THE GOOD NEIGHBOR PROBLEM: REGULATING INTERSTATE TRANSPORT OF SMOG PRECURSORS[1]

By Dr. Albert Monroe

[1] Dr. Albert Monroe is currently Chief of Staff of the Connecticut Department of Energy and Environmental Protection. Before that, Dr. Albert Monroe was Visiting Assistant Professor at the Quinnipiac University School of Law (2013-14) and Faculty Fellow at the Thomas Jefferson School of Law (2012013). Dr. Monroe earned a doctorate in economics from Harvard University in 2002 and a law degree from Yale Law School in 2012. Dr. Monroe's research is focuses on environmental and administrative law issues, especially both climate change and conventional air pollution. While in law school, Dr. Monroe served as Vice-President of the Connecticut Network to Abolish the Death Penalty when the death penalty was abolished in Connecticut. Thank you to all of those who have commented on this paper, especially Merrily Gere and the others in the Stationary Source Control Group at the Connecticut Department of Energy and Environmental Protection; the 2013 Colloquium on Environmental Scholarship at Vermont Law School; and the 2013 University of Washington Environmental Law Scholars Annual Workshop.

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INTRODUCTION

About 200,000 Americans die every year from smog.[2] Smog is a mix of ozone and fine particulates ($PM_{2.5}$), mostly from fossil fuel consumption. This means that almost one out of every twelve deaths in the United States is from smog.[3] The Clean Air Act (CAA) regulates smog, setting national ambient air quality standards (NAAQS) for ozone and $PM_{2.5}$. Many cities in the Northeast fail ozone and $PM_{2.5}$ NAAQS because of pollutants emitted from Midwestern power plants.[4] The CAA expressly forbids pollution from one state contributing to another state's nonattainment of its air quality criteria, and in recent years, the EPA has promulgated rules using regional cap-and-trade programs to control the interstate transport of smog precursors from power plants.

The EPA's authority to promulgate interstate cap-and-trade programs to control smog comes from a short section of the CAA called the "good neighbor provision," which states that each state's plans to control air pollution must:

> contain adequate provisions (i) prohibiting…any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will (I) contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any [NAAQS]…[5]

The good neighbor provision provides very little guidance to the EPA in how it must be fulfilled, even in the context of the rest of the CAA. The EPA has interpreted this silence as

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[2] Fabio Caiazzo et al, *Air Pollution and Early Deaths in the United States: Part I: Quantifying the Impact of Major Sectors in 2005*, 79 ATMOSPHERIC ENV'T 198, 203 (2013).
[3] CENTERS FOR DISEASE CONTROL AND PREVENTION, NATIONAL VITAL STATISTICS REPORTS, DEATHS: FINAL DATA FOR 2010 (2013) (Noting that 2,468,435 Americans died in 2010, which suggests that almost one out of every twelve Americans died from smog exposure).
[4] *See e.g.*, Jake Mooney, *Their Smoke, Our Smog: Meet These Midwestern Power Plants*, CITY LIMITS (Jul. 31, 2011).
[5] 42 U.S.C. § 7410(a)(2)(D)(i)(I) (2012).

giving it the authority to promulgate interstate cap-and-trade transport rules that allow it to consider the cost of compliance in distributing tradable allowances to power plants.

In contrast, recent decisions by the D.C. Circuit have created doubt about the legality of cap-and-trade interstate transport rules under the good neighbor provision. In 2008, the D.C. Circuit remanded the current transport rule, the Clean Air Interstate Rule (CAIR), back to the EPA but left it in place until the EPA could develop a new rule.[6] The EPA promulgated a new transport rule, the Cross-State Air Pollution Rule (CSAPR), in 2011. CSAPR was vacated by the D.C. Circuit in 2012, leaving CAIR in place and casting doubt on whether any market-based transport rule could survive judicial review.[7] The Supreme Court granted the EPA's petition for certiorari asking the Supreme Court to reinstate CSAPR, and heard oral arguments on Dec. 10, 2013.[8] The Supreme Court then overturned the D.C. Circuit, upholding CSAPR, on April 24, 2014.[9]

This paper studies the problem of mitigating the interstate transport of smog precursors under the CAA and has three major conclusions. First, cap-and-trade programs similar to CAIR and CSAPR are probably the best solutions available to regulate the interstate transport of air pollutants given the difficulties of successfully mitigating such pollution. Second, the D.C. Circuit's unwise decisions to remand CAIR and CSAPR back to the EPA probably deprive the EPA of any workable future solution to mitigate smog in the Central and Eastern United States. Therefore, the Supreme Court was right to overturn the D.C. Circuit's recent decisions about anti-smog cap-and-trade programs. Lastly, when Congress provides unclear direction about how

