UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standard; Proposed Rule 87 Fed. Reg. 20,036 (April 6, 2022)	Docket ID No. EPA–HQ–OAR–2021–0668

COMMENTS OF EARTHJUSTICE, T.E.J.A.S., SIERRA CLUB, APPALACHIAN MOUNTAIN CLUB, ENVIRONMENTAL DEFENSE FUND, CENTER FOR BIOLOGICAL DIVERSITY, CHESAPEAKE BAY FOUNDATION, CLEAN AIR TASK FORCE, DOWNWINDERS AT RISK, NATURAL RESOURCES DEFENSE COUNCIL, CLEAN AIR COUNCIL, CLEAN WISCONSIN, CITIZENS FOR PENNSYLVANIA'S FUTURE, AIR ALLIANCE HOUSTON, FAMILIAS UNIDAS DEL CHAMIZAL, CHAPARRAL COMMUNITY COALITION FOR HEALTH AND ENVIRONMENT, AND NATIONAL PARKS CONSERVATION ASSOCIATION ON EPA'S PROPOSED FEDERAL IMPLEMENTATION PLAN ADDRESSING REGIONAL OZONE TRANSPORT FOR THE 2015 OZONE NATIONAL AMBIENT AIR QUALITY STANDARD

Submitted via regulations.gov and e-mail on June 21, 2022 by Earthjustice

Earthjustice, t.e.j.a.s., Sierra Club, Appalachian Mountain Club, Environmental Defense Fund, Center for Biological Diversity, Chesapeake Bay Foundation, Clean Air Task Force, Downwinders at Risk, Natural Resources Defense Council, Clean Air Council, Clean Wisconsin, Citizens for Pennsylvania's Future, Air Alliance Houston, Familias Unidas del Chamizal, Chaparral Community Coalition for Health and Environment, and National Parks Conservation Association submit these comments on EPA's proposed Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standard ("Good Neighbor Rule"). Our organizations are deeply concerned about the health, environmental, and economic harms of ozone pollution, as well as the unequal distribution of those harms. On behalf of our millions of members and supporters across the country, we strongly support EPA's proposal to fulfill its obligations under the Clean Air Act's Good Neighbor Provision, 42 U.S.C. § 7410(a)(2)(D), building on the foundation of prior ozone transport rules to achieve large reductions in ozone-forming pollution from high-emitting stationary sources.

EPA correctly proposes to make several improvements to its prior rules in response to widespread violations of the 2015 ozone National Ambient Air Quality Standard ("NAAQS," or "standard") and the problem of pollution hotspots that have persisted under prior ozone transport rules. EPA's health-protective approach is required by court decisions that EPA must implement the Good Neighbor provision consistent with the Clean Air Act's directive that downwind areas attain and maintain the ozone standard as expeditiously as practicable, and not later than specified deadlines. Commenters strongly support EPA's proposal to adopt safeguards to ensure that all power plants (also called electric generating units, or EGUs) participating in the trading program actually control their pollution, as well as EPA's decision to base emission budgets for power plants on selective catalytic reduction (SCR) controls. Indeed, it is past time for all large power plants to install and run this highly effective pollution control technology. We also strongly support EPA's proposal to require reductions in NOx emissions from other high-polluting stationary sources, in addition to power plants.

As we explain in these comments, greater pollution reductions are still needed, beyond what EPA has proposed, to ensure that no one is forced to breathe unsafe air in part due to interstate ozone transport. Real-world data on ozone values and trends demonstrate that ozone pollution is worse than EPA has projected. Updated modeling that corrects several overly optimistic assumptions and addresses all relevant downwind receptors will likely demonstrate that Arizona, New Mexico, North Carolina, Alabama, and Tennessee must be included among the states regulated by the final rule in 2023 and 2026, as must Oregon.

EPA must improve the methodology for setting emissions budgets for electric generating units (EGUs), strengthen requirements for large coal-fired steam EGUs, and expand its EGU control strategy to more types of units and to higher cost thresholds to achieve emission reductions that are needed for downwind attainment. EPA's budget-setting methodology is overly conservative and must be adjusted to enable tighter budgets that reflect the level of performance that controls can achieve. EPA also must eliminate or narrow the threshold of 150 tons of NOx per ozone season as a prerequisite for installation of SCR on oil- or gas-fired steam EGUs and include SCR retrofits on uncontrolled natural gas combined-cycle units in the budgets. EPA must also include cogeneration units within the EGU trading program if they meet applicability criteria, along with boilers and combustion turbines serving generators that provide the electricity for cryptocurrency mining. EPA must strengthen the daily backstop emissions rate for EGUs by: setting a lower backstop limit for coal-fired EGUs; extending backstop limits to all EGUs assumed to install and operate post-combustion controls, and to peaking units; imposing backstop limits in 2023 (instead of 2024) for units that have already installed post-combustion controls and in 2026 (instead of 2027) for units that have not yet installed post-combustion controls; and declining to allow sources to avoid a backstop limit by committing to retire at a later date. EPA should also make further improvements to the administration of the emission credit trading regime for EGUs.

EPA must strengthen the proposed rule to include additional cost-effective NOx control strategies for non-EGUs. EPA must apply emission limits to all engines used in the oil and gas industry, not just transmission, tighten the proposed emission standards for four-stroke lean burn and four-stroke rich burn engines, and require operators to replace smaller fossil-burning engines with electric engines. EPA must also tighten the proposed emission standards for industrial sources; shorten the averaging period for compliance; and require the use of continuous emissions monitoring systems. EPA must also set strict limits for large emissions units in addition to boilers in chemical manufacturing, petroleum and coal product manufacturing, pulp, paper, and paperboard mills, metal ore mining, and lime and gypsum product manufacturing. EPA must also consider replacing industrial emission units with electric options where possible, such as all-electric glass melter installations. Finally, EPA must set strict limits for municipal waste combustors in the final rule.

We urge EPA to promptly issue a final rule that covers all of the states and sources necessary to satisfy its obligation under the Clean Air Act to protect public health and the environment.

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I. Ozone pollution harms human health and the environment.

A. Harm to Human Health.

Ozone is one of the most dangerous and persistent forms of air pollution in the United States today. Scientists link ozone, the principal component of smog, to premature deaths, thousands of emergency room visits, and tens of thousands of asthma attacks each year. Short-term exposure to ozone is linked to many health problems including heart disease, reduced lung function, lung inflammation and susceptibility to infection, asthma exacerbation, and premature death from heart and lung diseases. It has even been shown to worsen metabolic diseases like diabetes. Ozone is dangerous to everyone, but it is especially dangerous for small children, people with asthma, outdoor workers, and senior citizens, who are often warned to stay indoors on polluted days.[1] Ozone pollution also disproportionately impacts economically marginalized communities and communities of color. Across the nation, people of color are consistently overrepresented in areas with higher ozone levels and that are in nonattainment of ozone standard. Furthermore, the asthma burden of people of color—particularly among Black people—is far higher than that of white people. Hundreds of counties throughout the nation, home to hundreds of millions of people, suffer from unsafe ozone levels.[2]

EPA's most recent review of the scientific evidence not only shows that ozone harms human health, but that significant harms occur at ambient ozone levels much lower than what is currently allowed under the 2015 ozone standard. Scientific evidence across various disciplines—including controlled human exposure studies, animal toxicology, and epidemiology—confirms these harms and adverse health effects. At levels as low as 60 parts per billion (ppb), studies observe evidence of impaired lung function, pulmonary inflammation, oxidative stress and other respiratory symptoms in children and adults exposed to ozone.[3] Controlled human exposure studies showed ozone-induced decreases in lung function and inflammation in exercising adults at levels as low as 60 ppb.[4] Risks of hospital admissions, emergency department visits, and physician visits for respiratory ailments were found to be elevated at 8-hour maximum levels of 31-55 ppb.[5]

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[1] Comments of Appalachian Mountain Club *et al*. on U.S. EPA's Review of the Ozone National Ambient Air Quality Standards, Docket No. EPA-HQ-OAR-2018-0279-0444 (Oct. 1, 2020). Commenters extensively address the health and environmental impacts of ozone pollution in these comments. We incorporate those portions of the comments here, by reference.

[2] *See* EPA Green Book, 8-hour Ozone (2015) Nonattainment Area Summary, available at: https://www3.epa.gov/airquality/greenbook/jnsum.html (more than 125 million people in more than 200 counties); *see also* American Lung Association, State of the Air, Key Findings, Ozone Trends (2022) ("3 out of every 8 Americans live in counties with F grades for Ozone smog"), https://www.lung.org/research/sota/key-findings/ozone-pollution.

[3] U.S. EPA, Integrated Science Assessment for Ozone and Related Photochemical Oxidants at IS-29 (Apr. 2020), https://www.epa.gov/isa/integrated-science-assessment-isa-ozone-and-related-photochemical-oxidants.

[4] *Id.* at IS-1.

[5] *Id.* at IS-27.

Ozone is formed by emissions of nitrogen oxides (NOx) and volatile organic compounds (VOCs), reacting in the presence of heat and sunlight. Reducing these ozone precursors "generally reduces human exposure to ozone and the incidence of ozone-related health effects."[6] The Good Neighbor proposal addresses these precursors and is keyed to EPA's 2015 Ozone standards. In particular, the Clean Air Act requires that states adopt plans (state implementation plans, or SIPs) to bring their smog-afflicted areas in line with the NAAQS as expeditiously as practicable. These SIPs must incorporate measures that prohibit interstate pollution that causes or contributes to high levels of ozone. Each SIP must "contain adequate provisions . . . prohibiting . . . any source or any 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)(I). This requirement is known as the Act's "Good Neighbor" provision. Should EPA find, as it did here, that states have not submitted a Good Neighbor SIP, or if the EPA disapproves the SIP, within two years, the EPA must issue a Federal Implementation Plan (FIP) to assure downwind states are protected, as it proposes to do here with the Good Neighbor rule.

EPA estimates that in 2026, the Good Neighbor proposal will "prevent approximately 1,000 premature deaths, 2,400 hospital and emergency room visits, 1.3 million cases of asthma symptoms, and 470,000 school absence days."[7] The Agency estimates that these benefits will be attributable to "proposed reductions in emissions of oxides of nitrogen (NOx), a pollutant critical to the formation of ozone "smog," from sources in the power sector by 29% and heavy industry by 15% across 26 states during the ozone season."[8] For each year between 2027 and 2042, EPA estimates benefits at least equal to those projected for 2026, with estimated monetized benefits outweighing costs by well over $10 billion per year.

Nonetheless, as NGO commenters and others noted at length in comments on the 2020 ozone NAAQS proposal, the 2015 ozone standard (to which the Good Neighbor proposal is keyed) that was retained in 2020 does not reflect the latest scientific knowledge and is not sufficient to protect public health with an adequate margin of safety. Americans have waited years for the EPA to meet its obligations under the Act's Good Neighbor provisions and to strengthen the underlying NAAQS for ozone. The Good Neighbor proposal is a huge step forward, and we strongly encourage EPA to finalize a strong final rule in order to expeditiously meet the 2015 ozone standard of 70 ppb, as required by the Clean Air Act, and provide more protection for all who experience the adverse health effects of air pollution. Communities dealing with pollution blowing in from across state lines have been waiting far too long for EPA to fulfill

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[6] EPA, Regulatory Impact Analysis for Proposed Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standard at ES-14, EPA-HQ-OAR-2021-0668-0151 (Feb. 2022) [hereinafter, "RIA"].

[7] EPA, EPA's Proposed "Good Neighbor" Plan to Address Ozone Pollution – Overview, *available at* https://www.epa.gov/system/files/documents/2022-03/fact-sheet_2015-ozone-proposed-good-neighbor-rule.pdf.

[8] *Id.*

its statutory duty to prohibit such pollution at levels causing or contributing significantly to downwind nonattainment.

B. Communities of color and economically marginalized communities are most affected.

Ozone pollution disproportionately impacts economically marginalized communities and communities of color. Across the nation, people of color are consistently overrepresented in areas with high ozone levels, including areas that are in nonattainment of the 2015 ozone standard. Data from the 2018 U.S. Census 5-Year American Community Survey[9] show that ozone pollution disproportionately affects Hispanic and Black communities. Of people living in counties projected to violate the standard in 2023, 37% identify as Hispanic, compared with only 19% of people nationwide, and 35% identify as not white, compared to 27% nationwide. In many parts of the country, as air quality progressively worsens in an area, representation of people of color in the population increases while representation of white people decreases. Importantly, the most polluted census tracts in the 1980s largely continue to struggle with some of the worst air quality in the country more than four decades later.[10]

Furthermore, the prevalence of asthma in people of color—particularly among Black people—is far higher than white people. Worse, asthma-related hospitalizations and deaths are elevated "among children in general and black children in particular." 62 Fed. Reg. at 38,864/2. "Black children are two times as likely to be hospitalized for asthma and are four times as likely to die from asthma as White children."[11] Prior studies have identified health risks in populations of healthy individuals; underlying co-morbidities present in higher rates in low-income communities and communities of color produce increased risks that necessitate strong protection for these and other communities. For example, at least 16 million people suffer from chronic obstructive pulmonary disease (COPD) in the U.S. population and there were more than 7 million COPD-associated emergency department visits in 2015.[12] Additionally, ozone exposures are associated with increased respiratory disease severity, disease symptoms, and lung disease exacerbations in this population at levels as low as 25.1 ppb.[13] It is critical to consider the cumulative impacts of multiple stressors on these communities when assessing health impacts,

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[9] Available at: https://data.census.gov/cedsci/.

[10] Mercedes A. Bravo *et al.*, *Where Is Air Quality Improving, and Who Benefits? A Study of PM2.5 and Ozone Over 15 Years,* Am. J. of Epidemiology (Apr. 5, 2022), *available at* https://pubmed.ncbi.nlm.nih.gov/35380633/.

[11] EPA, Children's Environmental Health Disparities: Black and African American Children and Asthma" at 3 (2014), *available at* https://www.epa.gov/sites/production/files/2014-05/documents/hd_aa_asthma.pdf.

[12] U.S. Centers for Disease Control and Prevention, National Hospital Ambulatory Medical Care Survey: Emergency Department Summary Tables at Table 13, Presence of chronic conditions at emergency department visits: United States (2015), *available at* https://www.cdc.gov/nchs/data/nhamcs/web_tables/2015_ed_web_tables.pdf.

[13] Laura M. Paulin *et al.*, *Association of long-term ambient ozone exposure with respiratory morbidity in smokers*, JAMA Internal Medicine (Dec. 9, 2019), *available at* https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2757312.

including a population's exposure to multiple pollutants, exposure to higher levels of multiple pollutants, and chronic exposure to lower levels of multiple air pollutants.

Environmental justice advocates have long called for mandatory reductions in pollution in overburdened communities, and highlighted the necessity of addressing the cumulative public health impact of multiple sources of pollution on these communities. In communities that often suffer from disproportionately high pollution loads, a cumulative impacts approach, coupled with mandatory emissions reductions required from various sources, is required to significantly reduce elevated levels of pollution. A policy must explicitly prioritize and guarantee emission reductions and public health benefits for EJ communities to be considered an EJ policy.

C. Harm to the environment.

In addition to harming human health, ground-level ozone and its precursor pollutants are damaging to ecosystems. The proposed Good Neighbor Rule will be helpful in cutting ozone and precursor pollution that is harming crops, forests, waterways and wildlife. The Regulatory Impact Analysis discusses these and other environmental benefits of the proposed rule including decreases in acidic deposition, forest biomass impacts, visibility impairment, and nutrient enrichment.[14]

Ozone has a multitude of adverse effects on vegetation and ecosystems including disruption of normal storage of nutrients and carbon and direct visible damage to foliage. "In terms of forest productivity and ecosystem diversity, ozone may be the pollutant with the greatest potential for region-scale forest impacts."[15] These impacts directly translate to harming crop and forest productivity, resilience, scenic beauty, and ecosystem functioning and biodiversity. EPA has documented these direct impacts from ozone:

- 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

Ozone has a role in disrupting below ground processes including carbon storage. Decreased carbon storage capacity has important ramifications related to carbon sequestration and mitigation of greenhouse gas emissions. When ozone is present in the ambient air there are significant and multiple harms 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. New evidence continues to illustrate the widespread impact of ozone. In fact, the EPA has provided new science supporting a causal relationship between alteration of

[14] RIA at 5-35, EPA-HQ-OAR-2021-0668-0151.

[15] EPA, Regulatory Impact Analysis of the Final Revisions to the National Ambient Air Quality Standards for Ground-Level Ozone at 7-3, EPA-HQ-OAR-2015-0500-0191 (Sep. 2015).

terrestrial community composition and ozone exposure.[16] Recent research has also indicated that ozone can disrupt important plant relationships with other organisms, from reducing their nutritional value to herbivores, to confusing the scent trails of pollinators, and even impacting soil microbiomes through root impacts.[17]

The Chesapeake Bay watershed serves as an example of the harm wrought by this pollution on sensitive ecosystems across the country. Of relevance to Chesapeake Bay is the problem of eutrophication caused by excess nutrients in an aquatic ecosystem, including nitrogen deposition from NOx emissions. The excess nutrients lead to large algae blooms which, when decomposing, use up oxygen from the water and create dead zones where no aquatic life can survive. "Eutrophication of estuaries can disrupt an important source of food production, particularly fish and shellfish production, and a variety of cultural ecosystem services, including water-based recreational and aesthetic services."[18]

In 2010, in response to pervasive eutrophication and dead zones in Chesapeake Bay, EPA established a federal-state clean-up plan called the Chesapeake Bay Total Maximum Daily Load ("Bay TMDL").[19] To develop the Bay TMDL, EPA calculated the maximum amount of sediment, nitrogen, and phosphorus the Chesapeake Bay could receive and still meet water quality standards.[20] These overall pollutant loads were then allocated to each of the seven Bay jurisdictions. Each jurisdiction is responsible for reducing its amount of pollutant contribution to meet the TMDL goals.[21]

At the time the Bay TMDL was established, EPA found that atmospheric deposition contributed roughly one-third of the total nitrogen loads delivered to the Chesapeake Bay.[22] EPA set a cap of 15.7 million pounds of atmospheric deposition of nitrogen per year directly to the Bay and its tidal tributaries, and accepted responsibility for the reductions necessary to meet this cap.[23] Accordingly, EPA committed to reducing atmospheric nitrogen deposition to the Bay by 3.7

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[16]*See* U.S. EPA, Integrated Science Assessment for Ozone and Related Photochemical Oxidants at ES-12, Fig. ES-5 (Apr. 2020), https://www.epa.gov/isa/integrated-science-assessment-isa-ozone-and-related-photochemical-oxidants.

[17] Evdenios Agathokleous *et al.*, *Ozone affects plant, insect, and soil microbial communities: A threat to terrestrial ecosystems and biodiversity*, 6 Science Advances (Aug. 12, 2020), *available at* https://doi.org/10.1126/sciadv.abc1176.

[18] EPA, Regulatory Impact Analysis for the Final Revised Cross-State Air Pollution Rule (CSAPR) Update for the 2008 Ozone NAAQS at 5-36, EPA-HQ-OAR-2020-0272-0221 (Mar. 2021).

[19] EPA, Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus, and Sediment (Dec. 2010), https://www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-tmdl-document ("Bay TMDL").

[20] *See* Bay TMDL at Executive Summary, ES-1.

[21] *Id*.

[22] *Id*. at Section 4, 4-33.

[23] *Id*. at Section 8, 8-33; *see also id.* at Appendix L, at L-23 (noting that "the nitrogen deposition directly to the Bay's tidal surface waters is a direct loading with no land-based management controls and, therefore, needs to be linked directly back to the air sources and air controls as EPA's allocation of atmospheric nitrogen deposition.").

million pounds annually between 2009 and 2025.[24] EPA ensured it would achieve atmospheric nitrogen reductions based on state and federal compliance with Clean Air Act regulations, including efforts to attain and maintain the National Ambient Air Quality Standards ("NAAQS").[25] More recently, in its Two-Year Milestone Report, EPA listed actions that would reduce NOx emissions to the watershed, including: "[w]ork with states and review SIPs that address infrastructure requirements, including interstate transport, for the 2015 ozone NAAQS."[26]

At 570,000 square miles, the Bay airshed is roughly nine times the size of the Bay watershed and sources of NOx in this expansive airshed contribute nitrogen to the Bay and its tributaries.[27] Fifty percent of the atmospheric deposition of nitrogen to the Bay watershed comes from areas outside of the Bay watershed.[28] Thus, the Bay TMDL depends upon the effective implementation of the Clean Air Act, including enforcement of the Good Neighbor provision, to reduce interstate transport of NOx and ensure that reductions in nitrogen from atmospheric deposition continue and are maintained. As the federal partner to the Bay TMDL and signatory to the Chesapeake Bay Watershed Agreement,[29] EPA must consider impacts to the Chesapeake Bay, in addition to other ecosystems, as it finalizes the Good Neighbor Rule.

National parks and other public lands are yet another example of natural ecosystems that are harmed by transported emissions of nitrogen species and ozone pollution. In 2018, National Parks Conservation Association (NPCA) found (using EPA data) that there are ninety-eight national parks that are wholly (84) or partially (14) in areas out of compliance with the 2015 ozone standards.[30] These parks include many across California and numerous urban parks from Washington DC and Maryland to Delaware and New York. In addition, parks like Cuyahoga National Park in Ohio, Rocky Mt. National Park in Colorado, and Chattahoochee River National Recreation Area in Georgia struggle with ozone pollution problems. During the 2017 ozone season, parks from Acadia to Joshua Tree recorded a total of 276 exceedances of the ozone standard. These are places where ozone regularly threatens the health of park visitors – but also seriously harms nature.

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[24] EPA, The Importance of Clean Air to Clean Water in the Chesapeake Bay (Jan. 2015), *available at* https://www.epa.gov/sites/production/files/2015-06/documents/cb_airwater_fact_sheet_jan2015.pdf.
[25] Bay TMDL at Section 6, 6-28.
[26] EPA, Federal Water Quality Two-Year Milestones for 2020-2021 at 6 (updated June 3, 2020), *available at* https://federalleadership.chesapeakebay.net/file.axd?file=2020%2f6%2f2020-2021-Federal-Programmatic-WQ-Milestones+V3.pdf.
[27] Bay TMDL at Section 4, 4-34.
[28] *Id.*
[29] *See* Chesapeake Bay Watershed Agreement at 16 (2014) (recommitting Chesapeake Bay Program partners, including EPA, to the goals of Chesapeake Bay watershed restoration), *available at* https://www.chesapeakebay.net/channel_files/24334/2014_chesapeake_watershed_agreement.pdf; *see also*, Executive Order 13508—Chesapeake Bay Protection and Restoration, 74 Fed. Reg. 23,099 (May 15, 2009); 33 U.S.C. § 1267(g)(1).
[30] Nat'l Parks Conservation Ass'n, Ozone Fact Sheet: Ozone Pollution in Our Parks (June 2018), *available at* https://www.npca.org/resources/3224-ozone-fact-sheet.

As anthropogenic nitrogen enters ecosystems it can contribute to a "nitrogen cascade" disturbing natural nutrient cycling. Eutrophication can occur where excess nutrients cause unhealthy and sometimes deadly algal outbreaks. Damage to ecosystems that are typically nitrogen limited is particularly concerning, as biodiversity can be reduced, and invasive species can be favored. Air pollution that harms ecosystems and scenic beauty in national public lands adversely affects overall public welfare because, among other things, these special places were set aside for conservation of their natural values, for use and enjoyment by the public, and under the Clean Air Act, as places to have the most pristine air quality. *See* 42 U.S.C. 7472. As further described in section VIII below, EPA must finalize a strong Good Neighbor Rule to protect the public welfare from interstate ozone pollution, and also act separately to fulfill its legal obligation to limit the impacts from regional haze pollution to Class I areas. Advancing protections to safeguard the air and resources in these areas is critical to meeting the Clean Air Act's objectives.

Class I areas include many mountain systems that can have high background ozone with little change in diurnal concentrations, even during the daylight hours. Consequently, when ozone pollution events occur, they build upon these high background levels and therefore exacerbate overall cumulative impacts. Class I areas also include many sensitive wetland ecosystems that support significant diverse wildlife, and where foliar injury from ozone can be more severe.

Ozone also affects our climate as a potent greenhouse gas with strong warming impacts, especially in Northern mid-latitudes (where the United States is) and in the Arctic. National parks and natural ecosystems are significantly threatened by a rapidly warming planet. Impacts range in degree and breadth and include coastal areas affected by rising oceans, deserts experiencing extreme heat events, and alpine regions beleaguered by extended drought. Warmer temperatures in some regions like the Southeast U.S., home to the Great Smoky Mountains National Park, could also increase ozone levels, further damaging critical tree and plant species.

In 2014, the National Park Service published a study that examined the extent to which 289 parks are experiencing extreme climate changes when compared to the historical records from 1901–2012.[31] Results show that parks are overwhelmingly at the extreme warm end of historical temperatures. Species within national parks experience extreme climates, causing changes to plant growth and animal behavior. For example, temperate tree species in the Great Lakes region appear most sensitive to higher summer temperatures, while white-tailed deer are more sensitive to winter conditions.

All publicly protected lands are visited for recreation and rejuvenation and are often important wildlife habitat areas. This nexus between the benefits to ecological systems with the significant ecosystem services and the public's health and welfare must be considered. These environmental considerations provide further reason to strengthen the Good Neighbor Rule before finalizing.

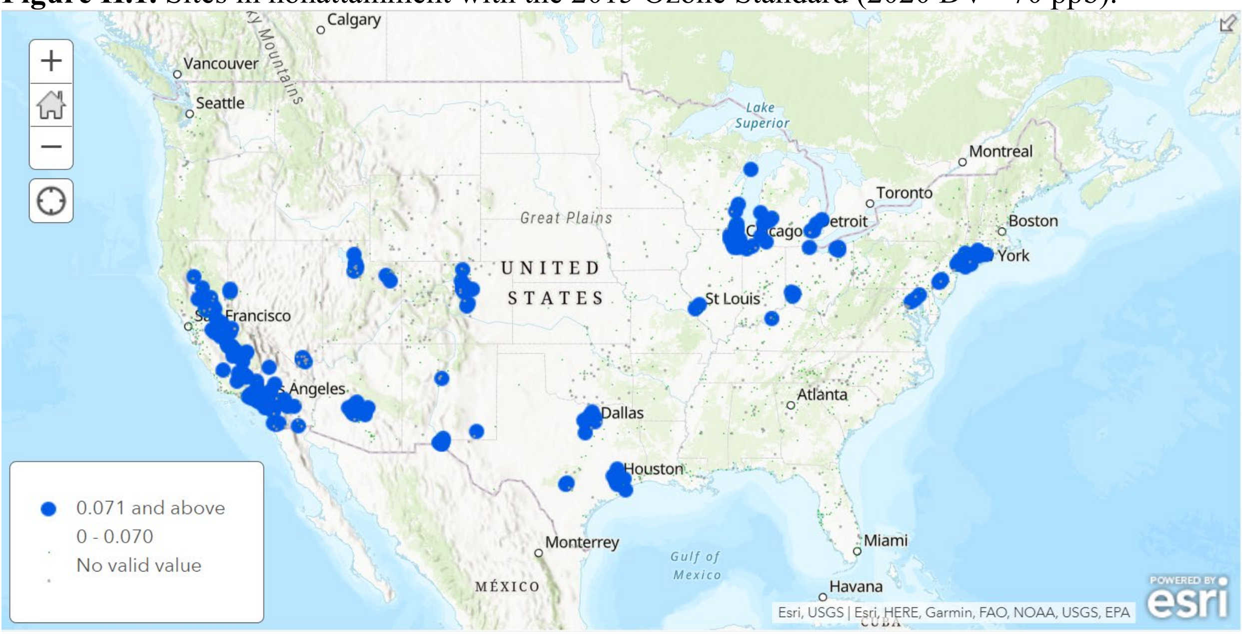
[31] William B. Monahan & Nicholas A. Fisichelli, *Climate Exposure of US National Parks in a New Era of Change* (July 2, 2014), 9(7) PLoS ONE, *available at* https://doi.org/10.1371/journal.pone.0101302.

II. Interstate pollution contributes significantly to ongoing difficulty attaining and maintaining the 2015 ozone standard across the U.S.

A. Interstate pollution contributes to states' ongoing difficulties in attaining and maintaining the 2015 ozone standard.

Ozone pollution remains problematic across the United States. In fact, 213 monitors show a design value (DV) of greater than 70 ppb in 2020, *see* Figure II.1. Unhealthy ozone levels persist along the eastern seaboard in Connecticut, New York, Maryland, and Washington D.C., as well as in the Great Lakes region and Texas. Ozone levels are unhealthy and are actually increasing in several regions of the western United States. These monitoring data demonstrate the clear need for additional reductions in ozone precursor emissions.

Figure II.1. Sites in nonattainment with the 2015 Ozone Standard (2020 DV >70 ppb).



Source: EPA, https://www.epa.gov/air-trends/air-quality-design-values.

Of the current 51 EPA designated nonattainment areas, 46 had 2020 DVs exceeding the 2015 standard (Table II.1). Worse, air pollution is on the upswing in a number of states, as shown by an additional 16 monitors not previously designated nonattainment in the Central and Western U.S. having 2020 DVs that exceed the standard (Table II.2). Furthermore, we provide examples in Section II.B of a number of states where monitoring sites have shown increases in DVs.

The bolded locations in Tables II.1 and II.2 are not included in EPA's contribution modeling for this proposal, despite having ozone levels that exceed the 2015 ozone standard. As explained in section III below, EPA must address these problem areas in the final rule.

Table II.1. Nonattainment areas with EPA reported 2020 DVs above the 2015 standard. Bolded sits are not included in contribution modeling for this proposal.

Designated Area	Designation Status	Classification	2018-2020 Design Value (ppb)	Met NAAQS?	Included in Modeling
Allegan County, MI	**Nonattainment**	**Marginal**	**73**	**No**	**No**
Amador County, CA	Nonattainment	Marginal	69	Yes	Yes
Atlanta, GA	Nonattainment	Marginal	70	Yes	Yes
Baltimore, MD	Nonattainment	Marginal	72	No	Yes
Berrien County, MI	**Nonattainment**	**Marginal**	**72**	**No**	**No**
Butte County, CA	Nonattainment	Marginal	73	No	Yes
Calaveras County, CA	Nonattainment	Marginal	72	No	Yes
Chicago, IL-IN-WI	Nonattainment	Marginal	77	No	Yes
Cincinnati, OH-KY	Nonattainment	Marginal	74	No	Yes
Cleveland, OH	Nonattainment	Marginal	74	No	Yes
Columbus, OH	Maintenance	Marginal	67	Yes	Yes
Dallas-Fort Worth, TX	Nonattainment	Marginal	76	No	Yes
Denver Metro/North Front Range, CO	Nonattainment	Marginal	81	No	Yes
Detroit, MI	**Nonattainment**	**Marginal**	**72**	**No**	**No**
Dona Ana County (Sunland Park), NM	**Nonattainment**	**Marginal**	**78**	**No**	**No**
Door County, WI	Maintenance	Marginal	72	No	Yes
Greater Connecticut, CT	Nonattainment	Marginal	73	No	Yes
Houston-Galveston-Brazoria, TX	Nonattainment	Marginal	79	No	Yes
Imperial County, CA	Nonattainment	Marginal	78	No	Yes
Kern County (Eastern Kern), CA	Nonattainment	Moderate	86	No	Yes
Las Vegas, NV	Nonattainment	Marginal	74	No	Yes
Los Angeles-San Bernardino Counties (West Mojave Desert), CA	Nonattainment	Severe-15	90	No	Yes
Los Angeles-South Coast Air Basin, CA	Nonattainment	Extreme	114	No	Yes
Louisville, KY-IN	Nonattainment	Marginal	72	No	Yes
Manitowoc County, WI	**Nonattainment**	**Marginal**	**70**	**Yes**	**No**
Mariposa County, CA	Nonattainment	Marginal	79	No	Yes
Milwaukee, WI	Nonattainment	Marginal	73	No	Yes
Morongo Band of Mission Indians, CA	Nonattainment	Serious	99	No	Yes

Designated Area	Designation Status	Classification	2018-2020 Design Value (ppb)	Met NAAQS?	Included in Modeling
Muskegon County, MI	**Nonattainment**	**Marginal**	**76**	**No**	**No**
Nevada County (Western part), CA	Nonattainment	Moderate	82	No	Yes
New York-Northern New Jersey-Long Island, NY-NJ-CT	Nonattainment	Moderate	82	No	Yes
Northern Wasatch Front, UT	Nonattainment	Marginal	77	No	Yes
Pechanga Band of Luiseno Mission Indians, CA	Nonattainment	Marginal	78	No	Yes
Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE	Nonattainment	Marginal	74	No	Yes
Phoenix-Mesa, AZ	Nonattainment	Marginal	79	No	Yes
Riverside County (Coachella Valley), CA	Nonattainment	Severe-15	88	No	Yes
Sacramento Metro, CA	Nonattainment	Moderate	84	No	Yes
San Antonio, TX	**Nonattainment**	**Marginal**	**72**	**No**	**No**
San Diego County, CA	Nonattainment	Moderate	79	No	Yes
San Francisco Bay Area, CA	Nonattainment	Marginal	69	Yes	Yes
San Joaquin Valley, CA	Nonattainment	Extreme	93	No	Yes
San Luis Obispo (Eastern part), CA	**Nonattainment**	**Marginal**	**73**	**No**	**No**
Sheboygan County, WI	**Nonattainment**	**Marginal**	**75**	**No**	**No**
Southern Wasatch Front, UT	**Nonattainment**	**Marginal**	**69**	**Yes**	**No**
St. Louis, MO-IL	Nonattainment	Marginal	71	No	Yes
Sutter Buttes, CA	**Nonattainment**	**Marginal**	**76**	**No**	**No**
Tuolumne County, CA	Nonattainment	Marginal	77	No	Yes
Tuscan Buttes, CA	**Nonattainment**	**Marginal**	**74**	**No**	**No**
Uinta Basin, UT	**Nonattainment**	**Marginal**	**76**	**No**	**No**
Ventura County, CA	Nonattainment	Serious	77	No	Yes
Washington, DC-MD-VA	Nonattainment	Marginal	71	No	Yes
Yuma, AZ	Nonattainment	Marginal	68	Yes	Yes

Table II.2. EPA-reported Violating Sites Based on 2020 DVs in Areas Not Previously Designated Nonattainment for the 2015 8-Hour Ozone NAAQS. Bolded sites are not included in contribution modeling for this proposal.

State Name	County Name	AQS Site ID	2018-2020 Design Value (ppb)	CBSA Name	Included in Modeling
California	San Bernardino	060711234	76	Riverside-San Bernardino-Ontario, CA	Yes
Colorado	El Paso	080410013	72	Colorado Springs, CO	Yes
Colorado	El Paso	080410016	71	Colorado Springs, CO	Yes
Indiana	**LaPorte**	**180910005**	**77**	**Michigan City-La Porte, IN**	**No**
Michigan	**Cass**	**260270003**	**71**	**South Bend-Mishawaka, IN-MI**	**No**
Michigan	**Kent**	**260810020**	**71**	**Grand Rapids-Wyoming, MI**	**No**
Michigan	**Ottawa**	**261390005**	**71**	**Grand Rapids-Wyoming, MI**	**No**
Nevada	**Washoe**	**320310031**	**72**	**Reno, NV**	**No**
Nevada	Washoe	320312009	72	Reno, NV	Yes
New Mexico	**Bernalillo**	**350011012**	**71**	**Albuquerque, NM**	**No**
New Mexico	**Dona Ana**	**350130020**	**72**	**Las Cruces, NM**	**No**
New Mexico	**Eddy**	**350151005**	**78**	**Carlsbad-Artesia, NM**	**No**
Ohio	**Lucas**	**390950035**	**73**	**Toledo, OH**	**No**
Texas	**El Paso**	**481410037**	**76**	**El Paso, TX**	**No**
Texas	**El Paso**	**481410044**	**74**	**El Paso, TX**	**No**
Texas	El Paso	481410058	73	El Paso, TX	Yes

B. Ozone problems are worsening in several states.

Phoenix, Arizona continues to have elevated ozone concentrations with many local sites' 2020 DVs exceeding the standard, and the DVs for a number of sites are rising rather than improving. *See* Figure II.3 and Table II.3. The high elevation site at Humboldt Mountain, in the Tonto National Forest (040139508, data not shown), is also exceeding the standard, with a DV of 73 ppb for the last 6 DVs, indicating the possible impact from interstate transport on the nearby Wilderness Area.[32]

[32] *See* EPA, Class I Areas Chart, *available at* https://www.epa.gov/sites/production/files/2020-06/max4_w126_2002_2018_class1areas.xlsx.

Figure II.3. Ozone design values over time at selected Arizona (AZ) sites identified by AQS Site ID. See Table II.3 for site details.

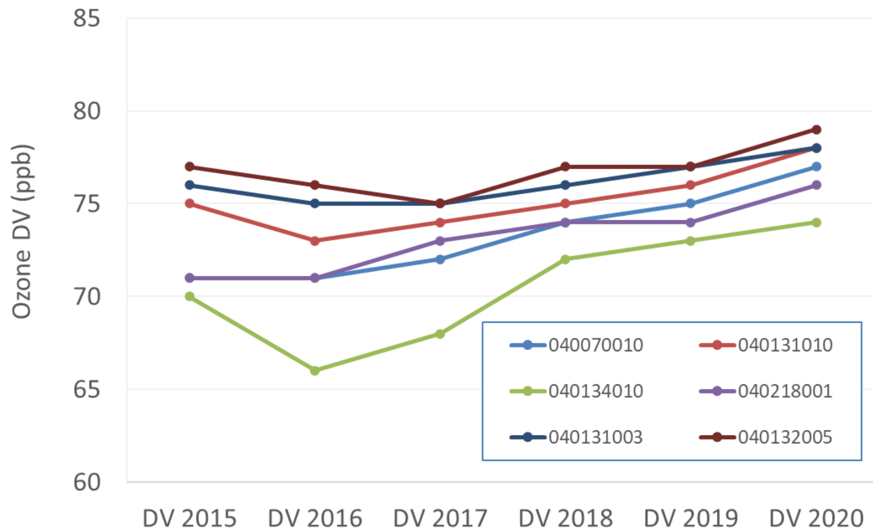


Table II.3. Arizona sites shown in Figure II.2. Bolded sites are not included in contribution modeling for this proposal.

State Name	County Name	AQS Site ID	Site Latitude	Site Longitude
Arizona	**Gila**	**040070010**	**33.654700**	**-111.107400**
Arizona	Maricopa	040131003	33.410180	-111.865360
Arizona	Maricopa	040132005	33.706390	-111.855750
Arizona	Maricopa	040131010	33.452440	-111.733270
Arizona	Maricopa	040134010	33.637180	-112.341850
Arizona	**Pinal**	**040218001**	**33.293465**	**-111.285594**

New Mexico has five sites with 2020 DVs exceeding the standard; seven sites are trending upwards since 2016. *See* Figure II.4. The Desert View monitor in the New Mexico portion of the El Paso-Las Cruces Nonattainment Area (350130021) has a 2020 DV of 78 ppb.

Figure II.4. Ozone design values over time at selected New Mexico (NM) sites identified by AQS Site ID. See Table II.4 for site details.

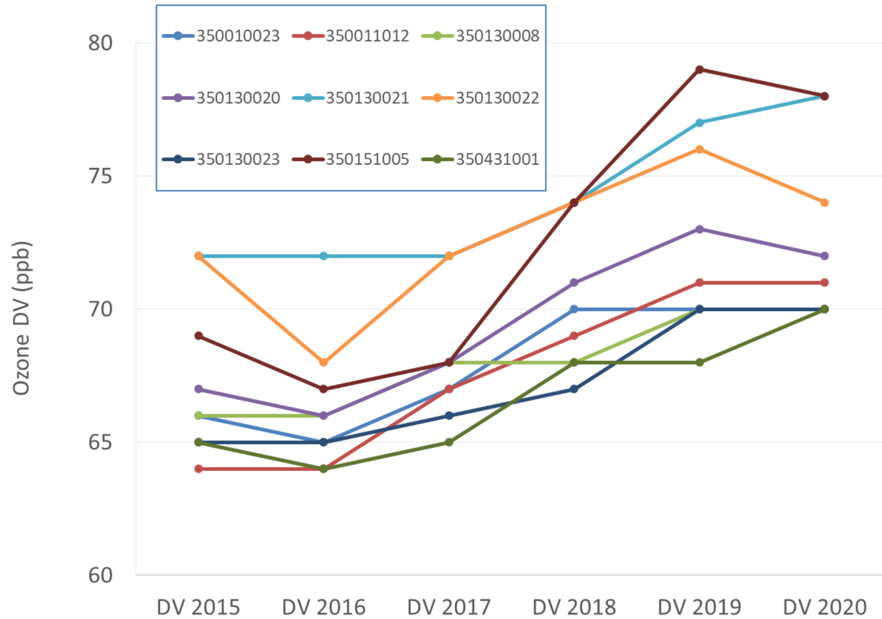


Table II.4. New Mexico sites shown in Figure II.4. Bolded sites are not included in contribution modeling.

State Name	County Name	AQS Site ID	Site Latitude	Site Longitude
New Mexico	**Bernalillo**	**350010023**	**35.13430**	**-106.58520**
New Mexico	**Bernalillo**	**350011012**	**35.18520**	**-106.50815**
New Mexico	**Dona Ana**	**350130008**	**31.93066**	**-106.63110**
New Mexico	**Dona Ana**	**350130020**	**32.04121**	**-106.40971**
New Mexico	**Dona Ana**	**350130021**	**31.79622**	**-106.58443**
New Mexico	**Dona Ana**	**350130022**	**31.78789**	**-106.68332**
New Mexico	**Dona Ana**	**350130023**	**32.31759**	**-106.76834**
New Mexico	**Eddy**	**350151005**	**32.38012**	**-104.26273**
New Mexico	**Sandoval**	**350431001**	**35.29948**	**-106.54891**

Some sites in Nevada have persistent or increasing ozone levels (e.g., 320310031, 320312009). Ozone levels in Colorado are also increasing and exceeding the standard, not only in the designated Denver Metro/North Front Range sites but also in Colorado Springs (El Paso County) as identified in Table II.5 below and a newer site in Boulder, CO (080130014). The Fort Collins site (80690011), while not increasing, continues to have chronically and consistently high ozone levels. Figure II.5 shows DVs for some of the sites in Colorado since 2015.

Figure II.5. Ozone design values over time at selected Colorado (CO) sites identified by AQS Site ID. See Table II.5 for site details.

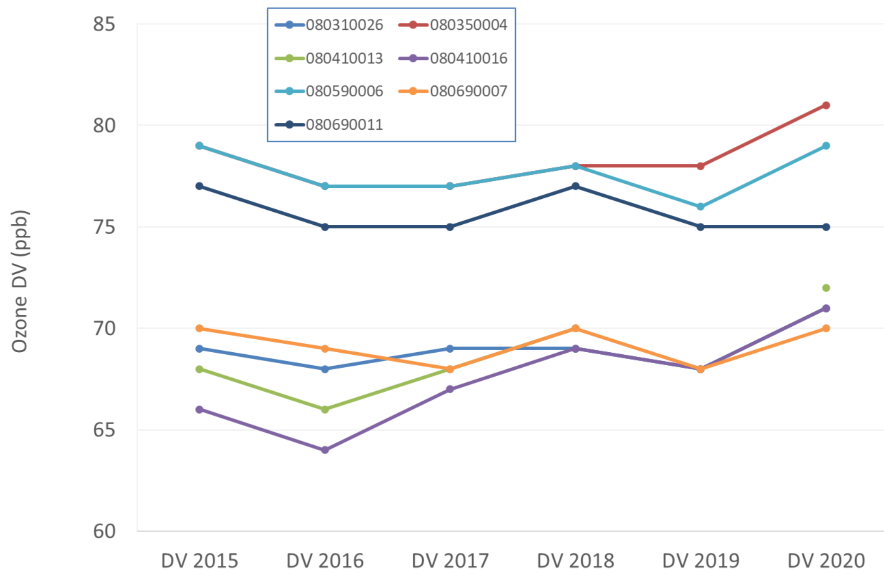


Table II.5. Colorado sites shown in Figure II.5. Bolded sites are not included in contribution modeling for this proposal.

State Name	County Name	AQS Site ID	Site Latitude	Site Longitude
Colorado	Denver	080310026	39.779490	-105.005180
Colorado	Douglas	080350004	39.534488	-105.070358
Colorado	**El Paso**	**080410013**	**38.958341**	**-104.817215**
Colorado	**El Paso**	**080410016**	**38.853097**	**-104.901289**
Colorado	Jefferson	080590006	39.912799	-105.188587
Colorado	Larimer	080690007	40.278130	-105.545640
Colorado	**Larimer**	**080690011**	**40.592543**	**-105.141122**

The Great Lakes region also has a number of trouble spots. For example, Wisconsin and Michigan combined have 16 sites in nonattainment of the NAAQS, based on 2020 DVs.

While some Texas sites are seeing declining ozone levels, others are getting worse. Ozone levels in the El Paso area have increased dramatically since 2016 (481410037, 481410044). And ozone levels remain unhealthy around the large metropolitan areas of Houston and Dallas as well as in San Antonio (480290032, 480290052).

California's ozone levels continue to be high, with some regions worsening. EPA should have included the San Francisco Bay area Livermore site (060010007) as a receptor site in modeling. This CA site had its last 4th highest exceedance in 2019 (72 ppb), and data for 2021 have this site at 72 ppb.[33] This location is slightly higher in elevation (>400') and is adjacent to significant traffic corridors including routes connecting the I-5 trucking route to just east of 880 corridor that sees significant truck traffic and gridlock. Other California sites that should be included as receptor sites because they are both in designated nonattainment areas and currently exceeding the health standard are Eastern San Luis Obispo (060798005), Sutter Buttes (061010004), and Tuscan Buttes (061030004).

Three Maryland sites' 2020 DVs exceeded the standard, and the coastal area of the state continues to experience persistently high levels. Excluding 2020, which is influenced by the COVID-related lockdowns in the Eastern US, and instead looking at 2019 DVs as more representative of Maryland's ozone problem, the state had 6 locations exceeding the standard. In 2021, Maryland had 17 exceedance days reported by the Maryland Dept. of the Environment with several sites' 4th highest ozone levels rebounding back above 70 ppb after falling in 2020. The Agency has detailed the complex meteorology that contributed to ozone exceedances in 2021 and identified interstate transport as a cause, in combination with local emissions, stagnation, and remixing that occurs over multiple days from onshore breezes and upper atmospheric reservoirs.[34] Relief from interstate transport would help to improve Maryland's ongoing unhealthy air quality.

With few large stationary sources of ozone pollution of its own, Washington DC is almost exclusively reliant on remedying interstate transport to attain the standard. The Capital was in attainment according to its 2020 DV but, as with other eastern U.S. sites, emissions in 2020 were reduced as a result of COVID. Two DC sites' 2019 DVs exceeded the standard. Connecticut's ozone pollution also persists with 8 monitoring sites' 2020 DVs above the standard.

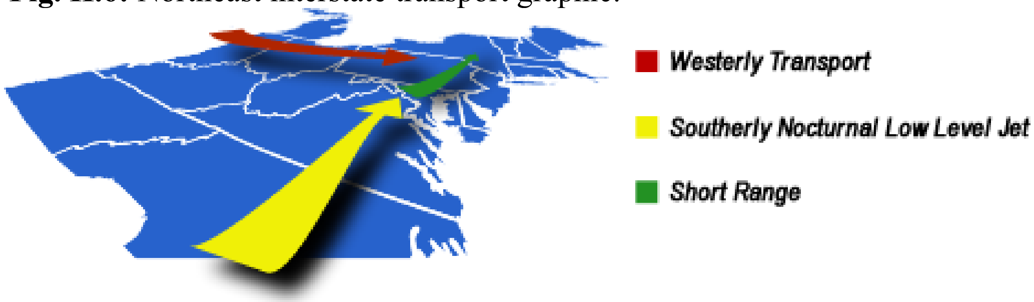
C. Interstate Pollution is Driving Downwind Attainment and Maintenance Problems

While EPA must ensure its final transport rule addresses *all* significant contributions to downwind nonattainment and maintenance monitors—i.e., those that exceed 1 percent of the 2015 ozone NAAQS—the need for EPA's rule is particularly stark for the downwind states that cannot attain the 2015 ozone national ambient air qualityNAAQS without substantial emission reductions from their upwind counterparts. For example, Connecticut's largest contribution to an instate nonattainment or maintenance monitor is only 9.53 ppb or 13 percent of the NAAQS.[35] By contrast, upwind states collectively contribute 37.18 ppb (53 percent of the NAAQS) to that same monitor. The 2020 design value at this monitor was 82 ppb. Consequently, even if

[33] EPA, Air Quality Design Values, https://www.epa.gov/air-trends/air-quality-design-values (last visited June 20, 2022).
[34] See Maryland Dep't of Env't, Peak Ozone Partnership 2021 Season Summary (Nov. 18, 2021), *available at* https://mde.maryland.gov/programs/Regulations/air/Documents/PeakOzone/2021%20Peak%20Day%20EOS%2011-18-2021.pdf.
[35] Modeling TSD at C-2 to C-5, EPA-HQ-OAR-2021-0668-0099 (EPA 2023 and 2026 DVs state contributions to monitor 90010017 in Fairfield County, CT).

Connecticut fully zeroed out its emissions, the monitor would continue to violate the 2015 ozone NAAQS.

Fig. II.6: Northeast interstate transport graphic.



Wisconsin's Lake Michigan shoreline sees approximately 45% of pollution come from out of state.[36] Out of state contributions to Wisconsin shoreline counties' nonattainment and maintenance problems primarily come from other states in the region including Ohio, Indiana, Illinois, Missouri, and Michigan, but also from as far away as Texas.[37] For example, Kenosha, Wisconsin's two nonattainment monitors are overwhelmingly impacted by transported ozone emissions.[38] The state of Wisconsin contributes only 2.82 and 6.06 ppb to the two Kenosha monitors.[39] By contrast, Illinois contributes 18.55 and 18.13 ppb and Indiana contributes an additional 7.10 and 6.60 ppb.[40] And while EPA has included Kenosha (and Racine, Wisconsin) counties in its source-receptor modeling for this proposed rule,[41] it has disregarded other shoreline counties in nonattainment that also experience transported as well as local air pollution contributions. Sheboygan County, as shown in Table II.1 *supra* is in marginal nonattainment of the 2015 standard. Recent trends do not show ozone levels decreasing but instead remaining steadily in nonattainment.[42] While some of that nonattainment can be attributed to sources in the county (just as for other counties in the state), Sheboygan, like other lake-fronting counties, experiences transported ozone from out of state as well. However, it is not included in EPA's modeling for this proposal, despite experiencing transported ozone over the lake similar to the other more southerly counties in the state.

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[36] Air Quality Modeling Technical Support Document, Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standard Proposed Rulemaking at C-8, EPA-HQ-OAR-2021-0668-0099 (Feb. 2022) (showing Racing and Kenosha with 42-52 percent out of state contribution in 2023) [hereinafter, "Modeling TSD"].
[37] *Id.* at C-4 & C-5.
[38] *Id.* (EPA 2023 and 2026 DVs state contributions to monitors 550590025 and 550590019).
[39] *Id.* at C-3.
[40] *Id.* at C-2.
[41] *Id.* at E-1 & E-2 (showing downwind receptor-upwind state linkages for 2023 and 2026).
[42] Wisconsin Department of Natural Resources, 2021 Wisconsin Air Quality Trends by County (Data 2001-2020) (Rept. No. AM-600-2021, Oct. 2021) at 51, *available at* https://widnr.widen.net/view/pdf/c5qehxhesl/AM600.pdf?t.download=true.

Not every nonattainment or maintenance monitor is equally influenced by upwind state emissions. Indeed, for some, the upwind contribution is a considerably smaller fraction of the total ozone levels. However, to fulfill its obligations under the Good Neighbor provision, 42 U.S.C. § 7410(a)(2)(D)(i)(I), EPA must address *all* significant ozone linkages, and as illustrated by the above examples, this rule is acutely needed for those states that contribute so little to their own nonattainment.

D. Emissions from Oil-and-Gas Activities are Increasingly Contributing to Interstate Ozone Pollution.

Since the advent of hydraulic fracturing, the oil-and-gas industry has become a major contributor to cross-state ozone pollution. This is especially apparent in west Texas and southern New Mexico, where increased oil-and-gas activity in the Permian Basin has driven rising ozone levels from Hobbs, NM to El Paso, TX. Even Guadalupe Mountains National Park ("Guadalupe")—an area so isolated that visitors must drive 35 miles to reach the nearest gas station—is now on the verge of violating the NAAQS after reporting seven ozone exceedances in 2020 and four exceedances in 2021.[43] Guadalupe had never experienced a single exceedance day before 2019. The situation is even worse at Carlsbad Caverns National Park, which is reporting a design value of 75 ppb for 2018–2020.[44]

The weight of the evidence indicates that rising ozone levels across this region are driven by emissions from the Permian Basin. This region emits a tremendous amount of ozone-forming pollution. Data from the Texas Commission on Environmental Quality ("TCEQ") indicate that TCEQ Region 7, centered on Midland-Odessa, emits 362,139 tons of VOC and 85,550 tons of NOx per year.[45] TCEQ reported the following emissions by region:

Region (All Sources)	**VOC (tons per year)**	**NOx (tons per year)**
R7-Midland	362,139	85,550
R4-DFW	157,840	123,979
R12-Houston	175,802	132,696
R13-San Antonio	96,083	67,327

43 *See* Nat'l Park Serv., *Ozone Exceedances Monitored in National Parks* (May 24, 2021), https://www.nps.gov/subjects/air/ozone-exceed.htm.
44 *Id.*
45 TCEQ, 2020 Five-Year Ambient Monitoring Network Assessment at Table 10 (2020), *available at* https://www.tceq.texas.gov/downloads/air-quality/air-monitoring/network/historical/tceq-2020-5yr-assessment.pdf.

As these data show, the Midland-Odessa area is responsible for more VOC emissions than Dallas-Fort Worth and Houston *combined*.[46] Midland-Odessa also emits more NOx than San Antonio, the seventh largest city in the United States. The New Mexico Permian emits a tremendous amount of pollution as well, responsible for an estimated 97,977 tons of VOCs and 35,251 tons of NOx in 2014.[47]

In fact, Permian emissions are likely greater than reflected here. Researchers have found that emissions of both VOCs and NOx are dramatically underreported. For example, Yuzhong Zhang et al. (2020)[48] analyzed satellite observations of the Permian Basin from 2018–2019 and found that methane emissions from oil and natural gas production were approximately 2.7 ± 0.5 Tg a−1, more than two times higher than bottom-up inventory-based estimates. Since VOCs are co-emitted with methane, this study implies that VOC emissions are also underestimated by a factor of two. Indeed, studies that look directly at VOC emissions, comparing bottom-up inventory-based estimates with actual monitoring data, indicate that actual emissions of VOCs exceed estimates by 100-300%.[49] Flaring—a significant source of NOx pollution—is also grossly underreported. Willyard et al. (2019)[50] compared self-reported data on the amount of gas vented or flared in the Eagle Ford and Permian Basins with satellite imagery radiant heat measurements, and found that operators were flaring about twice as much as they were reporting.

Figure II.7: From 2012-2015 in the Texas Permian Basin and Eagle Ford Shale, observed flaring was significantly higher than what companies reported.

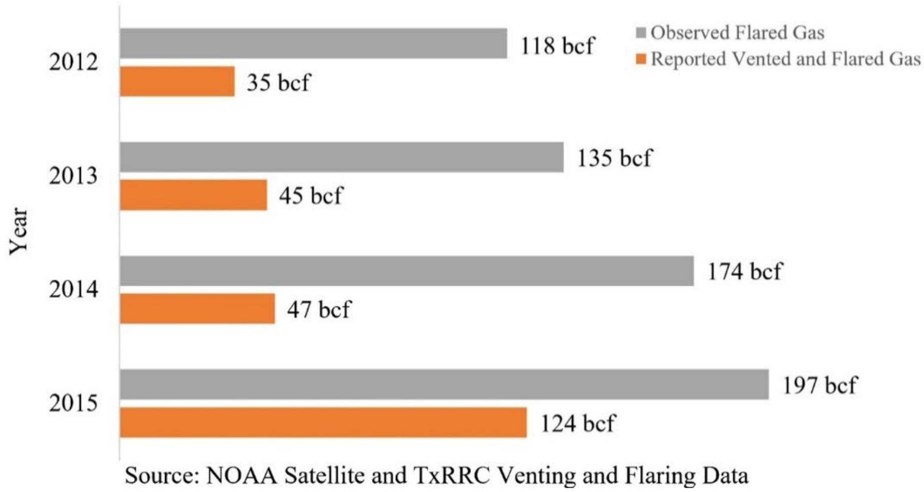
[46] *Id.* at Tables 10, 31, 58, & 74.

[47] *See* N.M. Env't Div., New Mexico Ozone Attainment Initiative Photochemical Modeling Study – Draft Final Air Quality Technical Support Document at 39, Table 4-5 (May 2021), https://www.wrapair2.org/pdf/NM_OAI_2028_AQTSD_v8.pdf.

[48] Yuzhong Zhang *et al.*, *Quantifying Methane Emissions from the Largest Oil-Producing Basin in the United States from Space*, Science Advances (Apr. 20, 2020), https://advances.sciencemag.org/content/6/17/eaaz5120.

