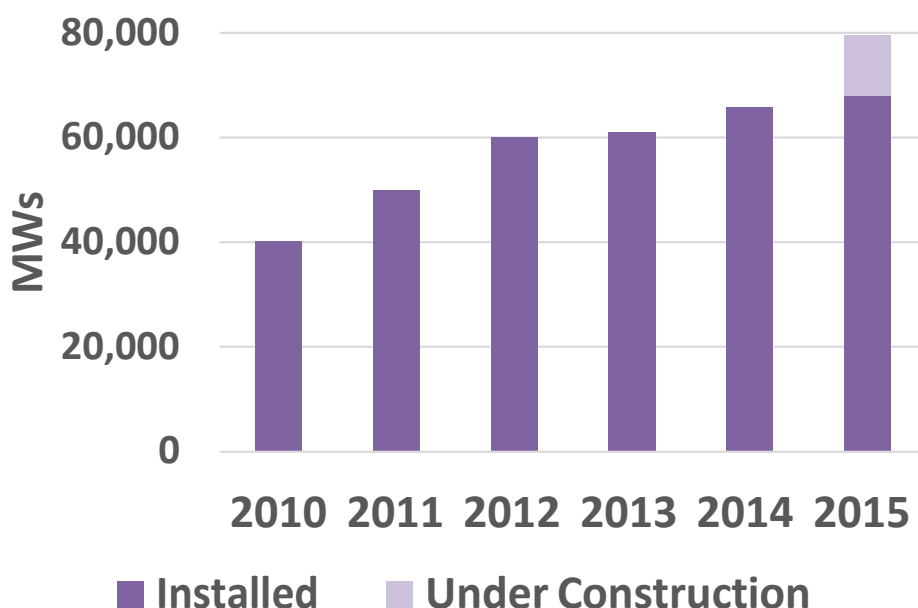
is great ability for generation fleets to shift dispatch from high-NO_x to low-NO_x sources. While EPA does assume a small amount of redispatch to low-NO_x emitters, the attached analysis indicates that a much greater amount of the generation from polluting power plants can be shifted to those plants' better-controlled counterparts. See CSAPR Update Coal Plant Analysis. In fact, even limiting redispatch of uncontrolled coal to SCR-equipped coal units (and thus ignoring the potential for such generation to be shifted to zero-NO_x renewable sources, or to low-NO_x gas-fired sources), and limiting total ozone-season capacity factors for such SCR-equipped units to 85%, emissions in numerous states could be slashed dramatically.

These reductions in emissions would translate into lowered emissions allocations under the CSAPR Update, thereby helping to close the gap between the proposed CSAPR 2 and what is necessary to fully resolve significant contributions to ozone transport under the 2008 NAAQS.

Retiring Units. EPA's analysis likewise ignores the fact that many power plant units incorporated into the proposed CSAPR Update have either announced for retirement or have actually already ceased operations. In fact, 175 units included in the proposal have retired or announced for retirement by 2017. See Table of Retired and Retiring Units, attached hereto as Appendix 3. Collectively, these units are allocated almost 25,000 tons of NO_x emissions under the proposal, or over 8 percent of the proposed CSAPR Supplement allocation as a whole. *Id.* Simply zeroing out the allocations to these emitters would help the CSAPR Update to achieve actual resolution of interstate impacts, without requiring additional reductions from remaining NO_x emitters.

Control Improvements by Ozone Season 2017. As noted above, EPA's calculation of NO_x emission allocations assumes that no new SNCR or SCR is installed. 80 Fed. Reg. at 75,731. But this is unrealistic—certainly, *some* new controls can be added to some units in the generating fleet, and EPA could readily calculate the emissions reductions that would flow from installing such controls on the highest-emitting uncontrolled units. This would be a functional way of incorporating installation of limited controls where they are most likely to benefit air quality. Further, existing controls can be readily improved or tuned to achieve greater reductions. Catalyst cartridges in SCR systems could be cleaned or replaced, or catalyst cartridges could be added to reserve trays, or reagent mixtures and addition processes modulated in SNCR systems. Because EPA in part bases its assessment of what reductions could be achieved by controlled units by reference to past emission rates, EPA's analysis fails to account for the potential for such air quality gains.