[6] *North Carolina v. EPA*, 531 F.3d 896 (D.C. Cir. 2008) (vacating CAIR); *North Carolina v. EPA*, 550 F.3d 1176 (D.C. Cir. 2008) (amending earlier decision and remanding CAIR to EPA without vacatur).
[7] *EME Homer City Generation v. EPA*, 696 F.3d 7 (D.C. Cir. 2012);
[8] *EPA v. EME Homer City Generation*, 133 S.Ct. 2857 (2013).
[9] *EPA v. EME Homer City Generation, L.P.,* No. 12-1182, 572 U.S. __, 2014 WL 1672044 (2014).

to solve a difficult regulatory problem, courts should interpret statutes in line with their purposes and only vacate regulations if they clearly contradict statutory language. To do otherwise is to contradict the will of Congress that passed legislation to solve a difficult regulatory program (in this case, smog).

Section II details the Clean Air Act (CAA) and describes the history of interstate transport rules under the CAA. Section III details the economic theory behind regulating interstate air pollution, a menu of options for such regulation, and how EPA probably should mitigate the interstate transport of smog precursors. Section IV describes the three court cases (*Michigan*, *North Carolina*, and *Homer City*) determining the legality of interstate transport rules and the EPA's choices to mitigate the interstate transport of smog precursors after those D.C. Circuit decisions. Section V discusses how courts should evaluate the legality of future transport rules, as well as how courts conduct judicial review in similar situations involving complicated statutes where Congress provides unclear direction to agencies. Section VI concludes.

I. The Clean Air Act (CAA) and the History of Regulating Interstate Transport of Air Pollution

A. Basic Structure of the Clean Air Act

The cause of smog was first described in the late 1940s.[10] In Los Angeles, smog was so severe in 1954 that it shut down industry and schools there for most of October.[11] Incidents such as these eventually led to the passage of the Clean Air Act (CAA) of 1970. The 1977 Amendments to the CAA required states to eliminate emissions that caused downwind states to violate the NAAQS, and the 1990 Amendments to the CAA strengthened that prohibition.

[10] *See* JAMES BONNER, NATIONAL ACADEMY OF SCIENCES, ARIE JAN HAAGEN-SMIT, 1900-1977, 196-201 (1989) (noting that Arie Jan Haagen-Smit linked the smog in Southern California to automobiles and was the first chairman of the California Air Resources Board).

[11] *See* Salvatore Cardoni, *Top 5 Pieces of Environmental Legislation*, ABC NEWS (July 2, 2010), http://abcnews.go.com/Technology/top-pieces-environmental-legislation/story?id=11067662#.UaUpUNK39p4

The CAA requires the EPA to issue national ambient air quality standards (NAAQS) for each air pollutant that "cause[s] or contribute[s] to air pollution which may reasonably be anticipated to endanger public health or welfare [and] the presence of which in the ambient air results from numerous or diverse mobile or stationary sources…"[12] There are currently six criteria pollutants: sulfur dioxide (SO_2), lead, nitrogen oxides (NO_x), particulates (both coarse (PM_{10}) and fine ($PM_{2.5}$)), ozone, and carbon monoxide.[13] For each criteria pollutant, the EPA must divide the country into areas designated as "nonattainment," "attainment," or "unclassifiable," depending on whether the area meets the NAAQS.[14]

At its core, the CAA is a command-and-control statute, prescribing air quality standards (NAAQS) and prescribing technology standards for polluters. The CAA gives each state "primary responsibility for assuring air quality" within its borders,[15] and therefore requires that each state submit to the EPA a State Implementation Plan (SIP), detailing how each state will meet the NAAQS for each criteria air pollutant.[16] As part of its SIP, each state must require that major stationary sources of air pollution (power plants, industrial factories, etc.) get permits to operate under Title V of the CAA.[17] States give major stationary sources permits to operate if they have adequate pollution controls as prescribed in the CAA.[18] The EPA is required to promulgate a Federal Implementation Plan (FIP) if (1) a state has not turned in a SIP or (2) the

[12] 42 U.S.C. § 7408(a)(1)(A), (B) (2012).
[13] *See Six Common Air Pollutants*, EPA.GOV, http://www.epa.gov/airquality/urbanair/ (last visited April 14, 2014).
[14] 42 U.S.C. § 7407(c), (d).
[15] 42 U.S.C. § 7407(a).
[16] 42 U.S.C. § 7410.
[17] 42 U.S.C. § 7661 *et seq.*
[18] *See* 42 U.S.C. § 7661c.