[49] Detlev Helmig, Atmospheric Emissions from Oil and Natural Gas Extraction and Processing: A Comparison and Evaluation of Bottom-Up versus Top-Down Estimates (June 13, 2022), attached as Ex. DH 1.

[50] Katherine Ann Willyard & Gunnar W. Schade, *Flaring in two Texas shale areas: Comparison of bottom-up with top-down volume estimates for 2012 to 2015*, 691 Sci. Total Env't 243 (Nov. 15, 2019) https://doi.org/10.1016/j.scitotenv.2019.06.465.



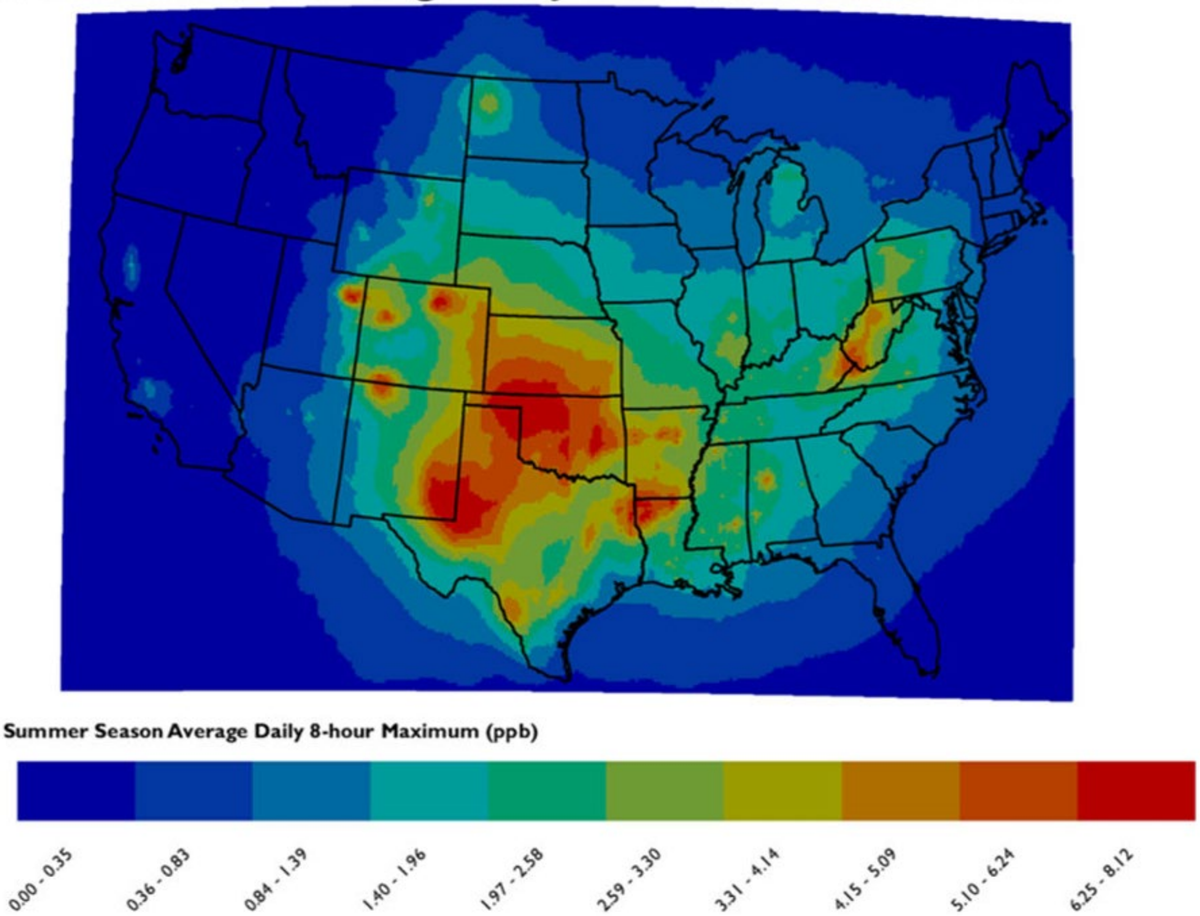
This study indicates that estimates of NOx emissions that are based on operator reported activities may significantly understate emissions.

Evidence indicates that the dramatic increase in oil-and-gas development is contributing to cross-state transport of ozone. For example, Fann et al. (2018) found that oil and gas emissions were expected to contribute significant amounts of ozone to the summer seasonal average across the central United States in 2025, including in states that do not have significant oil and gas activities (e.g., southwest Missouri is projected to see contributions of up to 3.3 ppb from oil and gas, despite the lack of production in the state).

Figure II.8. Summer Season Daily 8-hour Maximum Ozone Attributable to the Oil and Natural Gas Sector in 2025.[51]

[51] Neal Fann *et al.*, *Assessing Human Health PM2.5 and Ozone Impacts from U.S. Oil and Natural Gas Sector Emissions in 2025*, 52 Env't Sci. & Tech. 8,095, 8,099, Fig. 1 (July 13, 2018), https://pubs.acs.org/doi/10.1021/acs.est.8b02050.

Summer Season Average Daily 8-Hour Maximum Ozone

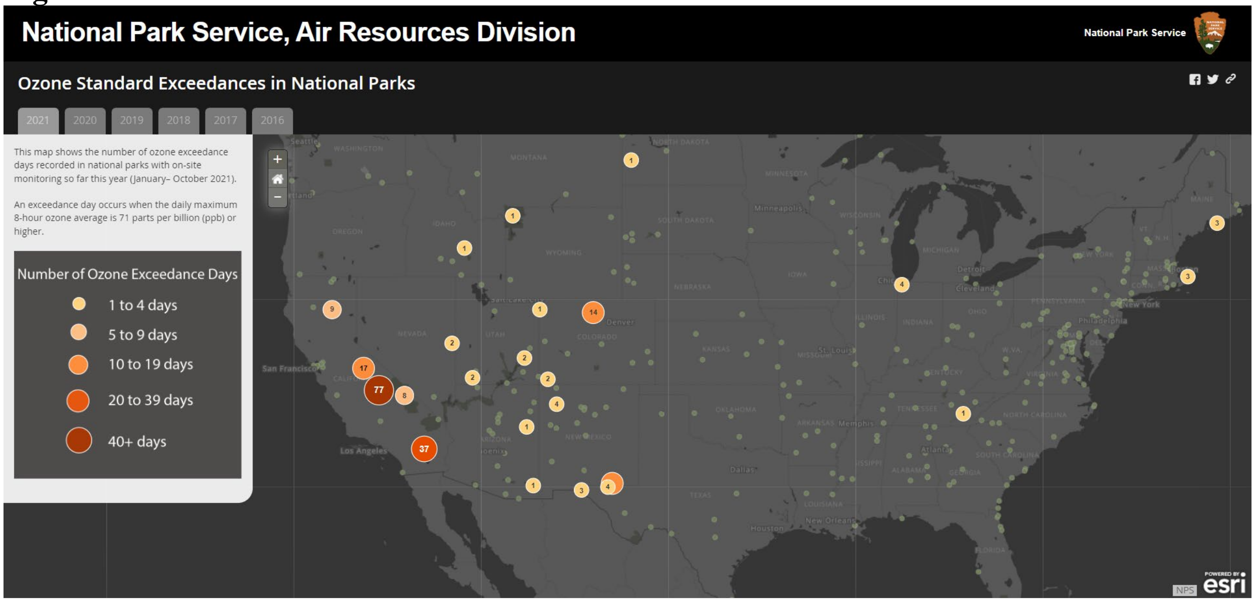


As noted, the contribution from oil-and-gas is very likely understated in modeling that relies on operator-reported data. But even using these data, it is clear that oil-and-gas activity is contributing to dramatic increases in ozone pollution across the country. We applaud EPA for taking a first step to address this industry's contribution to cross-state pollution in this rule, and urge the agency to strengthen those portions of this rule, as explained below.

E. Interstate ozone pollution impacts protected lands.

EPA should give full consideration to, and include in its contribution modeling, receptor sites in or near National Parks and other protected lands. Public lands visitation is on the upswing as outdoor recreation increased during the pandemic. Yet National Parks are experiencing too many ozone exceedances due to pollution transport. The map below shows the number of exceedance days in 2021 at National Parks across the U.S. It is well documented that Eastern U.S. parks and beaches see long-range transport from areas in the Eastern U.S. and seabreeze remixing. EPA has also identified interstate transport between the western states of Arizona, California, Nevada, Oregon, Utah, and Wyoming.

Fig II.9: Ozone Standard Exceedances in National Parks



III. EPA's Modeling Underpredicts Future Ozone Levels, Resulting in Weaker Protections, and Should be Updated in the Final Rule.

A. Real-World Monitored Ozone Levels Demonstrate that EPA's Modeling Underpredicts Future Ozone Levels.

EPA's baseline 2023 modeling projects extraordinary improvements in ozone levels over the next year and a half. While ozone levels in many places have improved during the past decade, they have not done so uniformly or at the rates that EPA's modeling projects. Moreover, in many locations and at many monitors, improvements in ozone levels have stagnated and, in many locations, ozone levels have *increased* in recent years.

EPA's overly optimistic modeling has significant consequences for its proposed transport rule. In some instances, by modeling certain monitors into attainment by 2023, despite strong evidence that key downwind monitors will not actually attain, entire states are excluded from the rule (e.g., NC, NM, AZ). In other instances, by modeling certain monitors into attainment by 2026, when relevant downwind monitors show persistent nonattainment, the budgets and compliance obligations of other states are dramatically reduced (e.g., AL, TN). Furthermore, the divergence of EPA's projected ozone levels from real-world observations and trends cannot be explained by random variation, because projected ozone levels are much more frequently understated than overstated in comparison to measured values. Indeed, the tendency of EPA's projections consistently to understate ozone levels overall is starkly apparent in the data. The 2020 monitored design value exceeds EPA's 2023 projected average design value at 94 out of the 111 nonattainment and maintenance receptors for which EPA has made projections, usually by large margins.[52] By contrast, EPA's projections exceed measured design values at only 12 of these 111 monitors, and almost all of these are by very small margins. *Id.*

[52] Modeling TSD at 13-16, EPA-HQ-OAR-2021-0668-0099.

The tendency of EPA's projected ozone design values to understate real-world levels is borne out by past experience. For instance, in the CSAPR Update, EPA used a similar methodology to the approach here, projecting design values in 2017 based on a five-year base period from 2009 to 2013. In retrospect, the projected values often proved much lower than observed levels.[53] For example, for one receptor in Fairfield, CT, (90010017), EPA projected a 2017 average DV of 74.1 ppb; the measured 2017 DV was 79 ppb. For Bucks County, PA, (420170012), EPA projected a 2017 average DV of 70.3 ppb; the measured 2017 DV was 80 ppb. And for one receptor in Kenosha County, WI, (550590019), EPA projected a 2017 average DV of 66.3 ppb; the measured 2017 DV was 78 ppb. Although EPA's projections were not low in every instance, the preponderance of underestimates when the projected values are checked against real-world observations calls into question EPA's methodology and demonstrates the consistent tendency of EPA's approach towards underestimation.

While agencies typically receive some degree of deference when undertaking complex modeling, courts have cautioned that "model assumptions must have a 'rational relationship' to the real world." *Appalachian Power Co. v. EPA*, 249 F.3d 1032, 1053 (D.C. Cir. 2001). In *Appalachian Power*, the D.C. Circuit addressed EPA modeled projections of future electric demand that appeared inconsistent with then-current growth trends. The court rejected EPA's invocations of deference, noting that "even in the face of evidence suggesting the EPA's projections were erroneous, the EPA never explained why it adopted [its] particular methodology." *Id.* Similarly, in *National Association of Clean Water Agencies*, the D.C. Circuit explained that:

> We are hesitant to rubber-stamp EPA's invocation of statistics without some explanation of the underlying principles or reasons why its formulas would produce an accurate result, particularly when the 'facts found' . . . demonstrate flaws in the formula.

734 F.3d 1115, 1145 (D.C. Cir. 2013).

As discussed below, the most current ozone data indicate that EPA's modeling underpredicts future ozone levels. EPA projects attainment by numerous monitors that are extremely unlikely to attain based on 2021 design values. Even more concerningly, EPA wholly omits from its contribution analysis a number of monitors that are modeled to have 2023, and in some cases, 2026 design values above 71 ppb or are otherwise highly likely to remain out of attainment through 2023 and whose inclusion would have increased the scope of this transport rule and expanded the states to which it applies.

EPA must update its modeling to more closely align it with real world ambient ozone trajectories and should begin by addressing overly optimistic assumptions, as discussed in Section III.H., below. Moreover, EPA must include in its final contribution analysis all monitors that may fail to attain or maintain the NAAQS by 2023 under realistic assumptions. Table III.1 below highlights the irrational optimism of EPA's modeling. For dozens of monitors currently violating the 2015 ozone standard, EPA projected ozone levels to decline by between 7.1 and 10.6 ppb in a period of only three years. As discussed in greater detail below, this magnitude of

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[53] *Compare* EPA, "final_csapr_update_ozone_design_values_contributions_all_sites," available at https://www.epa.gov/csapr/final-cross-state-air-pollution-rule-update, *with* EPA, 2021 Design Value Interactive Map, available at https://www.epa.gov/air-trends/air-quality-design-values.

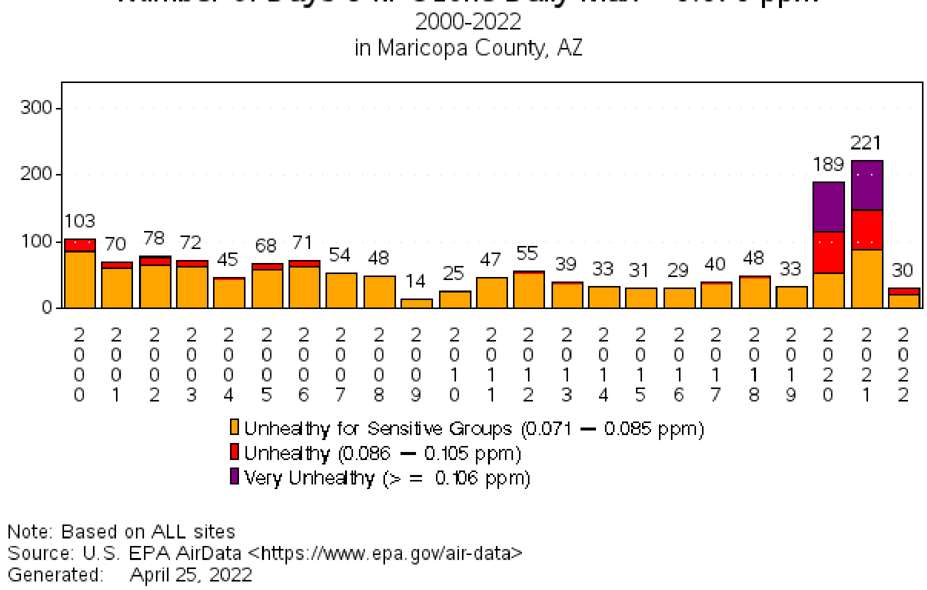
improvement is contrary to recent air quality trends for many of these monitors, which reveal ozone levels flatlining or increasing.

Table III.1: EPA Projected Improvements in Air Quality at Select Nonattaining Monitors

Site ID	State	County	2020 DV	2023 Avg No Water	2023 Max No Water	Difference between 2023 Avg DV and 2020	Difference between 2023 Max DV and 2020
40134010	Arizona	Maricopa	74	63.4	66.5	-10.6	-7.5
40139702	Arizona	Maricopa	77	66.8	68.0	-10.2	-9.0
40131010	Arizona	Maricopa	78	68.2	69.1	-9.8	-8.9
40133003	Arizona	Maricopa	74	64.6	64.9	-9.4	-9.1
40132005	Arizona	Maricopa	79	69.6	70.5	-9.4	-8.5
390610006	Ohio	Hamilton	74	64.6	66.1	-9.4	-7.9
391650007	Ohio	Warren	72	62.9	63.2	-9.1	-8.8
390850003	Ohio	Lake	74	65.2	65.5	-8.8	-8.5
480850005	Texas	Collin	75	66.2	66.8	-8.8	-8.2
40139704	Arizona	Maricopa	74	65.2	66.1	-8.8	-7.9
80050002	Colorado	Arapahoe	77	68.4	68.4	-8.6	-8.6
60650009	California	Riverside	73	64.4	64.8	-8.6	-8.2
40131004	Arizona	Maricopa	78	69.4	70.1	-8.6	-7.9
40134008	Arizona	Maricopa	74	65.5	66.4	-8.5	-7.6
240251001	Maryland	Harford	72	63.9	64.8	-8.1	-7.2
40131003	Arizona	Maricopa	78	69.9	70.6	-8.1	-7.4
40134003	Arizona	Maricopa	73	65.0	65.3	-8.0	-7.7
484393009	Texas	Tarrant	76	68.0	68.7	-8.0	-7.3
240031003	Maryland	Anne Arundel	72	64.4	64.4	-7.6	-7.6
40134004	Arizona	Maricopa	72	64.5	65.5	-7.5	-6.5
361030009	New York	Suffolk	72	64.5	66.3	-7.5	-5.7
170311003	Illinois	Cook	73	65.6	66.3	-7.4	-6.7
482010029	Texas	Harris	73	65.6	67.1	-7.4	-5.9
40137020	Arizona	Maricopa	74	66.7	66.7	-7.3	-7.3
40137024	Arizona	Maricopa	74	66.7	67.6	-7.3	-6.4
170314201	Illinois	Cook	77	69.9	73.4	-7.1	-3.6

Arizona exemplifies the inaccuracy of EPA's 2023 design value modeling. Two receptor sites that exceed the standard and are not included in modeling are to the SE of Phoenix (40218001) and on the eastern side of the Mazatzal Mountains and Wilderness Area near the Tonto National Monument (040070010). Maricopa County has 19 monitors with 2019-2021 design values violating the 2015 ozone NAAQS. Six of these monitors have design values of 75 ppb or higher for 2019-2021, and 4th highest 8-hour maximum daily average ozone concentrations were as high as 82 ppb at these monitors in 2021. Moreover, Maricopa monitors show alarming worsening trends. As shown in the figure below, the number of days where the 8-hour maximum daily ozone concentration exceeded 70 ppb skyrocketed beginning in 2020, jumping from 33 days in 2019 to 189 days in 2020 and 221 days in 2021.

Figure III.1: Number of Days 8-hr Ozone Daily Max > 0.070 ppm



Yet EPA modeling projects that *no monitors* in Maricopa County will be out of attainment of the 2015 ozone standard come 2023. This is simply not credible given current ozone levels and recent ozone trends.

Arapahoe County, Colorado, similarly illustrates the over-optimism of EPA's modeling. Design values at both Arapahoe County monitors have been increasing in recent years. At monitor 080050002, the 2019-2021 design value hit 80 ppb, the highest level in the past 10 years, driven in part by a 2021 4th highest 8-hour daily maximum level of 84 ppb. The number of ozone exceedance days also jumped in 2021 to the highest number in more than two decades.

Figure III.2: Design Values in Arapahoe, Colorado

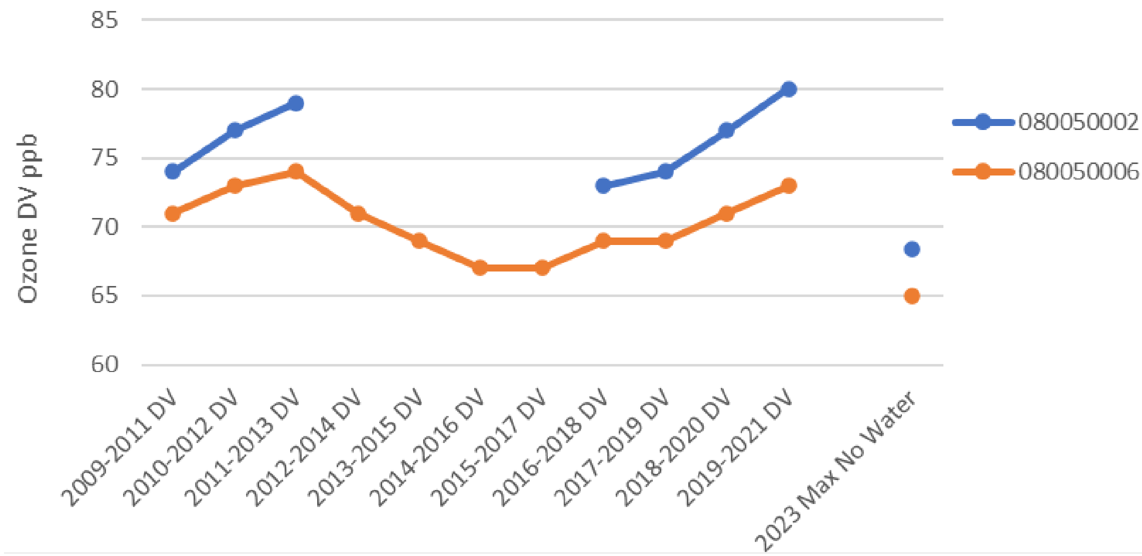
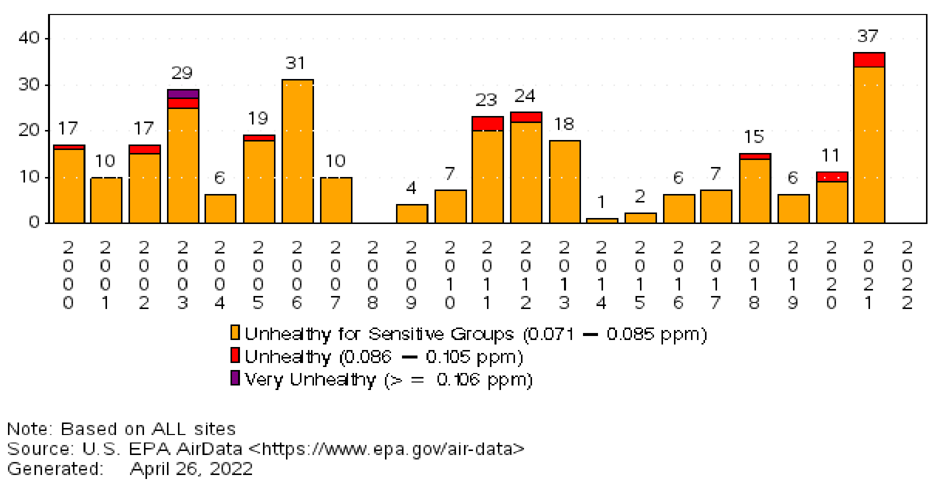


Figure III.3: Number of Days 8-hr Ozone Daily Max > 0.070 ppm
2000-2022
in Arapahoe County, CO



Despite these recent trends, EPA projects that Arapahoe County will have a maximum "no water" 2023 design value of only 68 ppb, a *12 ppb drop in just two years' time*. This again defies credibility.

EPA irrationally omits numerous monitors from its contribution analysis, with significant implications for its proposed transport rule. EPA's 2023 and 2026 ozone design value projection analysis includes 941 monitors. However, its contribution analysis includes only 397 monitors. EPA's exclusion of nearly 550 monitors, some of which are projected to be nonattainment monitors creates a significant risk of missing linkages that could affect the scope of the rule. EPA must update its contribution analysis to include, at minimum, all monitors for which the average or maximum 2023 or 2026 design value, is above the 70 ppb standard.

In the "README" tab of its contributions workbook,[54] EPA explains that:

> Data in this file are provided for those monitoring sites that meet certain criteria used for calculating the contribution metric. Specifically, the contribution metric values are calculated based on modeled contribution data for the top-10 model-predicted 8-hour daily maximum (i.e., MDA8) ozone concentration days in the future year modeling. **Monitoring sites were eliminated from the calculation of the contribution metric if there were fewer than 5 days with future year modeled-predicted MDA8 ozone concentrations greater than or equal to 60 ppb.** Note that the calculation of contribution metric values for 2026 are based on daily contributions for the same set of days used to calculate the contribution metric values for 2023 at each monitoring site.

In other words, EPA claimed to exclude from its contribution analysis only those monitors where EPA projected that fewer than 5 days in 2023 would have an 8-hour daily maximum ozone concentration above 60 ppb—*10 ppb below the 70 ppb ozone standard*. While this approach appears conservatively inclusive, it was either misapplied by EPA or its application nevertheless missed numerous monitors that should have been included in the contribution analysis. Rather than attempt to redo the analysis using this 5-day criterion, EPA should instead use an approach that ensures that *all* monitors with projected average or maximum design values exceeding 70 ppb in 2023 or 2026 are included in the contribution analysis.

As an initial matter, EPA's focus on the 5th highest day is irrational, as it does not ensure that all monitors exceeding the 70 ppb NAAQS are included in EPA's contribution modeling. Design values are based on a three-year average of *4th highest* ozone days. The 5th highest day has no relevance to calculation of design values. Moreover, as discussed further below, EPA's explanation for its excluded monitors is insufficient or implausible as an explanation for many of the missing monitors. Indeed, as discussed in Section II.A. above, EPA omitted from its contribution modeling numerous monitors that are presently designated nonattainment with 2018-2020 design values exceeding the 70 ppb NAAQS, as well as for numerous monitors with 2018-2020 design values exceeding the 70 ppb standard that are not in areas presently designated nonattainment. As shown in Table III.2 below, there are at least 55 monitors with 2018-2020 design values of 71 ppb or higher that were not included in EPA's contribution modeling. EPA must remedy this serious modeling deficiency and must update its contribution analysis to ensure that all monitors with 2023 or 2026 design values above 70 ppb are included.

Table III.2: Monitors with 2018-2020 design values of 71 ppb or higher not included in EPA's contribution analysis.

State Name	County Name	AQS Site ID	2018-2020 Design Value (ppb)	Current Designation
Arizona	Gila	040070010	77	Nonattainment
Arizona	Pinal	040218001	76	Nonattainment
California	Kern	060296001	82	Nonattainment
California	Mariposa	060430006	79	Nonattainment

[54] *Available at* https://www.epa.gov/csapr/good-neighbor-plan-2015-ozone-naaqs (Data File with Ozone Design Values and Ozone Contributions).

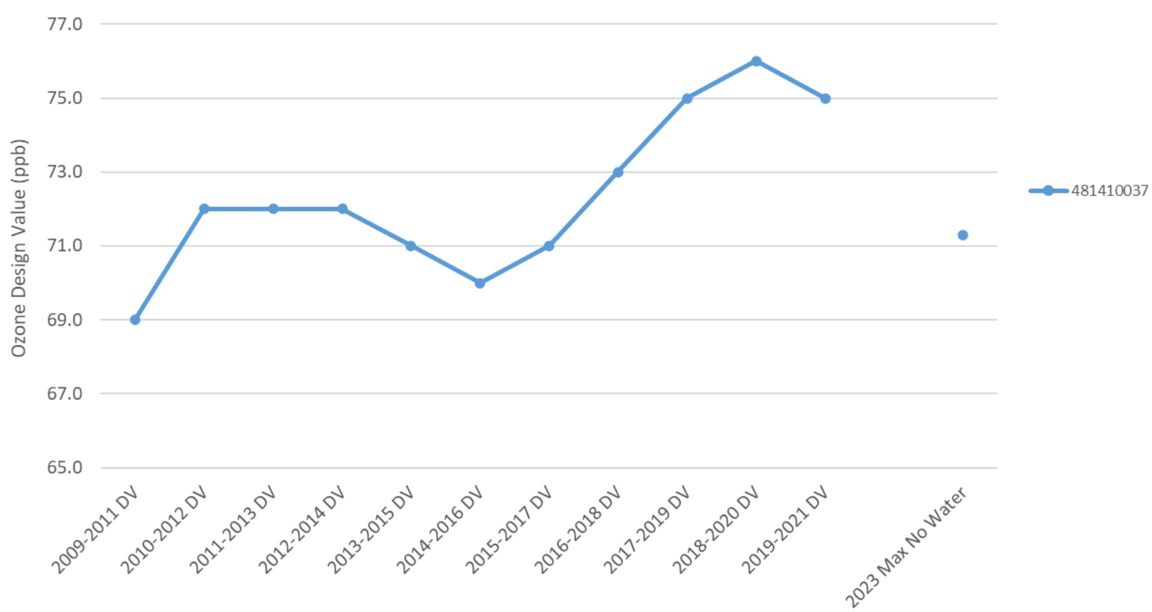
State Name	County Name	AQS Site ID	2018-2020 Design Value (ppb)	Current Designation
California	Riverside	060650010	71	Nonattainment
California	San Diego	060731016	72	Nonattainment
California	San Luis Obispo	060798005	73	Nonattainment
California	Sutter	061010004	76	Nonattainment
California	Tehama	061030004	74	Nonattainment
Colorado	Arapahoe	080050006	71	Nonattainment
Colorado	Boulder	080130014	74	Nonattainment
Colorado	El Paso	080410013	72	Attainment
Colorado	El Paso	080410016	71	Attainment
Colorado	Larimer	080690011	75	Nonattainment
Indiana	La Porte	180910005	77	Attainment
Michigan	Allegan	260050003	73	Nonattainment
Michigan	Berrien	260210014	72	Nonattainment
Michigan	Cass	260270003	71	Attainment
Michigan	Kent	260810020	71	Attainment
Michigan	Muskegon	261210039	76	Nonattainment
Michigan	Oakland	261250001	72	Nonattainment
Michigan	Ottawa	261390005	71	Attainment
Michigan	St. Clair	261470005	71	Nonattainment
Michigan	Wayne	261630093	71	Nonattainment
Nevada	Washoe	320310031	72	Attainment
New Mexico	Bernalillo	350011012	71	Attainment
New Mexico	Dona Ana	350130020	72	Attainment
New Mexico	Dona Ana	350130021	78	Nonattainment
New Mexico	Dona Ana	350130022	74	Nonattainment
New Mexico	Eddy	350151005	78	Attainment
Ohio	Cuyahoga	390355002	71	Nonattainment
Ohio	Lucas	390950035	73	Attainment
Texas	Bexar	480290032	72	Nonattainment
Texas	Bexar	480290052	72	Nonattainment
Texas	Dallas	481130075	74	Nonattainment
Texas	El Paso	481410037	76	Attainment
Texas	El Paso	481410044	74	Attainment
Texas	Galveston	481671034	74	Nonattainment
Texas	Harris	482011017	72	Nonattainment
Texas	Harris	482011039	78	Nonattainment
Texas	Johnson	482510003	73	Nonattainment
Texas	Montgomery	483390078	74	Nonattainment
Texas	Tarrant	484390075	75	Nonattainment
Texas	Tarrant	484391002	72	Nonattainment
Texas	Tarrant	484392003	73	Nonattainment
Utah	Davis	490110004	77	Nonattainment

State Name	County Name	AQS Site ID	2018-2020 Design Value (ppb)	Current Designation
Utah	Duchesne	490130002	73	Nonattainment
Utah	Salt Lake	490352005	73	Nonattainment
Utah	Salt Lake	490353006	74	Nonattainment
Utah	Salt Lake	490353010	77	Nonattainment
Utah	Salt Lake	490353013	73	Nonattainment
Utah	Uintah	490472003	76	Nonattainment
Utah	Weber	490571003	71	Nonattainment
Wisconsin	Ozaukee	550890008	71	Nonattainment
Wisconsin	Sheboygan	551170006	75	Nonattainment

B. EPA Arbitrarily Omitted Relevant El Paso County Monitors and Thus Erroneously Excludes Arizona and New Mexico from the Proposal.

El Paso County, Texas, has six ozone monitors, and routinely records elevated ozone levels. In 2020 three of the monitors recorded design values exceeding the 70 ppb ozone standard, and in 2021, two monitors continued to record design values of 71 ppb or higher, including one monitor (the University of Texas at El Paso or UTEP Monitor, No. 481410037) with a design value of 75 ppb. For the past 10 years, the UTEP Monitor has recorded the highest design value in El Paso County, consistently violating the 2015 ozone standard since its 2017 design value, as shown in Figure III.4 below.

Figure III.4: Design Values for El Paso, TX Monitor 4841410037



Critically, in EPA's own modeling, the Agency characterized the UTEP monitor as a "maintenance" monitor, with a max 2023 "no water" design value of 71.3 ppb.[55] In its contribution modeling, however, EPA inexplicably omitted this monitor. Its lone explanation for omitted monitors (that they are not anticipated to have more than 5 days above *60 ppb*) almost certainly does not apply here because EPA itself models that this monitor will have a 2023 maximum design value above 71 ppb, requiring many days of ozone levels above 71 ppb, let alone 60 ppb.

The omission of the El Paso maintenance monitor has significant implications for EPA's transport rule. EPA's contribution spreadsheet shows that Arizona contributes well above the 1 percent contribution threshold to the two El Paso monitors that EPA did include (contributing 1.66 ppb to monitor 481410029 (the "Ivanhoe" monitor) and 1.27 ppb to monitor 481410058 (the "Skyline Park" monitor). Similarly, New Mexico contributes well in excess of the 1 percent contribution threshold to the two El Paso monitors that EPA included in its contribution spreadsheet (contributing 1.52 ppb to monitor Ivanhoe and 1.67 ppb to Skyline Park).[56] If Arizona and New Mexico contribute even half as much to the UTEP monitor, they would be significantly contributing to a maintenance monitor—the precondition for inclusion in the transport rule. Yet EPA's proposed rule does not include either Arizona or New Mexico. EPA's own contribution modeling strongly indicates that both Arizona and New Mexico must be included in the final rule.

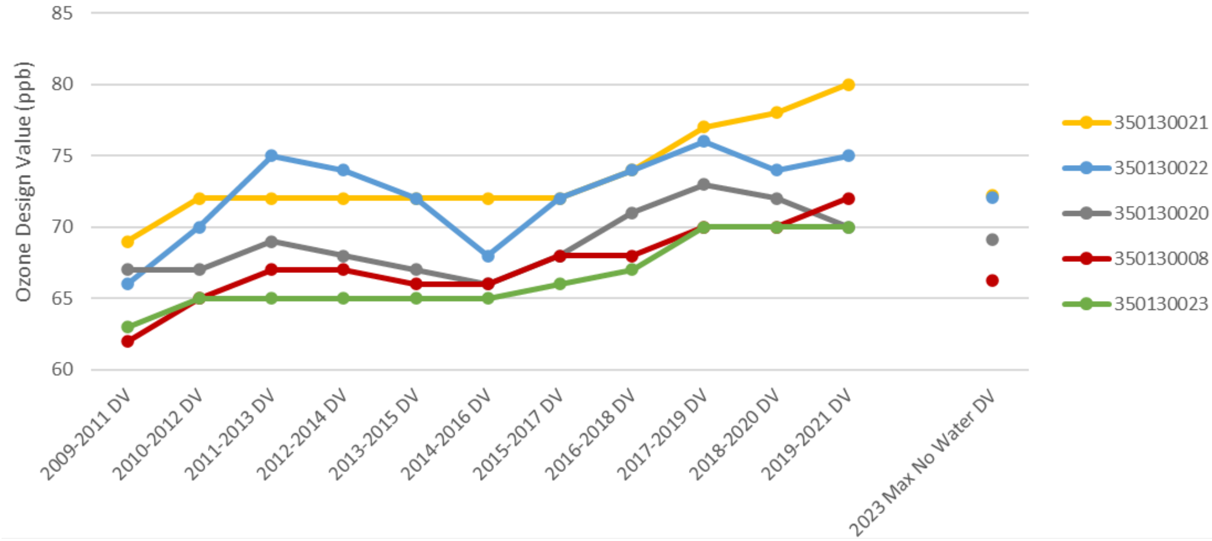
C. EPA Arbitrarily Omitted Relevant Dona Ana County Monitors and Thus Erroneously Excludes Arizona from the Proposal.

Dona Ana County, New Mexico has five ozone monitors. Based on both 2018-2020 and 2019-2021 design values, three of the five monitors violate the 2015 ozone NAAQS. The highest monitor (the Desert View monitor in Sunland Park, No. 350130021) has a 2019-2021 design value of 80 ppb, and the second highest monitor (the Santa Teresa Monitor, No. 350130022) has a 2019-2021 design value of 75 ppb, both well in excess of the 2015 70 ppb ozone standard.

In EPA's projection modeling, EPA provided 2023 and 2026 projections for four of Dona Ana's ozone monitors, including the two that have recorded the highest design values for the past 10 years. For both of these monitors, EPA projects max 2023 and 2026 no water ozone concentrations above 71 ppb. Specifically, EPA projects the "no water" max for Desert View to be 72.2 ppb in 2023 and 71.7 ppb in 2026. And EPA projects the "no water" max for Santa Teresa to be 72.1 ppb in 2023 and 71.6 ppb in 2026. Under EPA's terminology, both of these monitors would be considered "maintenance" monitors.

[55] *See* EPA 2016v2 2023 and 2026 DVs state contributions workbook, "2023_2026_2032_DVs_No Water" tab, line 817, *available at* https://www.epa.gov/csapr/good-neighbor-plan-2015-ozone-naaqs (Data File with Ozone Design Values and Ozone Contributions).
[56] *See id.* at "2023 Contributions" tab, lines 351 & 352.

Figure III.5: Design Values for Dona Ana, NM



Nevertheless, EPA excluded monitors Desert View and Santa Teresa from its contribution spreadsheet. That is, EPA provided no modeling of which states contribute to the elevated ozone levels at these monitors for 2023 or 2026. EPA must rectify this omission in the final rule. In doing so, EPA must look to see whether inclusion of these monitors would require inclusion of Arizona in the final rule. In particular, while EPA omitted contribution analyses for all Dona Ana County monitors, it did include two monitors in neighboring El Paso, TX, which show a significant contribution from Arizona. Specifically, the Ivanhoe monitor received contributions of 1.66 ppb from Arizona, while the Skyline Park monitor received a contribution of 1.27 ppb. Other New Mexico monitors received a significant contribution from Arizona as well. For example, Bernalillo County received a contribution of about 0.9 ppb from Arizona. All of this suggests that, following a complete contribution analysis, Arizona would be identified as a significant contributor to modeled nonattainment and maintenance monitors in New Mexico.

D. EPA Should Promulgate a FIP for New Mexico

The New Mexico Environment Department ("NMED") submitted a document entitled "Good Neighbor State Implementation Plan Certification for the 2015 Ozone NAAQS."[57] EPA notes that it has not taken action on this submission and is not proposing to take action in this rulemaking. 87 Fed. Reg. at 20,058, n.79. We urge EPA to disapprove NEMD's submission and finalize a FIP for New Mexico when it finally does take action on the matter.

NMED's submission is not a plan to reduce ozone-precursor emissions. Instead, it sets forth analysis purporting to demonstrate that New Mexico does not cause or contribute to nonattainment of the 2015 ozone NAAQS in any other state. The analysis is limited to considering New Mexico's impact on ozone levels in the Denver Metro/North Front Range ozone nonattainment area. NMED acknowledges that EPA modeling showed a contribution of greater than 0.7 ppb to the 2015–2017 design value at the Weld County monitor, and projects a

[57] *Available at* https://www.env.nm.gov/wp-content/uploads/sites/2/2017/01/NM_2015-O3-Good-Neighbor-SIP_Proposed-Certification_26Feb21.pdf.

contribution of 0.77 ppb in 2023; however, the agency baselessly seeks to write off its modeled significant contribution by pointing to much larger contributions from sources in Colorado.[58]

NMED's analysis is deficient because it completely ignores New Mexico's contribution to ozone violations in El Paso, TX. EPA's modeling indicates that New Mexico is expected to contribute 1.52 ppb to El Paso's Ivanhoe monitor (monitor 481410029) and 1.67 ppb to El Paso's Skyline monitor (monitor number 481410058) in 2023.[59] Contributions to El Paso's other monitors, many of which are reporting higher design values than these two monitors, were not included, but are expected to be similar. While these monitors are characterized as "maintenance" receptors, El Paso County has violated the 2015 ozone NAAQS every year since 2016 and was formally designated as a nonattainment area last year. Accordingly, New Mexico is not merely interfering with maintenance of the NAAQS in El Paso—it is significantly contributing to ongoing nonattainment.

Moreover, NMED's analysis also ignores New Mexico's contribution to maintenance receptors in southwest Colorado. EPA modeling indicates that New Mexico is expected to contribute 2.74 ppb to a maintenance monitor in La Plata, Colorado. New Mexico is plainly interfering with maintenance in southwest Colorado.

Given the clear evidence that New Mexico is violating the good neighbor provision, EPA must disapprove NMED's certification and promulgate a FIP for the state. There are significant opportunities to reduce NOx within the state. In a recent rulemaking, NMED considered adopting stringent emission limits for four-stroke lean-burn reciprocating internal combustion engines ("4SLBs"), but ultimately adopted a standard of 2.0 g NOx/hp-hr, which the agency's own analysis suggested almost all existing engines could meet. The standard was further weakened by the inclusion of an averaging provision, allowing operators to avoid implementing any emission controls as long as they had enough post-2010 engines (required by the federal New Source Performance Standard to meet a standard of 1.0 g NOx/hp-hr) to offset the emission from older engines.

Analysis from Clean Air Task Force indicated that adopting the standards proposed by the environmental coalition of 1.2 g NOx/hp-hr would have reduced NOx emissions by nearly 4600 tons compared with the standard ultimately adopted by NMED.[60] This analysis likely overstated the impact of NMED's proposed rule, because it assumed that all engines would be brought into compliance with a standard of 2.0 g NOx/hp-hr, when in fact, operators are most likely to use the averaging provision to avoid implementing any real-world emission reductions.

EPA must adopt a FIP for New Mexico, and should include standards for RICE in such plan.

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[58] *See* Section VII below for a more detailed explanation why this rationale is legally flawed.

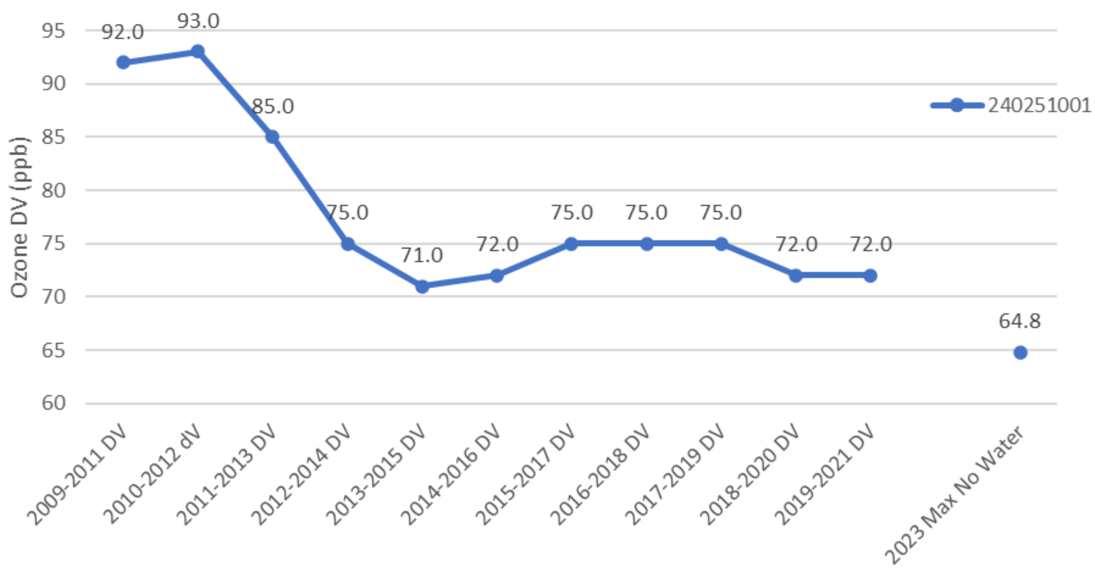
[59] *Available at* https://www.epa.gov/csapr/good-neighbor-plan-2015-ozone-naaqs (Data File with Ozone Design Values and Ozone Contributions).

[60] Clean Air Task Force, *Memorandum*: Emission Impacts of NMED Engine Proposal v. NPS/Clean Air Advocates Proposal (Oct. 7, 2021), attached as Ex. CATF 1; ERG, Inc., Analysis for Clean Air Task Force of emission reductions and costs from implementation of NOx control requirements for internal combustion engines in the draft NMED rule "OIL AND GAS SECTOR - OZONE PRECURSOR POLLUTANTS" (May 6, 2021), attached as Ex. CATF 2.

E. EPA's Inaccurate Modeling of Ozone Levels in Harford County, Maryland Causes EPA to Erroneously Exclude North Carolina from its Proposal.

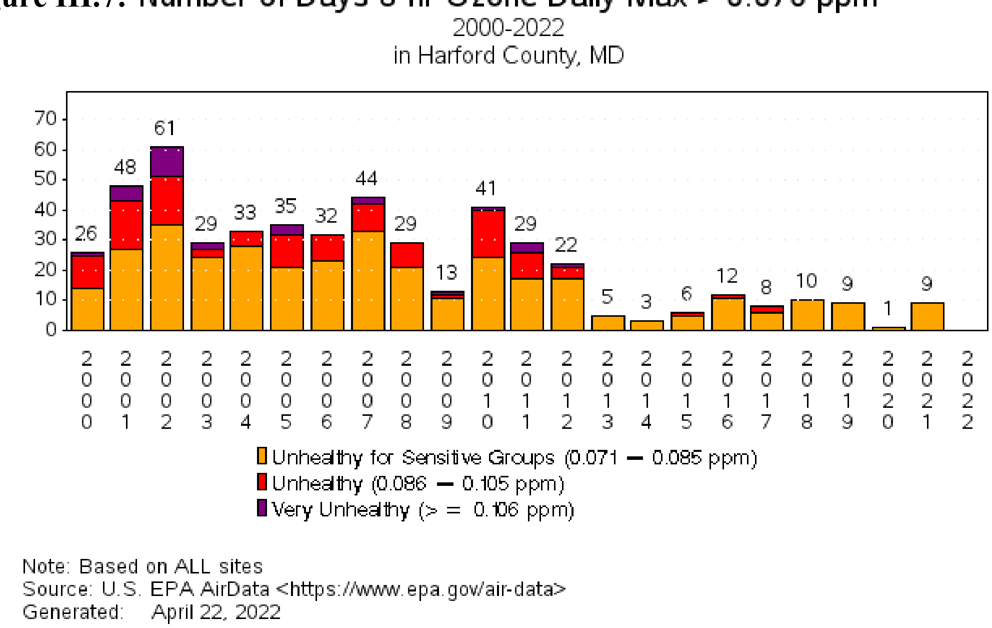
While ozone levels in Maryland have improved since the early 2000's, elevated ozone levels remain a persistent problem for certain Maryland counties, including Harford County. Harford County has never recorded a design value below 71 ppb. Although it reached a low of 71 ppb with its 2013-2015 DV, the design value has increased since then and remained at 72 ppb in 2020 and 2021, as shown in Figure III.6 below. The 4th highest 8-hour daily maximum ozone concentration in 2021 was 73 ppb, well in excess of the 2015 ozone NAAQS.

Figure III.6: Design Values for Harford, MD Monitor 240251001



With the exception of 2020, for the past six years, Harford County has had at least 8 days each year with 8-hour daily maximum ozone levels above 70 ppb (see figure below).

Figure III.7: Number of Days 8-hr Ozone Daily Max > 0.070 ppm



Despite the fact that Harford County has never attained the 2015 ozone NAAQS and the fact that the 2021 4th highest 8-hour daily maximum of 73 ppb will be averaged into the calculation of the 2021-2023 design value, EPA nevertheless projects a 2023 max "no water" design value for monitor 240251001 of 64.8 ppb. That is, in spite of design values remaining at or above 72 ppb for the past six consecutive DVs, EPA projects that the design value fall 7.2 ppb in just two years. This is simply not credible. As *Appalachian Power* holds, EPA's modeling must have a "'rational relationship' to the real world." 249 F.3d at 1053. However, EPA identifies no plausible set of emission reductions that will produce a greater than 7 ppb drop in ozone levels in Harford County in just two years, particularly when one of the three numbers that will go into that average is already set at 73 ppb.

The regulatory implications of EPA's inaccurate modeling for Harford County are substantial. EPA projects that North Carolina contributes more than 1 percent of the NAAQS (0.72 ppb) to the exceeding Harford monitor.[61] Since it contributes more than 1 percent to a monitor that persists in nonattainment and will almost certainly remain in nonattainment through 2023, North Carolina must be included in the final transport rule.

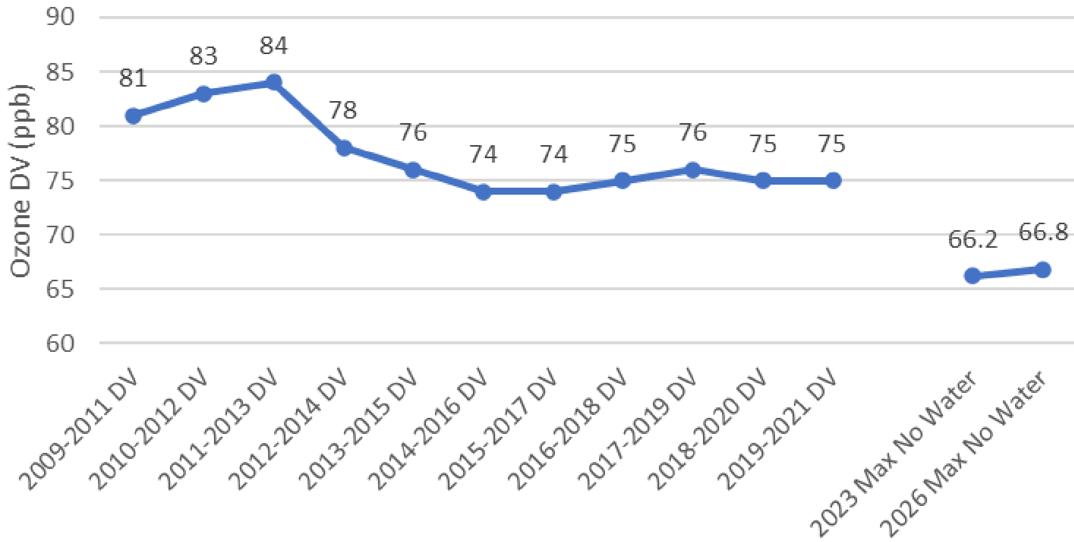
F. EPA's Arbitrary Modeling of Collin, Denton, Harris and Tarrant Counties in Texas Causes EPA to Irrationally Exclude Alabama and Tennessee from the Post-2023 Phase of Its Transport Rule

The monitors in several Texas counties show persistent ozone nonattainment trends that do not appear likely to abate in the near future. EPA optimistically projected that all of these monitors would attain by 2026. But scrutiny of recent design values demonstrates that this is not plausible. EPA must revisit its modeling of these counties with more-realistic assumptions.

Collin County, Texas, has consistently recorded violations of the 70 ppb ozone standard for the past 10 years. Since 2009-2011, the lowest design value for Collin County has been 74 ppb, and the 2018-2020 and 2019-2021 design values are 75 ppb. The 4th highest 8-hour maximum daily ozone concentration at the Collin County monitor in 2021 was 81 ppb, far in excess of the 2015 ozone standard.

[61] *See* EPA 2016v2 2023 and 2026 DVs state contributions workbook, "2023 Contributions" tab, line 223, https://www.epa.gov/csapr/good-neighbor-plan-2015-ozone-naaqs (Data File with Ozone Design Values and Ozone Contributions).

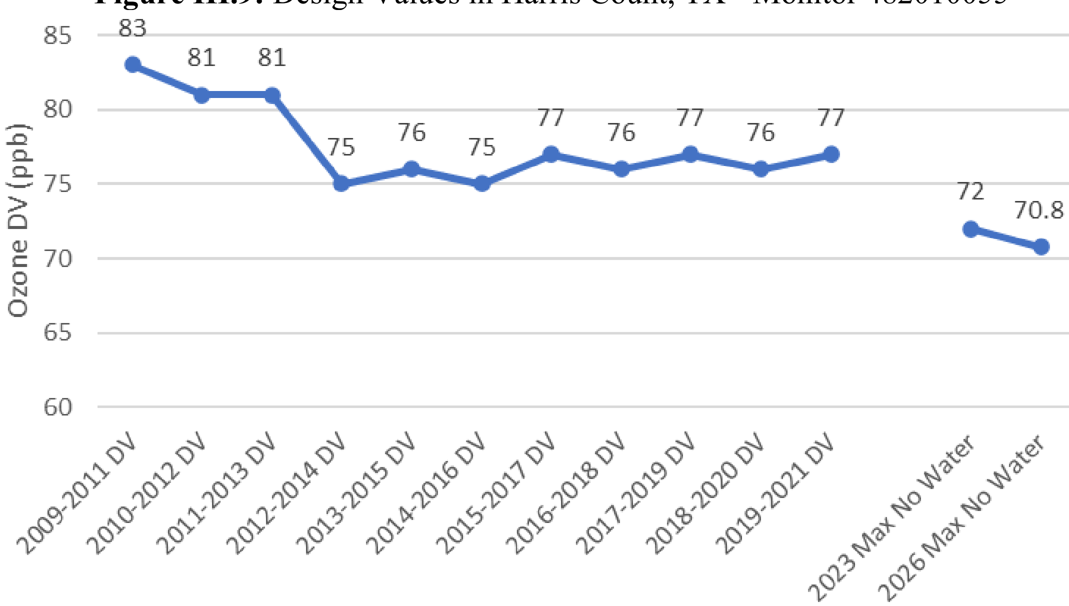
Figure III.8: Design Values in Collin County, TX



Despite persistent elevated ozone levels and this recently observed deterioration in air quality, EPA nevertheless projects that Collin County will attain the ozone standard in 2023 with a "no water" max of only 66.8 ppb. Given that the 4th highest 8-hour daily maximum from 2021 was 81 ppb, 4th highest daily ozone levels would have to average 59.7 ppb in 2022 and 2023 for Collin County to achieve the "max" 2023 DV EPA projects and would have to average below 66 ppb in 2022 and 2023 to attain the 2015 standard by 2023. Based on actual recent monitor data and monitor trends in Collin County, this is not plausible and EPA's modeling that Collin County will attain by 2023 cannot be credited.

Harris County has also demonstrated persistent nonattainment of the 2015 ozone standard. Monitor 482010055 has not had a design value below 75 ppb in the past 10 years. Its 2019-2021 design value was 77 ppb and its 2021 4th highest 8-hour daily maximum ozone concentration was 78 ppb.

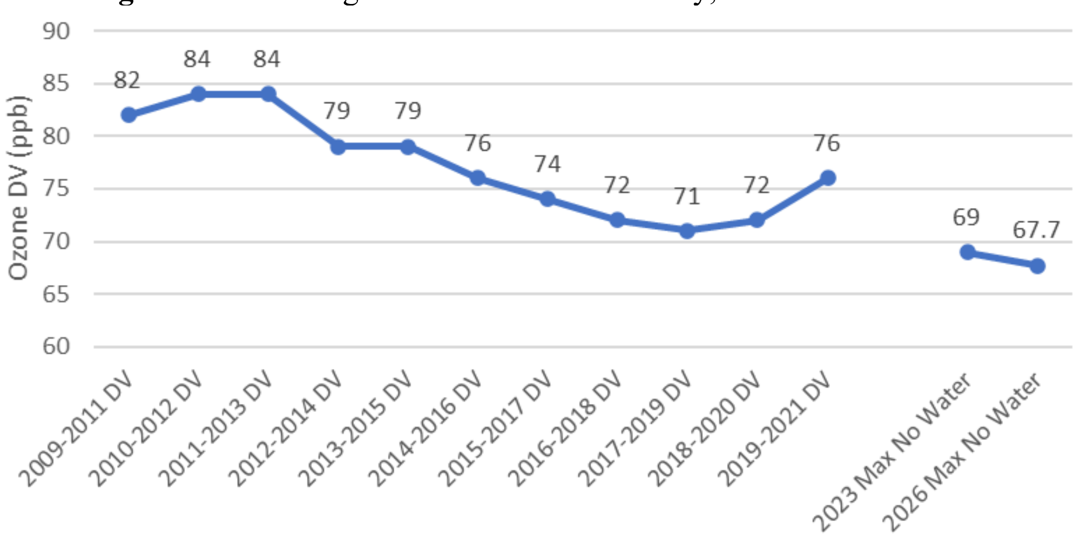
Figure III.9: Design Values in Harris Count, TX - Monitor 482010055



Despite its continuing ozone nonattainment and the recent trend of worsening pollution, EPA projects that Harris County's ozone levels will improve dramatically between now and 2026. Indeed, EPA projects that Harris County will fall just below the threshold for a maintenance monitor in 2026 with a 2026 "no water" max of 70.8 ppb. As with Collin County, EPA needs to provide some plausible explanation for such precipitous and dramatic projected improvements in air quality.

Similarly, Denton County, Texas continues to struggle to meet the 2015 ozone standard. The lowest design value at monitor 481211032 in the past 10 years was 71 ppb and recent design values at that monitor have been increasing. Indeed, the 2019-2021 design value was 76 ppb and the 2021 4th highest 8-hour maximum daily ozone concentration was 85 ppb.