Zero-NO_x Emitters. EPA's proposed CSAPR Update is predicated on granting emission credits to potential NO_x emitters, with the total allocation being based in part on historical emissions. This methodology thus assumes a somewhat steady picture in terms of the fraction of NO_x-emitting generators in the entire EGU fleet. But this overlooks the increasingly rapid adoption of clean, zero-NO_x emitting generation throughout the CSAPR states, particularly in terms of wind and solar generation.

Figure 2: Cumulative U.S. Solar Installed²⁵**Figure 3: Cumulative U.S. Wind Capacity Installed²⁶**

²⁵ Data taken from Solar Energy Industries Association, <http://www.seia.org/research-resources/solar-industry-data>. See also Lazard, Lazard's Levelized Cost of Energy Analysis – Version 9.0, available at <https://www.lazard.com/media/2390/lazards-levelized-cost-of-energy-analysis-90.pdf>, at 10 (showing an 82% decrease in the levelized cost of utility-scale solar generation since 2009) [hereinafter Lazard].

²⁶ Data taken from American Wind Energy Association, <http://www.awea.org/index.aspx>. See also Lazard at 10 (showing a 61% decrease in the levelized cost of wind energy since 2009).

Indeed, the U.S. Department of Energy projects additions of roughly 50 gigawatts in wind capacity by 2020, much of that in the CSAPR states.²⁷ EPA's approach of limiting reductions to what could be achieved by better control operation ignores the fact that a declining proportion of total generation is likely rely on high-NOx emitting sources. The increasing availability of wind and solar is an avenue for greater NOx emission reductions, and one that EPA should employ in helping close the gap between the reductions in CSAPR 2 and what is necessary to resolve interstate transport impacts under the 2008 Ozone NAAQS.

Accordingly, in finalizing the allocations under the CSAPR Update, EPA should use the lower of either historical ozone season emission rates or 0.065 lbs/MMBtu (for SCR-equipped units) or 0.25 lbs/MMBtu (for SNCR-equipped units), should consider a greater degree of redispatch from uncontrolled to controlled coal units, should zero out allocations to retired or retiring generators, and should incorporate some level of control installation or upgrades, as well as increasing availability of zero-NOx emitting renewable resources, in calculating available NOx reductions.

B. NOx Credits “Banked” under the 1997 Ozone NAAQS Should Not Be Credited towards the CSAPR Update

Exacerbating the critical failing of the proposed CSAPR Update discussed above—that it does not reduce emissions enough to actually resolve interstate transport under the 2008 ozone NAAQS—is the Update's potential incorporation of the huge surplus of NOx emission credits flowing from the three years of delay in implementing CSAPR 1. Those credits, generated by a litigation delay in implementation of the transport aspects of the 1997 ozone NAAQS, should not be considered at all as a tool to delay and weaken implementation of the transport aspects of the entirely different 2008 ozone NAAQS.

As EPA acknowledges, while CSAPR 1 was stayed, significant changes in the electrical generation fleet occurred. The nation has added vast quantities of zero-NOx renewables resources in the form of solar and wind generation, and increasing application of low-cost energy efficiency has bent the growth curve in electricity demand downward. Tightening environmental control requirements have forced dirty fossil power to internalize more of the costs it imposes on society and the environment, and in the meantime, low-NOx fossil fuels such as natural gas have become cheaper, shifting fossil generation away from high-NOx sources like uncontrolled coal units. As a result, the fleet of power plants in the CSAPR states emits less NOx in 2015 than it did in 2012, translating into a huge surfeit of credits under the CSAPR allocations intended to go into effect in 2012.

Given that ozone season 2016 has yet to occur, it is not yet possible to determine precisely how many “banked” emission credits under CSAPR 1 will be generated. However, it is clear that the number of credits will be immense:

²⁷ See U.S. Department of Energy “Wind Vision,” available at <http://energy.gov/maps/map-projected-growth-wind-industry-now-until-2050>.

Due to this delay, combined with the market forces and changes that took place during that timeframe, expectations are that **total banked allowances for the CSAPR ozone-season trading program could be in excess of 210,000 tons by the start of the 2017 ozone-season** compliance period.

80 Fed. Reg. at 75,746 (emphasis added). Using actual 2015 ozone season emissions data, there appear to be as many as 164,000 tons of banked credits from that year alone; if emissions in 2016 are similar to those in 2015, another 150,000 or more tons of banked credits could result, yielding well over 300,000 banked credits going into ozone season 2017. See CSAPR Allocations and 2015 Ozone Season NO_x Emissions, attached hereto as Appendix 4. EPA's estimate could be undercounting things by roughly half.