EPA finds that a SIP does not fulfill its responsibilities under the CAA and the State does not adequately revise that SIP.[19]

> One provision of the CAA (hereinafter the "good neighbor provision") requires SIPs to:
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> contain adequate provisions (i) prohibiting…any source of other type of emissions activity within the State from emitting any air pollutant in amounts which will (I) contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any [NAAQS]…[20]

The good neighbor provision of the CAA serves as an important backstop to the rest of the CAA to make sure that all states attain the NAAQS. Interstate transport of smog precursors and the national pervasiveness of smog have made the good neighbor provision one of the most important parts of the CAA. This is difficult because the good neighbor provision provides very little guidance to regulators and judges to how it must be enforced. States have the right to petition the EPA under § 126 of the CAA to enforce the good neighbor provision.[21] A denial of such a petition is subject to judicial review and can be reversed if arbitrary or capricious.[22]

B. Early Attempts to Mitigate Interstate Transport of Ozone

The 1990 Amendments included mechanisms by which the EPA could facilitate interstate compacts to mitigate smog. The most prominent of these mechanisms was the Ozone Transport Region (OTR), which comprised 11 states in the Northeast, the District of Columbia, and Northern Virginia.[23]

The OTR states were required to cooperatively plan for ozone attainment, and that cooperation took place as part of the Ozone Transport Commission (OTC), which included the

[19] 42 U.S.C. § 7410(c)(1) (2012).
[20] 42 U.S.C. § 7410(a)(2)(D)(i)(I).
[21] 42 U.S.C. § 7426.
[22] 42 U.S.C. § 7607.
[23] 42 U.S.C. § 7511c.

EPA and the OTR states.[24] The OTC concluded in 1992 that control of NO_x emissions from regional power plants and large industrial combustion sources would be necessary to achieve ozone attainment.[25] In 1994, all of the OTR states (except Virginia) entered into an agreement outlining a NO_x control strategy, limiting emission from large industrial units and power plants.[26]

The OTC concluded that a cap-and-trade program would be more cost-effective than just traditional command-and-control regulation at controlling ozone.[27] The OTC then agreed upon a region-wide cap on emissions and each state was allocated a share of the total.[28] Each state then allocated NO_x allowances to sources, and sources could then freely trade those allowances.[29] Each source was required to hold enough allowances to cover its total emissions during the May-September ozone season.[30]

It soon became clear that emissions reductions from Midwestern power plants were necessary for Northeastern states to meet the ozone NAAQS. To help facilitate such reductions, in 1995 the EPA convened a larger group of states, the Ozone Transport Assessment Group (OTAG), to solve the problem of interstate transport of NO_x.[31] The EPA set a two-year deadline for reaching resolution of the interstate transport problem before the EPA would impose a solution using §§126 or 110 of the CAA.[32]

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[24] *See Id.*
[25] *See Overview of the Ozone Transport Commission (OTC) NO_x Budget Program*, EPA.GOV, http://www.epa.gov/airmarkets/progsregs/nox/otc-overview.html
[26] *Id.*
[27] *Id.*
[28] *Id.*
[29] *Id.*
[30] *Id.*
[31] *See* PA. DEP'T. OF ENVTL. PROT. *History of Ozone Transport Issues*, http://www.dep.state.pa.us/dep/deputate/airwaste/aq/transport/timeline.htm.
[32] *See* Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone ("Final Rule"), 63 Fed. Reg. 57,356, 57,361 (Oct. 27, 1998) (hereinafter NO_x SIP Call).

Changes in electricity markets (and the large number of states involved) caused the OTAG process to collapse. In 1996, the Federal Energy Regulatory Commission (FERC) decided to deregulate wholesale sales of electric power.[33] This forced expensive, heavily-regulated electric power plants in the OTC to compete with relatively inexpensive, less-regulated electricity producers in the Midwest. Deregulation meant that power sold within the OTC would not necessarily be produced by protected local power generators subject to local requirements, but instead could be produced by producers with the lowest market cost.[34] The lowest cost producers were then in the Midwest, outside of the OTC.[35] The low-cost producers were not subject to OTC restrictions, which made their power even less expensive compared to power produced in the OTC. Negotiations among the states broke down and several northeastern states filed § 126 petitions.[36]