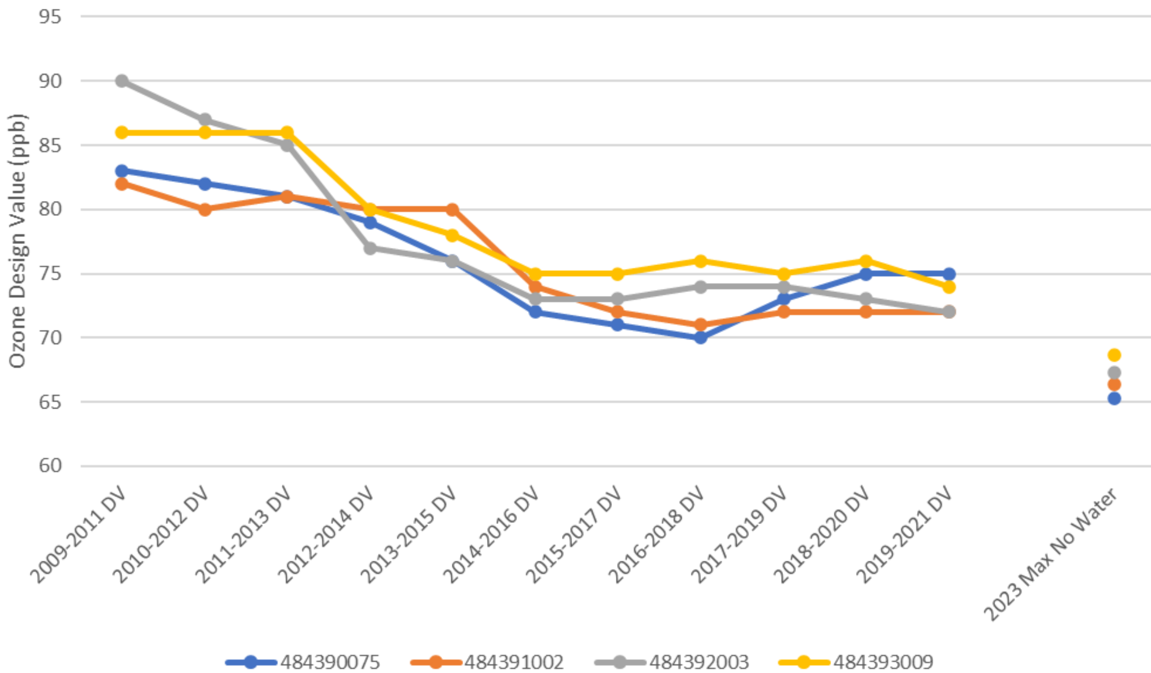
Figure III.10: Design Values in Denton County, TX – Monitor 481211032



Nevertheless, EPA projects that in only two years this monitor will be meeting the 2015 ozone standard. Yet to do so, based on the 2021 4th high of 85 ppb, would implausibly require the monitor to average below 64 ppb in 2022 and 2023.

Finally, Tarrant County has four monitors that continue to violate the 2015 NAAQS. In the past 10 years, only one of these monitors had a design value that ever dipped below 71 ppb (to 70 ppb for one year in 2018). That monitor has rebounded and its 2018-2020 and 2019-2021 design values were both 75 ppb. The 4th highest 8-hour maximum daily ozone concentrations at these four monitors were all between 74 and 76 ppb in 2021.

Figure III.11: Select Design Values for Tarrant, TX



Nevertheless, EPA projects that all five of the Tarrant County monitors will have max "no water" 2021-2023 design values well below the 70 ppb standard (ranging from 65.3 ppb to 68.7 ppb). This degree of rapid improvement in ozone levels is not realistic given current levels and recent trends.

EPA's failure to accurately model ozone trends in Collin, Denton, Harris and Tarrant Counties has significant ramifications for EPA's proposed transport rule. Alabama is projected to contribute more than 1 percent of the NAAQS to the Collin, Denton, and Harris County monitors in 2023[62] and to both the Collin and Harris County monitors in 2026.[63] Although Alabama is projected to contribute just below the 1 percent significant contribution threshold to the Denton County monitor in 2026 (0.67 ppb), given its relative contribution compared to other states, with a more accurate (i.e., higher) projected 2026 design value for Denton County, it is plausible if not likely that Alabama's contribution would increase above the 1 percent threshold.

Likewise, Tennessee is projected to contribute more than 1 percent of the NAAQS to the Collin, Denton, and Tarrant County monitors in 2023[64] and to the Collin and Denton County monitors in 2026.[65] It bears note that EPA only included one of the five Tarrant County monitors in its contributions tab (484393009), and not the one with the highest current design value (484390075). Tennessee's projected contribution to the one Tarrant monitor EPA modeled is just

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[62] 1.04, 0.72 and 0.88 ppb respectively. *See* EPA 2016v2 2023 and 2026 DVs state contributions workbook, "2023 Contributions" tab, lines 348, 350, 258, *available at* https://www.epa.gov/csapr/good-neighbor-plan-2015-ozone-naaqs (Data File with Ozone Design Values and Ozone Contributions).
[63] 0.98 and 0.84 ppb respectively. *See id.* at "2026 Contributions" tab, lines 348, 358.
[64] 1.26, 0.94 and 0.72 ppb respectively. *See id.* at "2023 Contributions" tab, lines 348, 349, 364.
[65] 1.17 and 0.87 ppb respectively. *See id.* at "2026 Contributions" tab, lines 348, 349.

below the 1 percent threshold for 2026 (0.67 ppb). Given its proportional share of Tarrant County's ozone levels, had EPA more accurately modeled Tarrant County's 2026 design value (i.e., higher), or had EPA included contribution analyses for the other four monitors, it is likely that Tennessee would have been modeled to contribute significantly to Tarrant's ozone levels in 2026 as well.

If any of the Collin, Denton, Harris or Tarrant County monitors discussed above were modeled to remain in nonattainment through 2026, as is highly likely based on their recent and historical ozone levels, Alabama and Tennessee would incur additional transport obligations in the second phase of the rule.

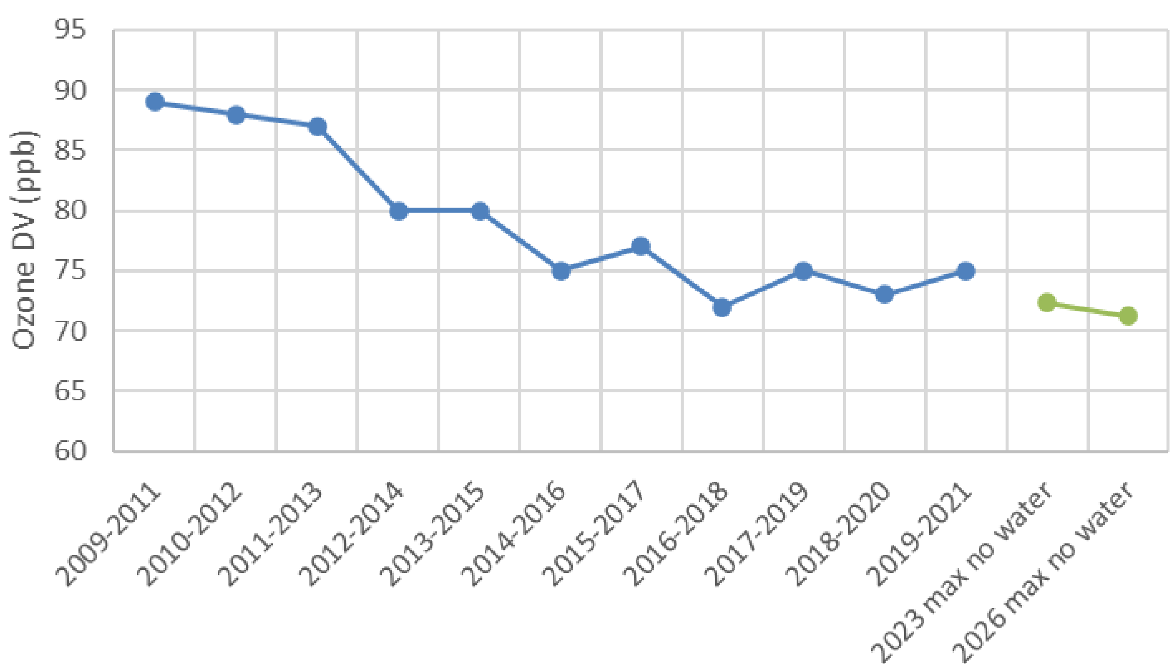
G. EPA's Unrealistic Projections of 2026 Ozone Levels in Brazoria County, Texas, and in Douglas County, Colorado, Create an Illusion of Pollution Reductions Below the Level of the Standard.

EPA's inaccurate modeling of future ozone levels also needlessly complicates this rulemaking by leading to apparent reductions in pollution below the level of the ozone standard in a few locations. Although a key receptor in Brazoria County, Texas, (480391004) is projected to continue to have maintenance issues in 2026, those issues resolve following reductions from EGUs and other sources according to the proposed rule's analysis. *See* 87 Fed. Reg. at 20,098-99.[66] Similarly, a receptor in Douglas County, Colorado, (80350004) would continue to have maintenance issues in 2026 were it not for the rule's requirements. *See* 87 Fed. Reg. at 20,099.[67] These receptors are important because Arkansas and Mississippi are only linked to Brazoria County in 2026, and Wyoming is only linked to Douglas County in that year. 87 Fed. Reg. at 20,098-99.

Regarding the Brazoria County receptor, EPA observes that the receptor "only resolves by a small margin" after imposition of the proposed rule's requirements and that "updates to emissions inventories, emissions reduction potential from identified technologies, or the over-control test methodology resulting from comments or other updated information could possibly move this site back into nonattainment- or maintenance-receptor status." *Id.* at 20,099. While we agree that these updates are likely to improve the accuracy of EPA's overcontrol analysis and resolve this issue, the problem would also likely be avoided if EPA's pre-control ozone projection for this monitor were more realistic. As with the monitors discussed above, the 2026 maximum DV at this receptor does not reflect recent trends in measured values:

[66] *See also* EPA, Ozone Transport Policy Analysis: Proposed Rule TSD at 52, tbl. C-9, EPA-HQ-OAR-2021-0668-0133 (Feb. 2022) [hereinafter, "Ozone Transport TSD"].
[67] *Id.*

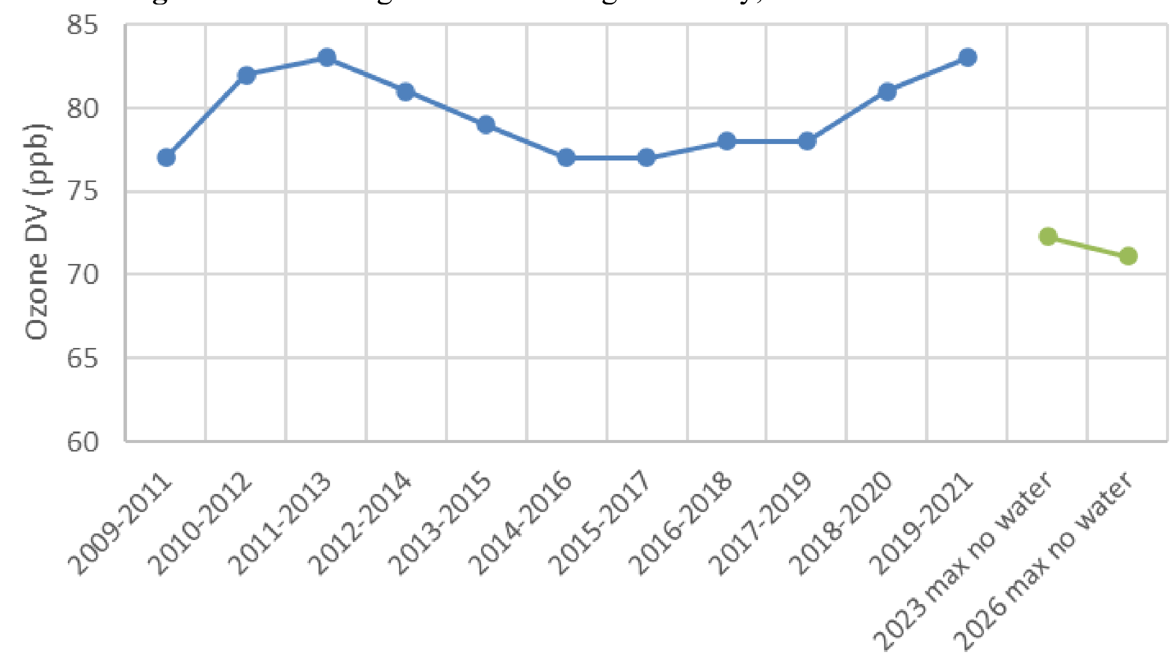
Figure III.12: Design Values in Brazoria County, TX – Monitor 480391004



If EPA had accounted for recent trends in its air quality modeling and other factors that will predictably worsen ozone pollution in the future, as discussed in greater detail below, this monitor would likely have a projected maximum DV in 2026 well above the NAAQS, rendering the expected reductions from the rule's requirements immaterial to maintenance and ruling out any potential overcontrol of Arkansas and Mississippi from full application of those requirements going forward.

Regarding the Douglas County receptor, EPA notes that its assumption that the downwind state (here, Colorado) will undertake all of the control measures that upwind states are required to implement under the proposed rule may not be appropriate in light of recent case law. *See* 87 Fed. Reg. at 20,099 n.206. Again, while EPA should correct this erroneous assumption, EPA also must properly account for recent trends in monitored ozone levels when projecting pre-control ozone levels at this receptor:

Figure III.13: Design Values in Douglas County, CO – Monitor 80350004



The stark disconnect between the modeled maximum DV in 2026 and the most recent measured values at this receptor could result from EPA's failure to account for those recent measured values, and from the omission of wildfires in its projections, as discussed below. In any event, if EPA were to correct its modeling to present more realistic ozone levels in the future, the emission reductions from the proposed rule's requirements almost certainly would not move this receptor into maintenance, regardless of the reductions that Colorado chooses to pursue. Thus, sources in Wyoming would be required to continue to eliminate their significant contributions to this receptor.

H. Several Factors Likely Contribute to EPA's Underestimation of Future Ozone Levels and Should be Corrected in the Final Rule.

Several factors likely contribute to the underestimation of ozone levels that is evident from a comparison of EPA projections with real-world monitored values and trends. Where possible, EPA should update its modeling in the final rule to correct these sources of underestimation. If some sources of underestimation cannot be corrected in time to inform the final rule, EPA must account for any remaining underestimation in its interpretation of the modeling and in its exercise of discretion, to ensure that the final rule takes a conservative approach that delivers robust protection of public health and the environment.

First, the modeling approach used for the proposed rule does not incorporate and account for recent monitored ozone values, even though those monitored values are already available and will be used to calculate the ozone design values used to determine whether the ozone standard is being attained and maintained in 2023. Instead, EPA's model "use[s] the average ambient 8-hour design values for the period 2014 to 2018" projected forward to the years around 2023.[68] Failing

[68] Modeling TSD at 10, EPA-HQ-OAR-2021-0668-0099; *see also id.* ("[the calculation] is based on model-predicted 'high' ozone days") (emphasis added).

to account for known monitored values in projecting design values for a year in which many of the actual inputs into the design value are already available leads EPA's projections to depart from reality in a manner that understates real-world ozone levels, as demonstrated above. EPA should correct this error in the final rule by incorporating available measured ozone values into its projected design values for 2023. EPA should also take into account recent monitored values and trends, including the 2020, 2021, and preliminary 2022 values, in making predictions about the 4th highest daily average in 2023 and future years. Failing to take recent experience into account when projecting 4th highest daily averages, in the face of abundant evidence that the projections underestimate future ozone levels, arbitrarily denies reality.

Between the base year period and the projection years of 2026 and 2032, long-term trends are expected to create conditions that produce higher ozone levels for a given quantity of anthropogenic ozone precursor emissions.

Importantly, climate change is directly worsening ozone air pollution through several mechanisms. Climate warming favors the chemical reaction underlying ozone formation, the so-called "climate penalty" effect. Evidence of a climate change signature on ozone levels in the U.S. is becoming more apparent as analytical precision improves. For example, a recent study of the Denver Metro North Front Range (DMNFR) nonattainment region found that the ozone climate penalty was 0.5–1.0 ppb for 8-h max ozone concentrations.[69] The highest penalty was around major urban centers and later in the summer. The penalty was positively associated with census tract-level percentage of Hispanic/Latino residents, children living within 100–200% of the federal poverty level, and residents with asthma, diabetes, fair or poor health status, or lacking health insurance. Some recent epidemiologic studies have indicated that temperature can modify the relationship between short-term ozone exposure and mortality, which has potentially important implications when considering the already heavy health toll imposed by exposure to ground-level ozone.[70]

Furthermore, intensifying wildfire events and more severe wildfire smoke events linked to climate change are influencing the co-occurrence of multiple harmful air pollutants including ozone and fine particulate matter. Wildfires have been shown to contribute to elevated ozone at air quality monitoring sites, sometimes by significant margins.[71] For example, a 2020 study in

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[69] James L. Crooks *et al.*, *The Ozone Climate Penalty, NAAQS Attainment, and Health Equity along the Colorado Front Range*, J. Exposure Sci. & Env't Epidemiology (September 2021), https://doi.org/10.1038/s41370-021-00375-9.
[70] Roger D. Peng *et al.*, *Acute Effects of Ambient Ozone on Mortality in Europe and North America: Results from the APHENA Study*, 6 Air Qual. Atmos. Health 445 (June 1, 2013), *available at* https://pubmed.ncbi.nlm.nih.gov/23734168/; Tao Liu *et al.*, *Tempo-Spatial Variations of Ambient Ozone-Mortality Associations in the USA: Results from the NMMAPS Data*, 13 *Intl. J. Environ. Res. Public Health* 851 (Aug. 26, 2016), https://pubmed.ncbi.nlm.nih.gov/27571094/.
[71] Daniel A. Jaffe & Nicole L. Wigder, *Ozone Production from Wildfires: A Critical Review*, 51 Atmospheric Env't 1 (May 2012), https://doi.org/10.1016/j.atmosenv.2011.11.063.

California observed a 19.6% increase in ambient ozone levels following a wildfire event.[72] Another study in Colorado found that during active fire periods, ozone levels caused significant increases in emergency department visits for asthma symptoms.[73] EPA should consider the potential for effect modification and corresponding health risks if Americans are increasingly exposed to more polluted air due to the climate-wildfire smoke nexus. In its modeling, EPA must better account for the growing burden of ozone air pollution linked to worsening wildfire smoke emissions.

The documented tendency of EPA's bottom-up emission inventories to underestimate ozone forming emissions from the oil and gas sector is another significant contributing factor to EPA's underestimation of future ozone levels. As explained in greater detail in the attached report by Detlev Helmig, multiple scientific studies have found that bottom-up approaches to estimating emissions from the oil and gas sector, like that used by EPA in this proposal, underestimate air emissions from the sector when measured against ambient observations (top-down).[74] Based on actual monitoring results, these studies indicate that actual emissions of VOCs exceed inventory-based estimates by 100-300%.[75] As these studies find, bottom-up estimates like EPA's fail to account for very high air pollution emissions from a relatively small number of high-emitting sources ("super emitters"), which account for a large fraction of overall emissions. Higher VOC emissions likely contribute to EPA's underestimation of ozone levels in regions with oil and gas production, including at key nonattainment and maintenance monitors in Colorado, Utah, California, and Texas.[76]

Another source of underestimation in EPA's ozone projections is underestimated mobile-source emissions. Recent studies have shown that mobile-source NOx emissions performance deteriorates faster than assumed.[77] In addition, abundant evidence confirms that tampering with

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[72] Sultan Ayoub Meo *et al.*, *Effect of Environmental Pollutants PM-2.5, Carbon Monoxide, and Ozone on the Incidence and Mortality of SARS-COV-2 Infection in Ten Wildfire Affected Counties in California*, 757 Sci. Total Env't 143948 (Feb. 2021), https://doi.org/10.1016/j.scitotenv.2020.143948.

[73] Colleen E. Reid *et al.*, *Associations between Respiratory Health and Ozone and Fine Particulate Matter during a Wildfire Event*, 129 Env't Int'l 291 (Aug. 2019), https://doi.org/10.1016/j.envint.2019.04.033 (RR = 1.05 and 95% CI =1.022-1.078).

[74] Detlev Helmig, Atmospheric Emissions from Oil and Natural Gas Extraction and Processing: A Comparison and Evaluation of Bottom-Up versus Top-Down Estimates (June 13, 2022), attached as Ex. DH 1.

[75] *Id.*

[76] Although EPA claims that VOCs do not account for a large fraction of transported ozone pollution across state lines, this says nothing about whether locally elevated VOC emissions contribute to underestimated ozone levels in EPA's baseline modeling. This underestimation leads to the exclusion of problem receptors at steps one and two of EPA's four-step approach and leads EPA to adopt a rule that is narrower in scope and less protective in terms of the emissions reductions required.

[77] *E.g.,* TRUE Initiative, *New Report: Real-world emissions of US vehicles increases with age, says 60m dataset* (Oct. 30, 2020), https://www.trueinitiative.org/blog/2020/october/new-report-real-world-emissions-of-us-vehicles-increase-with-age-says-60m-dataset.

emissions control equipment on vehicles is rampant.[78] EPA has recently acknowledged these challenges in the context of the heavy duty trucks rule, e.g., 87 Fed. Reg. 17,414, 17,505-6 (Mar. 28, 2022). However, the Good Neighbor proposal has not taken into account, the tendency for mobile sources to emit more pollution than estimated. Further, EPA's mobile-source projections depend on estimates of fleet turnover, which drives the replacement of more-polluting older vehicles with less-polluting newer vehicles. These projections, however, do not reflect decreases in fleet turnover rate. The average age of American vehicles hit a new record this year, at 12 years and two months, according to S&P Global, reflecting the lowest fleet turnover in the 20 years that S&P global has tracked these figures.[79] In addition, EPA has recently acknowledged that the real-world operational lives of heavy-duty highway engines are now "almost double the current useful life mileages in EPA's regulations."[80] Notably, nothing in EPA's Good Neighbor proposal addresses these developments, and it appears EPA has not accounted for them.

Yet another source of underestimation in EPA's ozone projections, which is likely to become more consequential with time, is EPA's failure to account for growing emissions from the burning of fossil fuels to mine cryptocurrencies in its Emissions Inventories. As explained in greater detail in section XVII below, U.S. cryptocurrency mining is experiencing explosive growth in the U.S., including in many of the states covered by this rule. Cryptocurrency mining is immensely energy-intensive, and only 39 percent of cryptocurrency mining is powered by renewable energy. As a result, cryptocurrency miners are continuing to run many fossil-fuel burning EGUs and boilers that otherwise would have retired or been utilized to a much lesser degree, thus increasing their NOx emissions. Notably, EPA's emissions projections do not account for these increased emissions, contributing to the underestimation of ozone levels.

I. Uinta Basin Railway.

The emissions inventory, and thus the modeling, also ignores of another important aspect of the problem; increased emissions from the Uinta Basin Railway. Recently, the U.S. Surface Transportation Board approved construction and operation of the Uinta Basin Railway, a planned 88-mile long railway that would transport crude oil from Myton and Leland Bench, Utah to Kyune, Utah, where it would connect to the national rail network.[81] Thus, as this is a final action by the federal government itself, EPA cannot justify ignoring it based on a claim that EPA does not consider future actions which are not final actions. The oil railway is intended to quadruple

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[78] *E.g.,* EPA, Tampered Diesel Pickup Trucks: A Review of Aggregated Evidence from EPA Civil Enforcement Investigations (Dec. 2020), https://www.epa.gov/sites/default/files/2021-01/documents/epaaedletterreportontampereddieselpickups.pdf.

[79] Irina Ivanova, *With cars in short supply, U.S. drivers are holding onto their vehicles longer than ever*, CBS News (May 23, 2022, 6:34 PM), *https*://www.cbsnews.com/news/average-car-age-american-drivers-are-holding-on-to-theirs-longer-than-ever/.

[80] Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards, 87 Fed. Reg. 47,414, 47,495 (Mar. 28, 2022).

[81] Ex. UBR 1, STB, Seven County Infrastructure Coalition-Rail Construction & Operation Exemption-In Utah, Carbon, Duchesne, and Uintah Counties, Utah, 86 Fed. Reg. 72366 (Dec. 21, 2021).

oil production in the Uinta Basin from roughly 90,000 barrels per day to 350,000 barrels per day, by providing a cheaper means of transporting crude oil to the Gulf Coast. Uinta Basin oil producers currently lack a cost-effective means of transporting oil outside the Basin, so they are mostly limited to trucking their oil to Salt Lake refineries (which cannot accept more than 80,000-90,000 barrels per day), and are thus forced to sell to Salt Lake refineries at a discount, compared to the West Texas Intermediate price benchmark. According to the project's proponents, the rail would open oil producers' access to new markets, allowing them to raise their prices, which would spur increased oil drilling and production.[82]

According to the EIS for the oil railway, the intended quadrupling of oil production in the Basin would require up to 3,330 new wells to be drilled in the Uinta Basin over the next 15 years; increased trucking to transport oil from oil fields to the rail terminal and to construct and maintain new wells, resulting in 46,051,432 vehicle miles traveled per year; and 11 unit trains per day traveling in and out of the Uinta Basin and through Colorado, each consisting of 110 tanker cars each and nearly 2 miles long.[83]

The EIS estimates that this amount of drilling would result in the following annual emissions (tons per year) associated with oil and gas development, including trucking:[84]

CO	4,454
NOx	3,146
VOCs	5,558

These figures, however, are likely a gross underestimate, because they assume the application of operator-committed measures that do not apply generally to all wells in the Uinta Basin. Further, they do not consider VOC emissions from wastewater pits. Recently, Utah, U.S. EPA and the Ute Indian Tribe updated the 2017 Uinta Basin Emissions Inventory as catalogued in a paper published in November 2020 ("VOC Inventory Study").[85] This effort made the inventory more accurate and found that the previous inventory significantly underestimated VOC emissions from produced water disposal. Indeed, the VOC Inventory Study found that the 2017 inventory underestimates VOC emissions from produced water disposal facilities by 69,137 tons per year.[86]

[82] Ex. UBR 2, Seven County Infrastructure Coalition, Petition for Exemption (May 29, 2020), Exhibit A, Verified Statement of Michael J. McKee in Support of Petition for Exemption at 31-35, 38-40.
[83]Surface Transportation Board, Uinta Basin Railway Final EIS, vol. 1 at 3.15-5, 3.15-14, 1.4 ("FEIS"), attached as Ex. UBR 5 [hereinafter, "UBR FEIS"]..
[84] UBR FEIS at 3.15-34.
[85] Ex. UBR 4, Uinta Basin Air Agencies, Uinta Basin VOC Composition Study Impacts on the 2017 Oil and Gas Emissions Inventory (November 2020), *available at* https://documents.deq.utah.gov/air-quality/planning/technical-analysis/DAQ-2020-016024.pdf.
[86] *Id.* at 18.

In any event, increased emissions spurred by the oil railway will significantly contribute to ozone levels in Utah, Colorado and downwind states.

In addition, the EIS estimates the following annual emissions (tons per year) associated with rail operations along the 88-mile long rail line, excluding downline emissions in Utah and Colorado:[87]

CO	405
NOx	1,056
VOCs	40

Emissions along downline segments between Utah and the greater Denver metro area, including segments within the Denver non-attainment area, would increase as follows:[88]

Table 3.7-5. Estimated Downline Emissions of Criteria Pollutants—Increase in Trains per Day

Rail Segment Description[a] (Attainment Status)[b]	Segment-Subsegment Number	Segment Length (miles)	Maximum Increase in Trains per Day	Locomotive Criteria Pollutant Emissions (tons/year)					
				CO	NO_x	PM10	PM2.5	SO_2	VOC
Denver East/North (N)	DE-01	3.2	8.4	11.04	30.69	0.66	0.64	0.04	1.09
Denver Eastbound (N)	EB-01	1.4	1.1	0.65	1.82	0.04	0.04	0.00	0.06
Denver Eastbound (N)	EB-02	0.7	1.1	0.30	0.83	0.02	0.02	0.00	0.03
Denver Eastbound (N)	EB-03	8.6	1.1	3.91	10.86	0.23	0.23	0.01	0.39
Denver Eastbound (N)	EB-04	18.5	1.1	8.46	23.53	0.51	0.49	0.03	0.84
Denver Eastbound (N)	EB-05	1.1	1.1	0.50	1.39	0.03	0.03	0.00	0.05
Denver Eastbound (A/N)	EB-06	28.8	1.1	13.13	36.49	0.79	0.77	0.05	1.30
Kyune to Denver (A/N)	KD-01	11.1	9.5	43.78	121.68	2.63	2.55	0.15	4.33
Kyune to Denver (A)	KD-02	3.3	9.5	12.96	36.03	0.78	0.76	0.05	1.28
Kyune to Denver (A)	KD-03	171.2	9.5	675.34	1877.08	40.59	39.37	2.38	66.78
Kyune to Denver (A)	KD-04	3.1	9.5	12.35	34.32	0.74	0.72	0.04	1.22
Kyune to Denver (A)	KD-05	0.6	9.5	2.42	6.74	0.15	0.14	0.01	0.24
Kyune to Denver (A/N)	KD-06	265.8	9.5	1048.35	2913.84	63.00	61.11	3.70	103.66
Kyune to Denver (N)	KD-07	2.1	9.5	8.48	23.56	0.51	0.49	0.03	0.84
Denver Northbound (N)	NB-01	43.9	7.3	132.95	369.53	7.99	7.75	0.47	13.15
Denver Northbound (N)	NB-02	15.7	7.3	47.73	132.66	2.87	2.78	0.17	4.72
Denver Northbound (N)	NB-03	0.5	7.3	1.49	4.15	0.09	0.09	0.01	0.15
Denver Northbound (N)	NB-04	9.1	7.3	27.56	76.61	1.66	1.61	0.10	2.73
Denver Southbound (N)	SB-01	4.1	1.1	1.89	5.25	0.11	0.11	0.01	0.19
Denver Southbound (N)	SB-02	8.2	1.1	3.75	10.42	0.23	0.22	0.01	0.37
Denver Southbound (N)	SB-03	42.2	1.1	19.28	53.58	1.16	1.12	0.07	1.91

Total NOx and VOC emissions along the downline segments (excluding emissions in attainment areas where train operations would not exceed 8 trains per day) would total 5,771.06 tons per year and 205.33 tons per year respectively, and CO emissions along the same segments would total 2,076.41 tons per year.

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[87] UBR FEIS at 3.7-26.

[88] *Id.* at 3.7-18 - 3.7-19.

EPA must revise its analysis to consider these increased emissions caused by the U.S. Government's final approval of the Uinta Basin Railway.

J. EPA Should Align Its Step 2 Approach with the Form of the Ozone Standard and Ensure that All Downwind Receptors With Nonattainment and Maintenance Concerns Are Fully Evaluated.

We urge EPA to modify its approach to determining linkages at Step 2 to ensure that significant contributions from upwind states are not missed. Specifically, we urge EPA to adopt an approach where any upwind state that contributes at least 1 percent of the NAAQS to a nonattainment or maintenance receptor on any day when that receptor's modeled 8-hour daily maximum value exceeds the NAAQS be subject to the requirements of the rule. Such an approach is not only more protective but is also consistent with the plain language of the Section 110(a)(2)(D)(i)(I).

Clean Air Act Section 110(a)(2)(D)(i)(I) requires that Good Neighbor plans include provisions "prohibiting, 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 . . ." for a NAAQS. 42 U.S.C. § 7410(a)(2)(D)(i)(I).

Over the course of its transport rulemakings, EPA has modified its approach to interpreting the "contribute significantly" language in Section 110(a)(2)(D)(i)(I) when determining linkages at Step 2. While EPA has consistently relied on some type of "average" contribution metric, it has shifted the days that it looks at in making that calculation. In the original Cross-State Air Pollution Rule, EPA averaged contributions across all model-predicted days above the NAAQS. *See* 87 Fed. Reg. at 20,054, n.64. Based on revised guidance from 2014, EPA modified its approach for the Cross-State Air Pollution Rule Update, using an average of contributions across the ten highest model-predicted ozone days rather than across the set of all model-predicted exceedances. EPA has proposed to retain that latter approach in this transport rule.

Both forms of averaging used by EPA have limitations. Most notably, because different sets of meteorological conditions can give rise to levels exceeding the ozone NAAQS in downwind states, different sets of upwind states can contribute above the 1 percent threshold on different days. Averaging contributions either across the ten highest model-predicted days or across all model-predicted exceedance days can dilute the calculated contribution of states that only contribute above the 1 percent threshold under certain conditions.

An area is designated nonattainment if its 3-year average of 4th highest 8-hour daily maximum exceeds 70 ppb. For a downwind state trying to reach attainment, each exceedance day is critical. If a state accumulates four or more in an ozone season, that year's 4th high will be above the NAAQS and make it difficult for the state to achieve a 3-year average that meets the standard.

Consequently, for an area to attain the standard, it may be insufficient to eliminate significant contributions from only a subset of the states that contribute significantly on exceedance days. Suppose upwind State A is modeled to contribute above the 1 percent contribution threshold to downwind State B on 5 of the top ten days but not on the other five and its average contribution across the top ten days falls below the 1 percent threshold. State A would be excluded from the transport rule and have no emission reduction obligations. Nevertheless, State B may be unable to attain the NAAQS because State A is contributing above the threshold on five days during the modeled ozone season.

Commenters recommend that EPA adjust its approach to linkages at Step 2 to again look at all modeled exceedance days, but to adopt a more protective criterion than the agency used in the past. Specifically, EPA should deem to be linked at Step 2 any upwind state that contributes above the 1 percent contribution threshold to a downwind nonattainment or maintenance receptor on any day where that receptor is modeled to exceed the standard. Such an approach coheres cleanly with the plain language of Section 110(a)(2)(D)(i)(I), which prohibits upwind state emissions "which will . . . contribute significantly to nonattainment in, or interfere with maintenance by" the downwind state. As noted above, each exceedance day can be critical to whether the downwind receptor meets the standard. Eliminating only a subset of those exceedance days is insufficient if four or more remain. Because EPA considers only monitors that are modeled as nonattainment or maintenance, there is no risk that focusing on an upwind state's largest contribution to a modeled exceedance day—rather than its average contribution across a monitor's top ten modeled ozone days—would result in over-inclusion at Step 2. Rather, such an approach would more faithfully ensure that each upwind state that is contributing significantly to nonattainment or interference with maintenance of the NAAQS is required to abate its significant contributions.

K. EPA's modeling of air quality (step one) and contributions from upwind states (step two) must include more receptor sites.

EPA conducted a 4-step process in its assessment of applying the good neighbor provision for the ground level ozone NAAQS which was:

> (1) Identifying downwind receptors that are expected to have problems attaining or maintaining the NAAQS; (2) determining which upwind states contribute to these identified problems in amounts sufficient to 'link' them to the downwind air quality problems (i.e., in this proposed rule, a contribution threshold of 1 percent of the NAAQS); (3) for states linked to downwind air quality problems, identifying upwind emissions that significantly contribute to downwind nonattainment or interfere with downwind maintenance of the NAAQS; and (4) for states that are found to have emissions that significantly contribute to nonattainment or interfere with maintenance of the NAAQS in downwind areas, implementing the necessary emissions reductions through enforceable measures.

87 Fed. Reg. at 20,041.

The first step in modeling for this proposed rule, identifying receptor sites, focused on projecting the ambient ozone levels —expressed as design values—for 2023, 2026 and 2032 at ozone monitoring sites in non-attainment and maintenance areas. EPA estimated both an average and a maximum design value for each receptor site to represent nonattainment and maintenance problems, respectively. The basis of these projections was centered around 2016, the year with the most recent and comprehensive emission inventory, and included a 5-year window of 2014-2018 8-hour ozone design values that were then modeled forward.[89] Air quality in future years was simulated using the Comprehensive Air Quality Model with Extensions (CAMx version 7.10).[90] These data are shown in Table V.D-1 and V.D-2 of the proposal, for each receptor site that *EPA identified* in the proposed rule. 87 Fed Reg. at 20,068-70. We appreciate that EPA provides the latest measured 2020 DVs; however, we also note that in some regions this level may be atypically low because of the COVID pandemic's impact on 2020 ozone-forming emissions.

EPA modeled 948 individual monitors' future average and maximum DVs in 2023, 2026, and 2032. Of those, EPA estimated state contributions for 397 monitors.

EPA should have included all sites that are currently measuring nonattainment, (2020 DV and/or 2021 DV >70 ppb) in estimating contributions, in addition to those that both are currently in nonattainment and are predicted to be in nonattainment in future years, see Table 3 and 4. As already presented above, a number of sites have design values that have increased since 2016, and actual measured ozone levels and trends call EPA's optimistic projections into question. By including the sites in Table 3, EPA can ensure that sites with unhealthy air will see relief. Further, EPA made ozone predictions from model simulations to project 5-year weighted average ambient DVs at each site in 2023. Relying largely on a 5-year average is problematic because this approach smooths the data on a metric that is already adjusted for interannual variability (e.g. the design value is already a 3-year average), thus under-projecting the actual incidence of DVs above the standard.

Table III.3. 2016-centered average and maximum design values, EPA-estimated 2023 average and maximum design values, and monitored 2020 and 2021 design values for ozone monitoring sites not included in contribution modeling for the proposal (units are ppb).

Monitor ID (AQS Code)	State	County	2016-Centered Avg	2016-Centered Max	2023 Avg	2023 Max	Monitoring 2020 DV	Monitoring 2021 DV
40070010	AZ	Gila	72.3	74	67.2	68.8	77	77
40218001	AZ	Pinal	72.7	74	67.4	68.6	76	75
60010007	CA	Alameda	74.0	75	69.1	70.0	69	71
60731016	CA	San Diego	70.0	72	66.5	68.4	72	70
60798005	CA	San Luis Obispo	72.3	73	67.6	68.2	70	72
61010004	CA	Sutter	73.0	75	66.7	68.5	70	72
80050006	CO	Arapahoe	67.7	69	63.7	65.0	71	73

[89] The 2016 base year centered ozone is the average ambient 8-hour ozone design values for the period 2014 through 2018 (i.e., the average of design values for 2014-2016, 2015-2017 and 2016-2018) to calculate the 5-year weighted average design values for the 2016-centered year to coordinate with this base emission year.
[90] *Available at* www.camx.com.

Monitor ID (AQS Code)	State	County	2016-Centered Avg	2016-Centered Max	2023 Avg	2023 Max	Monitoring 2020 DV	Monitoring 2021 DV
80130014	CO	Boulder	NA	NA	NA	NA	74	75
80410013	CO	El Paso	68.0	70	64.2	66.1	72	73
80410016	CO	El Paso	66.7	69	63.9	66.1	71	73
170890005	IL	Kane	69.3	71	64.8	66.4	72	70
171110001	IL	McHenry	69.7	72	64.5	66.7	73	71
180910005	IN	LaPorte	NA	NA	NA	NA	77	74
260050003	MI	Allegan	73.7	75	67.8	69.0	73	75
260210014	MI	Berrien	73.3	74	68.7	69.3	72	71
260270003	MI	Cass	72.0	74	64.6	66.4	71	68
260810020	MI	Kent	69.0	70	62.1	63.0	71	70
261210039	MI	Muskegon	75.0	76	69.1	70.0	76	74
261250001	MI	Oakland	70.7	73	64.4	66.5	72	69
261390005	MI	Ottawa	69.3	70	62.9	63.5	71	69
261470005	MI	St. Clair	72.0	73	66.4	67.3	71	70
261630019	MI	Wayne	73.0	74	65.7	66.6	71	70
320310031	NV	Washoe	NA	NA	NA	NA	72	72
350011012	NM	Bernalillo	66.7	69	63.7	65.9	71	72
350130020	NM	Dona Ana	68.3	71	66.5	69.1	72	70
350151005	NM	Eddy	NA	NA	NA	NA	78	77
390355002	OH	Cuyahoga	69.3	71	61.9	63.4	71	68
390950035	OH	Lucas	67.5	70	60.2	62.5	73	72
480290032	TX	Bexar	73.0	74	66.9	67.8	72	71
480290052	TX	Bexar	72.3	73	67.1	67.7	72	73
481130075	TX	Dallas	73.7	75	65.9	67.1	74	71
481410044	TX	El Paso	69.0	71	67.4	69.3	74	71
482011017	TX	Harris	71.0	73	67.1	68.9	72	68
482011039	TX	Harris	68.7	71	66.3	68.5	78	74
482510003	TX	Johnson	73.7	76	66.4	68.5	73	71
483390078	TX	Montgomery	73.7	75	67.6	68.8	74	73
484390075	TX	Tarrant	71.0	72	64.4	65.3	75	75
484391002	TX	Tarrant	72.3	74	64.8	66.4	72	72
484392003	TX	Tarrant	73.3	74	66.6	67.3	73	72
490130002	UT	Duchesne	NA	NA	NA	NA	73	74
490472003	UT	Uintah	NA	NA	NA	NA	76	78
550290004	WI	Door	72.7	73	66.3	66.6	72	70
550890008	WI	Ozaukee	71.3	72	66.6	67.3	71	71
560350099*	WY	Sublette	61.0	63	59.3	61.3	70	74

Table 4 includes sites that EPA identified as either in nonattainment or maintenance in 2023, in the proposed rule in Tables V.D-1 and V.D-2, but that were not included in the contribution modeling information provided by EPA. EPA should model these sites in the final rule and address the interstate transport contributing to these exceedances.

Table III.4. EPA identified as Nonattainment or Maintenance but contributions not modeled

Monitor ID (AQS Code)	**State**	**County**	2016-Centered Avg	2016-Centered Max	2023 Avg	2023 Max	Monitoring 2020 DV	Monitoring 2021 DV
60296001	CA	Kern	80.7	81	77.1	77.4	82	79
60430006	CA	Mariposa	75.0	76	70.1	71.0	79	81
61030004	CA	Tehama	79.7	81	72.3	73.4	70	72
80690011	CO	Larimer	75.7	77	71.3	72.6	75	77
350130021	NM	Dona Ana	72.7	74	70.9	72.2	78	80
350130022	NM	Dona Ana	71.3	74	69.5	72.1	74	75
481671034	TX	Galveston	75.7	77	71.4	72.7	74	72
481410037	TX	El Paso	71.3	73	69.6	71.3	76	75
551170006	WI	Sheboygan	80.0	81	74.7	75.6	75	72

IV. The proposal builds on proven EPA approaches to achieve a more just and health-protective result.

EPA's proposed Good Neighbor Rule is a major step toward realizing the promise of the Clean Air Act. By requiring reductions in NOx emissions from the worst polluters in 26 upwind states, the proposed rule will deliver improvements in air quality and large benefits to public health and the environment. The pollution reductions achieved by the proposed rule, if finalized, will prevent one thousand premature deaths and more than one million asthma attacks annually in 2026. This proposed rule will also improve the health of forests and waterbodies harmed by ozone and NOx, and improve visibility in national parks and wild places by cutting smog.

A health-protective approach is required by court decisions that direct states and EPA to implement the Good Neighbor provision consistent with the statutory command that downwind areas attain and maintain the ozone standard by specified deadlines. These deadlines for attainment and maintenance of the standard are not only "central to the … regulatory scheme," *Sierra Club v. EPA*, 294 F.3d 155, 161 (D.C. Cir. 2002) (quoting *Union Elec. v. EPA*, 427 U.S. 246, 258 (1978)), but constitute the very "heart" of the Act. *Train v. NRDC*, 421 U.S. 60, 66-67 (1975). As the D.C. Circuit has repeatedly held, "an implementation plan violates the Good Neighbor Provision if it fails to 'eliminate upwind states' significant contributions to downwind pollution by the statutory deadline for downwind states to meet the NAAQS for ozone.'" Under these decisions, EPA must implement a full remedy that eliminates significant contributions to downwind nonattainment and interference with downwind maintenance, including by regulating emissions from sources other than power plants, unless it is impossible to do so. *Wisconsin v. EPA* , 938 F.3d 303, 319 (D.C. Cir. 2019). Under the Act and these precedents, EPA is legally required to secure reductions in emissions of ozone precursors from upwind states in advance of the 2024 deadline for marginal nonattainment areas to attain and maintain the 2015 ozone standard (i.e., in 2023). *Id.*; 42 U.S.C. § 7511(a)(1); 83 Fed. Reg. at 65,892 ("data from the calendar year prior to the attainment date . . . are the last data that can be used to demonstrate attainment with the [ozone standard] by the relevant attainment date."). And EPA is legally required to secure any reductions that are impossible to achieve by 2023 as expeditiously as practicable thereafter, and not later than 2026. Commenters applaud EPA's decision to heed the attainment deadlines in the design of the proposed rule. However, as explained below, EPA can and must require additional achievable and cost-effective pollution reductions and implement them sooner than proposed.

This rule represents a major opportunity to protect public health and the environment while accelerating a just transition to a clean energy economy. By requiring polluters to bear more of the cost of the public health and environmental harms that they cause, this proposal will level the playing field for cleaner operators and technologies. Notably, the transition to clean energy approaches can bring economic benefits for communities and workers, as well as health and environmental protection. In New York, for example, the Climate Action Council's Just Transition Working Group put out a jobs report last December that looked at the job impacts of compliance with New York's ambitious climate legislation. It projects that a clean energy transition will increase overall employment by at least 189,000 jobs from 2019 to 2030, or a 38 percent increase in the overall workforce across the relevant sectors.[91] The evidence from the experience of California's renewable portfolio standard is similar, with analysts concluding that the clean energy transition has "produced a significant number of good quality jobs with family-supporting wages, health and retirement benefits, and career training opportunities across the state of California."[92] Wind power development has likewise been documented to increase employment opportunity. The first 1000 MW of wind power development in the State of Iowa (projects built between 1999 and 2008) generated employment totaling nearly 2,300 full-time-equivalent jobs within the State of Iowa during the construction periods and currently supports

[91] New York, Just Transition Working Group, 2021 Jobs Study at 6 (Dec. 2021), https://climate.ny.gov/-/media/Project/Climate/Files/JTWG-Jobs-Report.ashx.
[92] Betony Jones, Peter Philips, & Carol Zabin, University of California Berkely, The Link Between Good Jobs and a Low Carbon Future: Evidence from California's Renewables Portfolio Standard, 2002—2015 (July 2016), http://laborcenter.berkeley.edu/pdf/2016/Link-Between-Good-Jobs-and-a-Low-Carbon-Future.pdf.

approximately 270 permanent Iowa jobs, among other economic benefits.[93] Similar job creation effects have been observed in other states.[94]

EPA's proposal follows the agency's longstanding approach, tested in many prior interstate transport rules and largely upheld by the courts, to identifying the downwind areas whose air quality is compromised by interstate ozone and the upwind states that should be required to reduce emissions. As explained above in section III, Commenters urge EPA to update several technical approaches and assumptions that result in underpredictions of future ozone levels.

As in prior ozone transport rules, the system of state-level emission budgets for power plants is a central component of EPA's proposed rule. This regulatory mechanism ensures reductions in aggregate NOx emissions from these highly polluting sources. In this proposal, EPA correctly recognizes that these state-level emission budgets should reflect widespread adoption and consistent use of selective catalytic reduction (SCR) technology, a highly effective pollution control that most power plants have already installed. In light of the extent and severity of violations of the 2015 ozone standard, and the major contribution of interstate transport to those violations in downwind states, EPA is correct to base the emission budgets on selective catalytic reduction controls. Indeed, it is past time for all large power plants to install and run this highly effective technology.

As EPA recognizes, limiting emissions at the state level, but not at the facility level, leaves individual facilities free to pollute at high levels, with consequences for communities nearby and downwind. 87 FR at 20,110. Instead of installing, maintaining, and consistently operating effective pollution controls, power plant operators have been authorized under prior interstate ozone rules to purchase tradable emission credits from other operators. Indeed, under EPA's prior ozone transport rules, power plants were known to idle their existing pollution controls, resulting in excess pollution that could have been easily and cost-effectively avoided. This shortcoming of prior interstate ozone rules has contributed to "hotspots" of persistent ozone nonattainment, and the burden of this excess pollution has fallen disproportionately on people of color, people that are linguistically isolated, and people that are economically marginalized. Commenters therefore strongly support EPA's proposal to adopt several safeguards to ensure that all power plants participating in the trading program actually control their pollution. Indeed, EPA concludes based on its analysis that its adjustment to budgets to ensure ongoing cost-effective implementation of controls does not result in any over-control in any upwind state. 87 Fed. Reg. at 20,096, n.204. Further, as detailed below in sections XI to XIV, EPA should strengthen these safeguards in several respects.

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[93] Sandra Halvatzis & David Keyser, National Renewable Energy Laboratory, Estimated Economic Impacts of Utility Scale Wind Power in Iowa (Nov. 2013), https://www.nrel.gov/docs/fy14osti/53187.pdf.

[94] Sandra Reategui & Stephen Hendrickson, National Renewable Energy Laboratory, Economic Development Impact of 1,000 MW of Wind Energy in Texas (Aug. 2011), https://www.nrel.gov/docs/fy11osti/50400.pdf; S. Tegen *et al*., National Renewable Energy Laboratory, Economic Impacts from Indiana's First 1,000 Megawatts of Wind Power (Aug. 2014), https://www.nrel.gov/docs/fy14osti/60914.pdf.

Commenters also strongly support EPA's proposal to require reductions in NOx emissions from other high-polluting industrial sources. While power plants remain among the largest sources of nitrogen oxide pollution, pollution from sources other than power plants contributes greatly to unhealthy ozone levels in downwind areas. In fact, regulation of stationary sources other than power plants is long overdue. EPA has recognized for decades that pollution reductions from other high-polluting industries are needed to remedy the interstate ozone problem.[95] EPA has estimated that nitrogen oxide emissions from stationary sources other than power plants in some states were nearly six times greater than emissions from power plants.[96] Worse, up to 98% of the nitrogen oxide emissions from other stationary sources were uncontrolled in some states. EPA is therefore correct to propose limits on NOx emissions from stationary sources other than power plants, and it has correctly identified several industrial sectors where such limits should apply: reciprocating internal combustion engines in pipeline transportation of natural gas; kilns in cement and cement product manufacturing; boilers and furnaces in iron and steel mills and ferroalloy manufacturing; furnaces in glass and glass product manufacturing; and high-emitting equipment and large boilers in basic chemical manufacturing, petroleum and coal products manufacturing, and pulp, paper, and paperboard mills. As explained in Section XIX below, EPA must add municipal waste combustors to the list of non-power plants whose emissions will be regulated under the final rule.

EPA is also correct to propose to secure these reductions through rate-based limits, rather than an emission credit trading regime. Rate-based limits are the typical mechanism for air pollution regulation under the Clean Air Act, and EPA, state regulators, and the relevant industries all have experience with air pollution regulation in the form of rate-based limits. Unlike with EGUs, the owners and operators of the various industrial sources included in the proposal do not necessarily have experience with emissions trading programs, or even familiarity with the regulated entities in other industries. Nor would there be any clear advantage to allowing industrial sources some limited flexibility to emit above the rates that EPA has found to be achievable, as individual industrial sources are not needed to meet real-time demand in particular geographic locations. Regulating these sources through an emission credit trading regime would introduce unnecessary complexity and raise serious environmental equity concerns.

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[95] EPA has had more than enough time to gather the information needed for regulation of non-power plants. In the 2005 Clean Air Interstate Rule, EPA stated it was "working to improve its inventory of emissions and control cost information" for non-power plants. Clean Air Interstate Rule, 70 Fed. Reg. 25,162, 25,214-15 (May 12, 2005). Eleven years later, in the 2016 CSAPR Update, EPA acknowledged that emission reductions from sources other than power plants were needed, but stated it was "still in the process" of gathering that information. CSAPR Update, 81 Fed. Reg. at 74,522/2.

[96] EPA estimated Louisiana emitted 91,952 tons per year of nitrogen oxides from non-power plant sources, which is 5.9 times its nitrogen oxide emissions of 15,476 tons per year from power plants. 86 Fed. Reg. at 23,100, tbl. VI.C-2 (15,476 tons per year of nitrogen oxides from power plants); EPA, Assessing Non-EGU Emission Reduction Potential - Updated for Final Rulemaking at 2-3, EPA-HQ-OAR-2020-0272-0198 (Mar. 12, 2021) (91,952 tons per year from non-power plant facilities with greater than 150 tons per year of emissions reported to the 2017 National Emissions Inventory).

V. EPA's proposed rule undercontrols ozone pollution, and greater reductions are therefore necessary.

To fully discharge its obligation under the Good Neighbor Provision, EPA must require greater reductions in upwind states' emissions of ozone-forming pollution. The Good Neighbor Provision directs EPA to "prohibit[]" emissions of any air pollutant in "amounts which will . . . contribute significantly to nonattainment" or "interfere with maintenance." 42 U.S.C. § 7410(a)(2)(D). The provision thus requires EPA to "call for upwind States to eliminate their substantial contributions to downwind nonattainment," and their pollution that interferes with maintenance, "in concert with the attainment deadlines." *Wisconsin*, 938 F.3d at 318 (emphasis added).

By not requiring greater pollution reductions, EPA's proposal falls short of the Good Neighbor Provision's directive. The emissions reductions that EPA proposes to require in 2023 are very small, amounting to less than one percent of total ozone season NOx emissions for 22 out of 26 upwind states.[97] Even in 2026, when all emission reductions are projected to be implemented, ozone-season NOx emissions will be reduced by less than 10 percent in all but five covered states.[98] The states with the highest NOx emissions, Texas and California, will reduce their emissions by only 4 and 1 percent, respectively.[99]

The impact on downwind ozone levels is projected to be correspondingly modest in comparison to the scale of the problem. In 2023 the estimated ozone reduction is projected to be less than 0.1 ppb at most receptors.[100] Even at the receptors that see the greatest benefit, in Connecticut, Illinois, Texas, and Utah, ozone levels are projected to be reduced by less than 0.2 ppb. *Id.* Even in 2026, after all proposed reductions have taken effect, the impact at most of the relevant downwind receptors is less than 0.3 ppb.[101] While these modest, incremental ozone reductions will deliver substantial benefits to public health and the environment, harm from excessive ozone pollution will persist if EPA fails to strengthen the proposal.

As explained below in section VI.B., the ozone reductions EPA projects are overestimates. But even taken at face value, average air quality improvements of less than 0.1 ppb in 2023, and less than 0.3 ppb in 2026, are inadequate when considered against the extent to which ozone levels in these downwind areas exceed the 2015 ozone standard. Average or maximum projected ozone levels at most problem receptors exceed the ozone standard by at least several parts per billion, and many exceed it by more than 10 ppb.[102] Thus, the (overestimated) air quality improvement that EPA projects in most downwind areas as a result of the rule is a small fraction of the exceedance of the 2015 ozone standard.

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[97] RIA 3B-3 to 4 (table 3B-1).
[98] RIA 3B-3 to 6 (table 3B-2).
[99] *Id.*
[100] RIA at 3B-6.
[101] RIA at 3B-9 to 11 (table 3B-4). At the receptors that see the greatest benefit in 2026, in Brazoria County and Harris County, Texas, the estimated ozone reduction is only 1.3 ppb. RIA at 3B-6, EPA-HQ-OAR-2021-0668-0151.
[102] RIA 3B-12 to 3B-18 (tables 3B-5 and 3B-6).

The result, as EPA's own analysis confirms, will be the widespread, continued failure of downwind areas to attain and maintain the 2015 ozone standard of 70 ppb, by wide margins, due in major part to interstate ozone pollution above the 1 percent threshold. For example, EPA projects the following average ozone levels (indicating failure to attain) in downwind nonattainment and maintenance areas in 2026, when the proposed rule's emissions reductions have all taken effect:[103]

El Dorado, CA:	74.8
Fresno, CA:	79.3
Jefferson, CO:	72.4
Fairfield, CT:	74.1
Harris, TX:	72.9
Salt Lake, UT:	73.1

EPA projects the following maximum ozone levels (indicating failure to maintain) in downwind nonattainment and maintenance areas in 2026, when the proposed rule's emissions reductions have all taken effect:[104]

El Dorado, CA:	77.2
Fresno, CA:	85.2
Jefferson, CO:	73.1
Fairfield, CT:	74.3
Cook, IL:	72.0
Harris, TX:	74.4
Davis, UT:	73.5
Salt Lake, UT:	73.7
Kenosha, WI:	72.0

By allowing interstate ozone pollution to continue to contribute significantly to downwind attainment and maintenance problems in many downwind areas after the deadlines for attainment, EPA's proposal undercontrols ozone pollution. 42 U.S.C. § 7410(a)(2)(D); *Wisconsin*, 938 F.3d at 318; *EPA v. EME Homer City Generation*, 572 U.S. 523 ("[T]he Good Neighbor Provision seeks attainment in *every* downwind State.") (emphasis in opinion). Moreover, because the projected continued violations of the ozone standard due in part to interstate pollution are clear and dramatic, not incidental or uncertain, this undercontrol does not fall within EPA's statutory leeway to "balance" "the possibilities of under-control and over-control." 572 U.S. at 523.

EPA has a statutory duty to avoid undercontrol of interstate ozone pollution, and the Agency cannot justify an insufficiently stringent Good Neighbor rule by claiming the necessary

[103] This is only a partial list of the areas that EPA projects will continue to fail to attain the ozone standard. The full list is in EPA's RIA at 3B-9 to 11 (table 3B-4); *see also* Modeling TSD at 16-18, tbl. 3-3, EPA-HQ-OAR-2021-0668-0099.