Under the proposed CSAPR Update, total allocations in ozone season 2017 are less than 300,000 tons,²⁸ or roughly 76,000 tons less than the ozone season 2015 emissions by the covered facilities. Thus, a pool of banked credits equal to more than three times the reductions contemplated under the CSAPR Update could be available to those facilities charged with reducing their emissions.²⁹ Even with CSAPR's prohibitions against states exceeding their total state allocations by more than 20%, such a vast pool of credits could mean that no real reductions in NO_x emissions occur for many years beyond ozone season 2017 until that pool runs dry. Accordingly, EPA's proposal to include banked credits from CSAPR 1 in the Update runs the risk of taking an inadequate level of reductions and then delaying them significantly, postponing indefinitely actual resolution of transport obligations under the 2008 NAAQS.

"Early" reductions in NO_x emissions as part of a trading scheme designed to resolve interstate impacts under the 1997 ozone NAAQS do nothing to ensure resolution of impacts under the 2008 ozone standard. Put another way, progress towards achieving a 75 parts per billion standard does not translate into achievement of a lower 70 parts per billion standard. Accordingly, there is no reason to allow credits banked under the 1997 NAAQS to be used in delaying attainment of the 2008 NAAQS, while at the same time, significant harm would flow from the use of those credits in CSAPR 2. Thus, EPA should not allow credits from CSAPR 1 to weaken and delay the already only partial attainment benefits that would come from CSAPR 2.³⁰

²⁸ 298,196 tons, to be exact.

²⁹ Thomas F. McNevin (2016) Recent increases in nitrogen oxide (NO_x) emissions from coal-fired electric generating units equipped with selective catalytic reduction, Journal of the Air & Waste Management Association, 66:1, 66-75, DOI: 10.1080/10962247.2015.1112317.

³⁰ At most, EPA should only consider a 10-to-1 surrender ratio for such credits, and not the exceedingly generous 4-to-1 or 2-to-1 surrender ratios considered in the proposed CSAPR Update. Such a ratio would effectively reduce the pool of credits from the 210,000 EPA estimates to 21,000—a pool small enough to only minimally distort emission reductions.

C. The Proposed Update Suffers from Significant Technical Issues in Calculating and Addressing Ambient Concentrations, and in how Allocations Are Distributed

1. EPA's Approach of "Truncating" Is Nonsensical and Damaging to Air Quality

At a variety of steps on the technical side of calculating impacts and linkages under the proposed CSAPR Update, EPA invokes a unique and distorting method of dealing with decimal figures: EPA simply chops them off. As EPA itself explains in calculating the design values upon which the linkages driving NO_x reductions are based, "[c]onsistent with the truncation and rounding procedures for the 8-hour ozone NAAQS, the projected design values are truncated to integers in units of ppb." In other words, according to EPA, $75.0 = 75$, $75.5 = 75$, and $75.9 = 75$.

EPA's approach is particularly bizarre given that the significance level for the 2008 ozone NAAQS, equal to 1% of the standard, is 0.75 parts per billion. In other words, EPA acknowledges that as little as 0.75 parts per billion is "significant," but the agency is nonetheless happy to ignore 0.80 or 0.90 parts per billion where it occurs after a decimal point. If there is a single branch of science or engineering that considers it good practice to simply ignore data to the right of a decimal point in performing calculations, rather than rounding where appropriate, Commenters are unaware of it.

Nor is EPA's truncation methodology simply a mathematical oddity—it has the persistent and skewing effect of undercounting impacts, undercounting contributions, and overstating attainment of the NAAQS. In fact, by pretending that 75.9 is actually equal to 75, EPA effectively raises the NAAQS by a full part per billion. In an already weak and inadequate proposal to update CSAPR to address transport under the 2008 ozone NAAQS, such a systematic biasing of the data towards an artificial attainment of the standard further weakens the proposed CSAPR 2, and subjects the residents of downwind impacted areas to harmful air quality. In fact, all EPA's approach of truncation achieves is to ensure that the data EPA uses in devising its allocations diverges from the real world in a way that militates towards undercontrol of emissions. If EPA is uncomfortable with decimal places in its data, it should use the normal, non-biasing approach of rounding in common practice in every other technical field.