C. NO_x SIP Call

In response to the § 126 petitions, the EPA issued the NO_x SIP Call in 1998 to enforce the good neighbor provision of the CAA.[37] "NO_x SIP Call" was a specific reference to the fact that under the CAA, the EPA can call for SIP revisions if the Administrator finds a SIP inadequate to attain or maintain the NAAQS, to meet the dictates of pollutant transport commissions, or "to otherwise comply with any requirement of this chapter."[38]

The EPA addressed two major questions when it wrote the NO_x SIP Call: (1) which states needed to be included in the NO_x SIP Call and (2) how NO_x emissions budgets would be divided

[33] Open Access Non-Discriminatory Transmission Services by Public Utilities, 61 Fed. Reg. 21,540 (April 24, 1996) (codified at 18 C.F.R. pp. 35 and 37).
[34] *See Id.*
[35] *See* ELECTRICITY INFORMATION ADMIN., ELECTRICITY PRICES IN A COMPETITIVE ENVIRONMENT: MARGINAL COST PRICING OF GENERATION SERVICES AND FINANCIAL STATUS OF ELECTRIC UTILITIES – A PRELIMINARY ANALYSIS THROUGH 2015 44-60 (August 1997), *available at* http://www.eia.gov/FTPROOT/electricity/0614.pdf.
[36] *See Pennsylvania Dep't.of Envtl. Prot., supra* note 29.
[37] NO_x SIP Call, 63 Fed. Reg. at 57,356.
[38] 42 U.S.C. § 7410(k)(5) (2012).

among the states. In doing this, the EPA had to interpret the phrase "contribute significantly to nonattainment in, or maintenance by, any other State with respect to any [NAAQS]…" that is part of the good neighbor provision of the CAA.[39] The EPA answered these questions separately.

The EPA modeled the flow of interstate air pollution and its effect on ozone levels to determine which states needed to be included in the NO_x SIP Call.[40] In doing this, the EPA calculated how much and how often states contributed to nonattainment in nonattainment areas in other states. The EPA used several different criteria from their models to determine which states would and would not be included in the SIP Call.[41] This led to litigation from states on the margin, but most states included in the SIP Call clearly "contribute[d] significantly to nonattainment in" other states.[42]

The EPA then had to figure out how to divide responsibility for NAAQS nonattainment among states. Nonattainment in a particular state typically comes from in-state emissions and out-of-state emissions from several states. The CAA does not define "significant." There are an infinite number of ways to divide emissions among states, and they are interconnected because many states are both upwind and downwind states. EPA decided to define "significant" emissions based not only on the amount of ozone precursors an upwind state contributed to downwind areas, but also on what types of pollution sources were found in the state and whether affordable pollution controls were available for those sources.[43] To do this, the EPA studied emissions control options for various facilities and determined which controls could be deemed

[39] 42 U.S.C. § 7410(a)(2)(D)(i)(I) (2012).
[40] NO_x SIP Call, 63 Fed. Reg. at 57,439-47.
[41] *Id.*
[42] *See Michigan v. EPA*, 213 F.3d 663, 681-85 (D.C. Cir. 2000).
[43] NO_x SIP Call, 63 Fed. Reg. at 57,377-78.

"highly cost-effective."[44] It identified highly cost-effective controls for only a small subset of the hundreds of different types of sources that emit NO_x.[45] The EPA then determined what types of pollution sources were found in each state and calculated the total NO_x emissions of those sources used whatever highly cost-effective controls were available.[46] The resulting figure, which included growth projections, represented a subset of the state's total NO_x emissions and became the "budget" for that jurisdiction. Any NO_x emissions above that level were deemed to be the "significant" contributions that had to be eliminated; and emissions at or below that level were deemed insignificant.[47]

The EPA did not tell states which controls to use; instead, the state just had to meet its budget for NO_x emissions.[48] States could either promulgate a SIP that met the budget, or join an optional regional EPA cap-and-trade program.[49] Under the scheme, a state could allocate to its sources a total number of allowances equal to the state budget. A regulated entity could either emit NO_x in the amount covered by the allowances it held; it could over-control its emissions and sell its unneeded allowances to other facilities or bank them for future use; or it could emit more NO_x than covered by its allowances and buy from other facilities to cover the excess.[50] As a result, while emissions in some states might be higher than the budgets, emissions in other states might be lower than the budgets, so that throughout the entire region the total emissions would