[104] This is only a partial list of the areas that EPA projects will continue to fail to maintain the ozone standard. The full list is in EPA's RIA at 3B-16 to 18 (table 3B-6), EPA-HQ-OAR-2021-0668-0151.

pollution reductions are too costly. To be sure, the Supreme Court's decision in *EME Homer City*, 572 U.S. 489 (2014), authorized EPA to consider control costs when allocating the amounts of upwind emissions that must be eliminated to help downwind states attain or maintain the NAAQS. *Id.* at 518-19. The Court concluded that "EPA's cost-effective allocation of emission reductions among upwind States, we hold, is a permissible, workable, and equitable interpretation of the Good Neighbor Provision" of section 110(a)(2)(D). *Id.* at 524.

Yet the Court held that the statute, including the Good Neighbor provision's focus on "amounts," imposes important limits on EPA's cost considerations. *Id.* at 513-14, 522 & n.23 (quoting 42 U.S.C. § 7410(a)(2)(D)). First, EPA cannot use the cost-effectiveness of emissions controls as a reason to overcontrol an upwind state. *Id.* at 521. Second, "the Agency also has a statutory obligation to avoid 'under-control', *i.e.*, to maximize achievement of attainment downwind". *Id.* at 523 (emphasis added).

On remand, the U.S. Court of Appeals for the D.C. Circuit held that an upwind state is overcontrolled if "less stringent emissions limits" than those selected by EPA would achieve attainment in each downwind state to which the upwind state is linked. *EME Homer City Generation, L.P. v. EPA*, 795 F.3d 118, 127 (D.C. Cir. 2015). The appeals court was not asked to define undercontrol, but the logical extension of its definition of overcontrol (focusing on "less stringent emissions limits") is to recognize that undercontrol is the failure to impose more stringent emissions limits as necessary, in the words of the Supreme Court, "to maximize achievement of attainment downwind". 572 U.S. at 523.

After all, the CAA is designed to protect public health and welfare, not to protect industries from the costs of controlling their emissions, and the attainment and maintenance of the NAAQS are the centerpiece of the CAA. The Clean Air Act's attainment deadlines are "intended to foreclose the claims of emission sources that it would be economically or technologically infeasible for them to achieve emission limitations sufficient to protect the public health within the specified time." *Union Elec.*, 427 U.S. at 258. *See NRDC*, 777 F.3d at 468 ("the attainment deadlines … leave no room for claims of technological or economic infeasibility.") (quoting *Sierra Club*, 294 F.3d at 161); *North Carolina*, 531 F.3d 896, 912-13 (D.C. Cir. 2008) (rejecting EPA's attempt to delay Good Neighbor reductions based on "reasons of feasibility"); *see also Union Elec.*, 427 U.S. at 259 (Congress "determined that existing sources of pollutants either should meet the standard of the law or be closed down") (quoting S. Rep. No. 91-1196 at 2-3 (1970)).

Thus, it would be inconsistent with the CAA and the Supreme Court's decision in *EME Homer* for EPA to authorize continued nonattainment and interference with maintenance of the 2015 ozone standard, in a manner that privileges cost savings to industry over public health, the environment, and the CAA's statutory objective. Instead, EPA must impose more stringent emissions limits than currently proposed so as to avoid undercontrol. In particular, at the multi-factored Step 3 in its good neighbor analysis, EPA already considers cost as just one factor in determining the amounts by which upwind states must reduce their NOx emissions, with "downwind air quality impacts" another key factor. See 87 Fed. Reg. at 20076 col. 1. EPA has a duty to focus on the "downwind air quality impacts", especially given the numerous continuing ozone nonattainment problems, discussed extensively in these comments. Moreover, given the cost-effectiveness of more stringent controls, also discussed extensively in these comments, EPA cannot rationally refuse to impose tighter emissions limits that are critical to bringing downwind areas into compliance with the 2015 ozone NAAQS. *See Mountain Commc'ns, Inc. v. FCC*, 355 F.3d 644, 648-49 (D.C. Cir. 2004) (arbitrary for agency to fail to explain how its action comports with statutory requirements).

Requiring the additional reductions in interstate pollution needed for attainment and maintenance of the ozone standard is not "impossible." To the contrary, as explained below, major additional pollution reductions are achievable from a wide range of sources of NOx, including but not limited to power plants and the industrial source categories that EPA has already identified. Because additional pollution reductions are achievable in line with the deadlines for attainment, EPA cannot claim impossibility. The doctrine of impossibility exists because "it is not appropriate for a court—contemplating the equities—to order a party to jump higher, run faster, or lift more than she is physically capable." *Am. Hosp. Ass'n v. Price*, 867 F.3d 160, 168 (D.C. Cir. 2017). The Agency bears a "heavy burden to demonstrate the existence of an impossibility;" "infeasibility," "difficulty or inconvenience" is insufficient. *Id.*; *Wisconsin*, 938 F.3d at 319. Moreover, EPA may not, under cover of impossibility, "create[] an exemption from the statute based upon its perceptions of the costs and benefits of enforcing the law." *Sierra Club v. EPA*, 719 F.2d 436, 462 (D.C. Cir. 1983).

Further, EPA has failed to sufficiently explain and substantiate its impossibility claims. Far from demonstrating with evidence that achievement of additional pollution reductions is impossible in the timeframes contemplated by the Act, and explaining those conclusions with particularity, the proposal declares that "all possible emissions reductions" have been required, "in all cases." 87 Fed. Reg. at 20,062. In addition, any non-compliance with EPA's legal obligations must be limited to the non-compliance that is strictly necessary. To allow otherwise would impermissibly "seize on a remedy made available for extreme illness and promote it into the daily bread of convenience." *Price*, 867 F.3d at 168 (quoting *NRDC v. Train*, 510 F.2d 692, 713 (D.C. Cir. 1974). Thus, if it were lawful for EPA to delay any emission reductions beyond the attainment deadlines, EPA would still have to require the reductions at the time that they become possible.

VI. EPA's proposed rule does not overcontrol air pollution.

EPA correctly proposes to determine that the emission reduction requirements of the rule do not constitute "overcontrol." Regulation cannot constitute overcontrol when it is necessary to discharge EPA's central statutory obligation under the Good Neighbor Provision—to eliminate upwind states' contribution to downwind attainment and maintenance problems. And in light of the central statutory objective of attainment and maintenance of the ozone standard, EPA must resolve significant uncertainty in favor of protecting public health and the environment. All of the pollution reductions EPA proposes to require are necessary to discharge that statutory obligation, and projections that suggest ozone levels may fall to slightly below the level of the standard in two locations are the product of overly optimistic assumptions that underestimate future emissions. EPA should correct these projections in the final rule. Furthermore, the Supreme Court has held that some pollution reduction below the level of the standard is permitted under the statute in pursuit of necessary pollution reductions, and any such reductions that resulted from this rule, if they materialized, would fall within that statutory "leeway." *EME Homer City*, 572 U.S. at 523.

A. The statutory obligation to eliminate upwind states' contribution to downwind attainment and maintenance problems demands that EPA resolve uncertainty in favor of protecting public health and the environment.

EPA's central priority in this rulemaking must be the attainment and maintenance of the 2015 ozone standard in affected downwind areas. The Good Neighbor Provision, 42 U.S.C. § 7410(a)(2)(D), requires EPA to "prohibit[]" sources in upwind states "from emitting any air pollutant in amounts which will contribute significantly to nonattainment … or interfere with maintenance by … any other State with respect to" the 2015 ozone standard. Further, EPA must prohibit this pollution consistent with downwind areas' attainment deadlines, *Wisconsin*, 938 F.3d at 318; *North Carolina*, 531 F.3d at 911-13 (quoting 42 U.S.C. § 7410(a)(2)(D)). Thus, EPA's obligation is to require that states "eliminate their substantial contributions to downwind nonattainment [and their interference with downwind maintenance] in concert with the attainment deadlines." *Wisconsin*, 938 F.3d at 318. Regulation cannot constitute overcontrol when it is necessary to discharge EPA's statutory obligation under the Good Neighbor Provision.

As multiple decisions of the D.C. Circuit and the Supreme Court recognize, Congress enacted the Clean Air Act to ensure timely attainment and maintenance of clean air standards. *Train v. NRDC*, 421 U.S. 60, 64 (1975) (Congress reacted to "disappointing" progress "by taking a stick to the States"); *Union Elec. Co. v. EPA*, 427 U.S. 246, 256 (1976) (Clean Air Act is "a drastic remedy to … [the] problem of air pollution"); *Whitman v. Am. Trucking Ass'ns*, 531 U.S. 484 (2001). In pursuit of that objective, Congress established deadlines that "require[]" attainment and maintenance of the standards "within a specified period of time." *Train*, 421 U.S. at 64-65. These deadlines for attainment and maintenance of the standards are not only "central to the … regulatory scheme," *Sierra Club v. EPA*, 294 F.3d 155, 161 (D.C. Cir. 2002) (quoting *Union Elec.*, 427 U.S. at 258), but constitute the very "heart" of the Act. *Train*, 421 U.S. at 66-67. In light of the central statutory objective of prompt attainment and maintenance of the ozone standard, EPA must resolve significant uncertainty in favor of protecting public health and the environment. To do otherwise would defeat both the letter and the spirit of the Clean Air Act.

Although EPA is also required to avoid unnecessarily overcontrolling emissions, EPA's approach to overcontrol cannot defeat the central statutory obligation to secure prompt attainment and maintenance of the clean air standards. *Sierra Club*, 294 F.3d at 161 (rejecting interpretation that "would subvert the purposes of the [Clean Air] Act" by delaying attainment); *Motor Vehicle Mfrs. Ass'n of U.S. v. Ruckelshaus*, 719 F.2d 1159, 1165 (D.C. Cir. 1983) ("A statute should ordinarily be read to effectuate its purposes rather than to frustrate them."). EPA should avoid overcontrol of ozone pollution, but "the Agency also has a statutory obligation to avoid 'under-control.'" *EME Homer City*, 572 U.S. at 523. Yet in prior rulemakings EPA has frequently under-controlled ozone pollution, leaving ongoing significant contributions to downwind nonattainment, and interference with downwind maintenance, after full implementation of the rules. EPA projected that the CSAPR Update, for example, would reduce ozone levels by an average of only 0.29 ppb in downwind areas with attainment and maintenance problems, even though many of those areas faced ozone levels many parts per billion above the 75-parts-per-billion standard, due in large part to interstate ozone pollution.[105]

Even the Revised CSAPR Update, which EPA claimed was a full remedy to interstate ozone issues under the 2008 ozone standard, required measures projected to achieve only 0.17 ppb of average ozone reduction at downwind nonattainment and maintenance receptors, and all of the covered states were projected, after implementation of the rule, to continue to contribute at least one percent of the NAAQS to at least one struggling receptor. 86 Fed. Reg. at 23,107, tbl. VI.D.1, 23,115. Even these projections were overestimates, because they incorporated many of the same overly optimistic projections discussed below. In this rule, EPA must put an end to the pattern of persistent undercontrol of ozone transport and prioritize achievement of its central statutory objective of attainment and maintenance of the ozone standard.

B. Projected reductions below the ozone standard are the product of incorrect assumptions that understate future ozone pollution and interstate contributions, and EPA should correct them in the final rule.

As described at length in section III above, EPA's projections of future emissions and ozone levels are overly optimistic and contradicted by real-world monitored ozone levels and trends. Several incorrect or unrealistic modeling assumptions contribute to a consistent underestimation of future emissions and ozone levels in identifying problem receptors and linkages. The underestimation of future emissions and ozone levels also skews EPA's overcontrol analysis, leading again to projected ozone levels that are unrealistically low. Wherever possible, EPA should correct these incorrect and unrealistic assumptions in the final rule. In the event that any of these assumptions cannot be corrected for the final rule, due to for example technical reasons or due to lack of data, EPA must account in the overcontrol analysis for the tendency of its projections to understate future ozone levels.

At least one modeling assumption that leads to underprediction of future ozone levels is specific to the policy case. This assumption therefore affects EPA's overcontrol analysis, but not the identification of problem receptors and linkages, and is addressed here.

Specifically, in one variation of its overcontrol modeling, EPA assumes that home states not otherwise regulated under this rule (like Colorado and Connecticut) will require EGU emissions limits as stringent as the measures required from upwind states (*i.e.*, reflecting the same cost threshold per ton of NOx reduced), even though EPA does not claim that this will occur in reality. *See* 87 Fed. Reg. at 20,099 n.206.[106] Colorado and Connecticut certainly have done and are continuing to do their part to reduce EGU emissions, but the specific reductions that EPA is assuming may go beyond the reductions that Colorado and Connecticut have made, and no rule requires that they make these additional reductions. Thus there is no basis for EPA to assume that those states will adopt measures exactly on par with the requirements of the rule. Under basic administrative law principles, "EPA … bears the burden of demonstrating that [its] assumption is correct." *Nat'l Ass'n of Clean Water Agencies v. EPA*, 734 F.3d 1115, 1148 (D.C.

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[105] EPA, Regulatory Impact Analysis at 3-10, EPA-HQ-OAR-2015-0500-0580 (Sept. 2016); CSAPR Update, 81 Fed. Reg. at 74,533.
[106] *See also* Ozone Transport TSD at 34, n.43, 48, EPA-HQ-OAR-2021-0668-0133.

Cir. 2013); *accord Johnson v. Office of Thrift Supervision*, 81 F.3d 195, 202-04 (D.C. Cir. 1996) (rejecting agency decision that rested on "assumption based on nothing"); *BP W. Coast Prods. v. FERC*, 374 F.3d 1263, 1274 (D.C. Cir. 2004) (Holding an agency "may not regulate as if [the relevant facts] existed in a world that never was," but must "take [the facts] as it finds them"). And while a certain degree of imprecision is permitted in agency models, they must have a rational relationship to the facts. *Appalachian Power Co. v. EPA*, 249 F.3d 1032, 1053 (D.C. Cir. 2001). Here, the facts simply do not bear out that downwind states have made or will make the same pollution reductions that upwind states are required to make, and EPA does not even claim that is the case. In addition, assuming downwind pollution reductions that are not required by any rule is in unexplained conflict with EPA's consistent practice, including in this rule, of using only on-the-books reductions to calculate the baseline against which the action is measured. Moreover, the purpose of the Good Neighbor provision is to share the burdens among both upwind and downwind states, not to require every conceivable measure to be done downwind before an upwind state has to take responsibility. *Wisconsin v. EPA*, 938 F.3d 303, 324 (D.C. Cir. 2019) (Industry "incorrectly assumes that an upwind State 'contributes significantly' to downwind nonattainment only when its emissions are the *sole cause* of downwind nonattainment."). As EPA rightly notes, the *Maryland* case raised doubts about whether the agency can assume commensurate reductions from home states, 87 Fed. Reg. at 20,099, n.206 (discussing *Maryland v. EPA*, 958 F.3d 1185, 1204 (D.C. Cir. 2020)), and here EPA should reject that unrealistic assumption.[107] Instead, EPA should conduct its overcontrol analysis without counterfactually assuming these downwind reductions.

C. Statutory leeway allows some reductions below the NAAQS, and the reductions projected by EPA would fall within that leeway, if they materialized.

"A degree of imprecision is inevitable in tackling the problem of interstate air pollution." *EME Homer City*, 572 U.S. at 523. The interstate ozone problem is complicated, and projections of future ozone precursor emissions and resulting ozone levels are inherently uncertain. *Id*. at 514, n.16. This uncertainty is particularly pronounced when, as in this rule, models are asked to predict the distant future with precision. EPA's projections involve a long list of choices and assumptions, many of which tend to understate future pollution, as already described above. In this context, the Supreme Court has held, EPA has "leeway" under the statute: because reducing pollution by "exactly" the right amount is likely "unattainable," EPA must strive for "balance" between "the possibilities of under-control and over-control." *Id*. at 514, n.16, 523. Yet in prior interstate ozone rules, EPA prioritized the avoidance of overcontrol, resulting in widespread and serious undercontrol. *See supra* at Section VI.A. In this rule, EPA must instead prioritize the attainment and maintenance of the ozone standard, in accordance with the Clean Air Act and Supreme Court precedent.

In the overcontrol analysis, EPA projects that the rule will reduce ozone levels in Douglas County, CO—the last problem downwind receptor to which Wyoming is linked—and

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[107] *EME Homer City* confirms that EPA cannot assume reductions in downwind states if nothing requires them. There, the court offered a hypothetical scenario to illustrate the dynamics of interstate ozone pollution, and stated that "[f]or simplicity's sake, the hypothetical assumes that EPA has not required any emission reductions by the downwind State itself." 572 U.S. at n.17.

Brazoria County, Texas—the last problem downwind receptor to which Arkansas and Mississippi are linked—below the level of the 2015 ozone standard. 87 Fed. Reg. at 20,098-99. As described above, these projections are the product of incorrect, overly optimistic assumptions that understate future ozone levels, and EPA should correct them in the final rule. But even if EPA's optimistic projections materialized in reality, these areas are projected to fall only slightly below the 2015 ozone standard. Indeed, the Douglas County receptor is projected to avoid maintenance problems by the smallest possible margin of just 0.1 ppb.[108] . And EPA projects that only 2 out of 101 problem receptors will come into attainment of the 2015 ozone standard in 2023 under the proposed rule (one additional receptor is projected to come into attainment, but still struggle to maintain the standard).[109]. Even in 2026, after all of the projected emissions reductions have taken effect, only 5 out of 89 problem receptors are projected to come into attainment (one additional receptor is again projected to come into attainment, but still struggle to maintain the standard).[110]. Thus, the projected reduction in ambient ozone levels below the NAAQS would (1) amount to a small fraction of the ozone standard and (2) occur at only a small fraction of the downwind problem receptors. For both reasons, the projected reductions in ambient ozone levels below the NAAQS would fall within the "leeway" that EPA is afforded under the statute. *EME Homer City*, 572 U.S. at 523.

VII. EPA's Proposal to Exclude Oregon from Its Transport Rule is Unlawful; EPA Must Include Oregon in the Final Rule.

Based on its maximum downwind contribution to both nonattainment and maintenance monitors in California, EPA determined that Oregon contributes above the 0.70 ppb significant contribution threshold in both 2023 and 2026. Oregon's maximum 2023 modeled contribution to a nonattainment monitor of 1.10 ppb and its maximum contribution to a maintenance monitor of 1.31 ppb are larger than the maximum contribution of a number of other states that were included in EPA's transport rule. Nevertheless, EPA proposes to exempt Oregon from its proposed transport rule and approve its SIP as submitted. 87 Fed. Reg. at 20,074. EPA contends that the projected nonattainment and maintenance monitoring sites linked to Oregon above the 1 percent contribution threshold "should not be treated as receptors for purposes of determining" Oregon's interstate transport obligations. *Id*. at 20,075. Citing its prior determination for Arizona for the 2008 ozone NAAQS, EPA asserts that a "factor [. . .] relevant to determining the nature of a projected receptor's interstate transport problem is the magnitude of ozone attributable to transport from all upwind states collectively contributing to the air quality problem." *Id*. EPA fails to justify this extra-statutory requirement, which is contravened by the plain language of the Clean Air Act and thwarts the Act's salutary air quality goals.

Pursuant to Section 110(a)(2)(D)(i)(I), transport SIPs (and FIPs) "shall" contain provisions "prohibiting, 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." EPA does

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[108] RIA at 3B-18, tbl. 3B-6, EPA-HQ-OAR-2021-0668-0151 (projecting 2026 maximum ozone level of 70.9 ppb under the rule).
[109] *Id.* at 3B-12.
[110] *Id.*

not dispute that Oregon contributes above the 1 percent threshold to both nonattainment and maintenance monitors in California. EPA also acknowledges that its proposed exclusion of Oregon is not based on "any evaluation at Step 3 of emissions reduction opportunities in Oregon." 87 Fed. Reg. at 20,075. That is, EPA has not found that Oregon lacks emission control strategies that could abate its significant interstate ozone contribution. Instead, EPA invents an exclusion from the Good Neighbor requirement—appearing nowhere in the statute—that makes Oregon's obligation contingent on how much pollution other upwind states contribute to California. This cannot be squared with the mandatory obligation on upwind states to abate "any source or other type of emissions activity" that contributes significantly to nonattainment or interferes with maintenance by a downwind state and is unlawful. Under the plain text of the Good Neighbor provision, this obligation does not depend on whether other states also contribute significantly to nonattainment or interfere with maintenance in California. It depends only on whether Oregon does.

Further, the relative contribution by a home state (vs. upwind states) isn't logically related to the level of contribution by an upwind state that is significant. If it were, a state's contribution could become significant just because other states begin to contribute more—even though the receptor has always been in nonattainment and the upwind state in question has always contributed the same percentage of the NAAQS. This anomalous result can't have been what Congress intended.

EPA's basis for excluding Oregon from its transport rule is also flawed as a matter of policy, thwarting the Act's goal of attaining the NAAQS as expeditiously as practicable. Since the inception of the Clean Air Act, California has suffered from the highest ozone levels in the nation. California air districts have imposed stricter requirements on sources in California than anywhere else in the country, necessitating more costly controls. Upwind states such as Oregon have not imposed comparably stringent controls on their own in-state sources. Consequently, more cost-effective emission reductions are likely achievable in Oregon than in California. Yet, EPA's approach would absolve Oregon of achieving any emission reductions, no matter how inexpensive, foisting the entire burden of abating California's failing air quality on California alone. In doing so, EPA's approach overlooks the fact that, for the monitors in question, non-California emissions still dominate. For example, for the Butte County maintenance monitor, which Oregon contributes 1.31 ppb, international and boundary conditions and biogenic emissions contributions (40.11 ppb) exceed California's contribution (23.89 ppb).[111] Moreover, Oregon is not linked to just one nonattainment or maintenance monitor, but rather contributes at or above the 1 percent threshold to 15 different nonattainment and maintenance monitors in California.

Oregon is a significant contributor to numerous nonattainment and maintenance monitors in California. EPA has not analyzed, let alone demonstrated, that Oregon lacks control measures that would help abate these significant contributions. For all other upwind states, EPA terminated its Step 1 analysis and proceeded to Step 2 after determining a state contributes significantly to even a single nonattainment or maintenance monitor. EPA has not offered a rational or lawful

[111] EPA 2016v2 2023 and 2026 DVs state contributions workbook, "2023_2026_2032_DVs_No Water" tab, line 817, *available at* https://www.epa.gov/csapr/good-neighbor-plan-2015-ozone-naaqs (Data File with Ozone Design Values and Ozone Contributions).

basis for treating Oregon differently. EPA must follow the plain language of the Clean Air Act and include Oregon in its final transport rule.

VIII. EPA Must Make Clear that the Good Neighbor Rule's Seasonal Ozone Reduction Measures Do Not, and Cannot, Supplant the States' Obligation to Make Reasonable Progress Toward Natural Visibility in All Class I Areas.

Every year, more than 280 million people visit our nation's most treasured parks and wilderness areas.[112] Unfortunately, many visitors are not able to see the spectacular vistas they expect. During much of the year, a veil of "haze" hangs in the air, blurring or whitewashing the scenery in many of the nation's most iconic and treasured national parks and wilderness areas. Most of this haze is not natural. It is caused by anthropogenic air pollution—mostly from the burning or production of fossil fuels—carried by the wind often many hundreds of miles from where it originated.

The same pollutants that cause haze pollution in the nation's most iconic and treasured national parks and wilderness areas also cause or contribute to downwind ozone nonattainment. Indeed, nitrogen oxides are among the primary direct and precursor contributors to visibility impairment in the 156 mandatory national parks and wilderness areas that are classified as Class I areas and protected under the Clean Air Act's Regional Haze program.[113] Particulate nitrate, in particular, is an important contributor to light extinction in the western and upper central region of the United States, particularly during winter.[114] As EPA recognizes in its Regulatory Impact Analysis, the proposed Good Neighbor Rule, if implemented, would likely result in unquantified visibility and air quality benefits in Class I areas and communities throughout the country.[115]

The Good Neighbor Rule does not, and cannot, exempt states or EPA from their obligations to implement haze plans that ensure "reasonable progress" under 42 U.S.C. 7491(b)(2), for several reasons.

As an initial matter, unlike the statutory and regulatory process for exempting sources from any BART analysis,[116] neither the Clean Air Act nor the Regional Haze Rule allows states or EPA to exempt sources from the reasonable progress requirements of the statute. Under the Clean Air Act and EPA's BART regulations for the first planning period,[117] certain

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[112] EPA, Basic Information About Visibility, https://www.epa.gov/visibility/basic-information-about-visibility (last visited June 20, 2022).
[113] *See, e.g.*, EPA, Peter Tsirigotis, Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period at 4 (July 8, 2021), https://www.epa.gov/visibility/clarifications-regarding-regional-haze-state-implementation-plans-second-implementation [hereinafter, "2021 Clarification Memo"].
[114] RIA at 5-37, EPA-HQ-OAR-2021-0668-0151.
[115] *Id*.
[116] 42 U.S.C. § 7491(c); 40 C.F.R. § 51.408(e)(2).
[117] EPA has taken the position that BART was a one-time requirement during the first implementation period. EPA, Peter Tsirigotis, Guidance on Regional Haze State Implementation Plans for the Second Implementation Period at A-3 (Aug. 20, 2019), *available at*

sources were required to "install, and operate" BART controls, after consideration of the five statutory factors, on a case-by-case basis. *See* 42 U.S.C. § 7491(b)(2)(A) (requiring BART "for each major stationary source"); 40 C.F.R. § 51.308(e)(1)(ii)(A) ("[t]he determination of BART must be based on an analysis of the best system of continuous emission control technology available and associated emission reductions achievable for each BART-eligible source").[118] Rather than imposing source-specific BART emission limitations, as contemplated under the Act, in 2012, EPA issued a BART exemption rule (also known as the "CSAPR better-than-BART" rule), 77 Fed. Reg. 33,643, allowing states covered by CSAPR to rely in the emissions trading program as an alternative to BART. In so doing, EPA disclaimed reliance on the explicit statutory BART exemption provision, 42 U.S.C. § 7491(c)(1), but instead relied on the Regional Haze Rule's BART alternative provisions, which specifically allowed states to rely on the CSAPR trading programs for SO2 and NOx as an alternative to imposing source-specific BART.[119]

Neither the Clean Air Act nor the Regional Haze Rule, however, provides any such mechanism for exempting states from the requirement to issue comprehensive haze plans that include enforceable emission limitations to ensure "reasonable progress," after evaluation of the four statutory factors. 42 U.S.C § 7491(b)(2); 40 C.F.R. § 51.308(f). In fact, in 2017, EPA revised the Regional Haze Rule to clarify and strengthen aspects of the Clean Air Act's visibility program. Among other changes, the revised Regional Haze Rule required each state to "revise and submit its regional haze implementation plan revision to EPA by July 31, 2021, July 31, 2028, and every 10 years thereafter." 40 C.F.R. 51.308(f). The second planning period submittals, which were due July 2021, are required to be a "comprehensive SIP revision[s]" that include "emission limits, schedules of compliance and other measures" to ensure

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https://www.epa.gov/sites/default/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf [hereinafter, "Aug. 2019 Guidance"]. The Agency anticipates, however, that many BART-eligible sources will need to be reassessed for cost-effective, reasonable progress pollution controls in the second regional haze planning period. Especially those sources that installed only moderately effective controls (or no controls at all) will need to be reassessed. Protection of Visibility: Amendments to Requirements for State Plans, 82 Fed. Reg. 3078, 3083/1 (Jan. 10, 2017).

[118]Under the Act, BART controls are required at fossil fuel-fired power plants and other major stationary sources that "may reasonably be anticipated to cause or contribute to any impairment of visibility in any mandatory Class I Federal area," and were in existence in 1977, but were not in operation before 1962. 42 U.S.C. § 7491(b)(2)(A); 40 C.F.R. § 51.308(e). The term "major stationary source" is defined to include any source that has the potential to emit 250 tons per year or more of any pollutant, and falls within one of 26 categories of industrial sources defined by the Act. 42 U.S.C. § 7491(g)(7).

[119] 40 C.F.R. § 51.3008(e)(4) (A State whose sources are subject to CSAPR "need not require BART–eligible fossil fuel-fired steam electric plants in the State to install, operate, and maintain BART for the pollutant covered by such trading program in the State."). The Regional Haze Rule also allowed states to adopt BART alternatives or other emission trading programs based on a technical, multi-factor demonstration that the alternative achieved greater reasonable progress at each Class I area than would be achieved through the installation and operation of BART. 40 CFR 51.308(e)(2). EPA concluded that provision was not directly applicable to the CSAPR better-than-BART Rule. 77 Fed. Reg. at 33,646.

"reasonable progress" toward eliminating visibility pollution in Class I national parks and wilderness areas by 2064.[120] In evaluating the emission limitations and measures necessary to make reasonable progress, states "shall" consider "the costs of compliance, the time necessary for compliance, and the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any existing source subject to such requirements. 42 U.S.C. § 7491(g)(1).

Unlike the BART-alternative provisions of the Clean Air Act and Regional Haze Rule, nothing in the Act or the 2017 rule revision suggests (let alone explicitly provides) that states or EPA may rely on a trading program to exempt sources from an evaluation of the four statutory factors states and EPA must consider in determining reasonable progress toward the Clean Air Act's natural visibility mandate.[121] It is well established that "where Congress includes particular language in one section of a statute but omits it in another section of the same Act, it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion." *Russello v. United State*s, 464 U.S. 16, 23 (1983). Given the absence of any explicit statutory or regulatory language allowing states to forgo reasonable progress on the basis of a proposed trading program, EPA must make clear that the Good Neighbor Rule does not obviate the states' Regional Haze obligations.

Even if the Clean Air Act or Regional Haze Rule could be interpreted to allow emission trading programs to supplant reasonable progress (although, as discussed above, they cannot be), EPA still could not rely on the proposed Good Neighbor Rule to exempt sources from reasonable progress for several reasons. First, the proposed Good Neighbor Rule does little to reduce haze-causing NOx pollution during seven months of the year. Indeed, the proposed rule contemplates upwind NOx emission reductions only during the ozone season (May 1 through September 30) when contribution to downwind nonattainment is generally at its peak. *See* 87 Fed. Reg. 20,041-43. The Clean Air Act and Regional Haze Rule, by contrast, mandate that states make reasonable progress toward natural visibility on *both* the most and least impaired visibility days throughout the year.[122] Given that direct NOx emissions and

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[120] Protection of Visibility: Amendments to Requirements for State Plans, 82 Fed. Reg. 3078, 3116; 40 C.F.R. § 51.308(f).

[121] Under the Clean Air Act, each state must include in its regional haze SIP enforceable "emission limits, schedules of compliance, and other measures as may be necessary to make reasonable progress toward meeting the national goal . . . . ." 42 U.S.C. § 7479(b)(2). In determining reasonable progress, the state must consider the "costs of compliance, the time necessary for compliance, and the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any existing source" of anthropogenic visibility impairment. *Id.* § 7479(g)(1); *see also* 40 C.F.R. § 51.308(f)(2)(i). The State should consider evaluating major and minor stationary sources or groups of sources, mobile sources, and area sources, and "must include in its implementation plan a description of the criteria it used to determine which sources or groups of sources it evaluated and how the four factors were taken into consideration in selecting the measures for inclusion in its long-term strategy." *Id.*

[122] *See, e.g.*, Protection of Visibility: Amendments to Requirements for State Plans, 82 Fed. Reg. at 3083-84 (describing the requirement to monitor visibility conditions (in deciviews) for the 20 percent least impaired days and the 20 percent most impaired days over the 5-year period at each of their Class I areas).

particulate nitrate are (as relevant to this proposal[123]) important contributors to haze in the western and upper central region of the United States, particularly during winter,[124] the Good Neighbor Rule's proposed reduction of NOx emissions only during the ozone season simply cannot substitute for the emission reductions necessary to make reasonable progress at all Class I areas throughout the year.

Second, in developing comprehensive haze SIP revisions for the second planning period, states cannot rely on unenforceable, so-called "on-the-way" pollution reduction measures, such as the Good Neighbor Rule's yet-to-be finalized emission budgets.[125] The Clean Air Act requires that "[e]ach state implementation plan . . . *shall*" include "enforceable limitations and other control measures" as necessary to "meet the applicable requirements" of the Act. 42 U.S.C. § 7410(a)(2)(A). The Regional Haze Rule similarly requires each state to include "enforceable emission limitations" as necessary to ensure reasonable progress toward the national visibility goal.[126] This means that any so-called "on-the-way" measures, including anticipated emission reductions under the Good Neighbor Rule or any shutdowns or reductions in a source's emissions or utilization, "*must* be included in the SIP" as enforceable emission reduction measures. [127]

As proposed, the Good Neighbor Rule cannot satisfy the states' obligation to include enforceable emission limitations in their 2021-2028 SIP revisions. Although the rule proposes to impose a firm, state-level NOx emission budget for 2024, that budget will not necessarily ensure the emission reductions necessary to make reasonable progress toward natural visibility. Moreover, the vast majority of the emission reductions expected under the proposed Good Neighbor Rule will not be made enforceable until 2026, when EPA implements

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[123] In many Class I areas, sulfur dioxide is also a dominant contributor to haze pollution. Because the proposed rule does nothing to address SO2 pollution, it cannot substitute for a reasoned analysis of the four statutory reasonable progress factors states must consider in evaluating reasonable progress.

[124] RIA at 5-37, EPA-HQ-OAR-2021-0668-0151.

[125] 2021 Clarification Memo at 10.

[126] *See* 40 C.F.R. § 51.308(d)(3) ("The long-term strategy must include enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals established by States having mandatory Class I Federal areas."); 40 C.F.R. §§ 51.308(i); (d)(3) ("The long-term strategy must include enforceable emissions limitations, compliance schedules . . ."); (f)(2) (the long-term strategy must include "enforceable emissions limitations").

[127] 2021 Clarifications Memo at 8-9 (emphasis added); *see also* Aug. 2019 Guidance at 22 ("in selecting sources for control measure analysis," the state may choose "not selecting sources that have an enforceable commitment to be retired or replaced by 2028"); *id*. at 34 (To the extent a retirement or reduction in operation "is being relied upon for a reasonable progress determination, the measure would need to be included in the SIP and/or be federally enforceable.") (citing 40 C.F.R. § 51.308(f)(2)); *id.* at 43 ("[i]f a state determines that an in-place emission control at a source is a measure that is necessary to make reasonable progress and there is not already an enforceable emission limit corresponding to that control in the SIP, the state is required to adopt emission limits based on those controls as part of its long-term strategy in the SIP via the regional haze second planning period plan submission.").

additional emission budgets commensurate with the reductions achievable with SCR retrofits. 87 Fed. Reg. at 20,091. As discussed below, we urge the Agency to establish default budgets for 2025 and 2026 in the final rule that would apply were the Agency to fail to complete the dynamic budgeting process for those years, for whatever reason. However, under the rule as proposed, because neither the states nor EPA can guarantee that the 2026 emission budgets for EGUs will be implemented and permanent, or that they will achieve the emission reductions that are necessary to make reasonable progress, states may not rely on those speculative budgets in lieu of conducting the required, statutory four-factor reasonable progress analysis under 42 U.S.C. § 7491(b)(2) and 40 C.F.R. § 51.308(f). Moreover, the Good Neighbor Rule's dynamic budgets could lead to *increased* emissions from certain EGUs, undermining the Regional Haze Rule's mandate to ensure improvement of visibility at each Class I area on the most impaired days, and no degradation on the clearest days. 40 C.F.R. §§ 51.308(d)(1). Without commensurate emission reductions from other sources, and a technical demonstration that, under the trading program, the distribution of emissions would not be substantially different than source-specific emission limitations or that visibility will improve on the most impaired days and not degrade on the clearest, neither the state nor EPA can ensure reasonable progress.[128]

EPA suggests that a source commitment to retire by 2028 could "potentially defer[]" or satisfy the Good Neighbor Rule's SCR requirements, and also satisfy the Regional Haze Rule's requirements. 87 Fed. Reg. at 20,122/2. That proposed approach is inconsistent with the Regional Haze Rule. As noted, the Clean Air Act and Regional Haze Rule require that "[e]ach state implementation plan . . . *shall*" include "enforceable limitations and other control measures" as necessary to "meet the applicable requirements" of the Act—i.e., ensure reasonable progress. 42 U.S.C. §§ 7410(a)(2)(A); 7491(b)(2); 40 C.F.R. §§ 51.308(d)(1), (d)(3), (f). Thus, where a state or EPA relies on a source's plans to permanently cease operations or projects that future operating parameters (*e.g.*, limited hours of operation or capacity utilization) will differ from past practice, the state "must" make those parameters or assumptions into enforceable limitations *in the second planning period SIP itself*. A separate "written attestation" of the source's intent to retire by the "end of calendar year 2028," the enforceability of which is unclear, would not be sufficient to satisfy the Regional Haze Rule's requirements for the 2021-2028 haze planning period—particularly if the source is not then subject to the Good Neighbor emissions backstop until 2029, *after* the end of the planning period. *See* 87 Fed. Reg. at 20,122/2. Moreover, at least one court has held that EPA likely exceeded its authority under the Clean Air Act and Regional Haze Rule by imposing emissions reductions that go into effect after the end of a haze implementation period, so it is not clear whether sources that "attested" to their intent to retire and then reversed course would be subject to any limitations under the haze rule at all. *See Texas v. EPA*, 829 F.3d 405, 429 (5th Cir. 2016).

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[128] *Cf.* 40 C.F.R. 51.308(e) (under the BART-alternative provisions of the rule, requiring the state to demonstrate that under any trading program, "the distribution of emissions is not substantially different than under BART, and the alternative measure results in greater emission reductions,“ and providing that "[i]f the distribution of emissions is significantly different, the State must conduct dispersion modeling to determine differences in visibility between BART and the trading program for each impacted Class I area, for the worst and best 20 percent of days.“)

Moreover, even if a source's "attestation" under the Good Neighbor Rule of its intent to retire by 2028 were somehow binding and consistent with the statute's requirement to eliminate significant contributions to nonattainment and maintenance issues as soon as practicable, EPA would need to make clear that such a commitment does not obviate the need for states to evaluate interim, cost-effective emission reductions.[129] While a source's binding retirement date is a relevant consideration under the Clean Air Act's reasonable progress factors, 42 U.S.C. § 7491(g)(1) (states must consider the source's remaining useful life), EPA's past Guidance contemplates that states will consider cost-effective operational upgrades in the interim.[130] EPA's July 2021 Clarification Memo confirms that directive. There, the agency made clear that in evaluating reasonable progress for all sources, states should consider the "full range of potentially reasonable options for reducing emissions," including upgrades or other measures that "may be able to achieve greater control efficiencies, and, therefore, lower emission rates, using their existing measures."[131] Thus, even with a binding 2028 retirement date, states must evaluate whether there are control measures or upgrades to existing controls that are likely to satisfy reasonable progress during the 2021-2028 planning period.

Finally, by making clear that the Good Neighbor Rule does not supplant the states' obligations under the Regional Haze Rule, EPA can avoid even further delay in the implementation of Congress's visibility mandate. As noted, Congress directed EPA in 1977 to ensure the development and implementation of Clean Air Act plans that ultimately eliminate all anthropogenic air pollution impairing visibility in the nation's most iconic landscapes. 42 U.S.C. § 7491(a)(1), (b). After more than two decades of delay in implementing that mandate, in 1999, EPA finally issued the Regional Haze Rule, which requires the states (or EPA where a state fails to act) to periodically issue SIPs that contain enforceable "emission limits, schedules of compliance and other measures" to ensure reasonable progress toward eliminating visibility pollution in Class I national parks and wilderness areas by 2064. 64 Fed. Reg. 35,714 (July 1, 1999); 40 C.F.R. § 51.308(d)(1), (d)(3). The first of those periodic state implementation plans were due in 2007. Despite that mandate—and nearly fifteen years after the deadline—several proposed good-neighbor states, including Texas, Wyoming, and Utah, which are among the largest emitters of NOx in the country, still do not have fully approved Regional Haze plans for

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[129] *See, e.g.*, 40 C.F.R. § 51.308(f)(2)(i) (The State must evaluate and determine the emission reduction measures that are necessary to make reasonable progress by considering the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected anthropogenic source of visibility impairment."); *see also* Protection of Visibility: Amendments to Requirements for State Plans, 82 Fed. Reg. at 3088 ("Consistent with CAA section 169A(g)(1) and our action on the Texas SIP, a state's reasonable progress analysis must consider a meaningful set of sources and controls that impact visibility. If a state's analysis fails to do so, for example, by . . . failing to include cost-effective controls at sources with significant visibility impacts, then the EPA has the authority to disapprove the state's unreasoned analysis and promulgate a FIP.").

[130] Aug. 2019 Guidance at 34 ("If a control measure involves only operational changes, there typically will be only small capital costs, if any, and the useful life of the source or control equipment will not materially affect the annualized cost of the measure.").

[131] 2021 Clarification Memo at 7.

the first planning period.[132] Moreover, despite EPA's mandate requiring each state to "revise and submit its regional haze implementation plan revision to EPA by July 31, 2021," 40 C.F.R. § 51.308(f), at least 34 states still have refused to submit SIP revisions. EPA should make clear that the Good Neighbor Rule cannot be used by recalcitrant states to continue evading their obligations to address haze pollution.

Given the already decades-long delays in EPA's implementation of the Clean Air Act's visibility mandate and the agency's prior actions exempting many of the nation's largest and dirtiest sources from BART, we urge EPA to make clear that the Good Neighbor Rule does not, and cannot, exempt states or EPA from their obligations to implement haze plans that ensure "reasonable progress" under 42 U.S.C. § 7491(b)(2).

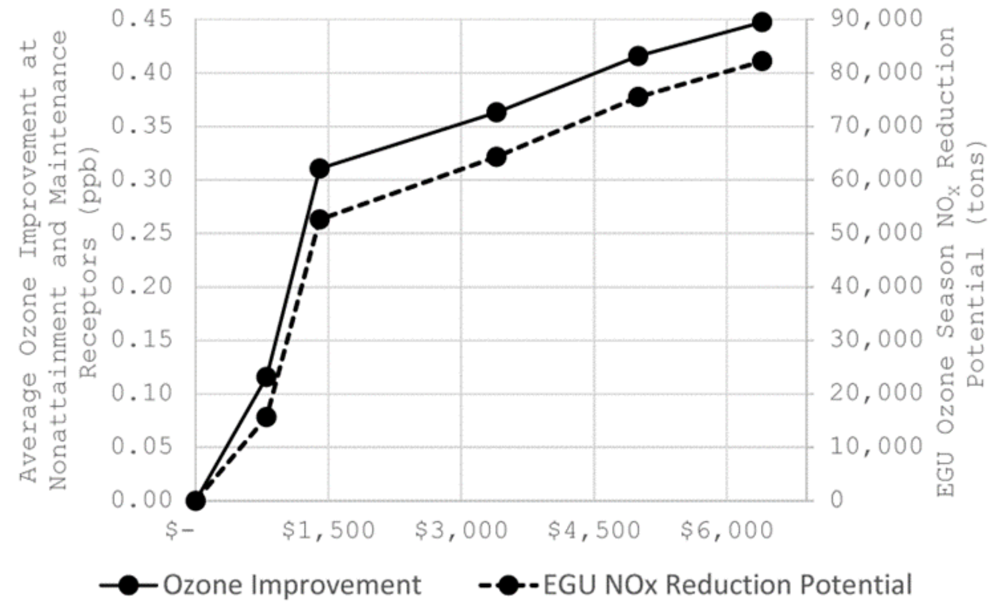
IX. EPA's proposed cost-per-ton threshold of $11,000/ton NOx for pollution controls for EGUs is conservative, aligns with agency precedent, and must be increased.

A. A cost threshold of $11,000/ton for EGUs reflects conservative assumptions about the costs of installing SCR and is consistent with EPA's precedent.

A cost threshold of $11,000/ton NOx that represents installing SCR on large coal-fired EGUs would comport with EPA's traditional approach to identifying the pollution control techniques that determine emissions budgets for the EGUs in covered states. In the CSAPR Update, EPA selected a level of stringency at which "incremental EGU NOx reduction potential and corresponding downwind ozone air quality improvements are maximized with respect to marginal cost."[133] This "knee in the curve" appeared at a marginal cost of $1,400/ton:

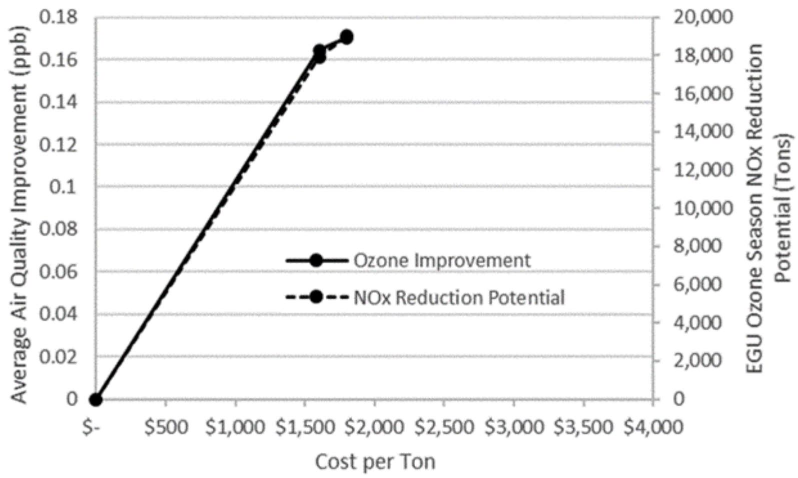
[132] In early 2022, EPA took final action approving parts of Wyoming's and Utah's SIP revisions for the first planning period. The agency may contend those actions satisfy Wyoming's and Utah's obligations, but those final actions are pending litigation and until those challenges are resolved, Wyoming's and Utah's first planning period obligations are incomplete.
[133] CSAPR Update, 81 Fed. Reg. at 74,550.

Figure VI.1. EGU Ozone Season NO_X Reduction Potential in 22 Linked States and Corresponding Total Reduction in Downwind Ozone Concentrations at Nonattainment and Maintenance Receptors for each Emission Budget Level Evaluated



Id. In the Revised CSAPR Update, EPA clarified its approach, explaining that a knee in the curve "is not on its own a justification for not requiring reductions beyond that point in the cost curve." 86 Fed. Reg. at 23,107. Thus, although optimizing existing SNCR systems at $1,800/ton would not have reduced enough NOx emissions and improve air quality sufficiently to avoid a slight knee in the curve, EPA nonetheless moved beyond the inflection point at $1,600/ton, which reflected SCR optimization and combustion control upgrades, because EPA found that the more stringent controls at $1,800/ton still demonstrated meaningful air-quality improvement:

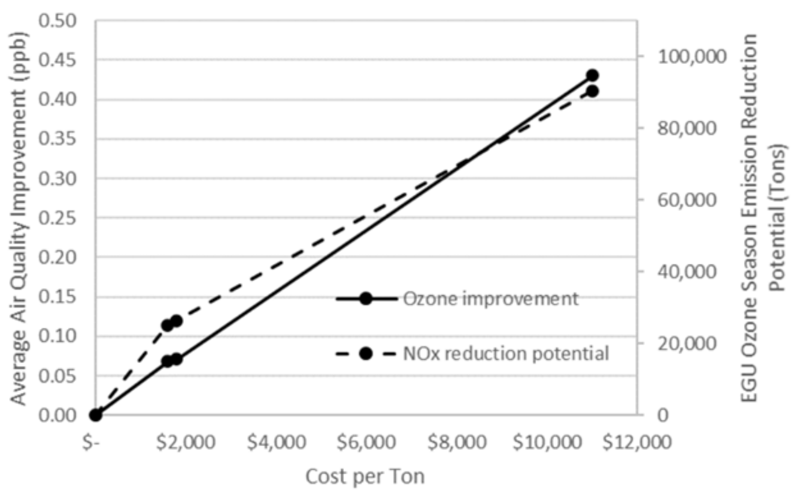
Figure 1 to Section VI.D.1 - EGU Ozone Season NO_X Reduction Potential in 12 Linked States and Corresponding Total Reductions in Downwind Ozone Concentration at Nonattainment and Maintenance Receptors for Each Cost Threshold Level Evaluated (2021/2022)*



***Note –** Starting with the $1,600 per ton cost threshold in this figure, full implementation of assumed SCR optimization and state-of-the-art combustion control upgrades are reflected.

Id. at 23,107-08. In the proposed Good Neighbor Plan, the abatement costs for different control stringencies are further apart on the cost curve, yet there is no discernable knee in the curve:[134]

Figure 2 to Section VI.D.1: EGU Ozone Season NO_X Reduction Potential in 23 Linked States and Corresponding Total Reductions in Downwind Ozone Concentration at Nonattainment and Maintenance Receptors for Each Cost Threshold Level Evaluated (2026)



[134] Ozone Transport TSD at 88, EPA-HQ-OAR-2021-0668-0133.

Correcting assumptions about the annualized cost of SCR installation—and thereby moving the points furthest to the right in the graph to the left—would further smooth the curve by reducing cost per ton of NOx reductions, as discussed immediately below.

EPA's cost analysis for SCR technology is conservative and likely overestimates the cost of controls in at least two ways. First, EPA's cost recovery factor is higher than warranted, and therefore overestimates costs to generators. Specifically, in its cost estimates for retrofitting EGUs with SCR, EPA assumed a capital recovery factor of 0.143.[135] The capital recovery factor is used to convert capital costs of SCR to annual costs based on an assumed life of the control and an assumed interest rate.[136] The basis for the assumed interest rate and life of retrofit controls is discussed in EPA's Integrated Planning Model (IPM) "Documentation for EPA's Power Sector Modeling Platform v6-Summer 2021 Reference Case," Chapter 10 Financial Assumptions.[137] In that document, EPA states, "[t]he EPA Base Case v6 assumes a book life of 15 years for retrofits. This assumption is made to account for recent trends in financing of retrofit types of assessments."[138] If EPA assumed a 15-year life of SCR to arrive at a capital recovery factor of 0.143, that means it assumed an interest rate of 11.5%.[139]

This 11.5% interest rate appears to reflect the weighted average "real capital charge" for environmental retrofits (weighted for utility-owned and merchant-owned plants assuming a 60-40 split between regulated (utility-owned) to unregulated (merchant-owned) plants.[140] If EPA's 11.5% interest rate truly reflects a weighted average capital charge between utility-owned and merchant-owned units (as we assume), the average interest rate is skewed towards merchant plants which, according to EPA, have a higher assumed capital charge for environmental retrofits.[141] A review of the EGUs in the states covered by the proposed Good Neighbor Plan that do not currently have SCR or SNCR shows that regulated EGUs reflect about 80% of the total generating capacity (much higher than the 60-40 split that it appears EPA has assumed). An

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[135] EPA, EGU NOx Mitigation Strategies Proposed Rule TSD at 25, EPA-HQ-OAR-2021-0668-0125 (Feb. 2022) [hereinafter, "Mitigation TSD"].

[136] *See* EPA, Control Cost Manual, Section 1, Chapter 2 Cost Estimation: Concepts and Methodology, November 2017, at 22, available at https://www.epa.gov/sites/default/files/2017-12/documents/epaccmcostestimationmethodchapter_7thedition_2017.pdf.

[137] *Available at* https://www.epa.gov/system/files/documents/2021-09/chapter-10-financial-assumptions.pdf; *see also* RIA at 4-12 to 4-13, EPA-HQ-OAR-2021-0668-0151.

[138] EPA, Documentation for EPA's Power Sector Modeling Platform v6-Summer 2021 Reference Case, Chapter 10: Financial Assumptions at 10-14 (2021), https://www.epa.gov/system/files/documents/2021-09/chapter-10-financial-assumptions.pdf.

[139] Based on the formula for capital recovery factor (CRF) given in EPA, Control Cost Manual, Section 1, Chapter 2 Cost Estimation: Concepts and Methodology at 22 (Nov. 2017), https://www.epa.gov/sites/default/files/2017-12/documents/epaccmcostestimationmethodchapter_7thedition_2017.pdf.

[140] *See* EPA, Documentation for EPA's Power Sector Modeling Platform v6-Summer 2021 Reference Case, Chapter 10: Financial Assumptions at 10-7 (Section 10.6) and at 10-13 (Table 10-9) (2021), https://www.epa.gov/system/files/documents/2021-09/chapter-10-financial-assumptions.pdf.

[141] *Id.* at 10-13 (Table 10-9).

assumed 80-20 split between regulated and merchant plants would equate to a weighted average real cost of capital for environmental retrofits of 11% rather than 11.5%. Use of a more realistic, lower interest rate will reduce the annualized cost of control by almost 3%.

Moreover, EPA's assumed interest rate used for determining annualized capital costs of control is much higher than the current bank prime interest rate which EPA typically recommends for use in cost effectiveness analyses unless a firm-specific interest rate can be justified. The current bank prime lending rate is 4.75%,[142] which is significantly lower than the interest rate that EPA apparently has assumed in the cost effectiveness analysis for the Good Neighbor Plan.

EPA's real cost of capital also appears high. For example, EPA's real cost of capital is significantly higher than the weighted cost of capital approved by public utility commissions for PacifiCorp, which owns several EGUs affected by the Good Neighbor Plan. PacifiCorp has stated that its weighted average approved cost of capital is 7.303%.[143] Thus, EPA should more thoroughly evaluate an appropriate interest rate to use for its cost analysis for the Good Neighbor Plan and ensure that it is not being inappropriately conservative in its estimate of annualized costs of NOx controls under the Good Neighbor Plan.

Second, EPA's assumption that an SCR at a coal-fired EGU would only have a life of only fifteen years is not justified, and makes SCR appear more expensive than it is. EPA's Control Cost Manual, last updated in 2019, discusses this issue at length, explaining, "the equipment lifetime of an SCR system is assumed to be 30 years for power plants" and that "[t]hese assumptions are based on several sources including . . . an expert report in the North Carolina lawsuit against the Tennessee Valley Authority (TVA) coal-fired electrical generation units indicated an expected useful life of an SCR is 30 years[Reference 118]; a 2002 study of economic risks from SCR operation at the Detroit Edison Monroe power plant used 30 years as the anticipated lifetime [Reference 119]; and a design lifetime of 40 years was used for an SCR at the San Juan Generating Station [Reference 120]."[144] Even before EPA revised the Selective Catalytic Reduction chapter of the Control Cost Manual in 2019, the October 2000 version of the

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[142] FRED Economic Data, Bank Prime Loan Rate, *available at* https://fred.stlouisfed.org/series/DPRIME (last visited June 20, 2022).

[143] *See* PacifiCorp Submittal to the Utah Department of Air Quality at 1-2 (Aug. 31, 2021), *available at* https://documents.deq.utah.gov/air-quality/planning/air-quality-policy/regional-haze/DAQ-2021-011726.pdf.

[144] EPA, Control Cost Manual, Section 4, Chapter 2: Selective Catalytic Reduction at pdf page 80 and references 118-120 (June 2019), https://www.epa.gov/sites/default/files/2017-12/documents/scrcostmanualchapter7thedition_2016revisions2017.pdf.

Control Cost Manual assumed a lifetime of SCR for a power plant of 20 years,[145] although as far back as 2011, EPA assumed a 30-year life for SCR systems at coal-fired EGUs.[146]

The assumed life of controls has a significant impact on the capital recovery factor, which in turn has a significant impact on the annualized cost of controls in a cost effectiveness analysis. If EPA were to assume a 30-year equipment life rather than a 15-year equipment life, the annualized capital cost of SCR would be 16% lower.[147] By assuming, without justification, a shortened useful life of SCR controls, EPA's cost estimates for coal-fired EGUs under the Good Neighbor rule are significantly overestimated.

As noted, however, in the Revised CSAPR Update EPA did not take the position that a state's significant contribution from EGUs necessarily ends with the pollution reductions resulting from controls reflected at any identifiable knee of the curve. Rather, EPA suggested that it might be appropriate to apply a higher cost threshold to secure a timely, full remedy to significant contributions to nonattainment or maintenance issues. *See* 86 Fed. Reg. at 23,108 (noting that SNCR optimization would improve air quality at problem receptors before nonattainment and maintenance issues were resolved in 2024). Here, although EPA claims that the proposed rule would supply a full remedy, 87 Fed. Reg. at 20,100, its own air quality modeling shows that problem receptors remain in nonattainment or struggle with maintenance in 2026, and that upwind states have not reduced their contributions to those receptors to the 1% significance threshold.[148] Thus, EPA must secure further emission reductions from EGUs at higher cost thresholds that are achievable and cost-reasonable.

B. EPA must establish higher cost thresholds for EGUs in light of downwind states' control requirements and persistent ozone transport problems in those states.