2. EPA's Proposed Allocation Methodology Rewards Polluters for Dragging their Feet on Emissions Reductions

Rather than allocating emission credits under the proposed CSAPR Update via an auction or other economically efficient method, EPA proposes to distribute the credits based on a combination of historical heat output and historical NO_x emissions. The result of this is an imperfect system that gives more credits to historically greater emitters while granting fewer credits to emitters that have been diligent about reducing emissions.

As described in the "Methodology" tab of the unit-level allocations spreadsheet, EPA calculates an average heat output of each CSAPR-eligible unit in each CSAPR state over the 2010-2014 time period by taking the mean, for each unit, of the highest three ozone season heat outputs during that time period. The heat output values for each unit in the state are then summed, yielding a total heat output for the state; initial allocations of NO_x emission credits are made

according to the fractional share of the total heat output for each unit. However, if the allocation for a unit is greater than the ozone season NO_x emissions for that unit in any of the years 2007-2014, the unit only gets an allocation equal to that peak emission year, with the rest of the allocation returned to the pool to be re-allocated. See Unit Level Allocations and Underlying Data for the CSAPR for the 2008 Ozone NAAQS. As such, while allocations are initially made according to fractional heat output, such allocations are capped by historical emissions. Thus, a plant that generated lots of heat, but little NO_x, would receive a small allocation, while a plant that generated little heat, but emitted lots of NO_x, could receive a relatively large allocation. *Id.*

This is problematic for a variety of reasons, not least because it rewards emitters for dragging their feet on installing NO_x control technology and reserves large quantities of emissions credits for high-emitting source categories. On the latter point, a power plant that supplies much of the energy produced in a state, but is a relatively low NO_x emitter (such as a newer gas plant with well-designed and controlled boilers) would receive very few NO_x emission credits for its trouble, since even its peak emission year at any point in 2007-2014 is unlikely to be very high. Conversely, a plant that generates large amounts of NO_x in proportion to its total energy output (such as an older coal plant without SCR or SNCR) would receive a much larger share of credits, since EPA's system reserves many of those credits for dirtier plants. This creates perverse incentives, and shifts more of the costs of compliance with the proposed CSAPR Update off the shoulders of dirtier plants and onto the shoulders of cleaner plants.

EPA's method has the further effect of rewarding even those facilities equipped with NO_x control technologies such as SCR or SNCR for electing not to operate those controls. By capping allocations at historical peak NO_x emissions, and not simply allocating emission credits based on fractional heat output, EPA effectively punishes good actors and rewards bad actors even within the same source category. An example is illustrative: suppose State A has two identical coal-fired power plants, X and Y. X operates its SCR, and thus achieves long-term emission rates of no higher than 0.05 lbs. of NO_x per MMBtu. Y, however, bypasses its controls, and emits at a long-term rate of 0.40 lbs. of NO_x per MMBtu. Assuming X and Y generate precisely the same amount of heat,³¹ Y would emit eight times as much NO_x as Plant X, meaning that Plant X would have an allocation cap of only 1/8 that of Plant Y. Depending on the size of the total pool of emission credits to be allocated in State A, that could mean Plant Y receiving multiple times the allocation as Plant X, by virtue of being a bad actor.

In order to avoid rewarding such bad behavior, to incentivize early and responsible adoption of control technologies, and to let the market efficiently determine the fastest and cheapest overall

³¹ There is, of course, no reason to assume this. Control-eschewing Plant Y is likely to actually have a *larger* share of State A's total heat output because—all else being equal—a facility that bypasses its controls is going to avoid control parasitic load as well as avoid spending money on control reagents and control maintenance, gaining an unfair economic advantage over its more responsible counterparts that will translate into higher dispatch. With that higher heat output, a bad actor such as Plant Y would receive even greater numbers of NO_x emission credits under EPA's current scheme, and be again rewarded for its bad behavior.

method of NO_x reduction from the EGU sector, EPA should simply allocate *all* emission credits based on facilities' fractional share of their state's heat output.³²

3. Unmonitored Areas Must Be Examined for Resolution of Transport Impacts

Currently, EPA only considers ozone levels at monitoring locations (or at least in grid cells that have a monitor in them). This practice is arbitrary and contrary to the Clean Air Act's conception of ambient air, in that it is likely to undercount ozone impacts and to overpredict resolution of ozone problems, because it has the tendency to ignore areas that lack direct monitoring data.