[44] *Id.*
[45] *See Id.* at 57,399-402 (noting that the EPA determined that highly cost-effective controls were available for four types of sources: (1) large boilers and turbines that generate electricity at power plants; (2) large boilers and turbines at industrial facilities; (3) cement kilns; and (4) stationary internal combustion engines (such as pipeline compressors)).
[46] *See Id.* at 57,403.
[47] *Id.* at 57,377-78.
[48] *Id.* at 57,378.
[49] *Id.* at 57,430-31; 57,456-57.
[50] *Id.* at 54,457-58.

not exceed the cap.[51] Court challenges to the NO_x SIP Call were rejected in 2000 in *Michigan v. EPA*.[52]

D. The Clean Air Interstate Rule (CAIR)

The NO_x SIP Call was insufficient to fully mitigate the interstate transport of NO_x and subsequent ozone pollution.[53] Also, increasing concern about $PM_{2.5}$ required further actions to reduce emissions of SO_2 and NO_x since interstate transport of SO_2 and NO_x were important contributors to $PM_{2.5}$ formation.[54]

The George W. Bush Administration urged Congress to pass the Clear Skies Act which would have established an interstate cap-and-trade program for NO_x, SO_2, and mercury.[55] Environmentalists and many states opposed the Clear Skies Act because they believed that the emissions targets were not stringent enough, among other reasons.[56] To get more stringent regulation, North Carolina petitioned the EPA under § 126 of the CAA, asking EPA to directly regulate the sources in upwind states that adversely affected North Carolina's air quality.[57] In order to avoid direct federal control of sources, in 2005 EPA denied North Carolina's § 126 petition and promulgated CAIR under the good neighbor provision of the CAA.[58]

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[51] *Id.*
[52] 213 F.3d at 669-70.
[53] Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Clean Air Interstate Rule); Revisions to Acid Rain Program; Revisions to the NOx SIP Call, 70 Fed. Reg. 25,162, 25,162 (May 12, 2005) (hereinafter CAIR)
[54] *See Id.*
[55] Clear Skies Act of 2003, H.R. 999, 108th Cong. (2003).
[56] *See* Patricia Ross McCubbin, *Cap and Trade Programs Under the Clean Air Act: Lessons from the Clean Air Interstate Rule and the NO_x SIP Call*, 18 PENN. ST. ENVTL. L. REV. 1, 9 (noting that opponents believed that the Clear Skies legislation would weaken existing Clean Air Act requirements); *see also*, David Whitman, *Partly Sunny: Why Enviros Can't Admit That Bush's Clear Skies Initiative Isn't Half Bad*, WASH. MONTHLY (December 2004), *available at* www.washingtonmonthly.com/features/2004/0412.whitman.html.
[57] 71 Fed. Reg. 25,328 (April 28, 2006) (denying North Carolina petition, filed with EPA March 19, 2004, under 42 U.S.C. § 7426) [hereinafter Section 126 Denial].
[58] *Id.*

For CAIR, the EPA determined that 27 states and the District of Columbia (upwind states) contributed significantly to out-of-state downwind nonattainment of one or both NAAQS.[59] Since SO_2 is a precursor to $PM_{2.5}$ formation and NO_x is a precursor to both ozone and $PM_{2.5}$ formation, CAIR requires upwind states "to revise their [SIPs] to include control measures to reduce emissions" of SO_2 and NO_x.[60]

CAIR requires upwind states to reduce their emissions in two phases.[61] NO_x reductions began in 2009, SO_2 reductions began in 2010, and the second reduction phase for each air pollutant begins in 2015.[62] To implement CAIR's emission reductions, the rule also creates optional interstate trading programs for each air pollutant, to which, in the absence of approved SIPs, all upwind sources are now subject.[63] The EPA cannot force states to participate, but all states covered by CAIR do participate because the alternative would likely be to force some sources to cease operations. In CAIR, sources emitting more pollution can choose to install controls or purchase allowances to cover its pollution.

In addition, CAIR revises Title IV's Acid Rain Program (ARP) regulations governing the SO_2 cap-and-trade program and replaces the NO_x SIP Call with the CAIR ozone-season NO_x trading program.[64] This revision preserves the ARP market in SO_2, but requires holders of ARP allowances to use multiple allowances for each ton of SO_2 burned, accounting for the reduction

[59] CAIR, 70 Fed. Reg. at 25,162.
[60] *Id.*
[61] *Id.* at 25,165.
[62] *Id.* at 25,162.
[63] *Id.*
[64] *Id.*

of the SO_2 cap to control $PM_{2.5}$.[65] Thusly, CAIR created separate (but related) regional trading programs for NO_x and SO_2.