A higher cost threshold would be feasible and cost-reasonable, as evidenced by successful emission-reduction programs in downwind states. In the Revised CSAPR Update, several downwind states cited their own requirements for EGU NOx controls that were estimated to achieve emission reductions at much higher costs-per-ton. *See* 86 Fed. Reg. at 23,109.[149] For example, under Connecticut's regulations, an emission limitation in a case-by-case RACT determination for any emission unit (including a boiler serving an EGU, or a combined cycle

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[145] EPA, Control Cost Manual, Section 4, Chapter 2: Selective Catalytic Reduction at 2-48 (Oct. 2000), https://www.epa.gov/sites/default/files/2020-07/documents/cs4-2ch2.pdf.
[146] *See* Final Rule on New Mexico Federal Implementation Plan for Interstate Transport of Pollution Affecting Visibility and Best Available Retrofit Technology (BART),76 Fed. Reg. 52,388 at 52,401-2 (Aug. 22, 2011).
[147] The capital recovery factor at EPA's assumed 11.5% interest rate and a 30-year life would be 0.120, which is 16% lower than the capital recovery factor used by EPA in determining annualized costs of SCR of 0.143 based on a 15-year life of SCR.
[148] *See* Ozone Transport TSD at 48, EPA-HQ-OAR-2021-0668-0133.
[149] *See also* Comments of the Attorneys General of New York, New Jersey, Connecticut, Delaware, and Massachusetts and the Corporation Counsel of the City of New York at 19, EPA-HQ-OAR-2020-0272-0114 (Dec. 14, 2020) [hereinafter, "2020 States Comments].

combustion turbine) is presumptively feasible so long as it has a cost-effectiveness value equal to or less than $13,118/ton NOx.[150] A New Jersey rule deems "technically feasible" SCR retrofits on natural gas compressor turbines (*i.e.*, simple-cycle turbines) at costs up to $18,983/ton NOx.[151] This coalition of downwind states argued that these requirements secured significant emission reductions from their existing sources, and that establishing budgets for upwind states under the Revised CSAPR Update reflecting a much lower cost threshold would be inequitable.[152]

EPA responded with the following points:

- Downwind states' emission reductions were more effective at addressing air pollution problems within those states than were reductions in upwind states.
- The post-combustion controls represented by higher cost thresholds could not achieve emission reductions until 2025, when all downwind nonattainment and maintenance issues with the 2008 ozone NAAQS would have been resolved.
- The "knee in the curve" plotting emission reductions and air quality improvements against the cost-effectiveness values of various controls that appears at the cost threshold associated with optimizing existing controls and installing combustion controls is a "reasonable stopping level."

86 Fed. Reg. at 23,109-10.[153] These responses were not persuasive when EPA promulgated the Revised CSAPR Update, and they certainly would not justify ruling out higher cost thresholds for EGUs in the Good Neighbor Plan, for the following reasons:

- The advantages of achieving greater improvements in air quality from geographically nearer reductions could also support gradations of cost thresholds within the EGU trading program for upwind states, with elevated cost thresholds applying to states closer to downwind receptors, yet EPA has historically applied the same cost threshold to upwind states' EGUs regardless of distances from downwind states, in order to reach an equitable result.
- EPA has concluded that downwind receptors continue to have difficulty attaining and maintaining the 2015 ozone NAAQS in 2026 following imposition of the proposed

[150] *See* Conn. Agencies Regs. § 22a-174-22e-(b)(1)(A), (b)(1)(C), (d)(1)(B), (h)(1)(A)(iii) (2019).
[151] 49 N.J. Reg. 14(a), at 31-32, tbl. D (Jan. 3, 2017) (proposed rule) (adopted 49 N.J. Reg. 3518(a) (Nov. 6, 2017)) (codified at N.J. Admin. Code § 7:27-19.5(a)(1), 19.8(g)).
[152] 2020 States Comments at 19-20, EPA-HQ-OAR-2020-0272-0114.
[153] *See also* EPA, Ozone Transport Policy Analysis for the Revised CSAPR Update at 55, EPA-HQ-OAR-2020-0272-0222 (Mar. 2021); EPA, Revised Cross-State Air Pollution Rule Update – Response to Comment at 95, EPA-HQ-OAR-2020-0272-0219 (Mar. 2021).

rule's requirements, when additional post-combustion controls could be installed regionwide. *See* 87 Fed. Reg. at 20,080-81, 20,098.[154]

- As noted above, EPA has stated that a knee in the curve plotting emission reductions and air quality improvements against the cost-effectiveness values of various controls is not an independent basis for ruling out controls at a higher cost threshold, provided that those controls achieve significant emission reductions and air-quality improvements. *See* 86 Fed. Reg. at 23,107.

In any event, the higher abatement costs that downwind states have deemed acceptable for their existing EGUs indicate that these marginal costs are reasonable for the electric-generating industry. As discussed in the next section, EPA must strengthen the proposed budgets in the final rule by extending assumptions of post-combustion controls to additional EGUs at higher cost thresholds—though ones that are still below the cost-effectiveness values previously found to be acceptable by the downwind states.

X. EPA must strengthen the EGU budgets to reflect emissions rates achievable through the use of the selected controls as soon as practicable, and certainly by the downwind attainment deadlines, or as soon as possible thereafter.

For both the preset budget years of 2023 and 2024, and the dynamic budget years of 2025 and beyond, EPA generally applies the same approach to determine the overall number of allowances to be distributed to covered units in each state. Under this approach, EPA relies on historical heat-input and performance data for each unit expected to be operating in the budget year and, if necessary, adjusts the unit's emissions to reflect an emissions rate that results from the use of selected controls that are available in the budget year. *See* 87 Fed. Reg. at 20,116-17. EPA then factors in additional emission reductions that are projected, through modeling, to result from a NOx price matching the cost of abatement of the most expensive of the selected controls. *See id.* Accordingly, to establish budgets that in fact drive the emission reductions associated with EPA's selected control strategy for EGUs, it is critical that the Agency calculate budgets based on achievable emissions rates from each of its selected controls and the earliest possible timing for deployment at the EGUs assumed to use those controls. Furthermore, as long as downwind attainment problems persist and upwind states are contributing to these problems above the 1% significance threshold, EPA must expand its EGU control strategy to more types of units and to higher cost thresholds to achieve emission reductions that are needed to eliminate significant contributions to downwind pollution.

A. EPA's methodology for calculating the EGU budgets based on optimization of SCR is excessively conservative.

For coal-fired EGUs that are expected to optimize SCR controls by 2023, EPA arrives at a NOx emissions rate "ceiling" that does not reflect the methodology that it claims to rely on,

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[154] *See also* RIA at 4-39, EPA-HQ-OAR-2021-0668-0151 ("[T]he proposed rule is projected to incentivize an incremental 18 GW of SCR retrofit at coal plants and 14 GW of SCR retrofit at oil/gas steam plants [by 2025 in IPM]."); *Am. Hosp. Ass'n v. Azar*, Civil Action No. 14-851 (JEB) (D.D.C. Nov. 1, 2018) ("[T]he Government cannot claim it is impossible to follow its own projections.").

and that methodology is itself unacceptably conservative. EPA's methodology is inherently conservative in part because the Agency relies on historic emissions data for determining the widely achievable level of performance. This is inherently conservative when attempting to determine the potential performance for controls that could actually be feasible because while historic emission data shows what units have previously achieved, it is unclear if units have historically utilized their controls in a way that fully optimized their NOx emissions rate performance to the level they are capable of. Rather, the opposite is likely true, as without sufficient financial incentives or penalties, EGUs' past performance likely reflects decisions made based on economics rather than optimized technical capabilities. As EPA observes, previous iterations of CSAPR have often provided insufficient incentive to run and optimize controls, as excess allowances have accumulated without budget or bank adjustments. *See* 87 Fed. Reg. at 20,107-09. Indeed, a 2015 analysis by the Ozone Transport Commission's Stationary Source Committee found that SCR-equipped coal-fired EGUs had higher average ozone-season NOx emissions rates when allowance prices fell below $100 at the beginning of the ozone season.[155] In more-recent years, allowance prices in May have remained below $200, except for 2017, when the price increased to about $600.[156]

Moreover, EPA's approach of using the third lowest ozone season NOx rates to identify a maximum emissions rate for purposes of setting the budgets is overly conservative because it reflects an average, third-best seasonal rate across units, rather than the level of performance that should be achievable by all units fully utilizing this control option. EPA claims it has previously relied on the third-lowest ozone season NOx rates in the CSAPR Update and Revised CSAPR Update because those "emission rates are characteristic of a well-run and well-maintained system and achievable on a routine basis."[157] While the third-best seasonal average rate may be achievable on a routine basis, it is unclear if a significantly lower rate might also be achievable on a routine basis, or at least widely achievable. Without adequate regulation or incentives, a rate that has been achieved on a routine basis may not even reflect a well-run and well-maintained system. Indeed, data on the lowest monthly average ozone-season NOx rates from 2009-2021 show significantly better performance.[158] And even the third-best seasonal average rate has come

[155] *See* Ozone Transport Commission, Stationary and Area Source Committee, Largest Contributors Workgroup, Draft Comparison of CSAPR Allowance Prices to Cost of Operating SCR controls at 1-2, Fig. 1, tbl. 1 (Apr. 2015), *available at* https://www.regulations.gov/document/EPA-HQ-OAR-2020-0272-0219, attached as Ex. OTC 2.
[156] *See* EPA, Power Sector Programs – Progress Report at 64 (2020), https://www3.epa.gov/airmarkets/progress/reports_2019-2020/pdfs/2020_report.pdf; EPA, Power Sector Programs – Progress Report at 66 (2019), *available at* https://www3.epa.gov/airmarkets/progress/reports/pdfs/2019_full_report.pdf; EPA, Power Sector Programs – Progress Report at 66 (2018) *available at* https://www3.epa.gov/airmarkets/progress/reports/pdfs/2018_full_report.pdf; EPA, Power Sector Programs – Progress Report at 71 (2017), *available at* https://www3.epa.gov/airmarkets/progress/reports_2017/pdfs/2017_full_report.pdf.
[157] Mitigation TSD at 8, EPA-HQ-OAR-2021-0668-0125.
[158] *Id.* at 9.

down over time, suggesting that this methodology does not reveal the level of performance that is actually achievable through optimization of SCR controls.[159]

B. EPA's chosen "ceiling" emissions rate for optimizing SCR does not reflect the result of its own methodology.

Even accepting, for the sake of argument, EPA's reliance on historic emissions data, the Agency's chosen "ceiling" is excessively high. The Agency asserts that it is using the same methodology for identifying an emission rate of 0.08 lb NOx/MMBtu as in the Revised CSAPR Update, which "focused on the third-lowest ozone season NOx rates achieved since 2009."[160] Yet the supporting information that EPA presents shows that the third-lowest season average ozone-season NOx rate is 0.071 lb/MMBtu.[161] As EPA observes, even those units that are running at low capacity factors should be able to achieve a NOx rate with optimized SCR well below 0.08 lb/MMBtu.[162] Independent analysis of a larger set of coal-fired EGUs confirms that even units that are cycling and that have older SCRs are able to emit at monthly rates below 0.075 lb/MMBtu.[163] EPA must therefore utilize a lower maximum emissions rate at coal-fired units that have optimized their SCRs when establishing the budgets.

C. An SCR ceiling rate between 0.065 and 0.071 lb/MMBtu would be widely achievable and more consistent with the Good Neighbor provision.

The seasonal and monthly emissions data in the EGU NOx Mitigation Strategies TSD support use of a ceiling rate of between 0.065 and 0.071 lb/MMBtu in the budget for optimizing SCR at historically poor performing units.[164] A ceiling rate between 0.065 and 0.071 lb/MMBtu would be both widely achievable and more consistent with the requirement to prohibit significant contributions to interstate air pollution. While we agree that the third best seasonal average rate of 0.071 lb/MMBtu (which is also the fifth lowest monthly average rate) is routinely achievable, the second-best seasonal rate of 0.065 lb/MMBtu is still conservative and should also be considered routinely achievable.[165]

It is also important to recognize that a routinely achievable rate is not the same as a rate that reflects the level of performance that is widely achievable for well-run and fully operating SCR if SCR operations have not previously been routinely optimized. The budgets should reflect the latter. EPA's data show the lowest monthly average ozone-season NOx rate from 2009 to 2021 was 0.048 lb/MMBtu, with second and third lowest monthly average rates of 0.057 and 0.062 lb/MMBtu respectively, while the lowest seasonal average ozone-season NOx rate was

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[159] *Compare* Revised CSAPR Update, 86 Fed. Reg. 23054, 23088 (Apr. 30, 2021) (identifying an average third-best rate of 0.08 lb/MMBtu), *with* CSAPR Update, 81 Fed. Reg. 74504, 74543 (Oct. 26, 2016) (identifying an average third-best rate of 0.10 lb/MMBtu).
[160] Mitigation TSD at 8.
[161] *Id.* at 8-9, Fig. B.1.
[162] *Id.* at 10-11, Fig. B.4.
[163] *See* Ranajit Sahu, US Coal Fleet Selective Catalytic Reduction (SCR) Performance Analysis, at 5-15 (Jan. 2022), attached as Ex. RS 1.
[164] Mitigation TSD at 9, EPA-HQ-OAR-2021-0668-0125.
[165] *Id.*

0.060 lb/MMBtu.[166] It is also worth noting that for the analysis of newly retrofitting a unit with SCR, EPA assumes a new state-of-the-art SCR retrofit can achieve a 0.05 lb/MMBtu emissions rate performance on a coal steam unit.[167] All of this information suggests a ceiling rate between 0.065 and 0.071 lb/MMBtu would still be widely achievable (and conservative compared to the lowest seasonal and monthly average rates), and a better approximation of the rate that can be achieved by a well-run and fully operating SCR.

Basing the budgets on past ozone season averages, without correcting them downwards to account for sources' failure to optimize the operation of installed controls, is inconsistent with EPA's own recognition that sources have failed to optimize the operation of installed controls. In justifying enhancements to the trading program, EPA itself recognizes that NOx controls have been underutilized in the past, and the Agency notes in the proposal the tendency for the allowance supply to grow while demand falls, "reducing allowance prices and eroding the consequent incentives for sources to effectively control their emissions." 87 Fed. Reg. at 20,107. The Agency also recognizes that the lack of source- or unit-specific emission reduction requirements has allowed some sources to idle existing controls. *Id.* Therefore, units have often lacked either regulatory requirements or the incentives that would force them to fully optimize operation of their controls. EPA has recognized the fact that previous programs have not resulted in optimization of SCR performance and is therefore proposing to enhance this program. Indeed, if units had previously optimized their control performance, this strategy would not be needed to ensure sufficient incentives to do so. In other words, this level is based on information from EGUs that were almost certainly not operating their controls anywhere close to full optimization, especially for the full ozone season, and EPA cannot enable poor performance from these units based on their historical performance.

As EPA recognizes in the proposal, the nature of the contribution to the tighter 2015 standard "warrants a greater degree of control stringency than the EPA determined to be necessary to eliminate significant contribution of ozone transport in prior CSAPR rulemakings." *Id.* at 20,043. This includes tighter budgets as long as further optimization is possible, as the level of SCR performance EPA considered adequate to eliminate significant contributions under the previous standard may not be adequate to do so for a lower one.

D. EPA must assume full use of SCRs on large coal-fired EGUs beginning in 2023.

We support the proposed timing of optimization of SCRs on large coal-fired EGUs. EPA notes that returning SCRs to service requires, at most, restocking reagent, bringing the system out of protective lay-up, and performing inspections, and that these tasks have frequently been carried out in under seven months.[168] Optimizing currently operational SCRs can be accomplished within a similar timeframe.[169] And hourly unit-level data show improved SCR performance within two months.[170] An examination of those coal-fired EGUs that have recently been operating SCRs—yet not consistently achieving emissions rates reflecting optimized

[166] *Id*.
[167] *Id.* at 24.
[168] *See* Mitigation TSD at 29, EPA-HQ-OAR-2021-0668-0125.
[169] *See id.*
[170] *See id.* at 30.

control—reveals that these units have emitted NOx at a daily rate below 0.075 lb/MMBtu across much of last year's ozone season.[171] For these reasons, EPA's proposal to set budgets in 2023 and future years that reflect emission rates achievable through optimization of already installed SCRs on coal-fired EGUs is well supported by record evidence, and assuming any delayed deployment of this technique beyond the beginning of the 2023 ozone season would contravene the CAA's requirement to eliminate significant contributions to downwind pollution problems as expeditiously as practicable and not later than the attainment deadlines.

E. The budgets must reflect wider deployment of post-combustion controls, as soon as practicable.

As another potential near-term reduction measure, installation of SNCR on coal-fired EGUs smaller than 100 MW and on all circulating fluidized bed coal-fired EGUs must inform budgets beginning in 2024. EPA asks whether it should "decouple" the timing of SCR and SNCR retrofits, to secure 1,000 tons of NOx reductions from SNCR retrofits of smaller coal-fired EGUs in the near term. 87 Fed. Reg. at 20,080. We urge the Agency to do so because it would better reflect what is likely to happen in the real world and not doing so would artificially inflate emission budgets. As EPA notes, although the emissions-reduction potential of SCR is greater than that of SNCR, smaller coal-fired units rarely elect to deploy SCR. *See id.* It is unlikely that allowance prices in later years of the program would provide sufficient incentive to install SCR on these smaller coal-fired units—which will only become less economic to run as other generation resources with lower fuel costs come online. It is therefore preferable and statutorily required to secure the near-term emission reductions from SNCR installations on smaller coal-fired units and begin to reflect those reductions in the budgets in 2024. Furthermore, because EPA likewise does not assume that circulating fluidized bed coal-fired EGUs will install SCR,[172] EPA must factor into the budgets the emission reductions from installations of SNCR on these units in 2024 as well.

Considering post-combustion controls that are available in 2026, we recommend two improvements to the control strategy that both relate to oil- or gas-fired EGUs.

First, we urge EPA to eliminate or narrow the threshold of 150 tons of NOx per ozone season as a prerequisite for assuming installation of SCR on oil- or gas-fired steam EGUs. EPA notes that the majority (76%) of the achievable NOx emissions reductions from oil- and/or gas-fired steam units are from units that historically have emitted greater than 150 tons per ozone season. 87 Fed. Reg. at 20,081. The Agency further observes that, considering only those units that fall below the 150-ton threshold, the weighted average cost-effectiveness is $15,600/ton. *Id.* [173] As an initial matter, we note that EPA's weighted average cost-effectiveness of $7,700/ton for oil- and gas-fired steam units includes historically lower-emitting units, and this cost threshold should be acceptable for all of these EGUs regardless of higher costs for individual units or

[171] *See* Ranajit Sahu, Technical Memorandum Relating to the Analysis of NOx Daily Data from Coal Units Equipped with SCRs in the Proposed FIP States, at 12 (June 2022), attached as Ex. RS 2 [hereinafter, "Sahu Report on Daily NOx Emissions Rates"].
[172] *See* Ozone Transport TSD at 12, EPA-HQ-OAR-2021-0668-0133.
[173] *See also* Mitigation TSD at 27, EPA-HQ-OAR-2021-0668-0125.

subsets of units.[174] Assuming SCR retrofits on all of these units could secure substantial emission reductions: the Agency calculated that installing SCRs on all of these units has the potential to reduce 20,400 tons of NOx per ozone season.[175]

If, however, the Agency remains concerned about the cost-effectiveness of SCR retrofits on oil- and/or gas-fired steam EGUs that have emitted below 150 tons of NOx in recent ozone seasons, then it should consider a narrower exemption. For example, removing EGUs that have partially or entirely fired with oil from this subset of units would lower the subset's weighted average cost-effectiveness to $14,000/ton, while still potentially reducing emissions by 10,500 tons per ozone season (assuming a capacity factor of 26%).[176] Alternatively, removing EGUs with emission-*reduction* potentials in future ozone seasons below 150 tons per ozone season (again assuming a 26% capacity factor) would result in a weighted average cost-effectiveness of $14,300/ton while reducing emissions by 18,800 tons per ozone season. As a final alternative, removing both EGUs that have not exclusively fired with gas and EGUs that have emission-reduction potentials below 150 tons per ozone season would result in a weighted average cost-effectiveness of $12,400/ton while reducing emissions by 9,500 tons per ozone season. We urge the Agency to adopt the approach that reduces the most NOx emissions at the highest cost threshold that it finds acceptable. Again, however, we point out that the overall cost-effectiveness for SCR retrofits on oil- and/or gas-fired steam EGUs is $7,700/ton--well below the cost-effectiveness of installing SCR on large coal-fired EGUs, at $11,000/ton.[177] Thus, EPA should assume that all of these units retrofit with SCRs for purposes of budget-setting, and impose corresponding backstop daily emission limitations as discussed below.

Second, regarding natural gas combined-cycle units (NGCCs), EPA identifies an emissions-reduction potential of 3,100 tons of NOx at 45 units or 4 GW of capacity, with a representative cost-effectiveness of $12,000/ton.[178] This cost-effectiveness is not markedly higher than the similar value for installing SCR on large coal-fired EGUs, and EPA must establish budgets assuming that poorly controlled existing NGCCs also retrofit with SCR.

XI. To ensure that the EGU budgets function to incentivize the intended level of control, EPA must account for the generation shifting that is likely to occur at an abatement cost corresponding to the most stringent selected controls, in both the near-term preset budgets and the dynamic budgets going forward.

We support EPA's proposal to account for generation shifting that is likely to occur under budgets that reflect deployment of the controls at a selected cost threshold. In order to ensure that sources actually install and run the controls that EPA has selected at step 3, EPA must account

[174] EPA suggests that the $7,700/ton cost-effectiveness reflects opportunities at the "segment of the oil/gas steam units" that emitted more than 150 tons of NO_x on average across recent ozone seasons. *See* 87 Fed. Reg. at 20,081; *see also id.* at 20,091. The NO_x Control Retrofit Cost Tool Fleetwide Assessment, however, shows all of the lower-emitting units included with the higher-emitting units in the sheet that yields the $7,700/ton weighted average cost-effectiveness.
[175] *See* EPA, NOx Control Retrofit Cost Tool Fleetwide Assessment Proposed CSAPR 2015 NAAQS, EPA-HQ-OAR-2021-0668-0113 (sheet "SCR_gas_horz (< 150 tons)," column ET).
[176] *See* Mitigation TSD at 27; *See* O&G steam SCR alternatives, attached as Ex. OG 1.
[177] *See* Mitigation TSD at 25, EPA-HQ-OAR-2021-0668-0125.
[178] *See id.* at 33.

for the NOx emissions expected to be reduced when EGUs choose to reduce or shift generation instead of installing and running the selected controls. To do so, EPA has historically modeled changes in generation that occur when EGUs face a NOx price equivalent to the cost of abatement through the use of the selected controls.[179] Were EPA not to adjust the budgets to reflect these emissions reductions anticipated to occur through generation shifting, the price of emission credits would likely fall below EPA's chosen cost-effectiveness threshold, and the budgets would fail to achieve their purpose of incentivizing units to install the selected pollution controls. This result would not be consistent with EPA's approach to quantifying the reductions required from these sources by the Good Neighbor provision—*i.e.*, the reductions that can be achieved through the full deployment of the selected controls. Furthermore, it could lead to an inequitable program in which EGUs that have access to lower-cost opportunities to shift generation forgo installing controls while others must do so (or face high allowance costs).

We disagree with EPA's conclusion, however, that "[e]mission reductions derived from generation shifting will be captured in the dynamic budgets in all cases" and that generation shifting "will be directly incorporated through the inclusion of updated heat input data reflecting observed, post-compliance generation shifting."[180] True, generation-shifting that has already occurred as a response to the NOx price in prior program years will be incorporated into future budgets through the dynamic-budgeting mechanism. Yet, under those reduced budgets, covered EGUs will still face a NOx price reflecting the cost of abatement at the selected level of control. Given increased availability of zero- or lower-emitting resources with lower variable costs, some covered EGUs may continue to find it more cost-effective to shift generation than to install and run the selected controls. As part of its dynamic budgeting process each year, EPA should model that generation shifting and remove allowances representing equivalent emission reductions from the budgets in the upcoming control period. Without accounting for generation shifting in the dynamic-budgeting mechanism, EPA would not satisfy its obligation to ensure that significant contributions to downwind nonattainment and maintenance issues are addressed by eliminating emissions commensurate with full deployment of the selected control strategy.[181]

Full deployment of the selected control strategy is properly modeled through a NOx price that reflects the cost-effectiveness of the most stringent level of control that EPA has selected for covered EGUs. Here, beginning in 2026, that NOx price should be at least $12,000/ton, which reflects SCR retrofits on NGCC units which, as discussed above, EPA must include in the rule.[182] EPA acknowledges that it modeled a NOx price of $10,000/ton, which is $1,000/ton below the cost threshold of $11,000/ton associated with EPA's most stringent selected level of

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[179] *See* Federal Implementation Plans: Interstate Transport of Fine Particulate Matter and Ozone and Correction of SIP Approvals, 76 Fed. Reg. 48,208, 48,279 (Aug. 8, 2011); CSAPR Update, 81 Fed. Reg. 74,504, 74,544 &74,546 (Oct. 26, 2016); Revised CSAPR Update, 86 Fed. Reg. 23054, 23095 (Apr. 30, 2021).
[180] Mitigation TSD at 28, n.51; 87 Fed. Reg. at 20,108.
[181] Excess allowances that result from failing to account for generation-shifting could allow some covered EGUs to garner enough credits to comply with even the enhanced, 3-to-1 ratio when they exceed their backstop daily emission limits. Thus, the backstop limits would not necessarily ensure elimination of significant contributions on a seasonal basis and would not obviate accounting for generation-shifting when setting budgets.
[182] *See also* Mitigation TSD at 33, EPA-HQ-OAR-2021-0668-0125.

control—*i.e.*, retrofitting large coal-fired EGUs with SCR.[183] The Agency asserts, however, that the results would not change appreciably if it modeled the higher NOx price, since the lower price "did not induce significant amounts of generation shifting."[184] Yet the amounts of generation-shifting shown are significant even with the artificially low NOx price, notably in 2026, when two regions are projected to reduce coal generation by over 8% relative to the base case, and by 62% in ERCOT.[185] These results underscore the need to incorporate the full quantity of emission reductions resulting from the NOx price reflecting the most stringent level of selected control for covered EGUs.

Even a higher NOx price that reflects the highest-cost technique in the selected control strategy would not, when imposed in the model, result in the full NOx reductions expected to occur through generation shifting because EPA fails to account for generation shifting across the interconnected grid when doing its state budget-setting modeling. As EPA recognized in the CSAPR Update, "[p]ower generators produce a relatively fungible product, electricity, and they operate <u>within an interconnected electricity grid</u> in which electricity generally cannot be stored in large volumes, so generation and use must be balanced in real time."[186] Generation shifting that occurs in the Integrated Planning Model (and in the real world) will often involve lower- and zero-emitting sources in states other than the state in which the EGU reducing utilization is located because of the interconnected nature of the grid. This is simply the reality of the structure of the grid, and EPA's analysis of generation shifting must reflect it.

Historically, EPA's modeling for budget-setting purposes has restricted a source's opportunities to shift generation to other sources outside the same state not because of any real-world geographic limitations, but to approximate "small amounts" of generation shifting that could occur by the next ozone season.[187] It is not clear why generation shifting, which happens in "real time," *id.*, should be time-constrained given available clean resources on the grid. Nor is it apparent why, if there is a time constraint, a geographic limitation to in-state generation shifting would reflect that constraint. EPA does not explain why it has constrained generation shifting to resources within the same state, other than to note that it is a "proxy for the near-term reductions required in 2023 and 2024." 87 Fed. Reg. at 20,117. And it has already reasonably assumed in its modeling that economic builds of zero- and lower-emitting resources are limited to baseline projected levels in 2023 and 2024.[188] Unless EPA demonstrates that cleaner generation resources are unavailable in the near term, it cannot reasonably limit generation shifting in the model to those generation resources within the same state. Nor can it maintain the arbitrary assumption that the amount of generation shifting available in the near-term is somehow related to state borders. Instead, EPA must evaluate the full measure of generation shifting potential on the grid and incorporate those available reductions into the state budgets.

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[183] *See id.* at 27 n.50.
[184] *Id.*
[185] *See id.* at 28, Fig. G.2.
[186] CSAPR Update, 81 Fed. Reg. 74504, 74544 (Oct. 26, 2016) (emphasis added).
[187] *See id.*
[188] Mitigation TSD at 27, EPA-HQ-OAR-2021-0668-0125 (Feb. 2022); Ozone Transport TSD at 5, EPA-HQ-OAR-2021-0668-0133.

Finally, we note that EPA received comments on the proposed Revised CSAPR Update contending that the Agency lacked authority to incorporate generation shifting into the budget-setting process. *See* 86 Fed. Reg. at 23,096-97. We agree with the Agency's response to these comments in the final Revised CSAPR Update, citing the longstanding practice of accounting for emission reductions that are expected to occur from generation shifting in past cross-state rules (including the rule upheld by the Supreme Court). *See id.* Indeed, it would be irrational for the Agency to ignore this real-world compliance technique that, if unaccounted for, could undermine the control strategy that it has identified as eliminating significant contributions to downwind nonattainment or maintenance issues. We also agree with EPA's observation that section 110 does not limit emission-reduction measures to controls deployed solely at individual sources. *See id.* To the contrary, the provision expressly authorizes the regulation of "any source" and also, more broadly, "any . . . other type of emissions activity within the State." 42 U.S.C. § 7410(a)(2)(D); *see also EME Homer City*, 572 U.S. at 499 (quoting S. Rep. No. 101–228, at 21 (1989), 1990 U.S.C.C.A.N. 3385, 3407). However, we also encourage EPA to make clear that adjusting the emissions budgets in this way accounts for generation shifting that is likely to be undertaken as a compliance measure by sources and that results incidentally from emission limits reflecting source-by-source NOx control techniques.

To ensure seamless functioning of the trading program, we recommend that EPA extend this component of the budget-setting process beyond 2024 and make it severable from the other components. Further, to address the potential for excessive compliance flexibility resulting from unaccounted-for opportunities for generation-shifting, EPA should specify in the final rule that, if this component of budget-setting were to be removed, the modified rule would also eliminate the allowance banks, interstate trading, or both. Those program features would no longer be needed to supply additional allowances to accommodate power-sector variability (up to a state's assurance level) if EGUs within that state could instead obtain surplus allowances from shifting generation.

XII. EPA's proposed EGU dynamic-budget mechanism is well justified and should be improved by accounting for emission reductions from planned retirements and from generation shifting.

We support EPA's proposal to include a mechanism for adjusting state budgets to reflect the most recent data on the state's fleet composition and heat input to their fossil-fuel-fired EGUs. Even absent empirical evidence that EGUs failed to achieve emission rate performance consistent with operation of the pollution controls selected in previous cross-state programs—evidence that is in fact available, *see* 87 Fed. Reg. at 20,108—the statute requires EPA to ensure that the supply of allowances eliminates each state's significant contribution by limiting emissions to levels that reflect the deployment of selected controls at all covered EGUs that are still operating. Omitting EPA's proposed dynamic-budgeting feature would not only result in a rule that fails to eliminate significant contributions from EGUs going forward, but it would also be arbitrary—as unfounded as a hypothetical rule that lifts unit-specific emissions rate limits from sources in an industrial sector when that sector shrinks, even though the state remains linked to a downwind nonattainment or maintenance issue above the significance threshold.

The additional trading-program enhancements that EPA has proposed—which are also designed to ensure that EGUs achieve emission rates consistent with the selected controls that would eliminate significant contributions to downwind nonattainment—do not obviate dynamic budgeting. To take one example, while EPA's proposal to recalibrate the banks is helpful, it does not reduce the excess allowances in unadjusted budgets: the allowance bank during each control period might not even be needed given an inflated budget. *See* 87 Fed. Reg. at 20,109. Further, resizing the bank to a percentage of an inflated budget would only compound the problem of excess allowances in that year. As a second example, the backstop daily emissions limits that reflect operation of post-combustion controls on some covered EGUs—operationalized through a 3-to-1 allowance surrender ratio—would not provide any incentive to EGUs that are not assumed to install post-combustion controls to reduce their NOx emissions; for those EGUs that are assumed to install post-combustion controls, the backstop limits would send only a weak compliance signal given the overabundance of allowances. *See id.* at 20,121.

In general, we endorse the mechanism that EPA has proposed to implement dynamic budgeting for the states' fossil-fuel-fired fleets. Although it would be preferable to implement an even more responsive dynamic-budgeting mechanism that takes into account unplanned additions and retirements of EGUs in the year leading up to the relevant control period, this accelerated timing could disrupt the smooth functioning of the trading program by injecting uncertainty as to the number of allowances available in the upcoming control period (and therefore the assurance level that the state's fleet must stay below, while providing reliable power supply). We therefore support a dynamic-budgeting mechanism that relies on heat-input data from the control period two years before the period to which the budget will apply. *See* 87 Fed. Reg. at 20,108.

On the other hand, EPA should account for all retirements (and additions) that are planned to occur before or within the control period for which it is computing a budget, instead of relying solely on the heat-input data of the fleet as it existed two control periods prior. For example, when calculating the budget for 2025, EPA should apply the selected control strategy to the fleet as it operated in 2023 but remove units that will retire before or during the 2025 control period. This approach would lead to a more accurate representation of the fleet in the future year in question while preserving certainty as to the number of allowances in the budget for that year.

Furthermore, for the reasons discussed above, we urge EPA to remove allowances from the adjusted budget to reflect future generation shifting as a compliance measure at the abatement cost reflecting the full range of selected controls.[189] It is simply not the case that generation shifting that has already occurred under previous years' budgets would remove this compliance technique from the remaining fleet's compliance toolbox. Accordingly, EPA must continue to model any generation shifting that occurs in future years up to the NOx price reflecting the highest cost-per-ton of the controls shaping the budget—especially considering that the availability of low-cost zero-emitting renewable energy will likely increase over the long term.

This modeling could occur before EPA publishes the preliminary state emissions budgets for the following year on March 1. *See* 87 Fed. Reg. at 20,117. Including modeling in future rounds of budget-setting (*i.e.*, beginning in 2023 to establish the budget for 2025) is appropriate because EPA has proposed to provide a 30-day window in which stakeholders may object to the

[189] *Contra* 87 Fed. Reg. at 20,108 & n.251; EPA, Ozone Transport TSD at 28, n.34, EPA-HQ-OAR-2021-0668-0133.

computation. *See id.* Even if EPA were to decide not to incorporate modeling of generation shifting into every computation of dynamic budgets going forward, we would urge the Agency at least to account for generation shifting in establishing the budget for 2026. In that year, there is a greater risk that units that currently lack post-combustion controls will forgo installing and running those controls, if less-expensive generation shifting is available as a compliance option. In subsequent years, the combined effects of the allowance price and the backstop daily emissions limits will likely have already led to retrofits of existing units with post-combustion controls.

EPA need not initiate a new rulemaking each time it implements its proposed dynamic-budgeting mechanism and updates states' budgets. As the Agency notes:

> The emissions budget computations for all years would reflect only the specific emissions control strategies used to determine states' good neighbor obligations as determined in this rulemaking, along with fixed historical emissions rates for units that are not assumed to implement additional control strategies, thereby ensuring that the annual updates would eliminate emissions as determined to be required under the good neighbor provision. The stringency of the emissions budgets would simply reflect the stringency of the emissions control strategies determined in the Step 3 multifactor analysis and would do so more consistently over time than EPA's previous approach of computing emissions budgets for all future control periods at the time of the rulemaking.

87 Fed. Reg. at 20,109. Thus, EPA's determination of the control strategy that eliminates significant contributions would not change with future budget computations, and there is no need to reopen for notice and comment the continued implementation of this policy.[190] Accordingly, EPA should carry out the dynamic-budgeting computations through a ministerial process—as with other routine implementation tasks, such as annually allocating allowances to the units that remain in or have recently entered the program. *See id.* at 20,115.

Nor does the statute contemplate that EPA or the states will continually check for overcontrol once they are implementing a full remedy to their significant contributions to downwind nonattainment or maintenance issues—including implementation that involves a dynamic-budgeting mechanism. Section 110 requires states to provide for SIP revisions "as may be necessary to take account of revisions of such national primary or secondary ambient air quality standard or the availability of improved or more expeditious methods of attaining such standard" and "whenever the Administrator finds on the basis of information available to the Administrator that the plan is substantially inadequate to attain the national ambient air quality standard which it implements or to otherwise comply with any additional requirements established under this Act." 42 U.S.C. § 7410(a)(2)(H). This subsection, which sets forth the required elements of a SIP, does not mention provisions that would *relax* any of the SIP's requirements. On the contrary, section 110(i) generally forbids modification of the requirements of a SIP. *Id.* § 7410(i).The plain statutory objective is to address attainment issues—including by eliminating significant contributions to downwind nonattainment or maintenance problems—

[190] By way of analogy, EPA would have no reason to reopen a hypothetical rule that imposed unit-specific emissions rates simply because the universe of sources had expanded or contracted, thereby altering overall emissions expressed in tons.

through a one-time plan; the CAA does not obligate or even typically authorize a state or EPA to weaken the provisions of a plan once air quality has improved.[191]

This conclusion is reinforced by the statute's anti-backsliding provision, which requires EPA to continue to require controls for those areas that effectively move into attainment when a NAAQS is relaxed. *See* 42 U.S.C. § 7502(e). Under this provision, even if controls are no longer necessary to attain the revised NAAQS, the progress in air quality that those controls were designed to achieve must be retained—even where the controls have not yet taken effect. *See, e.g.*, *S. Coast Air Quality Mgmt. Dist. v. EPA*, 472 F.3d 882, 904 (D.C. Cir. 2006) (rejecting EPA's contention that contingency plans that had not yet been triggered under a previous NAAQS were not required under the anti-backsliding provision). By analogy, in the hypothetical situation in which a state is no longer linked to a receptor with nonattainment or maintenance issues under the 2015 ozone NAAQS, that state should remain subject to the requirements of the proposed Good Neighbor Plan, including the dynamic budgeting mechanism. This outcome is all the more imperative where EPA has not revised its assessment of the level of pollution that is harmful to health, but rather the state has simply addressed the threshold problem that led to its initial inclusion in the program.

Indeed, the possibility of overcontrol is entirely independent of the dynamic budget mechanism: it has always been possible that a state could become delinked from nonattainment and maintenance monitors or could move below the 1% contribution threshold, and the ongoing budgets in prior CSAPRs would still have imposed obligations on the state's EGUs. A feature that more closely ties a state's budget to the selected levels of control for its operating fleet of EGUs simply holds the stringency of the control strategy constant. Although this feature could prove more effective in reducing emissions over time and thus resolving downwind nonattainment and maintenance issues than a static budget would, the ongoing effectiveness of the strategy (similar to emissions rate limitations that apply continuously and indefinitely) does not require a more exhaustive analysis of the potential for overcontrol, or repeated checking for overcontrol when setting future budgets. Put differently, the fact that the static budgets under previous iterations of CSAPR proved ineffective and thus less likely to help delink upwind states does not eliminate the possibility that those rules could also have overcontrolled, and yet EPA has never attempted to check all plausible emissions scenarios or current circumstances for overcontrol.

Nevertheless, it would be prudent for EPA to examine the potential for adjusted budgets to incentivize ongoing emission reductions at EGUs that remain in operation even when a state is no longer linked above the 1% threshold to a downwind receptor struggling with attainment or maintenance. To do so, EPA could model several scenarios in which retirements of fossil-fired EGUs are assumed to be higher than expected, and assess the impacts of these retirements on power sector operations and emissions under the dynamic budgets, downwind air quality, and

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[191] As with the dynamic-budgeting process proposed here, however, the effect of those provisions may change over time as the universe of sources within the state expands and contracts. For example, plan provisions implementing the statutory prohibition on contributions to a violation of Prevention of Significant Deterioration (PSD) increments may apply with greater force to new sources once much of the increment has already been consumed by other sources. *See Sierra Club v. EPA*, 705 F.3d 458, 461 (D.C. Cir. 2013) (describing EPA's PSD regulations for PM2.5).

contributions from upwind states. Running these sensitivities could assure the Agency and stakeholders that the dynamic budgets are not likely to prompt the remaining EGUs to undertake control measures that would arguably not be needed to eliminate each state's significant contribution to downwind pollution problems.

Finally, regardless of the precise approach that EPA ultimately selects for implementing the dynamic budgets, we recommend that the agency finalize the "illustrative state emissions budgets" for the 2025 and 2026 control periods, 87 Fed. Reg. at 20,117-18, as default budgets that would take effect in the event that EPA, for any reason, did not complete the ministerial dynamic-budget process for those years on the anticipated schedule. EPA has confirmed that these illustrative budgets, reflecting the selected control strategy for 2025 and 2026 as applied to the most recent historical heat-input data, likely does not result in overcontrol for any state covered by the EGU program, with the possible exceptions of Arkansas, Mississippi and Wyoming—all of which can and should be addressed in the final rule based on these comments. *See id.* at 20,098-99. Establishing these presumptive or default budgets now would provide sources in the EGU trading program—as well as beneficiaries of the Good Neighbor Rule—greater regulatory certainty by setting binding overall limits on EGUs' emissions in 2025 and 2026 that would take effect notwithstanding any delays or difficulties that EPA may encounter in carrying out the ministerial dynamic-budgeting process for these years.

XIII. EPA's proposed EGU bank recalibrations are well justified and should be improved by basing banks on the following year's budget.

EPA's proposal to recalibrate the allowance banks following each control period to ensure a strong, continuous incentive to deploy the selected control strategy comports with statutory requirements to eliminate significant contributions to downwind nonattainment and maintenance issues. *See id.* at 20,109. From a policy perspective, it appropriately balances the imperative to supply a consistent price signal to deploy controls with the interest in honoring early reductions of NOx emissions. We therefore support this mechanism as proposed. One potential improvement that we encourage EPA to adopt, however, would be to recalibrate the banks to a level equivalent to 10.5% of the *following* year's budgets, rather than the current year's budgets. For instance, EPA could recalibrate allowances banked in 2027 to 10.5% of the budgets in 2029, rather than 10.5% of the budgets in 2028. Although the banked allowances are available for use in the current year (2028, in this example), retirements in the previous year (2027, *e.g.*) that are reflected in the following year's (2029, *e.g.*) dynamic budget could render the current year's (2028, *e.g.*) budget excessively large. By recalibrating the banks to a specified percentage of the following year's (2029, *e.g.*) budgets, EPA could at least partially address the lag inherent in the dynamic-budgeting mechanism, which must establish budgets well in advance of the control period in question. *See id.* at 20,109, n.253. This approach would also be consistent with EPA's proposal to base the initial bank on the controls that will become available in 2024, rather than the controls assumed to be available in 2023. *See id.* at 20,136 & n.297.

XIV. Backstop daily emissions limits are required to ensure elimination of significant contributions within a timeframe relevant to the ozone NAAQS and must be strengthened and extended to all EGUs assumed to install and operate post-combustion controls.

We support EPA's proposal to impose backstop daily emissions limits on EGUs subject to the trading program. The proposed backstop provides not only "additional assurance that significant contribution is eliminated on a daily basis," 87 Fed. Reg. at 20,110, but indeed the *sole* impetus to run the controls that EPA has determined are needed to eliminate significant contributions within a daily timeframe. Daily emission reductions are critical to attaining the ozone NAAQS and achieving health-protective levels of air quality: aside from the form in which attainment is measured—and thus the benchmark number of high-quality air days that states must meet to reach attainment, *see id.* at 20,110, n.254—the ozone NAAQS itself is expressed with an 8-hour averaging time designed to protect public health. Thus, eliminating significant contributions to exceedances of the NAAQS within even this shorter timeframe is arguably required by the statute, and eliminating significant contributions on a daily basis is all the more imperative under the CAA. This proposed program feature is therefore essential to fulfilling statutory requirements and is not merely an "additional assurance" that the trading program's incentives to run the selected controls throughout the ozone season will prove effective, or a "prophylactic measure" to address hypothetical failures to implement the selected control strategy. *Id.* at 20,110.

Further, we agree with EPA that alleviating impacts on overburdened and environmental justice communities provides an additional rationale for adopting this program feature. *Id.* The backstop daily emissions limit would implement Congress's directive that the NAAQS protect sensitive individuals, including those individuals who are more likely to be chronically exposed to pollution at or near the level of the standard. *See Coal. of Battery Recyclers Ass'n v. EPA*, 604 F.3d 613, 618 (D.C. Cir. 2010). Sensitivity to ozone pollution may result not only from intrinsic vulnerabilities (*e.g.*, existing health conditions), but also from many other stressors (*e.g.*, other chemical exposures, discrimination, poverty, poor housing quality) and extrinsic vulnerabilities (*e.g.*, low socioeconomic status, lack of access to health care).[192]

EPA's proposed approach of implementing the backstop emissions limit through enhanced allowance-surrender ratios is reasonable. *See* 87 Fed. Reg. at 20,110. The Agency must balance the need to obtain consistent emission reductions from the set of large EGUs assumed to install and operate selected controls with the legitimate interest in avoiding unintended emissions consequences from a hard limit on their daily emissions. For instance, if EPA were to impose rigid daily emissions limits on large EGUs reflecting the controls that the Agency has found to be available, and on some days those EGUs could not meet their limits, then they could shift generation to higher-emitting units that are not assumed to install controls and might not be subject to daily limits under the program reflecting the selected control stringency needed to eliminate significant contribution.[193] Such an outcome could not only exacerbate overall ozone

[192] *Cf.* Gina M. Solomon *et al.*, *Cumulative Environmental Impacts: Science and Policy to Protect Communities*, 37 Annual Rev. Pub. Health 83, 86, tbl. 1 (2016), https://pubmed.ncbi.nlm.nih.gov/26735429/, attached as Ex. GS 1.
[193] Mitigation TSD at 34-38, EPA-HQ-OAR-2021-0668-0125.

pollution, but also intensify impacts on environmental justice communities. Further, to ensure the efficacy of this approach, we suggest that EPA include provisions in the final rule that would automatically increase the allowance-surrender ratio were any of the other proposed program improvements ultimately not included, as those improvements (*e.g.*, dynamic budgeting, bank recalibration) are also designed to ensure sufficient incentive to achieve emissions rates consistent with the selected control strategy.

The flexibility of the backstop daily emissions limit (allowing compliance through an enhanced allowance-surrender ratio) facilitates stronger, expanded requirements that are needed to eliminate significant contributions on a daily basis. For the reasons discussed below, in the final rule, EPA must:

A. set lower backstop daily emissions limits for coal-fired EGUs;
B. extend backstop daily emissions limits to all EGUs assumed to install and operate post-combustion controls, and to peaking units;
C. impose backstop daily emissions limits in 2023 (instead of 2024) for units that have already installed post-combustion controls and in 2026 (instead of 2027) for units that have not yet installed post-combustion controls; and
D. forgo any option to avoid a backstop daily emissions limit by committing to retire at a later date.

Each of these improvements is needed to eliminate significant contributions of NOx from covered EGUs through the use of the selected controls as expeditiously as practicable and is therefore required by the CAA.

A. Lower backstop daily emissions limit for large coal-fired EGUs

As an initial matter, we agree with the Agency that a daily emissions limit (as opposed to, *e.g.*, hourly or monthly) will apply in the appropriate timeframe to ensure that EGUs eliminate their significant contributions to nonattainment and maintenance issues. *See* 87 Fed. Reg. at 20,121-22.Although the ozone NAAQS is expressed with an 8-hour averaging time, EPA's analysis of hourly emissions rates shows that units are more likely to deactivate their SCRs in periods of low operation—typically, outside the high-demand hours of 12 pm to 6 pm, with the 12 pm to 6 pm period also being the period in which conditions are most conducive to ozone formation.[194] Thus, daily limits that ensure that post-combustion controls are operated on all days of the ozone season would also be expected to prompt EGUs to run their controls during all periods of peak ozone formation, and a shorter-term backstop emissions limit is not needed to address nonattainment or maintenance issues.

Yet EPA's proposed backstop daily emissions limit for large coal-fired EGUs is not sufficiently stringent to ensure that SCRs are operated on all days of the ozone season. EPA converts a 30-day emissions rate to a daily emissions rate by multiplying the 30-day rate (as a proxy for the targeted seasonal NOx rate) by the ratio of the 99th percentile of daily rates over the 99th percentile of 30-day rates.[195] Under this approach, EPA's daily emissions limit is too high

[194] *See* EPA, Discussion of Short-term Emission Limits at 2, EPA-HQ-OAR-2021-0668-0124 (Feb. 2022); *see also* 87 Fed. Reg. at 20, 111, n.257.
[195] *See* Ozone Transport TSD at 65, n.57, EPA-HQ-OAR-2021-0668-0133; 87 Fed. Reg. at 20,122.

because the targeted seasonal NOx rate should be lower for both optimized SCRs and newly installed SCRs: independent analysis of monthly NOx rates in recent years has shown that even units operating at low capacity factors and running older SCRs have frequently been able to achieve NOx emission rates below 0.075 lb/MMBtu[196], less than EPA's seasonal rate of 0.08 lb/MMBtu.[197] And, for purposes of budget-setting, EPA assumes that newly installed SCRs can achieve seasonal NOx emissions rates of 0.05 lb/MMBtu on large coal-fired units.[198] Accordingly, the daily emissions limit for large coal-fired units that are optimizing their existing SCRs must be lower than the proposed level of 0.14 lb/MMBtu, and for large coal-fired units that are installing SCRs by the 2026 ozone season, the daily emissions limit must be well below 0.14 lb/MMBtu, applying EPA's proposed methodology.

As a check on the achievability of lower daily limits for large coal-fired EGUs, EPA's observations demonstrate that a daily NOx emissions limit of 0.12 lb/MMBtu would not result in significantly more days on which well-controlled units would exceed the daily limit. For those units with a seasonal NOx rate of 0.075 lb/MMBtu or below, the fraction of operating days at rates greater than the limit increases negligibly between an assumed daily limit of 0.14 lb/MMBtu and 0.12 lb/MMBtu.[199] And, for those units with a seasonal NOx rate of 0.05 lb/MMBtu or below, the fraction of operating days at rates greater than the limit remains essentially the same between an assumed daily limit of 0.14 lb/MMBtu and 0.12 lb/MMBtu.[200]. This analysis supports a backstop daily emissions limit of 0.12 lb/MMBtu or below for large coal-fired EGUs with SCRs (assuming a seasonal NOx emissions rate of 0.075 lb/MMBtu), and likely well below this rate for large coal-fired EGUs that will need to install SCRs to eliminate significant contributions (assuming a seasonal NOx emissions rate of 0.05 lb/MMBtu).

Nonetheless, we urge EPA to consider setting backstop daily emissions limits that reflect the seasonal NOx emissions rates assumed for each type of covered EGU at the selected level of control, rather than converting those rates to values that are "comparably stringent" to the targeted seasonal NOx emissions rates. To perform this conversion, EPA applies the methodology that it previously used to translate a 1-hour SO2 emissions rate designed to protect the NAAQS (*i.e.*, the "critical emission value") to a 30-day SO2 emissions rate.[201].The Agency acknowledges that it deemed this methodology acceptable because it is unlikely that the hours in which sources exceed the critical emission value for SO2 would coincide with meteorological conditions conducive to a violation of the 1-hour SO2 NAAQS.[202] Here, in contrast, there are known exceedances of the ozone NAAQS that must be addressed through elimination of upwind states' significant contributions. Therefore, the objective of the backstop daily emissions limit is to ensure that the selected control strategy is implemented during every time period relevant to the 8-hour averaging time of the NAAQS—*i.e.*, every day. In this context, it does not make sense to convert the seasonal emission rates associated with the selected controls to "comparably

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[196] *See* Ranajit Sahu, US Coal Fleet Selective Catalytic Reduction (SCR) Performance Analysis, at 5-15 (Jan. 2022), Ex. RS 1.
[197] Ozone Transport TSD at 65, EPA-HQ-OAR-2021-0668-0133.
[198] *Id.* at tbl. B.1.
[199] *Id.* at 61, fig. D-1.
[200] *Id.*
[201] *Id.* at 62-66.
[202] *Id.* at 62.

stringent" daily values that, if applied in lieu of the longer-term requirements, would most likely produce the same environmental outcome. Requiring, on a daily basis, "approximately the same control strategy as demonstrated with longer-term emission rate averages,"[203] does not satisfy the statutory command to eliminate significant contribution. Instead, EPA must ensure that the selected controls are consistently operated every day by imposing backstop daily emissions limits that reflect the rates associated with good operation of these controls (*i.e.*, ≤ 0.075 lb/MMBtu for large coal-fired EGUs that already have SCRs installed, and 0.05 lb/MMBtu for large coal-fired EGUs that will need to install SCRs).

Given the flexibilities of the trading program and the design of the backstop daily emissions limit, a daily limit of 0.075 lb/MMBtu would be achievable by large coal-fired units that are currently equipped with SCR. Analysis of daily NOx emissions rates at these units in the 2021 ozone season shows that those units that were properly operating their SCRs and therefore achieving seasonal rates at or below 0.075 lb/MMBtu also achieved a daily rate at the same level, with rare exceptions leading to only 1,471 excess tons of emissions from these units that would require owners or operators to surrender an additional two allowances per ton.[204] Seven SCR-equipped units had no emissions in excess of a daily rate of 0.075 lb/MMBtu, and 45 units had fewer than 5 tons of excess emissions across the ozone season.[205] In fact, the bulk (90%) of the excess emissions above a daily rate of 0.075 lb/MMBtu in 2021 are attributable to only 47 units and 50% of excess emissions are attributable to 7 units, which deserve closer attention from owners and operators to ensure that their SCR systems are running optimally.[206] Further, among SCR-equipped coal units that had the greatest amounts of excess emissions, on days when the units did not operate a full 24 hours—and therefore may have had higher NOx emissions rates because of decreased effectiveness of SCR systems at lower temperatures—excess emissions above a daily rate of 0.075 lb/MMBtu throughout the ozone season only amounted to 42 or fewer tons at each unit, because on these days units also typically had lower heat input.[207] Together, these findings indicate that a backstop daily emissions limit of 0.075 lb/MMBtu would be widely achievable and readily complied with by all units by properly running SCRs and purchasing additional allowances to cover any remaining excess emissions.

B. Extend backstop daily emissions limits to all EGUs assumed to install and operate post-combustion controls, and to peaking units

As discussed above, assurances that covered EGUs are installing and operating the selected controls within a timeframe relevant to the ozone NAAQS—*i.e.*, every day—are essential to fulfilling the statutory requirement to eliminate significant contributions to downwind nonattainment and maintenance issues. EPA anticipates that failure to run SCR controls could become more prevalent in the later years of the proposed program and notes that certain coal-fired EGUs have not been operating their SCR controls throughout recent ozone seasons. *See* 87 Fed. Reg. at 20,110-11. Yet backstop daily emissions limits need not be premised on either an expectation that allowance prices will prove to be an insufficient incentive

[203] *Id.* at 63.
[204] *See* Sahu Report on Daily NOx Emissions Rates at 9.
[205] *Id.* at 6-10 & Tbl. 2.
[206] *See id.*
[207] *See id.* at 11-12, Tbl. 4.

to run all selected controls on all types of covered EGUs every day, or empirical evidence that sources are idling controls. On the contrary, a daily limit is needed on all units that EPA assumes will reduce emissions rates through post-combustion controls (*i.e.*, the controls that may be turned off day-to-day) in setting the seasonal budgets, in order to ensure elimination of significant contributions within the relevant timeframe of the NAAQS as well.

Thus, in addition to the lower backstop daily emission limits on large coal-fired EGUs discussed above, EPA must adopt daily backstop emission limits for other covered EGUs. The full set of required backstop daily NOx emission limits must include the following:

- Existing EGUs
  - 2023
    - 0.075 lb/MMBtu or below for all coal-fired steam EGUs with SCR
    - 0.03 lb/MMBtu for all oil- or gas-fired steam EGUs with SCR
    - 0.03 lb/MMBtu for all combustion turbines with SCR
    - 0.012 lb/MMBtu for NGCCs with SCR
    - 25% below previously reported rates for all EGUs with SNCR
  - 2024-2025
    - All of the above
    - 25% below previously reported rates for smaller (< 100 MW) coal-fired steam EGUs (not circulating fluidized bed) previously without SNCR or SCR
    - 50% below previously reported rates for circulating fluidized bed coal-fired steam EGUs previously without SNCR or SCR
  - 2026 and beyond
    - All of the above
    - 0.05 lb/MMBtu for large (≥ 100 MW) coal-fired steam EGUs previously without SCR
    - 0.03 lb/MMBtu for large (≥ 100 MW) oil- or gas-fired steam EGUs previously without SCR
    - 0.012 lb/MMBtu for NGCCs previously without SCR

- New EGUs
  - Any year
    - 0.05 lb/MMBtu for all coal-fired steam EGUs
    - 0.03 lb/MMBtu for all oil- or gas-fired steam EGUs
    - 0.03 lb/MMBtu for all combustion turbines
    - 0.012 lb/MMBtu for all NGCCs
    - 0.05 lb/MMBtu for all other fossil-fuel-fired EGUs

These daily backstop emission limits are consistent with the seasonal NOx emission limits that EPA assumes when establishing the budgets, with two exceptions: a lower emissions rate associated with optimizing SCR on coal-fired steam EGUs, and a rate associated with retrofitting NGCCs with SCR at a cost per ton ($12,000/ton) comparable to the cost per ton of retrofitting large coal-fired EGUs with SCR.[208] For the reasons discussed above, it would be inappropriate to convert these seasonal emission rates to higher daily values in circumstances where EPA must eliminate significant contributions to ongoing NAAQS violations by ensuring that the selected control strategies are implemented every day. If, however, EPA were to adhere to its approach in setting a comparably stringent limit to the 1-hour SO2 limit for purposes of protecting the SO2 NAAQS, then it should apply that methodology to each of the seasonal NOx rates noted above and impose the resulting daily backstop emission limits on the corresponding set of EGUs.

EPA's proffered rationale for exempting gas-fired steam EGUs that are assumed to install post-combustion controls for purposes of budget-setting from a backstop daily emissions limit does not grapple with the statutory requirement to ensure that these sources eliminate their significant contributions on a daily basis. The Agency posits that, because it does not assume universal installation of SCRs at gas-fired steam EGUs for purposes of budget-setting, owners and operators should have the flexibility to choose the units on which they retrofit controls. *See* 87 Fed. Reg. at 20,111. But providing flexibility to assign emissions controls to units of various sizes is not consistent with the CAA's requirement to eliminate significant contributions on every timescale relevant to the NAAQS; if EPA has assumed deployment of controls at a certain class of EGUs for purposes of seasonal budget-setting, then it must ensure that those controls are operated at those units on a daily basis as well. The fact that large coal-fired EGUs emit NOx at higher rates than other EGUs, *id.* at 20,111, is not a sound basis for excluding those other EGUs from backstop daily limits, given that those other EGUs emit NOx at high enough rates to justify installation of post-combustion controls.