In the context of nonattainment SIP modeling, EPA properly requests that states look at ozone levels throughout the whole nonattainment area, including areas without monitors. EPA calls this an unmonitored area ("UMA"), and EPA should do the same UMA analysis in the context of interstate transport of ozone that it expects states to do in their nonattainment SIPs.

4. The Proposed CSAPR Update Improperly Ignores EPA Findings Concerning the Length of Ozone Season, and Impacts from Climate Change

Despite the fact that EPA acknowledges that its May-September ozone season is an inaccurate construct, the proposed CSAPR Update still only contemplates limiting NO_x emissions during that time period. In promulgating the final rule for the 2015 Ozone NAAQS, EPA expanded the ozone monitoring seasons. Some states now have 12-month ozone monitoring seasons, some have 11-month seasons, and many have ozone seasons longer than May-September. EPA is thus acknowledging that ozone formation is a danger for more months than it previously thought. When ozone formation is a danger in downwind states, upwind states need to control their ozone precursors. EPA's modeling and finalization of the proposed CSAPR Update must take this into consideration, to ensure that allocations ensure reductions in transport contributions below the significance level where necessary beyond just May-September.

Similarly, given the accelerating alterations in summer temperatures throughout many of the states included in the proposed CSAPR Update due to climate change, EPA should take into consideration the reality that transport linkages are shifting, as the hot, humid weather most favorable to ground-level ozone formation moves northward, particularly in the mid-Atlantic region. Some modeled reductions in ozone may be due not to successful reductions in ozone precursor emissions, but to shifting of peak ozone impacts to different areas; likewise, some areas will see their ozone problems worsen, heightening the need for reductions in emissions from upwind states along linkages. EPA must model not only historical emissions and historical ozone concentrations, but also model climate change-derived shifts in ozone concentrations, to ensure that reductions driven by the final CSAPR Update are sufficient to resolve interstate

³² Better still, of course, would be to auction off emission credits, and use the proceeds of that auction to fund investments in clean energy technology, to support low-income ratepayers, and to mitigate and remediate any "hot spot" emission effects that result from regional emission trading.

transport.

CONCLUSION

For the foregoing reasons, EPA should revise the proposed CSAPR Update to fully resolve interstate impacts under the 2008 Ozone NAAQS, to remove the ability of ill-gotten credits gained from the litigation delay of the first CSAPR's implementation to impair the Update, and to remove inaccuracies in the technical calculation of allocations and impacts that undermine the ozone reductions that otherwise might occur under the rule.

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Methodology Used in Analysis

1. Used Data from 2015. Monthly data on generation, Nox rates, heat input were aggregated into ozone season data (May-Sep).
2. Identified all electric generating units with size greater than 25 MW.
3. Focused only on subset of generating unit that were coal-fired (including pet coke and waste coal).
4. Above data was separated for each CSAPR state. All of the subsequent analysis was done on a state-by-state basis.
5. Identified (using data from EPA AMPD and SNL) those coal units that have SCR or SNCR or which plan to install SCR/SNCR by 2018.
6. Units that have been retired or announced retirement by 2017 or earlier were removed from the analysis. To be consistent in comparison, their generation was not shifted to other coal units since it is more likely that the new generation will come from gas and renewables.

Base Case - Actual Emissions During 2015 Ozone Season

7. Basecase Nox emissions were simply sum (for ozone season) of actual Nox emissions for all coal units greater than 25 MW.

Case 1 - The "Utilize Available Controls Fully" Case.

- 8a. In Case 1, emissions from units with SCR and SNCR were recalculated assuming same generation/heat input for 2015 ozone season but assuming that these controls performed well. SCR was required to perform at 0.065 lb/MMBtu and SNCR at 0.25 lb/MMBtu (or lower if actual Nox rate in 2015 ozone season was lower).
 - 8b. All other non-SCR and non-SNCR units were assumed to emit at same level as 2015 ozone season.
- [Case 1 is considered conservative because (i) SNCR assumed rate of 0.25 lb/MMBtu is somewhat higher than what could be achieved (and is being achieved); and SCR rate of 0.065 lb/MMBtu, while smaller than EPA's assumption of 0.075 lb/MMBtu, is consistent with (and higher than) levels being achieved by many newer SCRs (reflecting expected catalyst performance). While some of the older SCR units may not be able to achieve 0.065 consistently because they may have only 2 layers of catalysts, even those units could replace catalyst and improve their performance and would be able to achieve this rate. Newer SCR units generally should have no problem achieving 0.065 or better.]