CAIR uses similar methods to the NO_x SIP Call to determine state budgets for each state included in the Rule. For both pollutants, the EPA determined a cost per ton of reduction level that would lead to downwind attainment of the ozone and $PM_{2.5}$ NAAQS. The EPA then used this cost per ton to develop a pollution budget for each state. States could either change their SIPs to conform to this pollution budget, or join a national cap-and-trade program for these pollutants and distribute allowance to polluters based on past output.

EPA's modeling projected large reductions in SO_2 and NO_x emissions in affected states from CAIR. At full implementation (after 2015), CAIR is projected to reduce power plant and industrial SO_2 emissions in covered states to 73% below 2003 emissions levels.[66] Similarly, by 2015, CAIR is projected to reduce power plant and industrial NO_x emissions by 61% from 2003 levels.[67] CAIR would also significantly reduce the incidence of acid rain from SO_2 emissions.[68]

CAIR was remanded without vacatur in *North Carolina*.[69] This meant the EPA had to develop a new transport rule in accordance with that decision. That rule was the Cross-State Air Pollution Rule (CSAPR).

E. The Cross-State Air Pollution Rule (CSAPR)

CSAPR was promulgated in 2011 to replace CAIR and satisfy the requirements of *North Carolina*.[70] Like CAIR, it was intended to be a complete solution to the interstate transport of

[65] *Id.* at 25,258 (promulgating that power plants in the CAIR region have to use 2 allowances to emit one ton of SO_2 from 2010-2014, and 2.86 allowances to emit one ton of SO_2 after that).
[66] EPA, *Fact Sheet: Clean Air Interstate Rule (CAIR): Clean Air, Healthier Lives, and a Strong America,* Mar. 10, 2005, at 2, *available at*, http://www.epa.gov/cair/pdfs/cair_final_fact.pdf.
[67] *Id.*
[68] *Id.*
[69] *North Carolina v. EPA*, 550 F.3d 1176, 1178 (D.C. Cir. 2008).

smog-causing pollutants.[71] CSAPR was an interstate cap-and-trade program which required "substantial near-term emission reductions in every covered state."[72] Within it, there were four sub-programs: annual NOx, ozone-season NO_x, SO_2 Group 1 and SO_2 Group 2.[73] There were two groups for SO_2 emissions because the EPA found that some states needed significantly more stringent controls so that all areas covered by CSAPR attained the NAAQS.[74] All programs were to start in 2012, with a second phase of SO_2 reductions in 2014.[75]

CSAPR was designed similarly to CAIR, except that it included assurance provisions to make sure that every nonattainment area benefited from CSAPR after allowance trading. The assurance provisions limit emissions from each state to an amount equal to that state's trading budget plus the variability limit for that state.[76] The variability limit takes into account the inherent variability in baseline power plant emissions and recognizes that state emissions may vary somewhat after all significant contributions to nonattainment and interference with maintenance are eliminated.[77] This approach also provides sources with flexibility to manage growth and electric reliability requirements, thereby ensuring the country's electric demand will be met, while meeting the statutory requirement of eliminating significant contribution to nonattainment and interference with maintenance.[78]

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[70] 76 Fed. Reg. 48,208, 48,211 (Aug. 8, 2011).
[71] *Id.* at 48,208 (EPA stated that after CSAPR, only two areas in the central and eastern United States would be in nonattainment for either ozone or PM2.5; Houston, TX, and Baton Rouge, LA.); *see also*, *Id.* at 48,210.
[72] *Id.* at 48.210.
[73] *Id.* at 48,211. Ozone-season NO_x is needed because ozone is most prevalent on hot, sunny days in urban environments. *See Ground-Level Ozone, Basic Information,* EPA.GOV, http://www.epa.gov/glo/basic.html (last visited April 14, 2014).
[74] *Id.* at 48,214.
[75] *Id.* at 48,211.
[76] *Id.* at 48,294.
[77] *Id.*
[78] *Id.*

If a state's total emissions are greater than the state's trading budget plus variability limit, sources within that state have to surrender two allowances for each ton of emissions over the limit.[79] Allowance surrender is allocated proportionally among sources within a state emitting too much pollution.[80] The strong penalties associated with the assurance provisions will make it almost certain that a state reduces its emissions to stay within its budget. This eliminates the issue from *North Carolina* where a downwind state couldn't be assured that upwind states that polluted that downwind state would actually reduce their emissions instead of purchase allowances from polluters in other parts of the CAIR region.