In addition, EPA must impose daily emissions limits on "peaking" units (*i.e.*, those units that have operated at capacity factors of 15% or less across recent ozone seasons).[209] We accept that combustion controls, estimated to cost $24,000/ ton, and post-combustion controls, estimated to cost $115,000/ton,[210] are not as cost-effective as other techniques that are needed to eliminate significant contributions on a seasonal basis, but EPA must still secure daily reductions needed to eliminate significant contributions to nonattainment on high-ozone days. The Agency acknowledges that, on high-electricity-demand days in 2019, combustion turbines contributed upwards of 20% of total peak-hour NOx emissions. To address these significant contributions to downwind nonattainment, EPA must establish daily emission rate limits on units with low seasonal capacity factors, as both New York and New Jersey have already done.[211] The fact that these two upwind states have already taken steps to reduce daily emissions from these units does not absolve EPA from its responsibility to eliminate all such significant contributions to downwind nonattainment. On the contrary, these examples provide a clear pathway toward fulfilling EPA's statutory obligation.

[208] Ozone Transport TSD at 11-12, tbl. B-1, EPA-HQ-OAR-2021-0668-0133; *id.* at 30; NOx Control Retrofit Cost Tool Fleetwide Assessment Proposed CSAPR 2015 NAAQS, EPA-HQ-OAR-2021-0668-0113 (Feb. 2022) (tab "CC SCR Retro," showing NO_x rate at NGCCs with SCR retrofits of 0.01 lb/MMBtu).
[209] *See* Mitigation TSD at 34, EPA-HQ-OAR-2021-0668-0125.
[210] *Id.*
[211] *See id.* at 37.

C. Impose backstop daily emissions limits in 2023 for units that have already installed post-combustion controls and in 2026 for units that have not yet installed post-combustion controls

EPA must expedite the proposed imposition of the daily emission limits. EPA has concluded that the emission reductions resulting from the selected controls strategies for EGUs can be obtained in 2023 and 2026. 87 Fed. Reg. at 20,000–103. Yet EPA defers imposing the backstop daily emission limits to 2024 and 2027, respectively, because EPA claims that doing so "achieves the necessary environmental performance as soon as possible while accommodating any heterogeneity in unit-level implementation schedules regarding daily operation of optimized SCRs" and "achieves the necessary environmental performance as soon as possible while accommodating any heterogeneity in unit-level implementation schedules regarding installation of new SCR." *Id.* at 20,100, 20,103. However, because the daily emission limits are required to ensure elimination of significant contributions to nonattainment and maintenance issues within a timeframe relevant to the ozone NAAQS, the CAA requires those reductions as expeditiously as practicable, and no later than the attainment deadlines in downwind states. *See* 87 Fed. Reg. at 20,057; *see also* 42 U.S.C. § 7511(a)(1); *Wisconsin v. EPA*, 938 F.3d 303, 317 (D.C. Cir. 2019).

EPA's rationale for the delay to 2024 and 2027 misconceives the "necessary environmental performance" under section 110.87 Fed. Reg at 20,100, 20,103. For the reasons discussed above, ensuring that EGUs operate the selected controls on a daily basis is critical to eliminating significant contributions to downwind nonattainment and maintenance issues within a NAAQS-relevant timeframe. Indeed, EPA itself recognizes that the daily limits are needed to "ensure the emissions control strategy selected at Step 3 is indeed implemented at Step 4." *Id.* at 20,110. Failing to apply the backstop daily emission limits in 2023 and 2026, when the selected controls are available, would be tantamount to allowing sources to average emissions over even longer windows, perhaps by borrowing emissions allowances from future control periods. Such borrowing clearly would not achieve the "necessary environmental performance" because it would not eliminate significant contributions to downwind nonattainment and maintenance issues "as expeditiously as practicable," even if it eventually results in the same overall NOx reductions. *Id*. at 20,100–103. Likewise, allowing EGUs to defer installing and operating the selected controls on a daily basis, simply because the budgets in 2023 and 2026 would reflect operation of those controls over those ozone seasons, falls short of eliminating significant contributions within all NAAQS-relevant timeframes as expeditiously as practicable and in time to assist downwind states in attaining the NAAQS by the statutory deadlines.

Nor is there any technical basis for concluding that emission reductions from seasonal use of the selected controls are "practicable" to obtain, whereas emission reductions under daily emission limits are not. Regarding the reduction opportunities available in 2023, EPA asserts that EGUs may need a "preparatory interval to focus attention on improving not only the average performance of their SCR controls but also the day-to-day consistency of performance." *Id.* at 20,111. An analysis of EGUs that were properly running their SCRs across the ozone season, however, demonstrates that those EGUs already consistently achieve daily rates below a limit of 0.075 lb/MMBtu, with limited exceptions and relatively few excess tons emitted above this daily rate.[212] EPA also notes that some EGUs with SCRs that share a stack with EGUs without SCRs

[212] *See* Sahu Report on Daily NOx Emissions Rates at 9 & Tbl. 2.

could need to install unit-specific monitors to show compliance with the daily limit. 87 Fed. Reg. at 20,111 & n.258. Installing unit-specific monitors downstream of those EGUs already equipped with SCRs before the daily limit would take effect in 2023, however, is also feasible.[213] If those few EGUs equipped with SCRs that share a stack with a unit not equipped with SCR demonstrate that this timing is not workable, then EPA could instead impose requirements for parametric monitoring to ensure that the SCRs are operating on all days during the ozone season.

Regarding the reduction opportunities available in 2026, EPA proposes to provide a "window for plant personnel to gain experience operating any new SCR controls." 87 Fed. Reg. at 20,112. Yet EGU operators should be familiar with operating similar controls and with the design specifications of the newly installed and tested SCRs, rendering any such window unneeded.[214] A second proposed rationale for deferring the backstop daily emissions limit to 2027 is that some EGUs might not complete SCR installation before 2026. As discussed in greater detail above, however, EPA's analysis and modeling projections indicate that it is feasible to install and begin operating SCRs nationwide within 36 months. For all these reasons, it is fully practicable to obtain emission reductions on a daily basis from the selected controls in 2023 and 2026, and EPA must impose the backstop daily emission limits reflecting the selected controls in these years.

D. Allowing EGUs to avoid a backstop daily emissions limit by committing to retire at a later date would be unlawful and unwarranted

EPA requests comment on "deferring the application of the backstop daily rate for large coal EGUs that submit written attestation to the EPA that they make an enforceable commitment to retire by no later than the end of calendar year 2028." 87 Fed. Reg. at 20,122. The proffered rationale for this option is that SCR retrofits "in practice may be less environmentally efficient compared to imminent retirement that would potentially yield lower cumulative emissions of NOx and multiple other pollutants over time." *Id.* EPA observes that this approach could "facilitate a potentially economic and environmentally superior unit-level compliance response across these programs that nonetheless maintains the NOx reductions required by the state budgets from 2026 forward in this proposed rule." *Id.*

It would be unlawful and arbitrary for EPA to allow EGUs to evade the daily backstop emission limits by electing to retire in 2028. For the reasons identified above, maintaining the seasonal NOx reductions under state budgets that reflect the application of post-combustion controls does not suffice to eliminate upwind states' significant contributions to downwind violations of the NAAQS within all relevant timeframes. Rather, EPA's rule must ensure that sources deploy the selected controls every day of the ozone season to secure the reductions needed to enable home states to meet the 8-hour NAAQS without significant contributions from upwind states. Moreover, EPA cannot defer those reductions past the time at which they become practicable to achieve—here, in 2026 at the latest, and in 2024 or 2025 for units assumed to install SNCR. Certainly EPA cannot postpone the required reductions beyond summer of 2026, the next relevant ozone season for purposes of attainment deadlines. *See* 87 Fed. Reg. at 20,057; *id.* at 20,062 (noting that summer of 2026 will be the last full ozone season with data that downwind states could use to demonstrate attainment by the 2027 deadline); *see also* 42 U.S.C. §

[213] *See id.* at 12.
[214] *See id.* at 12-13.

7511(a)(1); *Wisconsin v. EPA*, 938 F.3d 303, 317 (D.C. Cir. 2019). Thus, regardless of EPA's predictions about investments in pollution controls that could extend the lives of coal-fired power plants (including the full suite of controls and remedial measures needed to comply with the other cited regulations), the CAA requires EPA to secure full elimination of significant contributions to downwind ozone nonattainment and maintenance issues on a daily basis no later than 2026, and in some instances sooner.

Even if this approach were permissible, we have serious concerns about the non-binding nature of early retirement dates that owners and operators could elect in lieu of installing and running controls. EPA suggests that "units failing to retire contrary to their attestation would become subject to the backstop emissions rate in the 2029 ozone season, and would likely be subject to other appropriate enforcement proposed rule [*sic*] under the Clean Air Act or other relevant authorities." 87 Fed. Reg. at 20,122. This vague promise of enforcement does not guarantee prompt retirement of the EGUs that have opted for this compliance pathway. On the contrary, it implies that these units may continue operating in the 2029 ozone season and beyond as if they never planned to retire, effectively allowing the units to evade the backstop daily emissions limit for two years. The absence of any enforcement mechanism undermines the rationale for providing the compliance option in the first place—*i.e.*, securing greater overall emission reductions through near-term retirements of fossil-fuel-fired EGUs—and would render any deferral of the backstop daily emissions limits arbitrary, were it even a lawful approach to addressing significant contributions to NAAQS violations as soon as practicable.

XV. EPA's proposed unit-specific secondary emissions limitation would help ensure that states meet the CAA's requirement to eliminate significant contributions to downwind nonattainment and maintenance issues.

We support EPA's decision to include a unit-specific secondary emissions limitation contingent on assurance level exceedances within a state. The CAA's good neighbor provision requires EPA to prohibit a state's emissions that contribute significantly to nonattainment or interfere with maintenance of a NAAQS in another state. 42 U.S.C. §7410(a)(2)(D); *North Carolina v. EPA*, 531 F.3d 896, 906-908 (D.C. Cir. 2008). The current CSAPR program addresses the issue of a state exceeding its assurance levels, and thus contributing significantly to nonattainment or interfering with maintenance of the NAAQS in another state, through a requirement that owners and operators of sources surrender three allowances for each ton of NOx emissions by which a state exceeds its assurance level. 87 Fed. Reg. at 20,106. While mostly successful, the increased allowance-holding requirement has not proven sufficient to meet the CAA's requirements because it has consistently failed to ensure that sources collectively eliminate their significant contributions in certain states. Mississippi and Missouri have both exceeded their assurance levels twice since implementation of the current program. *Id.* at 20,122. In the case of Missouri, the exceedance may have been preplanned, with owners and operators purchasing excess allowances in advance to cover expected exceedances that could have been avoided if several SCR-equipped units had not idled their controls. *Id.* at 20,123. Without a firm deterrent for this kind of misconduct, states would be more likely to exceed their assurance levels in violation of the CAA's good neighbor provision.

EPA's proposed unit-specific secondary emissions limitation will help prevent future violations of the CAA's requirements, not only in Mississippi and Missouri, but in other states that might be tempted follow Missouri's example of using excess allowances from other states to avoiding running the selected controls that are needed to eliminate significant contributions to downwind nonattainment or maintenance issues. Notably, one of the exceedances of assurance levels in Missouri occurred in 2021 when allowance prices were not so low that the 3-to-1 surrender ratio lacked any bite,[215] and therefore the enhancements to the trading program in this proposed rule that are designed to reduce surpluses of allowances would not necessarily result in sufficient incentives for all states to remain within their assurance levels. On the other hand, the enhanced surrender ratio for emissions that contribute to exceedances of assurance levels is still needed, as the proposed secondary emissions limitation would only apply to egregious emitters and would not create any disincentive to contribute to exceedances of assurance levels by the number of tons up to sources' collective secondary emissions limitations.

The proposed unit-specific secondary emissions limitation is well-designed to prevent the kind of gamesmanship seen in Missouri while avoiding penalizing units that are running their controls and meeting their emission benchmarks. First, a state must be exceeding its assurance level for the secondary limitations to apply. 87 Fed. Reg. at 20,123. This ensures that the limitations will only restrict emissions where emissions across the state are problematic, allowing each state to retain a reasonable amount of flexibility within the power sector, with some units allowed to emit at higher-than-historic levels if other units within the state offset at least some of those excess emissions. Second, each unit's individual limit is based on the unit's benchmark emission rate (i.e., its lowest seasonal average from a previous control period) with an added 25 percent margin plus an additional 50 tons of NOx. at 20,123-24. The 25 percent margin and 50-ton buffer ensure that this secondary emissions limitation will not impact units that are properly running their controls and meeting their emission benchmarks (or nearly meeting those benchmarks) even if other units in that state are not. Together, these two guardrails ensure that only units egregiously contributing to violations of the CAA's good neighbor requirements are subject to enforcement and penalties. Moreover, although owners and operators may not be able to predict whether the state will exceed its assurance level, they can track their own units' emissions against their benchmark rates and make course corrections where current-season rates have so far exceeded the benchmark rates as to approach their units' secondary emissions limitations. Thus, when a unit is nearing or even exceeding the 50-ton buffer on top of its benchmark rate, it can sufficiently reduce its emissions rate for the remainder of the ozone season to bring its average rate below the benchmark.

EPA should consider strengthening the unit-specific secondary emissions limitations further by removing the benchmark floor and using each unit's historical performance to set its benchmark. As proposed, the 25 percent buffer is calculated from the higher of a 0.08 lb/MMBtu floor (yielding a 0.10 lb/MMBtu rate when the 25 percent margin is added) or the unit's lowest seasonal average NOx emissions rate in a previous control period. 87 Fed. Reg. at 20,123-24. Consequently, even if a unit has achieved better performance than 0.08 lb/MMBtu in the past, the unit's benchmark will be artificially raised to the 0.08 lb/MMBtu floor. EPA should eliminate the 0.08 lb/MMBtu floor and instead base a unit's benchmark on its historical performance. If a unit has achieved better rates in the past, then that unit should continue to be able to achieve those rates, especially with a 25 percent margin and a 50-ton buffer to add flexibility to account

[215] Argus, *Environmental Market Insights: NOx Allowance Program* (June 8, 2021), https://www.argusmedia.com/en/blog/2021/june/8/podcast-environmental-market-insights-nox-allowance-program.

for any reasonable variability in performance of controls. Controls that would yield rates below the proposed, artificial floor—such as post-combustion controls—should all be able to be restored to previous performance with proper maintenance and management plans.[216]

Overall, we support the unit-specific secondary emissions limitation as a way to help states stay within their assurance levels as required by the CAA. This is especially important in situations where excessive pollution is avoidable, such as the likely premeditated exceedances of the state's assurance level by sources in Missouri. Given the CAA's requirement to eliminate significant contributions to downwind nonattainment and maintenance issues, if EPA for whatever reason ultimately did not implement the unit-specific secondary emissions limitation, we strongly recommend that EPA include a fallback provision in the final rule that would automatically increase the allowance-surrender ratio for emissions that contributed to an exceedance of an assurance level above the 3-to-1 ratio in the current rule to a level high enough to prevent owners and operators from simply turning off controls and buying excess allowances from their counterparts in other states. As history has demonstrated, the 3-to-1 ratio is not enough to deter owners and operators from this type of gamesmanship and needs to be strengthened going forward if a unit-specific secondary emissions limitation is not implemented.

XVI. Cogeneration units must be included in the EGU trading program if they fit the applicable criteria and, if not, must be regulated as non-EGUs

We urge EPA to include cogeneration units that are not regulated as non-EGUs in the budgets for the emissions trading program as EGUs. While they can be more efficient than conventional generation, fossil fuel-fired cogeneration units can still emit significant amounts of NOx into the air. 87 Fed. Reg. at 20,086. Excluding cogeneration units from this FIP could incentivize generation shifting to these units without applicable requirements to limit their NOx emissions, potentially allowing for an increase in total NOx emissions that would not be accounted for in the trading program (at least up to the maximum capacity allowed for cogeneration units). Conversely, including cogeneration units in the program could encourage greater reliance on lower-emitting generation resources (while covering their emissions under the budgets), as allowances are allocated based on historical heat input rather than presumptive emissions. *See* 87 Fed. Reg. at 20,129, 20,086 (noting low NO_x emissions rates from several types of cogeneration units).[217]

The good neighbor provision requires EPA to prohibit significant contributions to interstate ozone pollution, and the fact that a certain type of unit is more efficient or performs better with regard to NOx emissions than other units should not necessarily qualify all units of that type for complete exemption from the EGU NOx emissions trading program. Therefore, any cogeneration units in non-EGU industries regulated by the proposal that do not meet the

[216] See Ranajit Sahu, US Coal Fleet Selective Catalytic Reduction (SCR) Performance Analysis, at 21-28 (Jan. 2022), Ex. RS 1.

[217] *See also* EPA Combined Heat and Power Partnership, Catalog of CHP Technologies, at 1-3 & tbl. 1-1 (Sept. 2017), https://www.epa.gov/sites/default/files/2015-07/documents/catalog_of_chp_technologies.pdf (listing gas turbines at 64% of CHP capacity in 2014, and noting that the median age of steam turbine CHPs was 45 years); *id.* at 1-6, tbl. 1-3 (showing uncontrolled NO_x emissions from gas-turbine CHP units of 0.036-0.050 lb/MMBtu).

applicability criteria for the trading program must be regulated as non-EGUs, and any units that meet the applicability criteria for the trading program must be regulated as EGUs.

XVII. Boilers and combustion turbines serving generators that provide the electricity for cryptocurrency mining must be regulated as EGUs under the rule.

The terms of the statute's Good Neighbor provision require upwind states to eliminate their significant contributions to downwind areas and cease interference with maintenance, and several D.C. Circuit decisions have made clear that this must occur within the framework of the attainment deadlines included in Title I.[218]

The specific case of fossil-fueled boilers and turbines that are connected to generating units producing electricity for cryptocurrency mining ("crypto-generators") warrants special attention by the Agency as it finalizes the applicability provisions of this rule. There is an emerging trend towards transitioning existing fossil-fueled EGUs which are (or would be) covered units under the proposal, to serve as crypto-generators, either by partial or complete removal from service selling electricity to the grid. The environmental implications of this trend are potentially massive. Among them are the serious air quality consequences if otherwise covered units were to be permitted to avoid their responsibilities under either the currently effective Good Neighbor Rules, or the requirements of this rule, once finalized.

EPA has long recognized that EGUs are a fundamental part of the Good Neighbor attainment and maintenance picture, as they offer the most cost-effective and significant control opportunities for the NOx emissions that form ozone. As such, their application and use of state of the art pollution control, and participation in the Good Neighbor trading system, are a crucial component of EPA's design of the Good Neighbor program. And EGUs' continued participation in the Good Neighbor program until full retirement is necessary to achieve the statute's required attainment and maintenance goals on time and in a cost-effective manner. As such, any unit that is a covered unit under the Group 3 program at the time the rule is finalized, including newly affected EGU units, must remain subject to the EGU-specific requirements. Nor is there any reasonable basis to treat EGUs that have already been retired, but are revived to serve as crypto-generators as anything other than a covered EGU under the final rule. These units are neither co-generators, nor are they heterogenous small boilers or turbines. Allowing them to escape regulation under the final rule will undermine the rule's ability to satisfy the statute's Good Neighbor requirements.

A. The Rise of Cryptocurrency Mining, Its Energy and Electricity Needs, and Its Air Quality Impacts.

Cryptocurrencies, like Bitcoin, have become increasingly popular in recent years as a decentralized form of currency that eliminates third-party intermediaries like banks from transactions. Underlying the most popular of these currencies is blockchain technology, which validates ledger transactions through a proof-of-work (PoW) algorithm that requires solving complex mathematical problems. As a result, mining for cryptocurrencies through PoW requires substantial electric energy to operate computational devices that perform the calculations and

[218] *See Maryland* v. *EPA,* 958 F.3d 1185 (D.C. Cir. 2020); *Wisconsin* v. *EPA,* 938 F.3d 303 (D.C. Cir. 2019); *North Carolina* v. *EPA,* 531 F.3d 896 (D.C. Cir. 2008).

regulate the temperature of these devices for optimal performance.[219] The Cambridge Centre for Alternate Finance estimates that over 150 TWh of electricity is consumed annually by mining operations for Bitcoin alone, not to mention all the other forms of cryptocurrency -- more electricity than is used by countries like Sweden and Poland.[220] The growth in cryptocurrency generation globally is explosive, causing the IPCC to note that Bitcoin emissions alone could drive global climate change to levels above 2º C.[221] Since China has banned cryptocurrency mining in August 2021, the activity has shifted to other countries, notably the U.S.[222] The high energy demand for cryptocurrency mining poses a threat to global climate, and also contributes to local and regional air pollution, as only about 39 percent of PoW mining is powered by renewable energy. The remainder is supported by electricity generated by fossil-fuel fired boilers and combustion turbines, including EGUs put into service of cryptocurrency generation. This produces significant amounts of non-climate air pollution, including NOx, and creates significant incremental air quality problems and related health impacts.[223] This problem only promises to get worse into the future, as the number of Bitcoin miners increases, and the mathematical problem that must be solved to generate each Bitcoin becomes more complex, thus demanding even more electricity to power the banks of computers that constitute the mining devices.[224]

Cryptocurrency companies turn to fossil-fuel fired boilers and EGUs to supply electricity for mining operations, either as an addition to electricity generation for sale to the grid, or shifting away from electric sales to become exclusively an electricity source for cryptocurrency

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[219] Corrie E. Clark & Heather L. Greenley, *Bitcoin, Blockchain, and the Energy Sector*, Congressional Research Service (Aug. 9, 2019), https://crsreports.congress.gov/product/pdf/R/R45863/3.

[220] Cambridge Bitcoin Electricity Consumption Index, Cambridge Centre for Alternative Finance, https://ccaf.io/cbeci/index (last visited Apr. 27, 2022); *see also* Jon Huang *et al.*, *Bitcoin Uses More Electricity Than Many Countries. How is that Possible?*, N.Y. Times (Sept. 3, 2021), https://www.nytimes.com/interactive/2021/09/03/climate/bitcoin-carbon-footprint-electricity.html.

[221] IPCC, Working Group III Contribution to the IPCC Sixth Assessment Report (AR6), IPCC Ch. I at 1-26 (2022), https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_FullReport.pdf (citing Camilo Mora *et al.*, *Bitcoin emissions alone could push global warming above 2C*, 8 Nat. Clim. Chang. 931–33 (Oct. 2018), *available at* https://www.nature.com/articles/s41558-018-0321-8).

[222] Joe Tidy, US Leads Bitcoin mining as China ban takes effect, BBC (Oct. 13, 2021), https://www.bbc.com/news/technology-58896545. The U.S. share of cryptomining had already grown considerably in the last several years, *see* Letters from Sen. Elizabeth Warren et al., to Riot Blockchain Inc. (Jan. 27, 2022) (pointing out that the U.S. share of global Bitcoin mining increased from 4 percent in August 2019 to 35 percent in July 2021, even before the China ban), *available at* https://www.warren.senate.gov/newsroom/press-releases/warren-colleagues-press-six-cryptomining-companies-on-extraordinarily-high-energy-use-and-climate-impacts.

[223] Andrew L. Goodkind *et al.*, *Cryptodamages: Monetary value estimates of the air pollution and human health impacts of cryptocurrency mining*, 59 Energy Res. & Soc. Sci. 101281 (Jan. 2020), https://www.sciencedirect.com/science/article/abs/pii/S2214629619302701.

[224] By contrast, cryptocurrencies that use proof-of-stake (PoS) require far less energy inputs at the outset and are not expected to demand increasing amounts of energy in the future. However, demand for these currencies is far overshadowed by the demand for Bitcoin.

mining. In many cases, these plants have been dormant or underutilized, and they are now roaring back to life.[225] This is occurring in many of the states that are covered by this rule.[226] For example, in upstate New York on the shores of Seneca Lake a former coal plant has been converted to run on natural gas to power a large-scale Bitcoin mining operation owned by Greenidge Generation. As of July 31, 2021, the facility powered approximately 41 MW of Bitcoin mining capacity and 63 MW capacity available for sale back to the grid, however the amount of excess electricity is expected to decrease as mining operations are expanded at the plant.[227] In Rockdale, Texas, Riot Blockchain operates the largest cryptocurrency mining facility which currently utilizes up to 200 MW of aggregate power capacity for cryptocurrency mining, with plans to expand up to 700 MW.[228] Unlike the facility operated by Greenidge Generation, Riot does not have plans to sell excess electricity back to the grid.

Cryptocurrency mining is taking the United States by storm, particularly in covered states or portions of covered states where energy is cheap, for example in parts of Texas[229] and New York, and in Kentucky, Pennsylvania, and West Virginia, breathing new life into decommissioned power plants that rely on fossil-fuel fired boilers and EGUs.[230] As Congress considers regulating the cryptocurrency industry, the House Committee on Energy & Commerce has solicited information on the energy impacts of blockchains and potential pathways for regulation.[231] And the White House Office of Science and Technology Policy recently has asked for information on the environmental impacts of cryptocurrency generation, as the President considers the advisability of U.S.-backed digital assets.[232] These issues are not going away, and

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[225] Brian Spegele & Caitlin Ostroff, *Bitcoin Miners are Giving New Life to Old Fossil-Fuel Power Plants*, Wall St. J. (May 21, 2021), https://www.wsj.com/articles/bitcoin-miners-are-giving-new-life-to-old-fossil-fuel-power-plants-11621594803.

[226] Benjamin Storrow & Jael Holzman, *Cryptocurrency's climate conundrum*, Climatewire (May 18, 2022), https://subscriber.politicopro.com/article/eenews/2022/05/18/cryptocurrencys-climate-conundrum-00033212 (citing a Sierra Club database tracking these developments, *available at* https://docs.google.com/spreadsheets/d/1E7489rM7Q62oXwk1f4NUlMvok9noAbpYfTynY2VTyww/edit#gid=0).

[227] Greenidge Generation Holdings Inc., Registration Statement (Form S-1) (Sept. 1, 2021), https://sec.report/Document/0001193125-21-263306/.

[228] Riot Blockchain, *Whinstone U.S.: North America's Largest Bitcoin Mining Facility by Developed Capacity*, https://www.riotblockchain.com/bitcoin-mining/whinstone-u-s (last visited June 21, 2022).

[229] Naureen S. Malik, *Crypto Miners' Electricity Use in Texas Would Equal Another Houston*, Bloomberg (Apr. 27, 2022), https://www.bloomberg.com/news/articles/2022-04-27/crypto-miners-in-texas-will-need-more-power-than-houston.

[230] Eric de Place, *Bitcoin Mining Breathes Life into Zombie Coal Plants*, Ohio River Valley Institute (Nov. 29, 2021), https://ohiorivervalleyinstitute.org/bitcoin-mining-breathes-life-into-zombie-coal-plants/.

[231] Cleaning Up Cryptocurrency: The Energy Impacts of Blockchains, 117th Congress (2022), *available at* https://www.congress.gov/event/117th-congress/house-event/114332?s=1&r=19.

[232] Request for Information on the Energy and Climate Implications of Digital Assets, 87 Fed. Reg. 17,105 (Mar. 25, 2022) (responding to Executive Order 14067, 87 Fed. Reg. 14,143 (Mar. 9, 2022)).

it would be unreasonable for any agency to ignore them. That is particularly the case for EPA as it considers and finalizes these Good Neighbor requirements governing EGUs.

B. Crypto-Generators Must Meet EGU Control Requirements and Obligations Under the Final Rule.

EPA asserts that the provisions of this rule, if finalized as proposed, will assure that sources in the covered states will not contribute significantly to 2015 ozone standard nonattainment or interfere with maintenance in downwind states. In order for that statutory requirement to be met, all fossil-fueled boilers or combustion turbines that serve generators greater than 25 MW capacity must remain subject to the EGU control requirements and obligations under the final rule, until full retirement . Additionally, EGUs that transition away from selling electricity to the grid to become crypto-generators also must continue to meet the EGU requirements.[233]

Because EPA's framework for the rule assumes and requires that all EGUs remain EGUs, under the rule, or permanently retire, meeting the statute's requirements is not possible unless EPA affirms that all EGUs will continue to be subject to the requirements of the rule. Allowing EGUs that repurpose to cryptogeneration to exit the EGU trading program would exacerbate the lag in the dynamic budgeting process because allowances reflecting these units' historical heat input would continue to be allocated to the EGUs remaining in the trading program for up to two years following the shift to cryptogeneration. These excess allowances, which would in this scenario no longer be needed by the exiting cryptogenerators, could compromise the effectiveness of the EGU trading program by significantly weakening the incentive to implement the selected control strategy for EGUs.

EPA must take the realities of electricity demand for cryptogeneration into account in finalizing the rule, to ensure that the final rule meets the statutory goals. Specifically, EPA must clarify that covered EGUs must remain in the program. So long as an EGU boiler or combustion turbine that is a covered unit on the effective date of the rule is continuing to generate electricity from fossil fuels, even if not for sale to the grid, it must remain a Group 3 source, and continue to meet the control requirements applicable to EGUs.

Furthermore, because crypto-generators that move entirely away from the sale of electricity to the grid are no longer generating electricity needed to meet variable demand, their portions of state budgets should not amplify the variability limits intended to provide flexibility to supply reliable electricity in all states. Accordingly, in developing provisions to take this crypto-generation phenomenon into account in the final rule, as it must, EPA should remove the portions of the state budgets it allocates to crypto-generators from the calculation of a state's variability limit (and assurance level). The assurance level for any control period in any given

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[233] In theory, this situation could present itself in a different industrial context, but the pressing issue is the use of fossil-fuel fired electricity for the production of cryptocurrency. That activity not only generates the same amount of air pollution as electricity generated for sale to the grid, but the transition means demand for retail electricity has to be met by some other source, potentially yielding significant increases in air pollution. This shift in the demand for electricity is not reflected in EPA's models.

state would therefore equal 121% of the total emissions allowances allocated to non-crypto-generators in that state plus the unadjusted number of allowances allocated to crypto-generators.

C. Retired EGUs that are resuscitated, as well as new EGUs that are constructed, to serve cryptocurrency mining operations must not escape the EGU control requirements

EPA must also clarify in the final rule that any EGUs that emerge from retirement or dormancy to serve as crypto-generators will be covered units and will be required to meet the control requirements of the rule applicable to EGUs. EPA must monitor this situation and adjust the program budgets accordingly. EGU owners committing to retire covered units must ensure that those units permanently cease producing electricity (and air pollution). Such units must not be allowed to withdraw from service as an EGU, and be reborn as generators serving cryptocurrency "mines." EPA must make clear in the final rule that once retired, a unit cannot restart as a source of electric energy for an industrial use (including but not limited to cryptocurrency production), and thereby avoid the EGU requirements of the CSAPR program.

Crypto-generators are for all the intents and purposes of this rule EGUs, whether or not they are selling any portion of the electricity they produce to the grid. They burn fossil fuels and emit NOx (and other pollutants) just as they did when selling electricity to the grid. The pollution control options available to them are precisely the same, and the NOx reductions achieved by the addition of those controls are as cost-effective, as if they were producing electricity for sale to the grid. Moreover, as described elsewhere, EGU units form the backbone of EPA's architecture in this program, which is designed to ensure the Good Neighbor requirements of the statute are satisfied. If EGU units in any of the 26 states covered by the proposal retire, they must permanently retire. Similarly, if retired EGUs are resuscitated to become crypto-generators, they must meet the EGU requirements of the rule. And any new EGUs, whether intended to mine cryptocurrency, supply electricity to the grid or to specific facilities, or both, must meet the requirements of the rule, as described elsewhere in these comments. There is no reasonable basis in the artificial distinction between sale to grid and sale or provision to mining operations to allow the application of weaker requirements. At the very least, where new fossil-fuel boilers or turbines are developed to serve crypto-generation they must be regulated as industrial boilers, and required to apply SCR – there is nothing that distinguishes them from other EGUs that would impact their ability to apply available NOx pollution controls.

i. There is no basis for an EGU used as a crypto-generator to be exempted from the rule's EGU requirements as a cogeneration unit.

EPA proposes that "fossil fuel-fired boilers and combustion turbines that produce both electricity and useful thermal energy . . . and that meet the applicability criteria to be included in the CSAPR . . . Group 3 Trading Program would be subject to the emissions reduction requirements established . . . for EGUs." 87 Fed. Reg. 20,086. However, the applicability provisions of EPA's current Good Neighbor rules, provide that some otherwise-affected units may be exempted from the EGU requirements as units serving co-generation systems.[234]

[234] *See* 40 C.F.R. § 97.1004(b) (exempting units qualifying as cogeneration units as of 2005 and not supplying more than one-third of the unit's potential electrical output capacity for sale to the grid); *id.* at § 97.1002 (defining cogeneration systems and units).

For the reasons discussed above, EPA must finalize this rule to include cogeneration units in the EGU trading program and subject them to all other requirements applicable to EGUs.

Whatever EPA's final rule includes on that point, there is no basis to exempt crypto-generators as cogenerators, and EPA must make that clear in the final rule. Crypto-generators, whether or not they continue to sell some portion of the electricity they generate to the grid, are not, in fact, cogeneration units. Nor do they satisfy any of the rationales put forward by EPA as offering potential bases for exempting certain cogenerators from coverage as EGUs.

a. Crypto-generators simply do not meet the definition of a cogeneration system or unit.

EPA defines a co-generation system in this proposal as "an integrated grouping of equipment at a source (including a boiler, or combustion turbine, and a generator), designed to produce useful thermal energy for industrial, commercial, heating, or cooling purposes and electricity through the sequential use of energy." 87 Fed. Reg. at 20,087.[235] While the physical configuration of components in a crypto-generator (an integrated grouping of a boiler or combustion turbine and an electricity generator) is the same, that is where the similarity with cogeneration systems ends. EGUs producing electricity used to generate cryptocurrencies are not "designed to produce useful thermal energy" for any industrial purpose. Nor do such crypto-generators provide any of the benefits EPA asserts support exemptions for certain co-generators, as described below. Thus, while we oppose any decision to exempt cogeneration units from requirements applicable to EGUs generally, crypto-generators would not qualify for such exemptions in any event.

b. Crypto-generator units or systems do not provide environmental benefits compared to other options for electricity production for the same use.

EPA proposes to continue the exemption for certain co-generation systems from the EGU requirements, because the Agency claims such systems are far more efficient, producing both electricity and useful thermal energy that would otherwise be wasted. 87 Fed. Reg. at 20,086. EPA argues that because co-generation systems achieve efficiencies of 60-80%, as compared with the average efficiency of U.S. fossil-fueled power plants, they achieve the same level of energy production with far fewer air emissions, and for that reason their use should be encouraged, as through exemptions from the EGU requirements under the Good Neighbor rules. EGUs that transition from grid sales to crypto-generators, however, do not provide any of those benefits. They are used to produce electricity to run the computers that create cryptocurrencies, using the same technologies used to generate electricity for sale to the grid. They continue to operate at the same low efficiencies (EPA states that the average efficiency for U.S. fossil-fueled power plants is 33%), and produce the same air pollution, whether they are selling electricity to the grid or providing it to a cryptocurrency production operation. There is therefore no basis for exempting crypto-generators from the EGU requirements as co-generation systems on efficiency grounds.

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[235] 40 C.F.R § 97.1002 includes the current definitions of cogeneration unit and system, which EPA does not propose to change.

c. Crypto-generators serve an emerging industry that is potentially a significant contributor to downwind attainment and maintenance problems.

EPA proposes that a co-generator serving one of the non-EGU industries identified in the proposal as significant contributors to the Good Neighbor problem would not qualify for any co-generator exemption in the final rule.[236] While the cryptocurrency mining industry is not (yet) identified as an industrial major contributor, as noted above, EPA must consider the realities of the current situation, including that its observed air quality and climate pollution footprint is considerable.[237] Any EGU serving as a crypto-generator continues to contribute to the interstate ozone problem just as if it remained operating as an EGU exclusively selling electricity to the grid. There is therefore no rational basis for offering any off-ramp from the rule's EGU requirements for EGUs that transition out of electricity sales to the grid in order to operate as crypto-generators. Doing so would exacerbate the current problem by creating further incentives for EGU owners to make that choice. In turn, that would lead to considerable backsliding from the ability to achieve the statutorily required objective of this rule.

ii. Crypto-generators do not require the additional lead time for control requirements or engagement in the Group 3 Trading Program that EPA suggests may be needed for industrial boilers.

Not only are crypto-generators not cogeneration units operating in cogeneration systems, they do not share any of the characteristics of the industrial boilers EPA proposes to pull anew into the CSAPR regime, and they do not require additional time beyond that provided for EGUs under the rule. EPA claims that industrial boilers as a class are "heterogeneous," and are characterized by more variation in emissions control requirements, emissions levels, and technologies for emissions controls, than are EGUs, and proposes a separate track for the applicability of the rule to non-EGU boilers. 87 Fed. Reg. 20,076. None of these rationales is relevant to EGUs, whether or not they are in transition to serving as crypto-generators, or are resurrected from retirement or near-retirement to serve as crypto-generators. EGU fossil-fueled boiler/turbine and generator systems have long been subject to ozone transport regulations, since the NOx SIP Call was finalized in 1998. Much is known about the pollution control options to lower their NOx emissions, and the costs and timing needed to install them, or run the controls that already may have been installed on these units. And much is known about the impacts of EGU systems on air quality – these are major emitters of NOx, and controlling these systems is essential to efforts to make meaningful air quality improvements downwind, at a reasonable cost threshold. The only characteristic of EGUs that crypto-generators do not share is the ability to generation shift with other networked EGUs – and that situation only occurs when an EGU no longer sells any of its generated electricity to the grid. Further, the emissions that EPA removes from state budgets to account for generation-shifting would not include emission reductions from crypto-generators that are not connected to the grid, as EPA's power sector model does not

[236] See 87 Fed. Reg. 20,087 for a discussion of EPA's proposed treatment of co-generation systems serving any of the industries identified in the rule as significant contributors to downwind nonattainment or maintenance of the 2015 ozone standard.

[237] Andrew L. Goodkind et al., *Cryptodamages: Monetary value estimates of the air pollution and human health impacts of cryptocurrency mining,* 59 Energy Res. & Soc. Sci. 101281 (Jan. 2020), https://www.sciencedirect.com/science/article/abs/pii/S2214629619302701.

incorporate these units as potential generation resources. There is therefore no rationale for treating crypto-generators as industrial boilers requiring additional time and less stringent backstop requirements than EGUs under the final rule.

XVIII. EPA should expand and strengthen its proposed emissions standards for non-EGUs.

We applaud EPA's decision to include non-EGU sources in this rulemaking. However, EPA projects that even after application all the proposed EGU and non-EGU control strategies, all but three receptors will remain in nonattainment or maintenance of the 2015 standard in 2026. *See* 87 Fed. Reg. at 20,096, tbl. VI.D.2-2. In addition, even after implementation all the proposed control strategies, EPA projects that each upwind state will continue to contribute at least 1 percent of the NAAQS to at least one downwind nonattainment or maintenance receptor. Accordingly, EPA must strengthen the rule to include additional cost-effective NOx control strategies for non-EGUs, in order to avoid impermissible under-control.

A. Reciprocating Internal Combustion Engines

EPA proposes to establish ozone-season NOx limits on reciprocating internal combustion engines (RICE) used in Pipeline Transportation of Natural Gas in 23 states. The limits would take effect in 2026 and apply to RICE with 1000 horsepower (hp) or more. EPA estimates that its proposed emission standards for RICE will reduce ozone season emissions of NOx by 23,144 tons per year, at an average cost per ton of $5,037.[238] The proposed RICE standards are the most significant of the non-EGU control strategies proposed, responsible for approximately half of the non-EGU emission reductions expected from the proposal.[239]

While we applaud EPA for taking this initial step to address the significant impact of the oil-and-gas industry on cross-state ozone pollution, the proposed regulation should be strengthened in three key ways. First, EPA should apply the proposed RICE emission standards to engines used throughout the oil-and-gas industry. Because pipeline facilities are responsible for only about 34% of the power generation from gas-powered RICE in the oil-and-gas industry, as shown below in Table XII.1, applying the proposed emission limits throughout the industry could significantly increase the impact on emissions.

Second, EPA should tighten the proposed emission limits for larger engines, similar to those adopted in Colorado. Third, EPA should consider setting zero-emission standards for engines smaller than 1000 hp, reflecting the feasibility of replacing these engines with electric motors.

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[238] EPA, Screening Assessment of Potential Emissions Reductions, Air Quality Impacts, and Costs from Non-EGU Emissions Units for 2026 at 16, tbl. 5, EPA-HQ-OAR-2021-0668-0150 (Feb. 28, 2022) (emission standards for RICE at natural gas pipelines will reduce ozone season NOx by 22,390 tons in the East and 754 tons in the West) [hereinafter, "Screening Assessment."].

[239] *See* 87 Fed. Reg. at 20,097, tbl. VI.D.3-1 (proposed emission limits for non-EGU facilities will reduce ozone season NOx emissions by 47,186 tons in 2026).

i. EPA Should Apply the Proposed Emission Limits to All Engines Used in the Oil and Gas Industry.

RICE are used throughout the oil-and-gas industry, including in the production, gas-processing, and transmission and storage sectors.[240] The same make and model of engine are often used in more than one segment of the industry. In some cases, an individual engine may be relocated from one segment to another. For example, a particular engine could be moved from a transmission compressor station to a gas processing facility. Because the emission reduction potential is comparable across segments, regulators typically set emission limits that apply based on engine type, regardless of where in the industry the engine is used.

Here, EPA proposes to set standards only for RICE used at natural gas pipeline transmission facilities. EPA's decision to focus on the pipeline segment is a function of its screening assessment. As the first step of this assessment, EPA seeks to identify industry segments where the greatest emission reductions could be obtained. At the second step, EPA attempts to identify cost-effective emission control strategies within the industry segments selected. Finally, EPA evaluates the emission reduction potential and estimated air quality impacts of the selected control strategies. *See* 87 Fed. Reg. at 20082.[241]

While this is generally a reasonable way to identify emission reduction opportunities, where EPA determines that it is possible to reduce emissions in a cost-effective way from a piece of equipment that is used in multiple industry segments, EPA should consider adopting uniform standards for that piece equipment, regardless of the industry segment in which it is used. Adopting uniform standards makes sense here, because it will lead to greater emission reductions and ensure that polluting engines are not simply shifted from one industry segment to another. Moreover, the cost-effectiveness of reducing emissions from these units is likely to be identical regardless of where in the supply chain they are deployed.

The April 2022 update to the Natural Gas and Petroleum Systems in the GHG Inventory estimates the amount of power generated from engines in the production, gas-processing, transmission, and storage segments.[242] That information is summarized here:

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[240] See 40 C.F.R. § 98.230(a) (2), (9) (specifying that emissions from engines must be reported for both production and gathering and boosting); Final Report: Cost-effective Reciprocating Engine Emissions Control and Monitoring for E&P Field and Gathering Engines (Nov. 2011), https://netl.doe.gov/sites/default/files/2018-03/nt15464-final-report.pdf (describing RICE as "ubiquitous" in production operations); N.M. Env't Dep't, Testimony, Section 20.2.50.112 at 2 (Sept. 2021), https://www.env.nm.gov/opf/wp-content/uploads/sites/13/2021/09/2021-09-22-EIB-21-27-NMED-08-Kuehn-Palmer-20.2.50.113-Engines.pdf (noting that "engines . . . are used throughout the oil and gas sector").

[241] Screening Assessment at 1, EPA-HQ-OAR-2021-0668-0150.

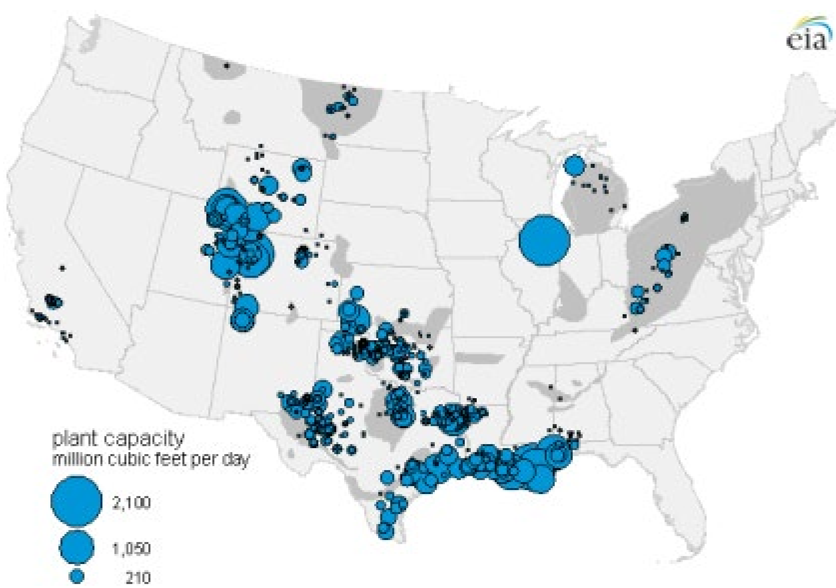
[242] Annex 3.6: Methodology for Estimating CH4, CO2, and N2O Emissions from Natural Gas Systems (xlsx), tbl. 3.6-7, *available at* https://www.epa.gov/sites/default/files/2021-02/2021_ghgi_natural_gas_systems_annex36_tables.xlsx. Information about the amount of power generated from engines at gathering and boosting facilities is not provided directly. However, the number of compressors used in this segment is provided. In 2020, there were 19,043 compressors in use at gathering and boosting stations.

Table XIII.1: Power generated from engines in production, gas processing, transmission, and storage segments

Industry Segment	Power Generated from Gas Engines in 2020 (MMHPhr)
Production	47,480
Gas Processing	66,282
Transmission (Pipelines)	60,829
Storage	4,905
Total	179,496

As this table shows, pipelines are responsible for about 34% of the generation from gas-powered RICE in the oil-and-gas industry. A logical way to strengthen the proposed rule would be to apply the proposed RICE emission standards to all the engines in the oil-and-gas industry. Extending the rule to the gas processing sector makes particular sense, since the RICE fleet used in this segment is similar to the fleet used at pipeline facilities, and the vast majority of the of the nation's gas processing capacity is located in states subject to non-EGU limits under the proposed rule, including California, Illinois, Kentucky, Louisiana, Michigan, Ohio, Oklahoma, Pennsylvania, Texas, Utah, and Wyoming:

Figure XIII.1: Gas Processing Plant Capacity



Source: U.S. Energy Information Administration, Form EIA-757A, Natural Gas Processing Plant Survey Schedule A: Baseline Report.[243] *Because gas processing plants produce more power from RICE than pipeline facilities do, but use a similar fleet of engines, it is likely possible to more than double the emission reduction impact of this rule simply by applying the proposed emission standards to gas processing facilities as well as to pipelines.*

[243] U.S. Energy Information Administration, Today in Energy (Oct. 25, 2012), https://www.eia.gov/todayinenergy/detail.php?id=8530.

In addition, applying the proposed RICE emission limits upstream of the pipeline segment may provide significant co-benefits. Because upstream engines do not burn pipeline quality gas, they may emit more unburned hydrocarbons (including VOCs and hazardous air pollutants) during combustion. Thus, implementing control techniques that increase combustion efficiency—such as nonselective catalytic reduction—may provide greater co-pollutant reductions at upstream facilities than at pipeline facilities.

ii. EPA Should Tighten the Proposed Emission Standards for Four-Stroke Lean Burn and Four-Stroke Rich Burn Engines.

Four-Stroke Lean Burn (4SLB) Engine Standard. EPA proposes a limit of 1.5 g-NOx/hp-hr for 4SLBs with at least 1000 horsepower. As EPA notes, this is less stringent than the applicable new source performance standard, which has required new engines of this type to meet a standard of 1.0 g-NOx/hp-hr since July 2010.[244] In addition, numerous states have adopted more-stringent emission standards for existing engines of this type, with "some states hav[ing] required limits equivalent to or even lower than 0.5g/hp-hr."[245]

Particularly given evidence that the proposed rule is likely to result in under-control, EPA should strengthen the standards for these engines. Colorado's standard for existing 4SLBs with horsepower of 1000 or greater is 1.2 g-NOx/hp-hr. The Colorado Air Pollution Control Division ("Division") found that 378 of the 589 engines meeting this description, approximately 2/3, were already operating below this standard.[246] The Division found that the remaining engines could achieve the standard by implementing control strategies such as high energy ignition systems, advanced air to fuel ratio controllers, electronic ignition systems, low emission combustion technology, or selective catalytic reduction.[247] In general, these technologies would lead to cost-effective reductions of NOx.[248]

Because a more stringent standard is cost-effective, EPA should strengthen the standard for existing 4SLBs in the final rule, to provide for greater emission reductions and reduce the risk of under-control.

Four-Stroke Rich Burn (4SRB) Engine Standard. EPA proposes a limit of 3.0 g-NOx/hp-hr for 4SRB engines with horsepower of 1000 or greater. As EPA notes, this is less stringent than the applicable new source performance standard, which has required new engines of this type to meet a standard of 1.0 g-NOx/hp-hr since July 2010.[249] In addition, numerous states have adopted more stringent emission standards for existing engines of this type, with "some states hav[ing] required limits equivalent to or even lower than 0.2g/hp-hr."[250]

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[244] EPA, Non-EGU Sectors TSD at 5, EPA-HQ-OAR-2021-0668-0145 (Dec. 2021) [hereinafter, "Non-EGU TSD"].
[245] *See id.*
[246] *See* Cost Benefit Analysis for Proposed Revisions to AQCC Regulation No. 7 at 13 (Sept. 4, 2020), attached as Ex. CO 1.
[247] *Id.* at 14.
[248] *Id.* at 14-17.
[249] Non-EGU TSD at 6, EPA-HQ-OAR-2021-0668-0145.
[250] *Id*.

Colorado's standard for 4SRB engines with horsepower of 1000 or greater is 0.8 g-NOx/hp-hr. The Colorado Air Pollution Control Division found that 104 of the 207 engines meeting this description, approximately 50%, were already operating below this standard.[251] The Division found that the remaining engines could achieve the standard by implementing either a high energy ignition system, which reduces NOx emissions by about 10%, or a combination of non-selective catalytic reduction (NSCR) with an air-to-fuel ratio (AFR) controller, which reduces NOx by 90% or more.[252] The Division found that it would cost $1,016,855 to implement NSCR with AFR at all of the covered engines in the state, resulting in annualized total costs of about $13,860 per engine.[253] This would reduce NOx emissions by 626 tons per year, at a cost of $1,624 per ton.[254]

Because a more stringent standard of 0.8 g-NOx/hp-hr is cost-effective, EPA should strengthen the standard for existing 4SRBs in the final rule, to provide for greater emission reductions and reduce the risk of under-control.

iii. EPA Should Require Operators to Replace Smaller RICE with Electric Engines.

EPA should also evaluate the possibility of reducing under-control by requiring operators to replace smaller RICE with electric engines. While these engines emit less pollution per unit than larger engines, their emissions are cumulatively significant. Ensuring that emission limits for these engines are tightened in lockstep with the standards for larger engines is important to avoid creating a perverse incentive that would encourage regulated parties to use multiple smaller engines instead of one larger engine (which would likely mean more pollution per horsepower hour).

Electrification of compressor stations has long been recognized as an available and cost-effective NOx control option for RICE. The California Air Resources Board (CARB) has determined that "the majority of beam-balanced and crank-balanced oil pumps in California are driven by electric motors," and this was already true more than 20 years ago.[255] CARB concluded that electrification must be a cost-effective option if operators were already deploying electric engines for these sources. CARB's analysis found that replacing a 500-to-1000 hp RICE with an electric motor would cost $1,100 per ton of NOx eliminated (1999 dollars).[256] For engines in the 150 to 500 hp range, the cost was even lower, at $900/ton in 1999 dollars.[257]

EPA also evaluated the emission reduction benefits of engine electrification as part of the Natural Gas STAR Program. In PRO Fact Sheet No. 103, EPA reported that a partner replaced

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[251] *See* Cost Benefit Analysis for Proposed Revisions to AQCC Regulation No. 7 at 10.
[252] *Id.* at 11.
[253] *See id.* at 12, tbl. 5.
[254] *See id.* at 12, tbl. 6.
[255] California Air Resources Board (CARB) Determination of Reasonably Available Control Technology and Best Available Retrofit Control Technology for Stationary Spark-Ignited Internal Combustion Engines, November 2001, tbl. V-2 at IV-2, *available at* https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.737.4290&rep=rep1&type=pdf
[256] *Id.* at V-2.
[257] *Id.* at V-3.

two 2,650 hp reciprocating compressors, two 4,684 reciprocating compressors, and one 893 hp reciprocating compressor with four 1,750 hp electric compressors.[258] The total cost of this replacement, the cost of electricity, and the fuel gas savings associated with this retrofit are reported in the Fact Sheet. Although the Fact Sheet did not specifically report the amount of NOx reduction achieved, one analysis found that the project would have reduced NOx at a cost of $2,766 per ton or lower (depending on how many hours a year the engine operated), assuming that the RICE emitted at an uncontrolled rate of 16.8g/hp-hr.[259]

Based on this information, EPA should consider requiring electrification of smaller engines to provide for greater emission reductions and reduce the risk of under-control. Electrification will also have significant co-benefits, in terms of greenhouse gas, HAP, and VOC reductions.

In the alternative to requiring electrification, EPA should, at minimum, adopt stringent emission standards for smaller engines, along the line of those recently adopted in Colorado. Colorado's Reg. 7, Section E.I.D.3, provides the following standards for smaller engines:

Maximum Engine Hp	Construction or Relocation Date	Emission Standards in G/hp-hr		
		NOx	CO	VOC
< 100 Hp	Any	NA	NA	NA
≥ 100 Hp and < 500 Hp	On or after January 1, 2008	2.0	4.0	1.0
	On or after January 1, 2011	1.0	2.0	0.7
≥ 500 Hp	On or after July 1, 2007	2.0	4.0	1.0
	On or after July 1, 2010	1.0	2.0	0.7

**These engines may also be subject to emission standards under Section I.D.5.*

iv. Expanding and Strengthening the Proposed RICE Emission Standards will have Significant Co-Benefits in terms of Reduced Methane, HAP, and VOC Pollution.

RICE are not 100% efficient in combusting fuel. For this reason, some of the hydrocarbons present in the fuel pass through the engine and are emitted in the exhaust.[260] This may result in emissions of methane, VOCs, and hazardous air pollutants. The rate at which an engine emits unburned hydrocarbons depends on the engine type. "Lean-burn" engines have an

[258] *Id.* at V-3.

[259] Reasonable Progress Analysis for Nitrogen Oxide Pollution Control Upgrades at San Juan Generating Station Units 1 and 4 and at Escalante Generating Station at 70-74 (Dec. 19, 2019), https://www.env.nm.gov/air-quality/wp-content/uploads/sites/2/2020/08/NPCA-comments-on-Four-Factor-Analysis.pdf.

[260] EPA, AP 42, Chapter 3: Natural Gas-fired Reciprocating Engines at 3.2-3 (Aug. 2000), https://www3.epa.gov/ttnchie1/ap42/ch03/final/c03s02.pdf ("VOC occur when some of the gas remains unburned or is only partially burned during the combustion process.").

average methane slip of 3 percent of methane feed gas, while rich burn engines average 0.4 percent methane slip.[261] RICE used at upstream facilities are more likely to emit VOCs and hazardous air pollutants, because they are burning unprocessed gas.

As EPA has explained, "[i]t appears that after-exhaust controls, such as selective noncatalytic reduction (SNCR)," reduce methane slip.[262] Electrifying RICE would eliminate onsite methane, HAP, and VOC emissions from the engine entirely. EPA must give appropriate weight to the substantial co-benefits that could be achieved by expanding and strengthening the proposed RICE emission standards, as proposed in these comments.

B. Cement kilns.

Cement kilns are large emitters of NOx pollution and are often concentrated in or near communities of color and economically marginalized communities. EPA estimates that, in 2023, cement kilns with annual emissions greater than 100 tons in the 23 covered states will emit 36,000 tons of NOx during the ozone season[263]—more than any state but one's 2023 EGU ozone-season NOx budget,[264] and more than any other considered non-EGU sector.[265]

i. EPA's record shows a more-stringent NOx standard is appropriate for cement kilns.

EPA estimates that its proposal will result in more than 8,000 tons of ozone season NOx emission reductions from the cement and concrete product manufacturing industry in 14 states, at average annual costs of $1,279- $2,624.[266] EPA expects to achieve these NOx emission reductions almost exclusively through the use of selective non-catalytic reduction control technology (SNCR).[267] We strongly support EPA's efforts to control NOx pollution from cement kilns. However, EPA should strengthen its proposed NOx emission limits, including adopting limits based on selective catalytic control technology (SCR).