Case 2 - The "Redispatch" Case

9. Case 2 is the redispatch analysis. The goal is to shift, within the coal fleet, generation from uncontrolled (i.e., no SCR and no SNCR) units to controlled units.
 - 9a. First, the 2015 ozone season capacity factor for controlled units was calculated.
 - 9b. Second, starting with the highest Nox emitting uncontrolled unit (by mass, i.e., tons/ozone season), generation was shifted to the controlled units within the state until the capacity factor of the controlled units reached (but did not exceed) 0.85.
- [It was assumed that 0.85 capacity factor is a conservative maximum for the controlled units.]
- 9c. The Nox rate for the shifted units was preferentially assumed to be the SCR rate (as long as the SCR units in the state could accommodate the shifted generation without exceeding the 0.85 capacity factor), or SNCR if the SCR capacity factor exceeded 0.85. This never came to pass. In all states where Case 2 was possible, the shifted generation was absorbed by SCR units in the state except Louisiana, which has no SCR units. In LA, the shifted generation was absorbed by SNCR units.
 - 9d. The Case 2 analysis was not possible in a few instances, as follows:
 - (i) for Arkansas, shifting any of the uncontrolled units' generation to the (few) controlled units resulted in exceeding the 0.85 CF for those units since the 2015 ozone season CF for the controlled units was already high at 0.80.
 - (ii) for Maryland, New Jersey and Tennessee, there are no uncontrolled units without SCR or SNCR. Therefore Case 2 did not apply.
 - (iii) for Oklahoma, there are no controlled units. So, Case 2 (and Case 1) did not apply.
10. The state by state ozone season Nox tons is shown for the Base Case, Case 1 and Case 2 - for comparison.

State	Total 2015 Ozone Season Emissions	EPA's Proposed 2017 Allocations	Commenter's Analysis (Coal Only)	Commenter's Analysis (Non- Coal Allocations)	Commenter's Analysis Total (Coal and Non- Coal) Allocations	EPA's Proposed 2017 Allocations to Coal Plants	% of EPA's Proposed 2017 Allocations to Coal Plants
AL	20,675	9,774	6,601	1,266	7,867	8,508	87.05%
AR	12,552	6,808	11,702	987	12,689	5,821	85.50%
IA	12,177	7,932	9,704	364	10,068	7,568	95.41%
IL	15,370	11,487	11,759	1,922	13,681	9,565	83.27%
IN	31,009	27,719	14,903	4,820	19,723	22,899	82.61%
KS	8,117	8,991	5,801	985	6,786	8,006	89.04%
KY	26,568	20,872	10,656	463	11,119	20,409	97.78%
LA	19,184	15,179	7,223	8,007	15,230	7,172	47.25%
MD	3,892	3,541	1,811	649	2,460	2,892	81.67%
MI	21,459	18,733	12,408	2,804	15,212	15,929	85.03%
MO	18,297	15,009	14,422	897	15,319	14,122	94.09%
MS	6,380	5,320	1,557	2,454	4,011	2,866	53.87%
NC	17,874	12,027	8,975	3,820	12,795	8,207	68.24%
NJ	1,703	864	731	653	1,384	211	24.42%
NY	5,446	4,357	721	3,559	4,280	798	18.32%
OH	27,216	16,323	12,797	2,841	15,638	13,293	81.44%
OK	13,951	15,890	N/A	6,286	6,286	9,604	60.44%
PA	2,704	13,370	10,945	3,675	14,620	9,695	72.51%
TN	9,201	5,927	4,909	1,224	6,133	4,703	79.35%
TX	55,150	55,092	35,227	19,692	54,919	35,400	64.26%
VA	9,580	4,974	4,625	2,240	6,865	2,734	54.97%
WI	9,070	5,440	5,501	530	6,031	4,876	89.63%
WV	26,937	13,122	12,618	197	12,815	12,925	98.50%
Total	374,512	298,751	205,595	70,335	275,930	228,203	

For chart:

Total 2015 Ozone Season Emissions	EPA's Proposed 2017 Allocations	Commenter's Analysis (Total Allocations)
374,512	298,751	275,930