However, in 2012, the D.C. Circuit vacated CSAPR in *Homer City*, stating that the method in which the EPA determined state budgets under CSAPR was unlawful and vacated CSAPR.[81] CAIR was left in place until the EPA could develop a transport rule that survived judicial review.

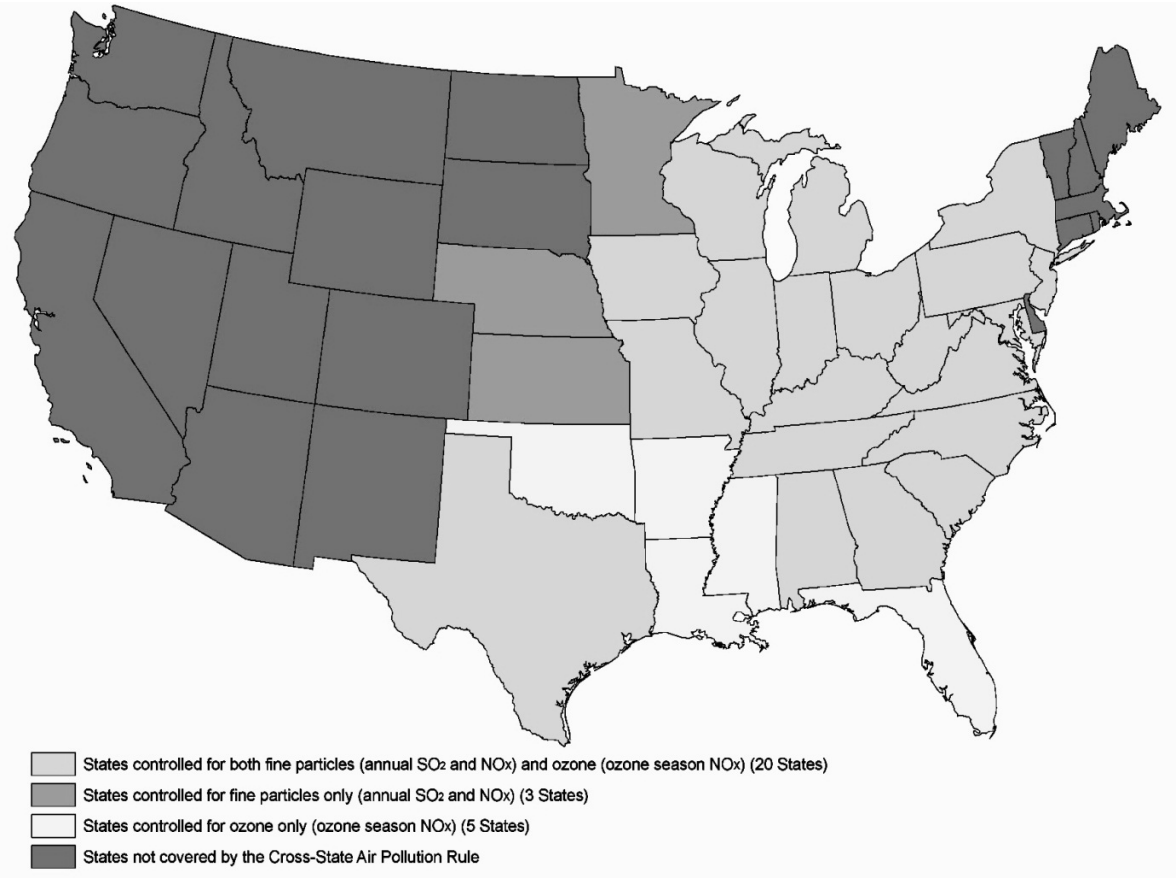
II. Options for Mitigating Interstate Transport of Smog Precursors

A. Ozone and fine particulate ($PM_{2.5}$) pollution

Both CAIR and CSAPR are designed to control smog, made of ozone and fine particulate ($PM_{2.5}$) pollution. $PM_{2.5}$ is particle air pollution less than 2.5 micrometers in diameter. Ozone is created when NO_x and volatile organic compounds (VOCs) react with oxygen in the presence of sunlight.[82] Ozone is more prevalent during the summer because the atmospheric reactions that produce ozone are accelerated by sunlight and warm temperatures.[83] $PM_{2.5}$ is created either