EPA proposes both a ton-per-day source cap limit, and the following kiln emissions limits:

Kiln Type	Proposed NOx Emissions Limit (lb/ton of clinker)
Long Wet	4.0 lb/ton

[261] EPA, Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Combustion Turbine Electric Generating Units at 57 (Apr. 21, 20220, https://www.epa.gov/system/files/documents/2022-04/epa_ghg-controls-for-combustion-turbine-egus_draft-april-2022.pdf.
[262] *Id.*
[263] Screening Assessment at tbl. A-3, EPA-HQ-OAR-2021-0668-0150.
[264] 87 Fed. Reg. at 20,044 (Texas, with 38,284 tons).
[265] Screening Assessment at tbl. A-3.
[266] *Id.* at tbl. 4.
[267] *Id.* at tbl. 6.

Kiln Type	Proposed NOx Emissions Limit (lb/ton of clinker)
Long Dry	3.0 lb/ton
Preheater	3.8 lb/ton
Precalciner	2.3 lb/ton
Preheater/Precalciner	2.8 lb/ton

In setting the proposed limits, EPA considered applicable new source performance standards (NSPS); state reasonably available control technology (RACT) rules; and limits in permits and consent decrees. EPA's record, however, shows not only that its proposed limits are achievable, but that its proposed limits should be strengthened. In fact, according to the Ozone Transport Commission (OTC) all states in the Ozone Transport Region with cement kilns already have more stringent limits in place for long wet kilns, preheater kilns, and precalciner kilns.[268]

For wet kilns, EPA proposes to require a NOx emission limit of 4.0 lb NOx/ton of clinker, consistent with a Texas state rule.[269] EPA considered a limit as low as 3.88 lb/ton of clinker.[270] The OTC found in 2006 that a limit of 3.88 lb/ton of clinker was consistent with the proven emission reduction capabilities of SNCR, and in 2017, the OTC again recommended that limit, and that it apply more broadly across states for the purposes of reducing ozone transport.[271]

For long dry kilns, EPA proposes a NOx emission limit of 3.0 lb/ton of clinker, based on a 40% reduction of a limit of 5.1 lb/ton of clinker through addition of post combustion controls. 87 Fed. Reg. at 20,144. However, the limits for dry kilns that EPA cites are much lower. For example, the dry kiln operated by Ash Grove is subject to a limit of 1.5 lb NOx/ton of clinker—consistent with the NSPS for Portland cement plants.[272] The dry kiln operated by Texas

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[268] Ozone Transport Commission, White Paper on Control Measures for Nitrogen Oxides (NOx) Emissions from Two Source Categories (Aug. 28, 2017), https://otcair.org/upload/Documents/Meeting%20Materials/OTC_Control_Measures_Recommendations_GN_SIPs_Whitepaper_Draft_08282017.docx ("In 2017 all OTR States with cement kilns have regulations meeting the proposed rates" of 3.88 lbs NOx/ton of clinker for wet kilns; 3.44 for long dry kilns; 2.36 for preheater kilns; and 1.52 for precalciner kilns) [hereinafter, "OTC Aug. 2017 Whitepaper"]; Ozone Transport Commission, Identification and Evaluation of Candidate Control Measures, Final Technical Support Document (Feb. 28, 2007), https://otcair.org/upload/Documents/Reports/OTC%20Control%20Measures%20TSD%20070228%20Final%20SB.pdf [hereinafter, "OTC 2007 TSD"].

[269] Non-EGU TSD at 22, EPA-HQ-OAR-2021-0668-0145.

[270] Ozone Transport Commission, White Paper on Control Technologies and OTC State Regulations for Nitrogen Oxides (NOx) Emissions from Eight Source Categories (Feb. 10, 2017), https://otcair.org/upload/Documents/Reports/WhitePaper_NOx_Control_04052017.pdf [hereinafter, "OTC Feb. 2017 Whitepaper"].

[271] OTC 2007 TSD at 4-8; OTC Aug. 2017 Whitepaper at 19.

[272] Non-EGU TSD at 21.

industries has a permitted emission factor of 1.95 lb NOx/ton of clinker, but operates "below 1.5 lb NOx/ton of clinker."[273]

Additionally, consent decrees for dry kilns require similar or more stringent emission limits, including:

- Holcim - 1.8 lb/ton clinker.[274]
- Lone Star Industries - 1.5 lb/ton clinker (for waste on days).[275]
- Cemex - 1.5 lb/ton clinker.[276]
- Lehigh - 1.5 lb/ton clinker.[277]

These limits show that lower limits than EPA proposes are achievable, and EPA should strengthen its proposed limits applicable to dry kilns.

For preheater kilns, EPA proposes a limit of 3.8 lb/ton of clinker, based on Texas and Illinois state standards.[278] However, Maryland and Pennsylvania have more stringent standards of 2.4 and 2.36 lb/ton of clinker in place.[279] In 2006, the OTC recommended a 2.36 lb/ton clinker for preheater kilns, and again in 2017 recommended this limit apply more broadly to reduce ozone transport.[280] For precalciner kilns too, EPA proposes a NOx limit of 2.3 lb/ton of clinker—yet, the OTC has recommended a limit of 1.52 lb/ton of clinker[281] and the NSPS sets a limit of 1.5 lb/ton of clinker based on the application of selective non-catalytic reduction technology.[282]

Moreover, while EPA proposes to reduce NOx emissions from cement kilns primarily through SNCR, it also admits that SCR "is now available in the cement manufacturing

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[273] *Id.* at 22.
[274] *United States v. Holcim*, Civil Action No. 1:11-cv-01119-CCB at 12 (July 11, 2013), https://www.epa.gov/sites/default/files/documents/holcim-cd.pdf.
[275] *United States v. Lone Star Industries*, Civil No. 16-206 at 14 (Aug. 1, 2016), https://www.epa.gov/sites/default/files/2016-08/documents/lonestarindustriesinc-cd.pdf.
[276] *United States v. Cemex*, Civil No. 3:16-cv-471 at 34 (July 27, 2016), https://www.epa.gov/sites/default/files/2016-07/documents/cemex-cd.pdf.
[277] *United States v. Cemex*, Civil No. 1:09-cv-00019-MSK-MEH at 14 (Apr. 19, 2013), https://www.epa.gov/sites/default/files/documents/cemex-lyons-cd.pdf.
[278] Non-EGU TSD at 22, EPA-HQ-OAR-2021-0668-0145.
[279] OTC Feb. 2017 Whitepaper at 5.
[280] OTC 2007 TSD at 4-8; OTC Aug. 2017 Whitepaper at 20.
[281] OTC 2007 TSD at 4-8; OTC Aug. 2017 Whitepaper at 20.
[282] 40 C.F.R. § 60.63; National Emission Standards for Hazardous Air Pollutants from the Portland Cement Manufacturing Industry and Standards of Performance for Portland Cement Plants, 75 Fed. Reg. at 54,994 (Sept. 9, 2010).

industry."[283]. In fact, SCR is in use at cement kilns across the globe,[284] and in at least two cement kilns in the United States. One in Joppa, Illinois, has successfully demonstrated SCR use with a reported 80 percent removal rate for NOx, and another in Midlothian, Texas, has been "running [SCR] smoothly since June 2017," reducing NOx by greater than 70 percent.[285] In May of this year, a mid/low-temperature SCR installation was completed on a cement kiln in Sichuan, China.[286] As far back as 2008, the National Association of Clean Air Agencies recommended SCR as the best demonstrated technology for controlling NOx from cement kilns, referred to SCR as "the regulated future" for cement kilns, and estimated that SCR could achieve NOx rates of 0.5 lb/ton clinker.[287] EPA should require more stringent NOx emission limits on the basis of SCR technology.

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283 Non-EGU TSD at 16.

284 *See e.g.,* EPA, Alternative Control Techniques Document Update – NOx Emissions from; New Cement Kilns (Nov. 2007), https://www3.epa.gov/ttncatc1/dir1/cement_updt_1107.pdf; The Costs and Benefits of Selective Catalytic Reduction on Cement Kilns for Multi-Pollutant Control (Feb. 11, 2008), https://www.4cleanair.org/wp-content/uploads/Documents/AlsSCR08report.pdf; Emily Thomas, *A Friend to the Environment*, World Cement (Aug. 20, 2020), https://www.worldcement.com/special-reports/20082020/a-friend-to-the-environment/; CemNet, *Nominee for Environmental Excellence 2019 – CTP (Austria) GmbH and Opterra Zement GmbH (Germany)* (2019), https://www.cemnet.com/Conference/Item/183937/nominee-for-environmental-excellence-2019-ctp-austria-gmbh-and-opterra-zement-gmbh-germany-.html; Dong Wang, *Deactivation Mechanism of Multipoisons in Cement Furnace Flue Gas on Selective Catalytic Reduction Catalysts*, ACS Publications (May 22, 2019), https://pubs.acs.org/doi/10.1021/acs.est.9b00337 ("[i]ncreasing numbers of cement furnaces have applied selective catalytic reduction").

285 Dr. Ranajit (Ron) Sahu, Comments on the Reasonably Available Control Technology (RACT) and Reasonably Available Control Measures (RACM) for the 2008 Ozone NAAQS Attainment SIP Modifications Proposed by the Texas Commission on Environmental Quality (TCEQ) for the Houston-Galveston-Brazoria (HGB) and Dallas Fort Worth (DFW) Non-Attainment Areas, attached as Ex. RS 3; City of Albuquerque, NM, Review of Regional Haze 2nd Implementation Period Four-Factor Analysis for GCC Rio Grande, Inc., Tijeras, New Mexico at 2-12 (Aug. 27, 2020), https://www.cabq.gov/airquality/documents/final-gcc-rio-grande-four-factor-analysis-review_erg.pdf.

286 CemNet, *Sinoma Overseas Development Completes SCR Project* (May 27, 2022), https://www.cemnet.com/News/story/172778/sinoma-overseas-development-completes-scr-project.html; Huaiping Liu, Jingrui Fang, & Junhua Li, *Pilot test of the low temperature SCR technology in cement plant*, IOP Conf. Series: Earth and Env't Sci. (2021), https://iopscience.iop.org/article/10.1088/1755-1315/651/4/042001/pdf; CemNet, *Selecting the Right SCR System* (June 29, 2020), https://www.cemnet.com/Articles/story/169111/selecting-the-right-scr-system.html; CemNet, *Lowering the temperature* (Oct. 14, 2019), https://www.cemnet.com/Articles/story/167540/lowering-the-temperature.html.

287 NACAA, Comments on Portland Cement NSPS at 2, http://www.4cleanair.org/sites/default/files/Documents/ATTACHMENTNOXFINALASFILED.pdf.

In addition to the installation of low-NOx burners and post-combustion SNCR, the Ozone Transport Commission recommended modifying cement kilns to implement mid-kiln firing,[288] which the EPA has estimated would take only 5-7 months to implement at a cost of only $73/ton of NOx reduction,[289] and converting and retrofitting wet kilns to the more efficient and less polluting dry manufacturing process.[290] According to industry sources (Bohan 2019) of the 128 kilns at the 91 U.S. cement plants, only 10 wet kilns remain in operation.[291] Additionally, according to a 2021 analysis by the Sierra Club, long dry kilns can be converted to preheater/precalciner kilns, significantly reducing emissions.[292] EPA should set more stringent NOx limits on the basis of converting and retrofitting wet kilns to modern technology.

EPA also proposes a source cap limit based on the type of kiln and the average annual production of clinker plus one standard deviation for the three most recent calendar years. Proposal at 20,046. This approach should more than account for varying operating levels. And, given that the NOx limit for cement kilns should be strengthened, the source cap limit should likely be strengthened as well.

ii. The cement kiln limit should apply on a 24-hour average basis, and CEMS must be required.

EPA's proposed compliance and monitoring requirements are inadequate to ensure cement kilns eliminate their significant contributions to downwind pollution as relevant to the 8-hour ozone standard. EPA proposes the cement kiln limits apply on a 30-day rolling average basis. 87 Fed. Reg. at 20,179. Instead, EPA must require compliance on a 24-hour averaging period, as shown through Continuous Emissions Monitoring Systems. A 24-hour average will ensure that cement kilns do not idle emission controls, such as SCR.

C. Glass Manufacturing.

i. Glass manufacturers are large NOx emitters.

The glass and glass product manufacturing units EPA proposes to cover under this rule are projected to emit 12,059 tons of Ozone season emissions in 2023.[293] NOx emissions from these units contribute greater than or equal to 0.01 ppb to 11 different downwind receptors, with

[288] OTC 2007 TSD at 4-7; OTC Aug. 2017 Whitepaper at 20.
[289] EPA, Assessment of Non-EGU NOx Emission Controls, Cost of Controls, and Time for Compliance Final TSD at 12, EPA-HQ-OAR-2018-0225-0023 (Aug. 2016).
[290] OTC Aug. 2017 Whitepaper at 20.
[291] ZKG Cement, *Development of alternative fuels in the U.S. cement industry* (2019), https://www.zkg.de/en/artikel/zkg_Development_of_alternative_fuels_in_the_U.S._cement_industry_3302670.html; Sierra Club Guidance: Cement Manufacturing at 12 (Jan. 2021), https://www.sierraclub.org/sites/www.sierraclub.org/files/Final%20Cement%20Guidelines%20January%202021.pdf.
[292] Sierra Club Guidance: Cement Manufacturing at 12 (Jan. 2021), https://www.sierraclub.org/sites/www.sierraclub.org/files/Final%20Cement%20Guidelines%20January%202021.pdf.
[293] Screening Assessment at tbl. A-4, EPA-HQ-OAR-2021-0668-0150.

glass manufacturers in at least seven states contributing greater than or equal to 0.01 ppb.[294] This makes glass and glass product manufacturers the fourth largest non-EGU industrial contributor to NOx emissions under the proposed rule and an important source of emissions to control for limiting interstate transport of NOx emissions. Moreover, EPA projects that the glass and glass product manufacturing subsector holds the third-highest potential for ozone-season NOx emission reductions among the various non-EGU subsectors covered by the proposal, only slightly surpassed by the cement and concrete product manufacturing subcategory.[295] The Agency notes that the glass and glass product manufacturing subsector's NOx emissions are not currently subject to NSPS, and that the industry is expected to grow in the coming years.[296] We support EPA's effort to regulate this important source of NOx emissions, which must be reduced to ensure that upwind states are eliminating their significant contributions to downwind ozone pollution problems.

ii. EPA's record shows more-stringent NOx emission limits are appropriate for glass manufacturers.

EPA estimates that the proposed rule will lead to 6,667 tons of ozone season NOx emission reductions from the glass manufacturing industry (in 15 states), at average annual costs of $1,109 to $3,770 per ton depending on the state, with an average of $1,520 per ton in eastern states and $1,293 per ton in western states.[297] EPA expects to achieve these NOx emission reductions primarily through SCR technology at an average cost of $1,516 per ton with some additional reductions through oxygen enriched air staging at an average cost of $764 per ton.[298] EPA proposes the following emissions limits:

Furnace	Proposed NO_X Emissions Limit (lb/ton of glass produced)
Container Glass Manufacturing Furnace	4.0 lb/ton
Pressed/Blown Glass Manufacturing Furnace or Fiberglass Manufacturing Furnace	4.0 lb/ton
Flat Glass Manufacturing Furnace	9.2 lb/ton

While the proposed limits on glass furnaces fall within the ranges of limits required by various states and air districts, the proposed limits are set at the weakest levels within those ranges. 87 Fed. Reg. at 20,147, tbl. VII.C-4. For example, EPA proposes to set a limit of 4.0 lb NOx/ton of glass for Container Glass Manufacturing Furnaces even though state and local requirements range much lower, from 1 to 4 lb/ton. *Id.* The same leniency is present in the

[294] *Id.*
[295] RIA at 4-45, EPA-HQ-OAR-2021-0668-0151.
[296] *See* Non-EGU Sectors TSD at 55, EPA-HQ-OAR-2021-0668-0145.
[297] Screening Assessment at tbls. 4 & 5, EPA-HQ-OAR-2021-0668-0150.
[298] *Id.* at tbl. 6.

proposed emission limit of 4.0 lb/ton for Pressed/Blown Glass Manufacturing Furnaces, while state and local emission limits range from 1.36-4 lb/ton, and 9.2 lb/ton for Flat Glass Manufacturing Furnaces, while states range from 5-9.2 lb/ton. *Id.*[299] With all of these ranges, EPA notes that the upper end could be reduced significantly through post-combustion control. *Id.* Given that some states and air districts—many of which are contending with ozone nonattainment problems that are exacerbated by upwind NOx emissions—already require glass manufacturing furnaces to meet emissions limits well below those proposed by EPA, EPA must finalize lower emission limits for these furnaces.

In addition to SCR technology, EPA's proposal shows that EPA has identified many effective controls for these sources through the years.[300] EPA has previously found that oxy-firing could reduce NOx emissions by: 7,880 tons from flat glass manufacturers at a cost of $3,097/ton; 2,628 tons from container glass manufacturers at a cost of $7,481/ton; and 851 tons from pressed glass manufacturers at a cost of $6,356/ton—all below EPA's proposed $7,500/ton cost threshold.[301] This technology has an even higher NOx reduction percentage, at 85%, than SCR, at 75%.[302] Given the availability of additional cost-effective controls, EPA should consider whether oxy-firing or other controls—potentially in combination—could produce much greater NOx emission reductions and air quality improvements and be implemented at glass manufacturing facilities sooner than 2026.

iii. EPA should consider phasing out and retiring units and replacing them with more energy efficient and less emitting units like all-electric melter installations.

In addition to lowering the emission limits to reflect the various additional cost-effective controls discussed above, EPA should consider requiring units to phase out and retire if they can be cost-effectively replaced by more energy efficient and less emitting units, like all-electric melter installations. Section 110(a)(2)(D)(i)(I) commands the states and EPA to "*prohibit* any source . . . 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." 42 U.S.C. § 7410(a)(2)(D)(i)(I) (emphasis added). Nothing in this language suggests that the plan must allow sources that are significantly contributing to downwind pollution problems to continue to

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[299] In addition, EPA partly bases its proposed NOx emissions limit for flat glass manufacturing furnaces on the San Joaquin Valley air district's RACT rules; however, the 9.2 lb/ton limit in those rules is a *daily* rate. *See* Non-EGU TSD at 57-58, EPA-HQ-OAR-2021-0668-0145. The San Joaquin Valley air district's rolling 30-day average rate, which is more comparable to the form of emission limit that EPA has proposed here, is lower: 7 lb/ton. *Id.* at 57. EPA should therefore lower the emission limit for flat glass manufacturing furnaces in the final rule, at least to a rate that reflects this underlying local precedent.
[300] *Id.* at 52-54.
[301] EPA, Assessment of Non-EGU NOx Emission Controls, Cost of Controls, and Time for Compliance Final TSD at 5, EPA-HQ-OAR-2018-0225-0023 (Aug. 20160).
[302] Non-EGU TSD at 55.

operate. The possibility of replacing units with all-electric or other lesser emitting units should be considered similarly to any other emission control and required where cost-effective.

iv. EPA must set a 24-hour averaging limit alongside the proposed 30-day averaging limit.

EPA's proposed emission limits take the form of a 30-operating-day rolling average. 87 Fed. Reg. at 20,147. Although some states and air districts also utilize a 30-day average, others include a 24-hour average emissions limit. For example, the San Joaquin Valley air district has adopted NOx emission limits based on both 30-day rolling and daily averages, with the daily averages slightly less stringent than the 30-day rolling average limits.[303] Including a daily average alongside a 30-day rolling average is preferable to ensure that units continue to run and maintain their controls throughout the ozone season. Indeed, for the reasons discussed in the section on the backstop daily emission limits for EGUs above, a daily limit is legally required to ensure that sources within a state are eliminating their significant contributions to downwind pollution within a timeframe relevant to the 8-hour ozone NAAQS. Establishing daily limits is similarly important within this industrial subsector because EPA is basing its glass and glass products manufacturing limits primarily on the installation and use of SCR, which is a post-combustion control that might be turned off when not needed to meet an emission limit. A daily emission limit would help prevent unnecessary idling of emission controls and is needed to ensure that a unit does not continue to contribute to downwind nonattainment or maintenance issues.

One possibility that EPA should consider is keeping the proposed limits, which, as discussed above, are lenient, but make them daily limits instead of 30-day averages while adding an additional, more protective 30-day average limit. This approach, as well as the daily limits themselves, would reflect the NOx limits that the San Joaquin Valley air district has established.[304] The higher daily limit would give sources additional flexibility on a day-to-day basis to account for variations in the unit's activity or problems that might arise with emission controls, while still ensuring that units effectively utilize their controls to meet daily and 30-day limits.

v. We support the use of CEMS to monitor NOx emissions in the glass and glass product manufacturing sector.

Monitoring emissions is critical to ensure that units operate within the required emission limits. CEMS is a well-known technology that has been used in many different applications to reliably monitor emissions and ensure that a source is meeting legal requirements. Requiring CEMS for glass and glass product manufacturing sources will help ensure that they meet the requirements of the proposed Good Neighbor Rule and help alert sources to any emission problems quickly so they can be remedied. Requiring CEMS will be especially important if, as it

[303] Non-EGU TSD at 57, EPA-HQ-OAR-2021-0668-0145.
[304] *Id.*

must, EPA adds a daily emissions limit to the proposed 30-day emissions limit. CEMS will be useful for ensuring compliance with the 30-day limit.

EPA's proposed alternative method for demonstrating compliance with a 30-day average limit—i.e., adding up emissions from three hourly tests and dividing those emissions by the tons of glass pulled in those three hours, 87 Fed. Reg. at 20,185 (proposed 40 C.F.R. § 52.44(d)(1))—does not suffice because emissions rates in those three hours could be uncharacteristically low, and unrepresentative of emissions rates during the other 717 hours during each 30-day period.

D. Iron & Steel.

i. EPA's proposed NOx limits for iron, steel, and ferroalloy manufacturers are likely achievable.

EPA estimates 3,250 tons of ozone season NOx emission reductions from iron and steel mills (in 6 states), at average annual costs of $631 to $5,823 per ton.[305] EPA expects to achieve these NOx emission reductions through the installation/implementation of ultra-low NOx burners, selective catalytic reduction control technology, and flue gas recirculation.[306] EPA proposes the following emissions unit limits:

Emissions Unit	Proposed NOx Emissions Standard or Requirement (lbs/hour or pound per million British Thermal Units [lb/mmBtu])
Blast Furnace	0.03 lb/mmBtu
Basic Oxygen Furnace	0.07 lb/ton
Electric Arc Furnace	0.15 lb/ton steel
Ladle/tundish Preheaters	0.06 lb/mmBtu
Reheat furnace	0.05 lb/mmBtu
Annealing Furnace	0.06 lb/mmBtu
Vacuum Degasser	0.03 lb/mmBtu
Ladle Metallurgy Furnace	0.1 lb/ton
Taconite production kilns	Work practice standard to install low NOx technology/burners, test and set
Coke ovens (charging and coking)	0.15 lb/ton of coal charged
Coke ovens (pushing)	0.015 lb/ton of coal pushed

EPA also proposed limits for boilers in the iron and steel manufacturing industry, which will be addressed in the following section on boilers.

[305] Non-EGU TSD at tbl 4, EPA-HQ-OAR-2021-0668-0145.
[306] *Id.* at tbl 6.

For blast furnaces, EPA proposes a NOx limit of 0.03 lb/mmBtu. This proposed limit is consistent with recent permit limits.[307] However, this proposed limit is higher than the average uncontrolled emissions from blast furnaces of 0.021 lb/mmBtu, reported in 1994 (with an uncontrolled minimum of 0.002 lb/mmBtu).[308] And EPA estimates that reductions from control technologies such as low-NOx burners and flue gas recirculation (FGR) can achieve pollution reductions of 55% to 77%.[309] Thus, EPA's proposed limit for blast furnaces is likely achievable, and should be strengthened.

For basic oxygen furnaces, EPA proposes a NOx limit of 0.07 lb/ton of steel. EPA estimates that uncontrolled basic oxygen furnaces emitted 0.12 lb/ton on average in 1994 (with an uncontrolled minimum of 0.042 lb/ton), and that "minimally" 50% NOx reduction is achievable through use of pollution controls.[310] Thus, EPA's proposed limit for basic oxygen furnaces is likely achievable.

For electric arc furnaces (EAFs), EPA proposes a NOx limit of 0.15 lb/ton of steel produced. Emission limits set to achieve BACT/LAER, including with use of only low NOx burners or no pollution controls, indicate that EPA's proposed limits for EAFs are likely achievable with pollution control technologies:

Facility Name (RBLC ID)	Date of Issuance	Controls	NOx Emission Limit (lb/ton)
Gerdau Ameristeel (GA)[311]	9/2001	Direct Evacuation Control and Low NOx Burners	0.1500
CF&I Steel- Rocky Mountain Steel (CO-0054)	6/2004	Good Combustion Practices	0.1500
Steel Mill (TX-0848)		Oxyfuel burners	0.1580
Co-Steel Raritan (New Jersey)[312]	12/1996		0.1812

[307] RACT Installation Permit for U.S. Steel Mon Valley Works, Edgar Thomson Plant, https://www.alleghenycounty.us/uploadedFiles/Allegheny_Home/Health_Department/Programs/Air_Quality/Public_Comment_Notices/uss-et-ract-ip8-draft.pdf (Jan. 23, 2020); U.S. Steel Edgar Thomson Plant SIP Package (Apr. 21, 2020), https://www.alleghenycounty.us/uploadedFiles/Allegheny_Home/Health_Department/Programs/Air_Quality/SIPs/84C-USS-ET-ract-ip8-Final-SIP-Package.pdf.
[308] Non-EGU TSD at 30, EPA-HQ-OAR-2021-0668-0145.
[309] *Id.* at 37-38, 41.
[310] *Id.* at 43.
[311] Prevention of Significant Air Quality Deterioration Review Preliminary Determination, Osceola Steel Company at tbl. 4-4 (Mar. 16, 2010), https://www.epd.georgia.gov/document/document/0750024pdpdf/download.
[312] *Id.*

Facility Name (RBLC ID)	Date of Issuance	Controls	NOx Emission Limit (lb/ton)
Gerdau Ameristeel-Wilton (IA-0087)	5/2007	Direct Evacuation Control and Oxy Fuel Burners	0.1900
Timken Company-Faircrest (OH-0339 / OH-0342)	2/2003 12/2010	Low NOx Burners None	0.2000 0.2000
Hoeganses Corporation (Tennessee)[313]	2/2000	Low NOx Burners	0.2000
Griffin Wheel Company (Oklahoma)[314]	10/1999		0.2000
J&L Specialty Steel Inc (Pennsylvania)[315]	4/2003	Low NOx Burners	0.2000

EPA should also consider oxy-fueled firing, which industry has found is feasible and is already in use at EAFs.[316] In other industries, EPA estimates that oxy-fueled firing can achieve NOx emission reductions of 85%.[317]

For ladle metallurgy furnaces, EPA proposes a limit of 0.1 lb/ton. However, other permit limits indicate that a more stringent limit is likely achievable:

Facility Name (RBLC ID)	Date of Issuance	Controls	NOx Emission Limit (lb/ton)
Republic Engineered Products (OH-0302)	2005	Good Operating Practices	0.0132
Nucor Steel (IN-0108)	2003	None	0.0176
SteelCorr, Inc., Bluewater Project (AR-0077)	2004	None	0.0200
Nucor Yamato Steel (AR-0055)	2001	None	0.0200
Mid American Steel & Wire (OK-0128)[318]	2008		0.05

313 *Id.*
314 *Id.*
315 *Id.*
316 Nucor, BACM/BACT Response Nucor Steel Utah (Mar. 22, 2017), https://documents.deq.utah.gov/air-quality/pm25-serious-sip/DAQ-2017-003841.pdf; RBLC Clearinghouse, IDs: TX-0848 (.158 lb/ton using oxyfire burners); MI-0438 (permit limit of 0.27 lb/ton using real time process optimization (RTPO) and oxy-fuel burners); IL-0132 (permit limit of 0.27 lb/ton using oxygen/gas burner or similar burner); TX-0880 (0.3 lb/ton with oxyfuel burners).
317 Non-EGU TSD at 55, EPA-HQ-OAR-2021-0668-0145.
318 *See also* OK Dep't of Env't Quality, Evaluation of Permit Application No. 2003-106-C (Sept. 8, 2008), https://www.deq.ok.gov/wp-content/uploads/air-division/Permit_2003106-cp1.pdf.

For ladle/tundish preheaters, EPA proposes a NOx limit of 0.06 lb/mmBtu. This limit is within the range of BACT/LAER permit limits:[319]

Facility Name	Date of Issuance	Controls	NOx Emission Limit (lb/mmBtu)
Nucor steel (AR-0090)	2006	Low NOx Burners	0.010
Constellium, Element 13 (AL-0306)	2015	Low NOx Burners	0.050
Gerdau Macsteel (MI-0438)	2018	Low NOx Burners, Good Combustion Practices	0.080 (hourly)

For reheat furnaces, EPA proposes a NOx limit of 0.05 lb/mmBtu. However, reheat furnaces are regularly subject to limits around 0.07, or lower, with low or ultra-low NOx burners alone:

Facility Name (RBLC ID)	Date of Issuance	Controls	NOx Emission Limit (lb/mmBtu)
Nucor Steel (NE-0026)	2004	Ultra-low NOx burners	0.064
Nucor Steel Brandenburg (KY-0110)	2020	Low-NOx Burners and good combustion and operating practices	Designed to maintain 0.70
Alleghany Ludlum, Brackenridge Facility (PA-0274)	2010	Ultra-low NOx burners	0.070
Nucor Steel, Kankakee (IL-0126)	2018	Low NOx burners and good combustion practices	0.070 (24-hour)
V&M Star (OH-0316)	2008	Ultra-low NOx burners	0.070
Nucor-Yamato, Blytheville (AR-0085)	2005	Ultra-low NOx burners	0.070
Structural Metals, Steel Minimill (TX-0705)	2014	Ultra-low NOx burners	0.073
Benteler Steel, Tube facility (LA-0309)	2015	Ultra low-NOx burners	0.075
Nucor Steel, Darlington (SC-0128)	2006	Low NOx burners	0.075
North American Stainless (KY-0094)	2003	Low NOx burners	0.075
Gerdau Ameristeel, Jacksonville (FL-0283)	2006	None	0.080

[319] *See also* Prevention of Significant Deterioration Preconstruction Review and Preliminary Determination for Sinova Silicon, Inc. in Lake County, Tennessee at tbl. 9, Recent RBLC Entries for NOx Emissions from Ladle Preheaters, *available at* https://www.tn.gov/content/dam/tn/environment/air/documents/publicnotices/APC_Sinova-Silicon-LLC-979383.pdf.

Thus, EPA's proposed limit of 0.05 lb/mmBtu is likely achievable with additional pollution reductions, such as flue gas recirculation and SCR, which has been used to control NOx emissions from reheat furnaces since 1999.[320]

For annealing furnaces, EPA proposes a NOx limit of 0.06 lb/mmBtu. This limit is consistent with permit limits, through use of ultra-low NOx burners and flue gas recirculation or selective catalytic reduction:

Facility Name (RBLC ID)	Date of Issuance	Controls	NOx Emission Limit (lb/mmBtu)
Benteler Steel, Tube Facility (LA-0309)	2015	Ultra-low NOx burners and flue gas recirculation	0.060
Thyssenkraup Steel, Mount Vernon Mill (AL-0290)	2010	Ultra-low NOx burner and selective catalytic reduction	0.060
Thyssenkraup Steel (AL-0230)	2007	Ultra-low NOx burner and exhaust gas recirculation	0.060
USS Galvanizing, Pro Tec Coating (OH-0258)	2001	Selective catalytic reduction and staged air	0.060
Charter Steel (WI-0181)	2000	Ultra-low NOx burner and gas-firing	0.060 (lowfire)

Additionally, annealing furnaces are often subject to limits around 0.075-0.080 using low or ultra-low NOx burners alone:

Facility Name (RBLC ID)	Date of Issuance	Controls	NOx Emission Limit (lb/mmBtu)
Alleghany Ludlum, Brackenridge (PA-0274)	2010	Ultra-low NOx burners	0.075
North American Stainless (KY-0094)	2003	Low NOx burners	0.075
Constellium, Alloys plant (AL-0307)	2015	Low NOx burners	0.080
North American Stainless (KY-0094)	2003	Low NOx burners	0.080

[320] Beta Steel, Report of Emissions Test: Hot Strip Mill Slab Reheat Furnace Stack Selective Catalytic Reduction Unit (Nov. 1999), https://www3.epa.gov/ttnchie1/old/ap42/ch12/s051/reference/bref28_c12s0501_ch3_2004draft.pdf; Noria Corp., *California Steel to increase capacity by 1 million tons*, https://www.reliableplant.com/Read/6765/california-steel-to-increase-capacity-by-1-million-tons (last visited June 20, 2022) ("[t]he new [reheat] furnace employs selective catalytic reduction"); Zycon, *Air Clear LLC* (listing application of Air-Clear SCR systems to Steel Reheat Furnaces), http://www.zycon.com/Profile/Air-Clear-LLC-220013/Selective-Catalytic-Reduction-SCR-Systems.html (last visited June 20, 2022); Consent Decree in *U.S. v. Nucor* at 15 (2013), https://www.epa.gov/sites/default/files/2013-09/documents/nucorcd.pdf (requiring SCR for two reheat furnaces); RBLC ID: IN-0109 (SCR in use)

Thus, EPA's proposed limit of 0.06 lb/mmBtu for annealing furnaces is likely achievable through low or ultra-low NOx burners and additional pollution controls.

For vacuum degassers, EPA proposes a NOx limit of 0.03 lb/mmBtu. However, permit limits support a more stringent limit:

Facility Name (RBLC ID)	Date of Issuance	Controls	NOx Emission Limit (lb/ton)
Nucor Steel, Tuscaloosa (AL-0275) (AL-0301)	2014	Flare	0.0050
Nucor Corporation, Darlington (SC-0197)	2019		0.0050
Nucor Steel, Brandenburg (KY-0110)	2020	Good work practices plan	0.0050

Thus, more stringent limits are likely achievable for vacuum degassers.

For taconite production kilns, EPA proposes a work practice standard of installation of low NOx technology/burners. EPA should set a numeric emission limit for these kilns.

For coke ovens, EPA proposes a limit of 0.15 lb/ton of coal charged and 0.015 lb/ton of coal pushed. Notably, while EPA proposes a stricter limit for pushing than charging, the AP-42 factors reflect the opposite.[321] While not consistently distinguishing between charging or pushing, the RBLC supports stringent standards for coke ovens with the application of pollution controls:

Facility Name (RBLC ID)	Date of Issuance	Controls	NOx Emission Limit (lb/ton)
Sun Coke Energy, Middletown (OH-0332)[322]	2010	Work practices	0.0190 (pushing)
Sun Coke Energy, Haverhill North (OH-0305 / OH-0305)	2003	Staged combustion	0.0160
Nucor Steel (LA-0239 / LA-0239)	2010	None	0.0190 (pushing)

ii. Commenters support EPA's proposed 3-hour rolling average compliance period with use of CEMS.

Commenters support EPA's proposed 3-hour rolling average compliance period and proposal to require continuous emissions monitoring to assure compliance with proposed NOx emission limits. 87 Fed. Reg. at 20,181.

[321] U.S. Dep't of Energy, Energy and Environmental Profile of the U.S. Iron and Steel Industry (Aug. 2000), https://www.energy.gov/sites/prod/files/2013/11/f4/steel_profile.pdf.
[322] *See also* Ohio Env't Prot. Agency, Final Air Permit (Sept. 21, 2016), http://wwwapp.epa.ohio.gov/dapc/permits_issued/1472728.pdf.

E. Boilers (in chemical manufacturing, petroleum and coal products, and pulp, paper, and paperboard mills).

i. EPA must require NOx reductions from other emissions units in Tier 2 industries in addition to boilers.

EPA identified five additional industries that either contribute >= 0.1 ppb to any one receptor or >=0.01 ppb to at least ten receptors, including: chemical manufacturing; petroleum and coal products manufacturing; metal ore mining; lime and gypsum product manufacturing; and pulp, paper, and paperboard mills.[323] While these industries contain a variety of emitting units, such as boilers, internal combustion engines, or other industrial process units, EPA, however, proposes to require NOx reductions only from boilers within these industries "because boilers represent the majority emissions unit in the Tier 2 industries for which there were controls that cost up to $7,500."[324] And, because the metal ore mining and lime/gypsum product manufacturing sectors do not have boilers of a relevant size, EPA excludes reductions from these industries entirely.[325]

Reductions from emissions units other than boilers in these industries are cost effective.[326] EPA's analysis shows that there are a significant number of industrial processes (77, including 48 in petroleum and coal products manufacturing alone) and internal combustion engines (14) in Tier 2 industries with controls that cost up to $7,500 per ton (compared to 132 boilers).[327]

EPA must not arbitrarily exclude reductions from emissions units other than boilers, or exclude reductions from the metal ore mining and lime/gypsum product manufacturing industries. Large industrial units in the metal ore mining and lime/gypsum product manufacturing, which EPA claims exclude boilers, emit more ozone season NOx than chemical manufacturing; petroleum and coal products manufacturing; and pulp, paper, and paperboard mills combined.[328] EPA finds that the metal ore mining and lime/gypsum product manufacturing industries, like the basic chemical manufacturing; petroleum and coal products manufacturing;

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[323] Screening Assessment at 3, EPA-HQ-OAR-2021-0668-0150.
[324] *Id.* at 5-6 (132 boilers compared to 77 industrial processes).
[325] Non-EGU TSD at 60, EPA-HQ-OAR-2021-0668-0145 ("EPA is not currently aware of boilers meeting this size classification within the other Tier 2 or Tier 1 industries but proposes to require that any such boilers would also be subject to the requirements of the FIP.").
[326] Screening Assessment at 5-6, tbl. 1 ("emissions unit[s] in the Tier 2 industries for which there were controls that cost up to $7,500 per ton").
[327] *Id.*; *see also* OTC Feb. 2017 Whitepaper at 6. (surveying limits applicable to asphalt production plants (NAICS 32411), part of the petroleum and coal products manufacturing industry).
[328] Screening Assessment at 25, EPA-HQ-OAR-2021-0668-0150 (compare 17,778 for metal ore mining and 8,856 for lime/gypsum product manufacturing (26,634 combined) with 9,612 for basic chemical manufacturing; 8,163 for petroleum and coal products manufacturing; and 6,773 for pulp, paper, and paperboard mills (24,548 combined)).

and pulp, paper, and paperboard mills industries, contribute >= 0.1 ppb to any one receptor or >=0.01 ppb to at least ten receptors, and may not arbitrarily exclude reductions from these two industries.

ii. EPA's record shows more-stringent NOx limits are appropriate for boilers.

EPA estimates potential ozone season NOx emission reductions of 3,305 tons from pulp, paper, and paperboard mills (in 8 states), at an average cost of $3,243-$7,019/ton; 1,698 tons from basic chemical manufacturing (in 2 states), at an average cost of $3,939-$5,113/ton; and 1,030 tons from petroleum and coal products manufacturing (in 4 states), at an average cost of $2,349-$3,498/ton.[329] EPA expects to achieve these NOx emission reductions primarily through the installation/implementation of ultra-low NOx burners and selective catalytic reduction technology.[330] Screening Assessment Tbl 6. EPA also proposes the following emission limits for boilers in the Tier 1 or 2 industries:[331]

Unit type	Proposed Emissions limit (lbs NO_X/Dry standard cubic feet per million Btu [mmBtu])
Coal	0.20 lb/mmBtu
Residual oil	0.20 lb/mmBtu
Distillate oil	0.12 lb/mmBtu
Natural gas	0.08 lb/mmBtu

However, a 2017 OTC survey found that boilers, including those used in the paper products, chemical, and petroleum industries, are already required to achieve more stringent limits.[332] The limits for distillate oil and gas boilers in particular are lower than the lowest limits that EPA even considered in developing the proposal.

Unit type	EPA's Proposed Emissions limit (lbs NOx/Dry standard cubic feet per million Btu [mmBtu])	OTC Identified NOx limits
Coal	0.20 lb/mmBtu	0.08 for coal boilers for coal boilers greater than 100 mmBtu/hr
Residual oil	0.20 lb/mmBtu	0.15 for residual oil boilers greater than 250 mmBtu/hr

[329] *Id.* at tbl 4.
[330] *Id.* at tbl. 6.
[331] Non-EGU TSD at 60, EPA-HQ-OAR-2021-0668-0145. EPA proposes to establish NOx emissions limits for all new and existing boilers found within any of the 23 covered states that are within a Tier 1 or Tier 2 industry and have a design capacity of 100 mmBTU/hr or greater.
[332] OTC Feb. 2017 Whitepaper at 3.

Unit type	EPA's Proposed Emissions limit (lbs NOx/Dry standard cubic feet per million Btu [mmBtu])	OTC Identified NOx limits
Distillate oil	0.12 lb/mmBtu	0.08 for distillate oil boilers greater than 50 mmBtu/hr
Natural gas	0.08 lb/mmBtu	0.05 for gas boilers greater than 50 mmBtu/hr

Moreover, California's South Coast Air Quality Management District has adopted a facility-wide NOx emission limit of 0.03 lb/mmBtu at petroleum refineries.[333] And, continuous emission monitoring data available through the EPA's air markets program[334] shows:

1. Coal-fired boilers achieve average NOx emissions rates of 0.1153 lb NOx / MMBtu with selective non-catalytic control technology (Ingredion Incorporated Argo Plant, Illinois), and 0.1162 lb/MMBtu using low NOx burner technology with overfire air (Axiall Corporation Natrium Plant, West Virginia).
2. Gas-fired boilers achieve average NOx emissions rates of 0.0058 lb NOx / MMBtu (Johnsonville, Tennessee). More than half of the gas-fired boilers included in the air markets program data already emit NOx at rates below the proposed rate.
3. Residual oil-fired boilers achieve average NOx emissions rates of 0.0716 lb NOx/MMBtu (Ravenswood Steam Plant, New York).

For gas, the RBLC Clearinghouse shows much more stringent limits are achievable. Many facilities are required to meet a NOx limit of less than 0.0400 lb/mmBtu—less than half EPA's proposed limit:

Facility Name (RBLC ID)	Date of Issuance	Controls	NOx Emission Limit (lb/mmBtu)
Big Lake Fuels, Methanol Plant (LA-0382)	2019	SCR	0.0060 (12 month rolling)
Lackawanna Energy Ceneter (PA-0309)	2015	SCR and ultra low NOx burners	0.0060
Cricket Valley Energy Center (NY-0103)	2016	FGR, Low NOx burners	0.0085 (1-hour)

333 California South Coast Air Quality Management District, Rule 1109.1 (adopted Nov. 5, 2021), https://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1109-1.pdf?sfvrsn=8 ; http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2021/2021-Nov5-034.pdf?sfvrsn=6 (40 / 5 ppmv NOx).

334 EPA, Air Markets Program Data, https://ampd.epa.gov/ampd/ (by SIP NOx Program, Unit Level Emissions, in ozone season, by average NOx rate).

Facility Name (RBLC ID)	Date of Issuance	Controls	NOx Emission Limit (lb/mmBtu)
South Louisiana Methanol, St. James Methanol (LA-0312 / LA-0312)	2017	SCR, Low NOx burners, good combustion practices	0.0100 (12 month average)
PTTGCA Petrochemical Complex (OH-0378)	2018	Ultra-low NOx burners and flue gas recirculation	0.0100 (30-day rolling average)
Jackson Generation (IL-0130)	2018	Ultra-low NOx burners, flue gas recirculation, automated combustion management systems, automated water blowdown, and good combustion practices	0.0100 (3-hour average)
Agrium, Kenai Nitrogen Operations (AK-0086)	2021	SCR	0.0100 (thirty-day average)
Formosa (LA-0364)	2020	Low NOx burners and SCR	0.0100 (rolling 12-month average)
SIO International (WI-0284)	2018	Ultra-low NOx burners, flue gas recirculation, and good combustion practices	0.0105 (1-hour average)
AFE, LCM Plant (WI-0283)	2018	Ultra-low NOx burners, flue gas recirculation, and good combustion practices	0.0105
Virginia Electric and Power, Greensville (VA-0325)	2016	Ultra-low NOx burners	0.0110
Tenaska, Westmoreland (PA-0306)	2016	Ultra-low NOx burners, good combustion practices	0.0110
First Quality Tissue (PA-0313)	2017		0.0110
Renovo Energy (PA-0316)	2018	Ultra-low NOx burners, flue gas recirculation, good operating practices	0.0110
Long Ridge Energy Generation (OH-0375)	2017	Low NOx burner, FGR	0.0110
Hilltop (PA-0315)	2017	None	0.0110
Alabama Power Company, Plant Barry (AL-0328)	2020	None	0.0110 (3-hour average)
CPV Three Rivers (IL-0129)	2018	Ultra-low NOx burners, flue gas recirculation, air preheater, automated combustion system with O2 trim system and automated water	0.0110 (3-hour average)

Facility Name (RBLC ID)	Date of Issuance	Controls	NOx Emission Limit (lb/mmBtu)
		blowdown, good combustion practices	
Pallas Nitrogen (OH-0368)	2017	Low NOx burners, FGR	0.0125
TVA, Johnsonville (TN-0162 / TN-0164)	2016 / 2018	Low NOX burners, FGR, SCR, good combustion design and practices	0.0130
Motiva Polyethylene Manufacturing (TX-0904)	2020	Low NOx burners and SCR	0.0150 (1-hour) 0.0100 (annual average)
Chevron Phillips, Polyethylene Plant (TX-0888)	2020	SCR	0.0150 (1-hour) 0.0100 (annual average)
Jupiter Brownsville, Centurion (TX-0930 / TX-0930)	2021	Low NOx burners with SCR and CEMs	0.0150 (1-hour) 0.0100 (annual average)
Motiva, Port Arthur Ethan Cracker (TX-0904 / TX-0876)	2020	Low NOx burners and SCR	0.0150 (1-hour) 0.0100 (annual average)
Nacero Penwell Facility (TX-0933 / TX-0933)	2021	Low NOx burners	0.0150 (1-hr) 0.0100 (annual average) 0.0300
Lake Charles Methanol (LA-0305)	2016	SCR	0.0150
Robinson Power, Beech Hollow (PA-0314)	2017	None	0.0200
Trumbull Energy Center (OH-0370)	2017	Low NOx burners, FGR	0.0200
Oregon Energy Center (OH-0372)	2017	Low NOx burners, FGR	0.0200
Guernsey Power Station (OH-0374)	2017	Low NOx burners, FGR	0.0200
APV Renaissance Energy Center (PA-0319)	2018	Low NOx burners, flue gas recirculation, good combustion practices	0.0200
Shintech Louisiana, Plaquemine Ethylene Plant (LA-0352 / LA-0374)	2019	Low NOx burners, SCR, and good combustion practices	0.0210 (30-day)
Harrison Power (OH-0377 / OH-0377)	2018	Low NOX burner and good combustion practices	0.0270 0.0350
Riverview Energy (IN-0317)	2019	Ultra-low NOx burner	0.0300

Facility Name (RBLC ID)	Date of Issuance	Controls	NOx Emission Limit (lb/mmBtu)
Nucor Steel (AR-0171 / AR-0172)	2021, 2019, 2018	Low NOx burners	0.0350
Harrison Power (OH-0377 / OH-0377)	2018	Low NOX burner and good combustion practices	0.0270 0.0350
Monsanto Company, Luling Plant (LA-0323 / LA-0323)	2017	Ultra-low NOx burners	0.0350
Thomas Township Energy (MI-0442)	2019	Low NOx burners and good combustion practices	0.0360 (hourly)
DTE Electric, Belle River (MI-0435)	2018	Low NOx burners, flue gas recirculation	0.0360 (hourly)

In addition to low NOx burners, ultra-low NOx burners, and selective catalytic reduction control technology, which several of the above listed facilities have installed, the OTC also identified boiler tuning and optimization as an additional control method. EPA should lower its proposed emission limits for boilers, and consider whether certain control methods such as boiler tuning and optimization could be implemented earlier than 2026.The limit should apply on a 24-hour average, and CEMS must be required.

EPA should require boilers to comply with a NOx limit on a daily basis rather than on a 30-day rolling average.[335] As shown above, many boilers are already subject to more stringent limits on a shorter averaging period, even hourly. Commenters support EPA's proposal to require continuous emissions monitoring to ensure compliance.

F. EPA should consider reductions from units that emit less than 100 tpy of NOx.

EPA should also consider reductions from non-EGU units that emit less than 100 tons of NOx per year. While the proposed rule's approach is consistent with prior interstate transport rulemakings,[336] the agency has also considered non-EGU point sources with NOx emissions greater than 25 tpy.[337] In that analysis, the agency identified 438 gas turbines and 350 gas boilers across 37 eastern states with NOx emissions between 25 to 100 tpy, and found that those units had potential NOx reductions of 7,193 tons and 6,814 tons respectively (14,007 tons combined).[338]

EPA has statutory authority to consider these sources, as the Good Neighbor Provision extends to "any source or other type of emission activity" that significantly contributes to

[335] Non-EGU TSD at 63-68, EPA-HQ-OAR-2021-0668-0145.
[336] EPA, Technical Memorandum Regarding Assessing Non-EGU Emission Reduction Potential at 8, EPA-HQ-OAR-2020-0272-0014 (Sept. 2020).
[337] EPA, Assessment of Non-EGU NOx Emission Controls, Cost of Controls, and Time for Compliance Final TSD at 5, EPA-HQ-OAR-2018-0225-0023 (Aug. 2016).
[338] *Id.*

downwind nonattainment or interferes with downwind maintenance. The agency has also recognized that the problem of interstate ozone pollution is driven by "collective impacts of relatively small contributions."[339] For that reason, Commenters suggest that the Agency consider reductions available from units with NOx emissions greater than 25 or 50 tpy.

G. EPA must require reductions from non-EGUs earlier than 2026.

Additionally, EPA finds "that controls on all of the non-EGU emissions units cannot be installed by the 2023 ozone season."[340] For that reason, EPA looked to 2026. As described below, we agree with EPA's conclusion that non-EGUs can install the necessary controls by the May 1, 2026 compliance deadline. However, EPA has failed to explain why some non-EGU units should not be required to install controls sooner than 2026. Considering the variety of units and available control options, it seems likely that controls could be installed more quickly on many non-EGUs, if not all. Moreover, EPA has previously estimated installation/implementation times of 42-51 weeks for SNCR on cement kilns; 26-58 weeks for the installation of SCR, SNCR, Low-NOx Burners on boilers; and 6-8 months for low-NOx burners and flue gas recirculation at iron and steel mills.

The Clean Air Act requires that areas of the country attain and maintain the ozone standard "as expeditiously as practicable but not later than" the specified deadlines. *See* 42 U.S.C. § 7511(a)(1); *see also NRDC v. EPA*, 777 F.3d 456, 460 (D.C. Cir. 2014). Accordingly, upwind areas must also be required to eliminate their significant contributions "as expeditiously as practicable but not later than" downwind attainment deadlines, unless doing so is impossible. *See* 42 U.S.C. § 7511(a)(1); *Wisconsin*. EPA has not made or substantiated the claim that it would be impossible to achieve any non-EGU reductions before 2026, and that plainly is not the case. EPA must reconsider whether some or all non-EGU sources can install controls prior to 2026.

To the extent that EPA's 2016 installation/implementation estimates do not account for installation/implementation across multiple sources, and controls cannot be installed on all sources until 2026, EPA should consider requiring tiering of installation/implementation, such that controls are required at Tier 1 industries sooner than Tier 2 industries.

H. Allowing non-EGUs to extend their compliance deadline by a year is unlawful and unwarranted.

It would be unlawful and arbitrary for EPA to allow non-EGUs to extend their compliance deadline beyond May 1, 2026. *See* 87 Fed. Reg. at 20,104. As described above, EPA must require NOx reductions as expeditiously as practicable and not later than the deadlines for downwind attainment. Because "data from the calendar year prior to the attainment date . . . are the last data that can be used to demonstrate attainment with the [ozone standard] by the relevant attainment date," EPA must require NOx reductions by the ozone seasons preceding the downwind 2024 and 2027 attainment deadlines, or by May 2023 and May 2026. 83 Fed. Reg. at

[339] CSAPR Update, 81 Fed. Reg. at 74,581.
[340] Screening Assessment at 2, EPA-HQ-OAR-2021-0668-0150.

65,892; *see Wisconsin*, 938 F.3d 303, 313 (D.C. Cir. 2019). Non-EGUs can install the necessary controls by the May 1, 2026 compliance deadline—and in many cases, sooner.

XIX. EPA must set NOx limits for Municipal Waste Combustors.

EPA should require NOx reductions from municipal waste combustors ("MWCs" or "incinerators") in the final rule. These facilities emit high amounts of NOx, with large MWCs producing more NOx on average than even coal plants per unit of energy generated, and MWCs can achieve far lower NOx limits than the limits to which most facilities are currently subject. In addition, MWCs are often sited in economically marginalized communities and communities of color, subjecting residents of those neighborhoods to toxic emissions like lead, mercury, and dioxin in addition to NOx. Finally, large MWCs are already equipped with continuous emissions monitors for NOx, reducing one aspect of the cost of complying with new standards under a final EPA rule.

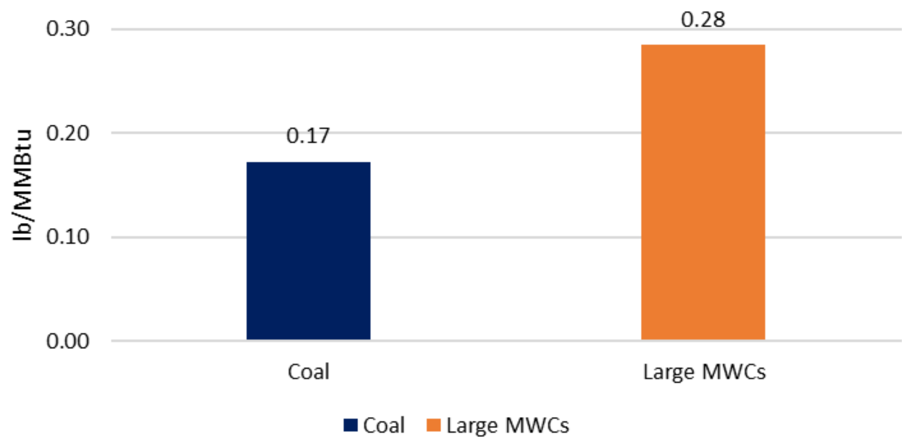
A. Incinerators are Very Large NOx emitters

Multiple analyses have shown that incinerators emit more NOx than coal plants per output generated (based on either megawatt-hours generated or heat input).[341] In 2017, NEI data shows that incinerators emitted about 65% more NOx per unit of heat input than coal-fired EGUs, with incinerators producing 0.28 lb/MMBtu of NOx compared with 0.17 lb/MMBtu NOx from coal plants.[342] This is illustrated in Figure XIX.1 below.

Figure XIX.1: Large Municipal Waste Combustors v. Coal EGUs, Average NOx Emission Rates (lb/MMBtu)

[341] *See, e.g.,* Environmental Integrity Project, Waste-to-Energy: Dirtying Maryland's Air by Seeking a Quick Fix on Renewable Energy? (Oct. 2011), https://environmentalintegrity.org/wp-content/uploads/2016/11/FINALWTEINCINERATORREPORT-101111.pdf.

[342] Emission rates were calculated for incinerators and coal-fired power plants using data from EPA's 2017 National Emission Inventory (NOx emissions) and the U.S. Energy Information Administration (EIA's) 923 Monthly Generation and Fuel Consumption Report. The analysis includes data from 53 incinerators and 235 coal-fired power plants. We excluded facilities if less than 90 percent of their net generation was attributable to either municipal solid waste or coal, based on the fuel type reported in EIA, if no NOx emission data was available, if the facility is a combined heat and power plant (i.e. produces both electricity and salable steam), or if the facility retired before the end of 2017. Some operators report facility data to NEI and EIA differently. For example, the Fort Smallwood EGU complex in Maryland is a single facility in NEI but reported separately as Brandon Shores and H A Wagner in EIA. In these cases, we combined fuel consumption and net generation, and calculated a collective emission rate.



In fact, in many of the nine transport states with both incinerators and EGU emissions budgets, NOx emissions from incinerators equate to a significant percentage of – or even more than – the EGU emission budgets. Comparing 2017 ozone season incinerator emission data from EPA's Non-EGU TSD[343] with the Proposed Rule's 2023 EGU emissions budgets, 87 Fed. Reg. at 20,044, tbl.I.B-1: New Jersey has *higher* MWC emissions than its entire EGU emission budget, while New York and Maryland have MWC emissions that exceed over half of their EGU emission budgets. By 2026, if EGU emissions reduce under the rule but incinerator emissions remain constant, an additional three states (Minnesota, Pennsylvania, and Virginia) would have incinerator emissions of 20-37% of their EGU emission budgets.

Table XIX.1: MWC Emissions Compared to EGU Emission Budgets

State	2017 MWC NOx Emissions (tons)	Estimated 2017 Ozone Season MWC NOx Emissions* (tons)	2023 Ozone Season EGU Emission Budget (tons)	2026 Ozone Season EGU Emission Budget (tons)
CA	654.5	268.8	(no EGU budget)	(no EGU budget)
IN	1,122.0	467.5	11,151	7,791
MD	1,542.9	642.9	1,187	1,189
MI	1,554.4	647.7	10,718	6,114
MN	2,279.7	949.9	3,921	2,536
NJ	2,162.1	900.9	799	799
NY	4,679.4	1,949.7	3,763	3,238
OK	518.5	216.0	10,265	4,275
PA	3,759	1,491.2	8,855	6,819
VA	2,071.7	863.2	3,090	2,567

343 Non-EGU TSD at 82–83, tbl.8, EPA-HQ-OAR-2021-0668-0145. Commenters have not conducted a comprehensive review of the information presented in Table 8, but we have noticed at least one item that requires correction. The Detroit Renewable Power facility in Michigan ceased operation in 2019. See, e.g., Aguilar, Louis, et. Al. *Detroit's controversial incinerator permanently shut down*, Detroit News, March 28, 2019, https://www.detroitnews.com/story/news/local/detroit-city/2019/03/27/detroits-controversial-incinerator-permanently-shutting-down-today/3287589002.

* 2017 Ozone Season MWC NOx Emissions estimated by multiplying 2017 MWC NOx Emissions by 5/12.

B. MWCs Harm Environmental Justice Communities

In addition to NOx, MWCs emit large amounts of health-harming toxic pollutants like lead, mercury, and dioxin into the air, often in economically marginalized communities or communities of color.

A 2019 report by the Tishman Environment and Design Center at The New School found that 79% of U.S. municipal solid waste incinerators are located in environmental justice communities, and that between eight to ten of the twelve incinerators that emit the most nitrogen oxides, sulfur dioxide, lead, mercury, particulate matter, and carbon monoxide are located in environmental justice communities, depending on the pollutant.[344]

MWCs are also recognized as large and problematic polluters within communities and states that house incinerators, including the ten states that house MWCs that EPA has identified as linked to downwind ozone impacts. In Maryland, the state's two large MWCs emit substantially more mercury per unit of energy generated than its largest coal-burning plants. In 2020, the Baltimore City large MWC emitted mercury at a rate 37 times higher than that of the average of the state's largest coal and gas-burning plants, while the Montgomery County large MWC emitted mercury at a rate 11 times higher than the fossil fuel-fired plants.[345] The large MWCs in the environmental justice communities of Newark and Camden, New Jersey, are the largest stationary-source emitters of NOx, PM2.5, HCl, lead, and mercury in their respective counties.[346]

C. EPA's Rule Must Not Arbitrarily Fail to Regulate MWCs

EPA's failure to include limits for MWCs in its proposed rule is the result of the Agency's arbitrary exclusion of MWCs from its screening analysis of non-EGUs. There is no basis for this exclusion, given the high NOx emissions from MWCs, and EPA must rectify this lapse by including limits for MWCs in the final rule. Further, EPA should not arbitrarily leave small MWCs - those with a waste burning capacity under 250 tons per day - unregulated. EPA should set NOx limits in the final rule for small MWCs except those whose operators can demonstrate the infeasibility of meeting the limit.

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344 Ana Isabel Baptista & Adrienne Perovich, *U.S. Municipal Solid Waste Incinerators: An Industry in Decline*, Tishman Env't and Design Ctr. at 15 & App. E (May 2019), https://static1.squarespace.com/static/5d14dab43967cc000179f3d2/t/5d5c4bea0d59ad00012d220e/1566329840732/CR_GaiaReportFinal_05.21.pdf.

345 Environmental Integrity Project, Testimony to Maryland House Economic Matters Committee in Support of HB11 at 1, https://environmentalintegrity.org/wp-content/uploads/2022/05/FINAL-EIP-2022-Testimony.pdf

346 Earthjustice & Vermont Law School Environmental Advocacy Clinic, *New Jersey's Dirty Secret: The Injustice of Incinerators and Trash Energy in New Jersey's Frontline Communities* at 9, https://earthjustice.org/sites/default/files/files/nj-incinerator-report_earthjustice-2021-02.pdf.

i. EPA Has Arbitrarily Excluded MWCs from its Screening Assessment

EPA's unexplained, unwarranted exclusion of incinerators from its Screening Assessment – and therefore, from any proposed regulation in the Proposed Rule – is arbitrary, and the final rule must assess and regulate incinerator emissions. EPA's threshold criteria for considering a non-EGU industry sector in its Screening Assessment is that the sector includes "emissions units that emit greater than 100 tons per year (tpy) of NOx" and that these are "uncontrolled sources or sources that could be better controlled at a reasonable cost." 87 Fed. Reg. at 20,083. Incinerators meet both these criteria. Over 90% of the incinerators in transport states emit over 100 tpy of NOx, with a per-facility average of 473 tpy of emissions.[347] And the Proposed Rule cites Ozone Transport Commission findings that incinerators could be better controlled at costs well within the Proposed Rule's cost effectiveness threshold. 87 Fed. Reg. at 20,086. Incinerators thus easily meet EPA's threshold criteria for the screening assessment.

But instead of analyzing incinerators in the Screening Assessment, EPA baselessly excludes this entire industry from the assessment. The Screening Assessment's only mention of incinerators is an introductory footnote that "The non-EGU 'sector' . . . does not include municipal waste combustors (MWC), cogeneration units, or <25 MW EGUs."[348] EPA provides no explanation of why it entirely excludes an industry that the Proposed rule admits "emit[s] substantial amounts of NOx." 87 Fed. Reg. at 20,085. To the extent that the footnote suggests that EPA does not consider incinerators to be "non-EGUs" because many of them do produce electricity, that is no rationale given that EPA expressly excludes incinerators from its regulation of EGUs.[349] Just because incinerators share characteristics of both the EGU and non-EGU sectors does not mean that they can avoid regulation altogether.

Indeed, EPA's exclusion of incinerators from the Screening Assessment and from proposed regulation is particularly arbitrary given that incinerators emit *more* NOx than nearly all of the 41 other non-EGU industries that EPA *did* screen and consider. EPA's supporting documents show that incinerators in transport states emit more NOx than what EPA predicts all but seven of the 41 analyzed industry categories emit.[350] And looking at the absolute number of facilities in transport states that emit 100 tpy or more of NOx, incinerators outnumber other

[347] Non-EGU TSD at tbl. 8, EPA-HQ-OAR-2021-0668-0145 (showing 39 of 43 incinerators with over 100 tpy of NOx emissions in 2017).
[348] Screening Assessment at 1, n.1, EPA-HQ-OAR-2021-0668-0150..
[349] *See* 87 Fed. Reg. at 20,085 ("The electrical output of MWCs is relatively small compared to the EGUs that will be regulated per the proposed requirements of Section VII.B of this proposal, with most MWCs having an electrical output capacity of less than 25 MW.").
[350] Compare Non-EGU TSD at 81 ("[I]n 2017[,] 20,344 tons of NOx were emitted from MWCs in the ten transport states containing them," then multiply 20,344 tons by 5/12 to estimate the 5 months of ozone season emissions, yielding 8,476.7 tons), with Screening Assessment at 25 tbl.A-3 (showing only seven industries with "ozone season emissions" in 2023 above 8,476.7 tons).

categories of facilities for all but five of the other industries analyzed.[351] It is arbitrary for EPA to fail to propose MWC emission limits when it did propose limits on industries with much less NOx impact – EPA must rectify this by including incinerator limits in the final rule.

ii. EPA Should Not Arbitrarily Fail to Set Limits for Small MWCs

EPA should set NOx limits for all MWCs in transport states, such as those listed in Table 8 of EPA's Technical Support Document ("TSD") for non-EGUs, including those that do not meet the 250 ton-per-day capacity threshold for large MWCs from CAA Section 129. *See* 42 U.S.C. § 7429(a)(1)(B), (C). Congress's choice of capacity threshold between large and small MWCs in Section 129 has no bearing on whether an incinerator must be regulated under the CAA Good Neighbor Provision. And EPA has not promulgated *any* enforceable NOx emission limit for facilities below this threshold under Section 129,[352] so NOx from these smaller facilities will continue to be entirely unregulated unless EPA imposes an emission limit in the final rule. Such an emission limit would increase NOx reductions and capture MWC units with capacity just below the threshold, like New York's Dutchess County Resource Recovery facility, which has a capacity of 242.2 tons per day.

Under Commenters' recommended approach, described below, the operators of smaller MWCs will have the opportunity to demonstrate that they are unable to meet the limit at or below EPA's final cost-effectiveness threshold and to accept the lowest possible limit based on that threshold.

D. The Final Rule Should Set a MWC NOx Limit of 50 ppm on a 24-Hour Average.

EPA must set a 24-hour NOx emission limit of 50 parts per million dry volume @ 7% O2 ("ppm") for MWCs based on selective catalytic reduction technology, which is the technology needed to ensure this high-emitting sector stops contributing to downwind ozone pollution. In the alternative, EPA should set a 24-hour emission limit no higher than 110 ppm based on less effective, though still widely available, control technology. It has been demonstrated that many kinds of MWCs can meet a 24-hour limit of 110 ppm by operating cost-effective NOx controls.

i. It is Critical that EPA Set a Short-Term Limit for Incinerators.

As a threshold matter, Commenters consider it imperative that EPA establish a NOx limit for MWCs that is measured on an averaging period of 24 hours or shorter. As described in more detail in the sections below, it has been well demonstrated that almost all large MWCs can meet a much more stringent 24-hour limit than the one to which most units are currently subject. A 24-

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[351] Compare Non-EGU TSD at 82-83, tbl.8, EPA-HQ-OAR-2021-0668-0145 (listing 39 incinerators in transport states with emissions above 100 tpy) with Screening Assessment at 25 tbl.A-3, EPA-HQ-OAR-2021-0668-0150 (showing only 5 of the 41 industries listed as having more than 39 facilities in transport states that emit over 100 tpy of NOx).

[352] "[W]aste combustion plants with an aggregate plant combustion capacity less than or equal to 250 tons per day of municipal solid waste . . . do not have a nitrogen oxides emission limit." 40 C.F.R. § 60.1045(a)(2), (b)(1). "No monitoring, testing, recordkeeping, or reporting is required to demonstrate compliance with the nitrogen oxides limit for [these] units." 40 C.F.R. Pt. 60, Subpt. AAAA, tbl. 1; *see also id.* Pt. 60, Subpt. BBBB, tbl. 4 (same).

hour limit will help to reduce the likelihood that the substantial NOx emissions from MWCs will contribute to a spike in ozone, which is measured on an eight-hour average for the 2015 ozone standard. This is particularly important for MWCs to prevent dangerous, shorter-term spikes in emissions.

ii. EPA Should Establish A 24-Hour NOx Limit of 50 ppm for MWCs.

EPA should establish a 24-hour NOx limit of 50 ppm based on selective catalytic reduction ("SCR") technology for incinerators. SCR is a widely available technology that, as the Proposed Rule notes, already is in use in 60% of the coal fleet, and has been considered Best Available Control Technology ("BACT") for decades. 87 Fed. Reg. at 20,080. The Ozone Transport Commission's revised Municipal Waste Combustor Workgroup Report ("Final OTC MWC Report") – whose prior version is discussed in the Proposed Rule – notes that the Palm Beach Renewable Energy Facility uses SCR and has a permitted emission limit of 50 ppm – both of which were considered BACT during the permitting process in 2010.[353] The Final OTC MWC Report also notes that analyses of installing SCR at three other existing MWCs also assumed emission rates of 50 ppm.[354]

The Final OTC MWC Report presents results from third-party studies of SCR installation and use costs of $10,296/ton to $12,779/ton (Wheelabrator Baltimore), $15,898/ton (Covanta Fairfax), and $31,445/ton (Covanta Alexandria/Arlington).[355] While these estimates vary, the lowest estimate (Wheelabrator Baltimore) is most analogous the $11,000/ton weighted-average cost for new SCRs of for coal units that EPA finds acceptable in the Proposed Rule. 87 Fed. Reg. at 20,081. As described in more detail below, the accuracy of the Wheelabrator Baltimore estimate appears to depend on what the cost is of operating the current control system on the Baltimore incinerator and we request that EPA ask for information to verify that cost.

These SCR emission controls are necessary to prevent interstate ozone transport, especially from upwind states like New Jersey where incinerators make up a significant percentage of NOx emissions but where the Rule, as proposed, would result in little to no NOx emission reductions. EPA predicts that New Jersey will continue to significantly contribute to downwind receptors in 2026, with contributions of up to 8.54 ppb for downwind nonattainment receptors and 5.47 ppb to downwind maintenance receptors that year, higher than the contributions of all but a handful of other states. 87 Fed. Reg. at 20,071, tbl.V.E.1-2. Yet EPA does not propose measures necessary to reduce this contribution, requiring no reductions from New Jersey's non-EGU sector and no reductions in the state's EGU emission budget after 2023. *See id.* at tbl. I.B-1 and tbl. VI.C.2-2. EPA should therefore look to emission reductions from incinerators to eliminate New Jersey's significant contributions to interstate ozone. But all four of New Jersey's currently operating incinerators are already equipped with SNCR systems, and the state's two largest incinerators – responsible for nearly 70% of the state's incinerator NOx

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[353] Ozone Transport Commission Stationary and Area Sources Committee, Municipal Waste Combustor Workgroup Report, Revised April 2022, at 60-61, https://otcair.org/upload/Documents/Reports/MWC%20Report_revised%2020220425.pdf [hereinafter, "Final OTC MWC Report"].

[354] *Id.*

[355] *Id.*

emissions[356] – are equipped with the additional Low NOx systems that are the basis of the 100 ppmvd (24-hour) limit EPA raised in the Proposed Rule.[357] Thus, for the Rule to make meaningful reductions in – let alone eliminate – New Jersey's significant 8.54 ppb contribution to downwind receptors, EPA must go beyond the technology already in place in New Jersey's largest incinerators, and instead require SCR technology and a 50 ppm (24-hour) limit.

EPA cannot discount SCR technology for incinerators merely because it may exceed EPA's cost-effectiveness threshold for non-EGUs. That threshold was determined by finding the "knee in the curve" of a plot of various control measures for EPA's Tier 1 and Tier 2 industries *only*, and so did not consider cost estimates specific to the incinerator industry.[358] And as noted above, EPA has cautioned that this knee in the curve "is not on its own a justification for not requiring reductions beyond that point in the cost curve," and EPA has previously required controls that exceeded this knee in the curve.[359] Indeed, states subject to this Rule have their own cost-effectiveness thresholds of up to $18,983/ton NOx,[360] which are more than high enough to accommodate SCR costs for incinerators.

iii. In the Alternative, EPA Should Establish a 24-Hour NOx Limit of 110 ppm for MWCs.

Assuming that EPA does not require a 50 ppm limit based on SCR – which it should do – EPA should require that MWCs meet a 24-hour NOx limit of no more than 110 ppm. Recent studies have shown that there are a variety of technologies that can help a wide range of MWC boiler types achieve this limit at costs that are significantly below the $7,500/ton cost effectiveness threshold in EPA's Proposed Rule.

1. Covanta facilities

As noted in the Final OTC MWC Report, there are eight Covanta large MWC units already subject to a 24-hour limit of 110 ppm, with significantly different size, boiler type, and manufacturers. These facilities have achieved this by installing Covanta's patented Low NOx system on facilities in combination with SNCR.[361] Two of these are Covanta large MWCs located in Virginia, which were required to meet limits of 110 ppm on a 24-hour basis and 90 ppm on an annual average pursuant to the Virginia Department of Environmental Quality's ("VADEQ's") decision regarding Reasonably Available Control Technology ("RACT")

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[356] This percentage calculated using 2017 NOx emission data from Non-EGU TSD Table 8 for all New Jersey MWCs except the Covanta Warren Energy Resource Center, which is no longer operating. *See* Steven Novak, *Covanta has shut down its Warren County trash incinerator. But it might not be permanent.*, Lehighvalley.com (Apr. 4, 2019), https://www.lehighvalleylive.com/warren-county/2019/04/covanta-has-shut-down-its-warren-county-trash-incinerator-but-it-might-not-be-permanent.html.
[357] *See* Final OTC MWC Report App.B at 35-36.
[358] *See* Screening Assessment at 4, EPA-HQ-OAR-2021-0668-0150.
[359] *See supra* Section X.A (quoting 86 Fed. Reg. at 23,107).
[360] *See supra* Section X.B.
[361] Final OTC MWC Report at 16.

requirements.[362] The cost-effectiveness of meeting the new 110 ppm daily limits was estimated by OTC, based on information submitted during Virginia's RACT process, as $3,204 per ton for the Fairfax facility and $4,639 per ton for the Alexandria/Arlington facility.[363]

In addition, though it is not currently subject to a 110 ppm permit limit, the Montgomery County Resource Recovery Facility ("MCRRF") in Maryland also operates Covanta's Low NOx technology installed in combination with SNCR. The Low NOx system was added in 2008-2010. As shown in Table 1 below, this reduction in NOx emissions was achieved while plant operations remained relatively constant.

Table XIX.2: MCRRF NOx Emissions and Operating Data 2006-2015[364]

Year	**NOx emissions** (tons)	**Waste processed** (tons)	**% capacity** (waste burning)	**Power generated** (megawatt hours)
2006	1,041	620,666	94%	371,971
2007	1,009	578,804	88%	343,955
2008	998	573,293	87%	331,055
2009	554	527,623	80%	282,170
2010	499	551,670	84%	303,075
2011	512	556,266	85%	308,150
2012	479	544,647	83%	310,008
2013	388	555,716	85%	312,539
2014	427	Not available	Not available	315,450
2015	441	599,250	91%	Not available

MCRRF's annual average NOx emissions from 2006-2008 were 1,016 tons per year. After the installation of the new Low NOx controls, during the period from 2009 through 2011, average NOx emissions were 522 tons per year. This is an average reduction of 494 tons per year

[362] *See* VADEQ February 8, 2019 letters to Covanta with NOx RACT permit conditions, attached as Ex. VA 1 (Fairfax facility and Alexandria/Arlington facility); *see also* EPA, Approval and Promulgation of Air Quality Implementation Plans; Virginia; Source-Specific Reasonably Available Control Technology Determinations for 2008 Ozone National Ambient Air Quality Standard, 84 Fed. Reg. 67196, 67197 (Dec. 9.2019).

[363] Final OTC MWC Report at 20,21.

[364] Emissions data from Maryland Emissions Inventory, obtained by the Environmental Integrity Project ("EIP") through public record requests. EIP will provide the data to EPA upon request. Capacity and power generation data from Northeast Maryland Power Waste Disposal Authority ("NMWDA") website at http://nmwda.org/montgomery-county/,except for 2014 power generation data from U.S. Energy Information Administration ("EIA") and 2015 waste processing data from Maryland Department of the Environment PowerPoint presentation dated August 30, 2016 on NOx RACT for Large MWCs.

or 48.6% of emissions. EPA also noted at the time that the technology "demonstrated a reduction of NOx emissions by approximately 50 percent from pre-installation levels."[365]

Further, based on current NOx CEMS data from the MCRRF, OTC states conclusively that this facility can meet a 24-hour NOx limit of 110 ppm, explaining:

> Maryland's NOx RACT also required a NOx 30-day rolling average emission rate of 105 ppmvd @7% O2 to be met beginning on May 1, 2020. Since that time, the peak 24-hour average recorded has been on the order of 103 ppmvd @7% O2. The facility is capable, and further demonstrates, meeting a 110 ppmvd 24-hour limit. Information from a Montgomery County Resource Recovery NOx optimization study found that ammonia slip is below 5 ppm for all units with LNTM technology with SNCR and with NOx emissions of 66 ppm and higher.[366]

If EPA wishes to review the NOx CEMS data from MCRRF itself, that data is available online.[367]

During the OTC process, Covanta representatives submitted comments noting that the Low NOx technology cannot be installed on certain of its facilities, including those that use Aireal grate technology, those that operate RFD units, and those that use rotary combustor units.[368]

However, even incinerators that don't use Low-NOx technology may be able to meet the 110 ppm limit with SNCR only. Covanta's Delaware Valley Resource Recovery Facility in Pennsylvania, for example, uses rotary combustors but has no NOx controls whatsoever. Nevertheless, its per-unit maximum 24-hour NOx emissions over the past 6 years ranged from 122 ppm to 172.5 ppm, so 110 ppm may be achievable with the installation of SNCR or other cost-efficient NOx controls. Covanta has already committed to a voluntary trial of SNCR at one of the units on this incinerator. [369]

In summary, it appears that the majority of Covanta units should be able to achieve a 24-hour limit of 110 ppm and those that are legitimately unable to meet this limit should be afforded the opportunity to submit facility-specific information demonstrating that the limit is infeasible for the facility in question.

2. Babcock Power study on Wheelabrator Baltimore facility

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365 U.S. EPA, Clean Air Excellence Award Recipients: Year 2014 at 1, https://www.epa.gov/sites/production/files/2015-06/documents/clean_air_excellence_award_recipients_year_2014.pdf.
366 Final OTC MWC Report at 15.
367 Montgomery County Department of Environmental Protection, Emissions Data Detail – Resource Recovery Facility, https://www.montgomerycountymd.gov/sws/facilities/rrf/cem-detail.html.
368 Excerpt from Comments from OTC MWC Stakeholder and OTC Responses at 7, attached as Ex. OTC 1 [hereinafter, "OTC Responses"]. In OTC's recap, it appears that Covanta stated that two of its Pennsylvania facilities use rotary technology, though the Final OTC MWC Report identifies only one facility in PA that uses this boiler type. *See* Final OTC MWC Report at 37
369 OTC Responses at 8.

Further, a report completed in 2020 assessing options for reducing NOx at the Wheelabrator incinerator in Baltimore City demonstrates that Covanta-operated facilities are not the only ones that can achieve a 110 ppm NOx limit on a 24 hour basis.[370]

In this study, vendors evaluated the control efficiency and costs of several technology options for reducing NOx at the Wheelabrator facility in Baltimore. The cost-effectiveness of the technologies was summarized in the final OTC report issued in April 2022 and includes a technology capable of achieving a 24-hour limit of 110 ppm at a cost of either $3,883/ton or around $6,000/ton depending on which set of assumptions is used, as discussed in more detail below.[371]

Thus, there is ample evidence that multiple types of large MWCs can achieve a 24-hour limit of 110 pm at costs well below EPA's proposed cost-effectiveness threshold for non-EGUs of $7,500 per ton.

E. Responses to Additional EPA Questions in Proposed Rule regarding Municipal Waste Combustors

In addition to the comments above, Commenters provide the direct responses below to EPA's list of six questions about regulating MWC NOx in the Proposed Rule.[372]

> EPA Question: What NOx emissions limit and averaging time should MWCs be required to meet, and in particular should the EPA adopt emissions rates of 105 ppmvd on a 30-day averaging basis and 110 ppmvd on a 24-hour averaging basis?

Response:

As explained in detail in Section XIX.D above, EPA should prioritize a 24-hour NOx limit, and set this 24-hour limit at 50 ppm.

> EPA Question: What types of NOx control technology could be used to reduce NOx emissions at MWCs, and in particular should the EPA adopt the combustion control modifications made to units with previously installed SNCR identified by the MWC workgroup?

Response:

As explained in detail in Section XIX.D above, EPA should set emission limits based on assumed installation of SCR technology. SCR is widely used in the industrial sector and currently installed at the Palm Beach Renewable Energy Facility to meet a 50 ppm NOx emission limit.

> EPA Question: Whether there is information that would call into question the OTC workgroup's estimated cost of controls for reducing NOx emissions from MWCs of

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[370] Waste to Energy NOx Feasibility Study Prepared for Wheelabrator Technologies Baltimore Waste to Energy, Baltimore, Maryland, BPE Project No. 100825 (February 20, 2020), attached as Ex. BPS 1 [hereinafter, "Babcock Power Study for Wheelabrator Baltimore Incinerator"].

[371] Babcock Power Study for Wheelabrator Baltimore Incinerator at 22, 63. The cost identified in Table 8 on page 22 of the report is $6,159/ton. However, as described in more detail below, that table overestimates pollution control operating costs.

[372] Revisions to the California State Implementation Plan, Bay Area Air Quality Management District and Imperial County Air Pollution Control District, 66 Fed. Reg. 20086 (Apr. 19, 2001).

> $2900 to $6600 per ton, and, assuming that range is accurate, whether there is any justification for not requiring these controls in light of their relative cost-effectiveness and total level of reductions available, which compare favorably with the proposed EGU and non-EGU control strategies?

Response:

There is no justification for failing to set limits for large MWCs that are at least as strong as the limits of 110 ppm on a 24-hour average and 105 ppm on a 30-day average that are identified in the OTC report so long as the operators of individual facilities are given the opportunity to submit facility-specific information demonstrating that a particular MWC is unable to meet the limit.

Commenters expect that industry may submit comments stating or implying that MWCs should not have to incur additional costs because of their ostensibly important role in energy and waste management systems. This is not correct. As explained above, as an energy source, large MWCs are more polluting than coal per unit of heat input for certain pollutants, including NOx. In addition, incineration should not be encouraged as a waste management approach. MWC industry representatives frequently claim that incineration is environmentally friendly because it avoids the generation of landfill methane emissions. This argument ignores that incinerators are themselves greenhouse-gas emitters,[373] not to mention emitters of various criteria pollutants and hazardous air pollutants, and generators of potentially toxic ash that itself must be appropriately disposed of at landfills. While reduction of landfill methane is extremely important, EPA must achieve this in other ways, specifically by ramping up programs for waste diversion and requiring improved emission control systems at landfills.

In addition, it appears that OTC overestimated the upper end of the cost-effectiveness range, based on existing materials, of achieving a 24-hour limit of 110 ppm. The upper end of the range for achieving this limit is based on the Babcock Power study on the Wheelabrator Baltimore facility. Using information from this report, OTC estimated in one table, Table 8, that the cost-effectiveness of achieving a 110 ppm limit on a 24-hour basis is $6,159/ton.[374] However, this number improperly includes the entire cost of operating the technology associated with that limit, rather than the incremental cost of altering the current control system to achieve the lower limit.

A proper analysis would use the same baseline for calculating emission reductions and costs. In Table 8, emission reductions are calculated using a baseline emissions limit of 150 ppm on a 24-hour average, the limit to which the Baltimore incinerator has been subject since May 2019,[375] which is achieved using an SNCR system. The cost of operating this system in a manner that meets the baseline 150 ppm limit must be subtracted from the cost of operating technologies to achieve further reductions. However, Table 8 incorporates the entire cost of operating the Advanced SNCR system associated with the 110 ppm limit.[376] This cost, $995,000 per year, is

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[373] *See* U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2018, at 2-3 (2020), https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf (noting incinerators emitted 11 million tons of carbon dioxide in 2018).
[374] Final OTC MWC Report at 22.
[375] COMAR 26.11.08.10(B).
[376] Id.

clearly identified in the original Babcock Power study as the entire cost, not the incremental cost, of operating Advanced SNCR.[377]

The only baseline cost information provided in the Babcock Power study is $695,000 for operating the existing SNCR. However, it is not clear from the Babcock Power study whether this cost is associated with a baseline 150 ppm or 135 ppm limit.[378] If this is the cost of meeting the current 150 ppm limit, then the cost-effectiveness table on page 63 of the Final OTC Report is approximately correct. This table identifies a cost of $3,883 per ton of achieving a 110 ppm limit using Advanced SNCR.[379] If $695,000 is the operating cost of meeting a 135 ppm limit, then the incremental cost of going from 135 to 110 ppm using Advanced SNCR is about $6,067 per ton. [380]

We urge EPA to request additional information from the incinerator's owner, WIN Waste (formerly Wheelabrator) and/or Babcock Power, the company that performed the study, on the current costs of operating the SNCR system to achieve the 150 ppm limit. Commenters are also concerned about the capital costs estimated in the Babcock Power study for the Advanced SNCR technology associated with achieving 110 ppm and recommend that EPA request a breakdown of the capital costs for that technology. Commenters will also seek this information, particularly

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[377] Babcock Power Study for Wheelabrator Baltimore Incinerator at 29.
[378] See id.
[379] Final OTC MWC Report at 63.
[380] A revised cost table for Advanced SNCR, based on Table 8 of the Final OTC White Paper but using internally consistent baseline information for Optimized SNCR from the Babcock Power Study is provided below.

	Advanced SNCR
Capital Costs	$8,665,162
Annual Operating Costs	**$300,000**
Annualized Capital Costs	$817,930
Projected Lifetime (yr)	20
Interest Rates (%)	7%
Total Yearly Costs	**$1,117,930**
Base Case NOx (ppm)	**135**
Controlled NOx (ppm)	110
Estimated NOx Reduction Factor	**0.185**
Estimated NOx Reduction (%)	**18.5**
Baseline NOx Emission (tons/yr)	**993.38**
Projected Controlled NOx Emissions (tons/yr)	**809.38**
Emission Reduction (tons/yr)	**184**
Cost effectiveness ($/ton)	**$6,067**

then baseline cost of operating the existing SNCR at the Baltimore incinerator, and will provide it to EPA if we obtain it.

Lastly, if industry raises increases in urea costs as it did during the OTC process, we urge EPA to require information relating to current urea costs, as many facilities already operate SNCRs and incur costs for its use.

> EPA Question: If the final FIP includes emission reduction requirements for MWCs, should any mechanism be available by which a particular MWC source could seek to establish that meeting the required emission limits is not feasible?

Response:

Yes. MWC operators should be allowed to submit facility-specific information demonstrating that a particular MWC cannot meet the new limits at or below the cost-effectiveness threshold in EPA's final rule. If EPA, after evaluation of the materials, determines that the MWC at issue cannot meet the limit at that cost/ton, then the MWC should be required to meet the lowest 24-hour limit that *can* be achieved at the cost threshold.

Among other things, EPA should require an MWC operator who seeks to avoid the FIP limits to submit the following in order to demonstrate that the units cannot meet the limit: (1) costs of operating the current NOx control system, including current urea or ammonia usage; (2) NOx CEMS data showing trends over the last 5 years; (3) information supporting costs and effectiveness of installation of the controls discussed in the Babcock Power study; and (4) if insufficient room for new technology is offered as a reason for infeasibility, facility blueprints or schematics. In addition, to increase transparency, EPA should post online requests submitted by MWC operators for an EPA determination that it is infeasible to meet the FIP limit as well as EPA's determinations letters.

> EPA Question**:** Is there any evidence that retrofit of MWC emission controls would take longer to implement than the 2026 ozone season?

Response:

The information submitted with the Babcock Power study suggests the following retrofit schedules from the start of engineering through commissioning and shows that retrofit of MWC emission controls would not take longer to implement than the 2026 ozone season:

Table XIX.3: Technology Retrofit Schedules Based on Babcock Power Study[381]

Control Technology	Schedule
Optimizing Existing SNCR	2 months
Flue Gas Recirculation (FGR) + Existing SNCR	16 months
Advanced SNCR	11 months
FGR + Advanced SNCR	16 months
SCR	18 to 26 months (depending on type)

[381] Babcock Power Study, Appendix A-1 (Preliminary Schedule).

EPA Question: Would it be appropriate to rely on existing testing, monitoring, recordkeeping, and reporting requirements for MWCs under the applicable NSPS or other requirements?

Response:

All large MWCs are already required to use continuous emissions monitoring systems ("CEMS") to demonstrate compliance with NOx limits.[382] This is yet another reason that EPA should require NOx reductions from this sector in the final rule.

EPA should improve electronic reporting requirements, however, beyond current requirements in the NSPS. An owner or operator of an MWC that is subject to a limit under the final rule should be required to report NOx CEMS data electronically at least annually to EPA's Compliance and Emissions Data Reporting Interface ("CEDRI") and any other database that EPA will utilize when considering revisions to the NSPS for large MWCs. In addition, MWC operators should be required to report NOx CEMS data to EPA's Clean Air Markets database, which will allow the public access to MWC CEMS data on a large scale for the first time.

XX. EPA should consider reductions from mobile sources and indirect sources.

A. Mobile sources.

While stationary sources, including power plants, drive much of the interstate ozone problem, mobile sources are now the largest contributor of ozone-forming pollution in many areas of the country. In Texas, for example, nitrogen oxide emissions from power plants and other stationary industrial sources remain significant, but emissions from mobile sources make up nearly half of all nitrogen oxide emissions.[383] Industrial sources include: petroleum and related industries; chemical and allied product manufacturing; metals processing; industrial fuel combustion; other industrial processes; other fuel combustion; solvent utilization; and storage and transport. Other includes: miscellaneous, and fires.[384]

In Dallas/Fort Worth and Houston, mobile emissions may be even more pronounced. For the Dallas/Fort Worth area, TCEQ estimates that 77% of emissions of nitrogen oxides and 23% of emissions of volatile organic compounds are from mobile sources.[385] For the Houston area, TCEQ estimates that 63% of the area's emissions of nitrogen oxides and 20% of the area's

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[382] *See, e.g.*, 40 C.F.R. §§ 60.38b(a), 60.58b(b).
[383] *See* EPA Air Pollutant Emissions Trends Data (2018), available at: https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data.
[384] For more information, see EPA Procedures Document for National Emission Inventory Criteria Pollutants at tbl. 4.1-2 (Mar. 2001), available at https://www.epa.gov/sites/default/files/2015-07/documents/aerr_final_rule.pdf.
[385] TCEQ, Texas Emissions Sources – A Graphical Representation, https://www.tceq.texas.gov/airquality/areasource/emissions-sources-charts (last visited Nov. 18, 2021).

emissions of volatile organic compounds are from mobile sources.[386] Reducing emissions from mobile sources is key to reducing ozone pollution in many environmental justice communities across the country, including those in Texas.

In addition to requiring reductions of nitrogen oxides from power plants and other stationary sources, EPA should require emissions reductions from mobile sources. EPA should begin by adopting, in its separate rulemaking, the strongest possible update to the national mobile source emissions standards applicable to vehicles, including medium and heavy-duty trucks, that is justified by the science and the law. EPA should also adopt a strong next rule on passenger vehicles that moves the nation towards 100% of new passenger vehicles being zero-emissions by 2035. And EPA needs to strengthen old, outdated standards for a several categories of non-road engines, including locomotives and ocean-going vessels.

EPA should also consider acting under the Good Neighbor provision to establish a budget for mobile source emissions of ozone precursors in upwind states. The Clean Air Act already requires nonattainment and maintenance areas to establish budgets for mobile source emissions, to which their transportation plans must conform. 40 C.F.R. § 93.118. A similar approach can be adopted under the authority of the Good Neighbor provision, which extends to emissions from "any source or other type of emissions activity," 42 U.S.C. § 7410(a)(2)(D) (emphasis added), including mobile sources. EPA should also require transportation control measures under the authority of the Good Neighbor Provision to reduce interstate ozone pollution. Improved public transit, walkability, and bicycle infrastructure, *see* 42 U.S.C. § 7408(f), would benefit communities overburdened with mobile source emissions, as well as communities downwind.

Reducing emissions from mobile sources to reduce ozone pollution will have cumulative benefits to environmental justice communities, by reducing particulate matter pollution; reducing volatile organic compounds, including carcinogens and other hazardous air pollutants; and reducing greenhouse gases which fuel climate change.

B. Indirect sources.

EPA's previous ozone transport rules have also overlooked another large source of nitrogen oxides: freight facilities, including marine ports and railyards. The nitrogen oxide emissions associated with these facilities are on par with those from coal-fired power plants.[387] However, the importance of these facilities is typically obscured by the way emissions inventories are organized, because their emissions are lumped in with all other mobile source emissions. But this approach ignores that mobile source operations and their emissions are

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[386] *Id.*

[387] *See* Port of Los Angeles Inventory of Emissions 2005 at 7 (Sept. 2007), https://kentico.portoflosangeles.org/getmedia/59baf614-fdfe-4cfa-9d58-3032d32583d7/2005_Air_Emissions_Inventory_Full_Doc (reporting annual NOx emissions of 17,389 tons); Port of NY & NJ Port Dep't, 2019 Multi-Facility Emissions Inventory (Dec. 2020), available at: https://www.panynj.gov/port/en/our-port/sustainability/air-emissions-inventories-and-related-studies.html (reporting 2019 annual NOx emissions for New York-New Jersey Port authority of 5,311 tons).

concentrated at these facilities, often in disadvantaged communities, and ignores the many ways that the design and operation of these stationary facilities can affect the related nitrogen oxide emissions.

The Clean Air Act recognizes that these mobile source "magnets," or indirect sources,[388] are potential targets for regulation, but limits EPA's authority to adopt national indirect source review rules. *See* 42 U.S.C. § 7410(a)(5)(A)(ii). The ozone transport rule, however, provides an important opportunity for EPA to address these sources. Clean Air Act section 110(a)(5)(B) provides:

> The Administrator shall have the authority to promulgate, implement and enforce regulations under [CAA section 110(c)] respecting indirect source review programs which apply only to federally assisted highways, airports, and other major federally assisted indirect sources and federally owned or operated indirect sources.

Id. § 7410(a)(5)(B). Many of the largest freight facilities receive some form of federal assistance and are ripe for regulation under the ozone transport rule.[389]

Regulation of these sources has the potential to provide significant reductions in nitrogen oxides and transported ozone pollution. There are a variety of ways that an indirect source review rule could be designed to control the way facilities are operated or built to reduce nitrogen oxide emissions, even while boosting efficiency. For example, strategies, such as intelligent dispatch systems or simple prohibitions, can minimize idling of vessels, trucks, and equipment. Strategies that require investment in infrastructure to support the use of zero-emission technologies can eliminate mobile source emissions both at the facility and beyond. The South Coast Air Quality Management District recently adopted an indirect source review rule to address emissions associated with warehouse operations.[390] Including indirect source measures in ozone transport rules can provide nitrogen oxide emission benefits and serve as a model for states interested in addressing these indirect sources themselves.

C. Mobile source measures are cost-effective.

Both transportation control measures, as listed in CAA section 7408(f)(1)(A), and indirect source review of federally funded projects, as authorized under section 7410(a)(5)(B), offer cost-effective opportunities for NOx mitigation. For instance, EPA could include in its FIP carsharing programs that encourage the use of public transit. *See* 42 U.S.C. § 7408(f)(1)(A)(xiv) (listing as a transportation control measure "programs . . . to generally reduce the need for single-

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[388] The Act defines an indirect source as "a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution." 42 U.S.C. § 7410(a)(5)(C).
[389] For example, the list of DERA grant awards includes a number of marine ports across the country. *See* EPA, *National DERA Awarded Grants*, https://www.epa.gov/dera/national-dera-awarded-grants (last visited Nov. 18, 2021).
[390] *See* South Coast Air Qual. Mgmt. Dist. Rule 2305, *available at* http://www.aqmd.gov/docs/default-source/rule-book/reg-xxiii/r2305.pdf?sfvrsn=15.

occupant vehicle travel”).[391] An illustrative carsharing program assuming the purchase and use of 500 vehicles for 5 years could reduce more than 11 tons of NOx per year with a cost-effectiveness of about $19,020/ton.[392]

As part of an indirect review program for federally assisted facilities, EPA could require intermodal freight facilities, to reduce heavy-duty truck trips and shift freight to rail or other modes of transportation.[393] By adding a rail track and a switch to a port and thereby avoiding 60,000 truck trips per year, a facility could reduce almost 9 tons of NOx annually at a cost-effectiveness of about $5,409/ton.[394] The median estimated cost-effectiveness of this type of project is $7,661/ton.[395]. Replacing heavy-duty trucks with zero-emission or near-zero-emission trucks could secure even greater reductions, although at higher cost-per-ton: a scenario in which Class 6 truck visits transition to all zero-emitting trucks across facilities within the South Coast Air Quality Management District would reduce more than 12,000 tons of NOx emissions over ten years at a cost-effectiveness of about $60,600/ton.[396]

Another possible approach is to charge indirect sources that are federally assisted a mitigation fee and apply the resulting funds to nearby sources of NOx that may have more-cost-effective emission reduction opportunities. The most recent round of such funding through the San Joaquin Valley Air Pollution Control District’s Indirect Source Review Program led to four tons of NOx reductions at about $11,600/ton.[397] In areas that have not yet implemented this approach, there may be even more-cost-effective opportunities for NOx emission reductions. For example, in 2011-2012—about 6 years after the District initiated the program—it logged 728 tons of NOx emission reductions at about $1,900/ton, mostly from projects intended to reduce emissions from agricultural tractors.[398] EPA should consider adopting this proven strategy when implementing an indirect source review program for federally assisted facilities in its FIP.

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[391] *See also* Fed. Highway Admin., Congestion Mitigation and Air Quality Improvement (CMAQ) Program: 2020 Cost-Effectiveness Tables Update, at 35 (July 2020), *available at* https://www.fhwa.dot.gov/ENVIRonment/air_quality/cmaq/reference/cost_effectiveness_tables/fhwahep20039.pdf (“Shared vehicles provide alternatives to reduce household LDV, and in some cases enable households to own fewer cars, both of which may result in decreases in VMT through eliminating some discretionary trips and mode shift to public transit.”).

[392] *Id.* at 37-38, Tbls. 19, 21.

[393] *See id.* at 50.

[394] *Id.* at 53, tbl. 45.

[395] *Id.* at 53.

[396] *See* S. Coast Air Quality Mgmt. Dist., Draft Staff Report Proposed Rule 2305 – Warehouse Indirect Source Rule - Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program and Proposed Rule 316 – Fees for Rule 230, at 61, Tbl. 14 (Scenario 10) (Mar. 2021); *id.* at 84, tbl. 26 (Scenario 10).

[397] San Joaquin Valley Air Pollution Control District 2021 Annual Report Indirect Source Review Program, at 8, tbl. 2 (Dec. 2021).

[398] *Id.* at 7, tbl. 2.

XXI. EPA should model downwind impacts from buildings' NOx emissions and consider requiring reductions in those emissions.

As discussed above, commenters support EPA's proposal to limit NOx emissions from sources other than EGUs, but EPA must do more in order to fulfill its statutory obligation to eliminate upwind states' contribution to nonattainment and interference with maintenance of the NAAQS in downwind states. The seventy million buildings across the country that burn oil or gas in appliances emit 425,000 tons of NOx pollution annually, according to EPA's 2017 National Emissions Inventory.[399] In states covered by the proposed transport rule, buildings emit 300,000 tons of NOx every year—more NOx than any of the industrial sectors covered by the proposed rule.[400] In California, Nevada, New Jersey, and New York, buildings emit more total NOx than power plants and all covered industrial sectors combined.[401] Given the modesty of the NOx emissions reductions currently proposed, EPA cannot afford to leave an entire sector of ozone pollution sources off the table. EPA should consider requiring NOx emissions reductions from buildings, and, as a first step, should model the impact on downwind ozone levels from such emissions.

Electrification–that is, using electricity to power heating and cooking appliances instead of fossil fuels–or adoption of low-NOx appliances are widely available, cost-effective ways to reduce NOx emissions from buildings. Switching to all-electric for new appliance sales by 2030 could avoid more than 500,000 tons of NOx emissions, 14,400 tons of PM2.5 emissions, and 3,750 premature deaths each year by 2045.[402] Electric appliances like air-source heat pumps and heat pump water heaters are highly efficient (two to four times as efficient as their fossil fuel-fired counterparts).[403] Electric appliances are widely available[404] and increasingly cost-

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[399] Jim Dennison, Leah Louis-Prescott & Talor Gruenwald, *How Air Agencies Can Help End Fossil Fuel Pollution from Buildings* at 5, RMI (2021) (reporting RMI analysis of EPA 2017 National Emissions Inventory), https://rmi.org/insight/outdoor-air-quality-brief.

[400] *Id.*

[401] *Id.*

[402] RMI & Sierra Club, *Factsheet: Why EPA Must Address Appliance Pollution* 3 (June 4, 2021), https://rmi.org/wp-content/uploads/2021/04/rmi_factsheet_appliance_pollution.pdf; *see also* Caitlin Murphy et al., *Electrification Futures Study: Scenarios of Power System Evolution and Infrastructure Development for the United States* at xii, 31-36, 70, NREL (Jan. 2021), https://www.nrel.gov/docs/fy21osti/72330.pdf.

[403] Jim Dennison, Leah Louis-Prescott & Talor Gruenwald, *How Air Agencies Can Help End Fossil Fuel Pollution from Buildings* at 12, RMI (2021), https://rmi.org/insight/outdoor-air-quality-brief.

[404] New air-source heat pump sales have matched those of fossil fuel furnaces. *See* Air-Conditioning, Heating, and Refrigeration Institute, *Historical Data*, www.ahrinet.org/resources/statistics/historical-data.

competitive.[405] Already, these appliances have lower net present costs than fossil fuel appliances for new construction, when replacing propane or heating oil appliances, and when simultaneously replacing furnaces and air conditioners.[406] EPA's own Menu of Control Measures identifies low-NOx furnaces, water heaters, and space heaters as having far lower abatement costs than the proposed rule's $7,500 per ton screening threshold and than a number of the proposed emissions reduction measures. 87 Fed. Reg. at 20,091.

In addition to NOx, the combustion of fossil fuels in buildings generates a significant amount of greenhouse gases every year—10% of all US emissions.[407] Requiring emissions reductions from buildings will deliver important climate co-benefits. For example, zero-emission heat pumps can promote climate resilience and climate justice by providing heating and cooling with a single appliance, expanding access to protection from increasingly common extreme heat. EPA should consider these benefits when assessing building pollution and electrification opportunities in the final rule.

Given the significant NOx emissions from buildings in upwind states and need to further reduce emissions in order to protect the air quality of downwind states, EPA should assess ozone transport from building emissions, expand and update its emissions inventories with respect to pollution from buildings, and consider requiring reductions in NOx emissions from buildings in the final rule.

XXII. EPA Should Formally Rescind Its 2018 Alternative Contribution Threshold Guidance.

For years, EPA has relied on a 1 percent contribution threshold for determining whether an upwind state's contribution to a downwind nonattainment or maintenance monitor was "significant" for purposes of implementing Section 110(a)(2)(D)(i)(I). EPA applied this 1 percent contribution threshold in the Cross-State Air Pollution Rule in 2011[408] and again in the CSAPR Update in 2016[409] and in the Revised CSAPR Update in 2021.[410] Commenters support

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[405] *See* Jim Dennison, Leah Louis-Prescott & Talor Gruenwald, *How Air Agencies Can Help End Fossil Fuel Pollution from Buildings* at 12, RMI (2021), https://rmi.org/insight/outdoor-air-quality-brief.
[406] *Id.*
[407] RMI, The Impact of Fossil Fuels in Buildings 7 (2019) (citing emissions data from U.S. Energy Information Administration, Environment, Sectoral Specific Emission Tables by State, https://www.eia.gov/environment/emissions/state/), https://rmi.org/insight/the-impact-of-fossil-fuels-in-buildings/.
[408] Federal Implementation Plans: Interstate Transport of Fine Particulate Matter and Ozone and Correction of SIP Approvals, 76 Fed. Reg. 48,208, 48,238 (Aug. 8, 2011).
[409] CSAPR Update, 81 Fed. Reg. 74,504, 74,518 (Oct. 26, 2016).
[410] Revised CSAPR Update, 86 Fed. Reg. 23,054, 23,057 (Apr. 30, 2021). EPA similarly relied on average contributions exceeding 1 percent of the NAAQS in determining significance in the Clean Air Interstate Rule, 70 Fed. Reg. 25,162, 25,175 (May 12, 2005) (explaining that

EPA's proposed retention of the 1 percent contribution threshold in the present transport rulemaking and, for the reasons identified below, urge EPA to formally rescind its August 2018 guidance memo regarding alternative contribution thresholds ("Contribution Guidance").

In August 2018, EPA released its Contribution Guidance, which cast into doubt years of consistent actions and guidance from the Agency regarding significant contribution thresholds.[411] The Contribution Guidance relied on EPA's 2023 modeling projection to quantify the amount of collective upwind ozone contribution captured by a range of alternative contribution thresholds for the 2015 ozone NAAQS, focusing on 0.7 ppb (1 percent of the value of the 2015 NAAQS), 1.0 ppb, and 2.0 ppb. The Guidance found that using a 1 percent contribution threshold captures 77 percent of the total upwind contribution, while a 1 ppb threshold captures 70 percent and a 2 ppb threshold captures 55 percent.[412] EPA reasoned that the amount of upwind collective contribution captured using a 1 ppb threshold is "generally comparable" to the amount captured using a threshold equivalent to 1 percent of the NAAQS[413] and concluded that, "[b]ased on the data and analysis summarized here, the EPA believes that a threshold of 1 ppb may be appropriate for states to use to develop SIP revisions addressing the good neighbor provision for the 2015 ozone NAAQS."[414] The Guidance also cautioned that "[f]ollowing [the Guidance's] recommendations does not ensure that EPA will approve a SIP revision in instances where the recommendations are followed."[415]

In its current NPRM, EPA reaffirmed its use of a 1 percent contribution threshold for Screening at Step 2 of the interstate transport framework.[416] EPA identified a number of reasons the alternative contribution thresholds discussed in the Contribution Guidance were less appropriate, explaining that "experience since the issuance of the [Contribution Guidance] regarding use of alternative thresholds leads the Agency to now believe it may not be appropriate to continue to attempt to recognize alternative contribution thresholds at Step 2, either in the context of SIPs or FIPs."[417] However, while EPA noted that it might do so in the future, EPA did not propose to rescind the Contribution Guidance. For the reasons identified by EPA itself in it the NPRM and for additional reasons, Commenters urge EPA to rescind the Contribution Guidance now.

First, Commenters strongly support EPA's observation that "consistency in requirements and expectations across all states is essential" in regulating emissions to address a regional air

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"emissions from an upwind State contribute significantly to nonattainment if the maximum contribution is at least 2 parts per billion, the average contribution is greater than one percent, and certain other numerical criteria are met").

[411] EPA, Peter Tsirigotis, Analysis of Contribution Thresholds for Use in Clean Air Act Section 110(a)(2)(D)(i)(I) Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards (Aug. 31, 2018).

[412] *Id.* at 4.

[413] *Id.* at 3-4.

[414] *Id.* at 3.

[415] *Id.* at 1.

[416] 87 Fed. Reg. at 20,073.

[417] *Id.*

pollutant such as ozone.[418] As EPA correctly observes, utilizing different contribution thresholds for different states "would allow certain states to avoid further evaluation of potential emissions controls while other states must proceed to a Step 3 analysis," creating "significant equity and consistency problems among states."[419] Indeed, a lack of uniformity in the stringency of control measures being applied to sources in upwind and downwind states is a significant cause of the persistent ozone nonattainment issues in many downwind areas.[420] States that contribute above a fixed amount to a downwind nonattainment or maintenance area should, uniformly, be included in EPA's Step 3 analysis.

Second, Commenters dispute the Contribution Guidance's characterization of the upwind contribution captured by a 1 ppb threshold and a 1 percent threshold as "generally comparable" and agree with the Agency's observation in the NPRM that, even if this were "true in some sense," it "is hardly a compelling basis to move to a 1 ppb threshold."[421] Indeed, as EPA now observes, "the core statutory objective of ensuring elimination of all significant contribution to nonattainment or interference of the NAAQS in other states and the broad, regional nature of the collective contribution problem with respect to ozone" counsel in favor of establishing a contribution threshold that pulls in more, not less, of the upwind emissions that are contributing to nonattainment and maintenance issues. Moreover, as EPA points out, an important virtue of a contribution threshold set as a percentage of the NAAQS is that, as the stringency of the NAAQS increases, "an appropriate increase in stringency at Step 2 occurs, so as to ensure an appropriately larger amount of total upwind-state contribution is captured for purposes of fully addressing interstate transport for the more stringent NAAQS."[422] Removing nearly 1/3 of the contributing upwind emissions at Step 2—as would occur with the use of a 1 ppb contribution threshold—would increase the cost and challenge of ameliorating ozone nonattainment in areas affected by ozone transport.

Third, Commenters agree with EPA that consistency also counsels in favor of retention of the 1 percent contribution threshold.[423] The Contribution Guidance identified no reasoned basis for deviating from EPA's consistent prior actions and guidance on this issue, and Commenters perceive none other than to simply reduce the number of states obligated to address their significant contributions to downwind nonattainment and maintenance. But shrinking the pool of states working to address regional ozone transport simply shifts the burden even more heavily to the downwind states, many of which contribute comparatively little to their own nonattainment and already control their in-state sources to a degree unmatched by their upwind counterparts.

For these reasons, Commenters not only urge EPA to retain the 1 percent contribution threshold in this rulemaking but also to immediately rescind the Contribution Guidance and eliminate the confusion this document has engendered.

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[418] *Id.*
[419] *Id.*
[420] For this same reason, Commenters object to EPA's proposal to truncate its analysis of Oregon at Step 2 (see Section VII).
[421] 87 Fed. Reg. at 20,074.
[422] *Id.* at 20,074.
[423] *Id.* at 20,074.

XXIII. EPA has failed to consider wintertime ozone.

It is contrary to the Good Neighbor provision for EPA to fail to prohibit interstate pollution that causes wintertime ozone nonattainment and maintenance problems. It is also arbitrary and capricious for EPA to fail to consider wintertime ozone -- an important aspect of the interstate ozone transport issue -- when promulgating this rule.

Wintertime ozone is an important aspect because it is a problem in multiple oil and gas basins in the West. For example, EPA designated the Upper Green River Basin Area, WY as nonattainment for the 2008 8-hour ozone NAAQS.[424] This nonattainment designation was due to wintertime ozone levels.[425]

Wintertime ozone also plagues areas which were not necessarily designated nonattainment because of wintertime ozone, but will still have a very difficult, if not impossible, time coming into attainment without addressing wintertime ozone. The Denver Metro/North Front Range nonattainment area is an example. On March 18, 2021, the Platteville Atmospheric Observatory (PAO) monitor had an 8-hour maximum value of 68 ppb.[426] The next day, on March 19, 2021, PAO had an 8-hour maximum value of 89 ppb. And the day after that, on March 20, 2021, PAO had an 8-hour maximum value of 82 ppb.[427] Also on that day, the Boulder Reservoir (BOUR) had an 8-hour maximum of 77 ppb, the Fort Collins West (FTCW) had an 8-hour maximum of 86 ppb, and the Rocky Flat (RFN) monitor, which is typically one of the worst monitors in the nonattainment area, had an 8-hour maximum of 74 ppb.[428] Weld County's "private" ozone monitoring network also picked up this wintertime ozone event.[429]

EPA cannot speculate, or simply declare without data, that these values were caused by stratospheric intrusion or wildfire. They were not. Rather, like the Upper Green River Basin Area and the Uinta Basin, PAO is near the heart of the Denver Julesburg oil and gas basin and 03/18 - 20/2021 were sunny days with snow on the ground. Monitors in nearby areas with less intense oil and gas activities but which receive pollution from the Denver Julesburg Basin, like BOUR, FTCW, RFN, had lower ozone values but still above the level of the 2015 ozone NAAQS. Monitors further away from the Denver Julesburg basin, such as NREL, had lower levels. It would not be a credible claim that a stratospheric intrusion happened to hit only the Denver Julesburg Basin oil and gas field, and not other nearby areas, for multiple days.

EPA has completely ignored upwind states' contributions to the Denver Metro/North Front Range ozone nonattainment area. And this is just one example. EPA must do an analysis of

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[424] 77 Fed. Reg. 30,088, 30,157 (May 21, 2012).

[425] *See* Ex. RU 1 at 3.

[426] *See* Ex. RU 2 at 2. The Colorado monitoring data is available here: https://www.colorado.gov/airquality/report.aspx.

[427] Ex. RU 3 at 2.

[428] Ex. RU 4 at 2.

[429] Ex. RU 5.

monitoring data for other western areas with significant oil and gas production and winter weather to determine if they also have a wintertime ozone problem.

EPA tries to excuse not analyzing the problem of wintertime ozone in one area, and one area only, that is the Uinta Basin by describing the "main" causes of wintertime ozone there, that is emission sources located at low elevations, the Basin's unique topography, and wintertime meteorological inversions. 87 Fed. Reg. at 20,070 n.123. As noted above, the Uinta Basin is not unique. Rather wintertime ozone is a problem in western areas where there is snow on the ground and significant upstream and midstream oil and gas activities, that is well pads, gas plants, and the related infrastructure.

Furthermore, while EPA uses a 1% threshold for determining if there is significant contribution to summertime ozone, EPA appears to be using a 50% or more, that is upwind states would have to be the main cause, threshold for significant contribution for wintertime ozone. To the extent EPA responds by saying that it did not mean that an upwind state has to be over 50% to be the main cause but it means some other value, EPA has failed to explain its rationale. In any event, using a threshold which is significantly higher for wintertime contribution than for summertime contribution is arbitrary. There is no science to show that all public health or welfare impacts are less from exposure to wintertime ozone than summertime ozone. Nor is the fact that EPA may have to expand or discard its concept of an "ozone season" in terms of control measures for some upwind states a reason to "sweep under the rug" wintertime ozone. In fact, there is no rational basis for EPA to treat wintertime ozone and summertime ozone differently in terms of what constitutes a significant contribution. Thus, EPA must do an analysis to determine which states contribute more than 1% to wintertime ozone in the Uinta Basin, the Denver Metro/North Front Range, and other areas with areas with wintertime ozone problems and then come up with emission reduction requirements for those upwind contributors.

CONCLUSION

Commenters strongly support EPA's proposal to fulfill its obligations under the Clean Air Act's Good Neighbor Provision, 42 U.S.C. § 7410(a)(2)(D), building on the foundation of prior ozone transport rules to achieve large reductions in ozone-forming pollution from high-emitting stationary sources. EPA's health-protective approach is required by court decisions requiring EPA to implement the Good Neighbor provision consistent with the Clean Air Act's directive that downwind areas attain and maintain the ozone standard as expeditiously as practicable, and not later than specified deadlines. As explained in these comments, however, greater and earlier pollution reductions are still needed, beyond what EPA has proposed, to ensure that no one is forced to breathe unsafe air in part due to interstate ozone transport. We urge EPA to promptly issue a final rule that covers all of the states and sources necessary to protect public health and the environment and satisfy the Clean Air Act.