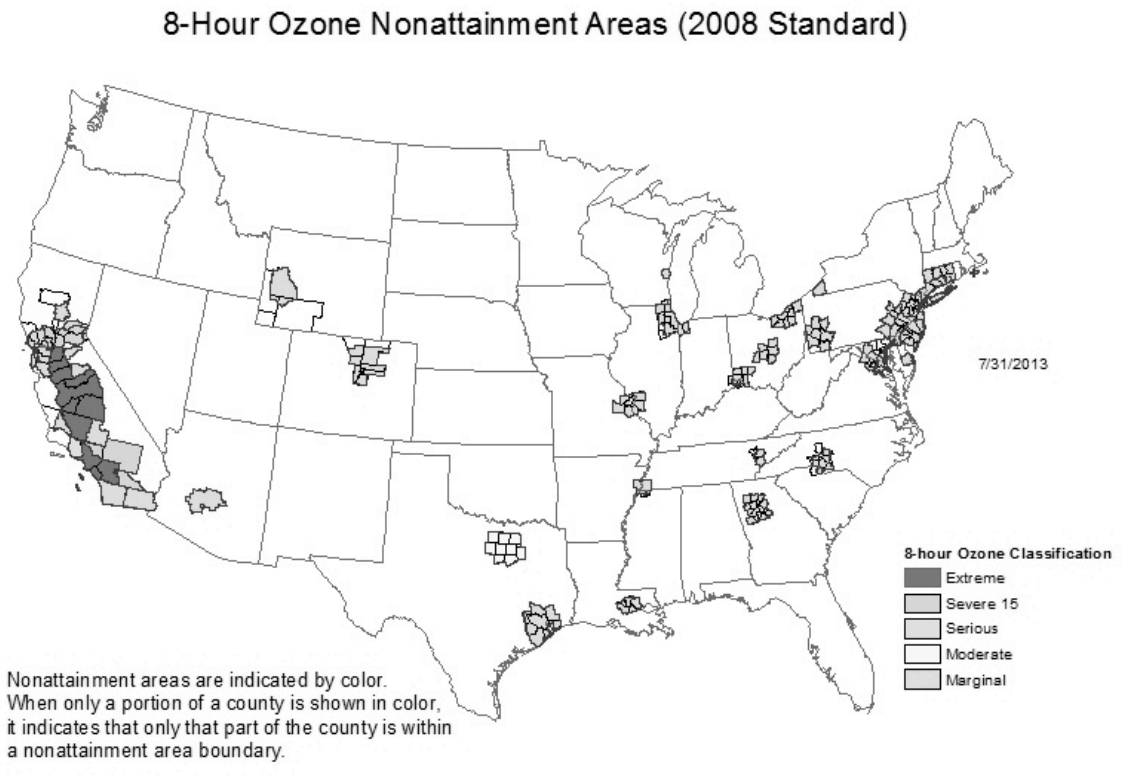
[79] *Id.*
[80] *Id.*
[81] *EME Homer City Generation, L.P. v. EPA*, 696 F.3d 7 (D.C. Cir. 2012), rehearing en banc denied (Jan. 24, 2013).
[82] *See Ground-Level Ozone: Basic Information*, EPA. GOV, http://www.epa.gov/glo/basic.html (last visited April 14, 2014).
[83] *E.g. What is Ozone?*, AIRINFONOW.ORG, http://www.airinfonow.org/html/ed_ozone.html (last visited April 24, 2014).

directly from sources such as forest fires or burning of agricultural matter, or indirectly when SO_2 and NO_x react in the air.[84] Since SO_2 and NO_x can travel long distances, CSAPR and CAIR control both SO_2 and NO_x emissions in order to limit ozone and $PM_{2.5}$. VOCs are localized pollutants, so they are included in SIPs, but not in CAIR or CSAPR. A map of the states included in CSAPR is below.[85]



[84] *Fine Particles (PM 2.5) Questions and Answers*, HEALTH.NY.GOV, http://www.health.ny.gov/environmental/indoors/air/pmq_a.htm (last visited April 14, 2014).
[85] *Air and Radiation: Cross-State Air Pollution Rule (CSAPR),* EPA.GOV, http://www.epa.gov/airtransport/CSAPR/index.html,

Ozone pollution is a serious problem in urban areas throughout the United States. While ozone high in the atmosphere protects us from ultraviolet radiation, ground-level ozone causes sickness and death, mostly from heart and lung disease.[86] Ozone causes disease because it is a powerful oxidant that can irritate airways, causing coughing, burning, wheezing, shortness of breath, and long-term lung damage.[87] Both short-term and long-term damage from ozone cause premature death. The current (2008) ozone standard is 0.075 ppm, averaged over eight hours.[88] Many cities are in nonattainment. A map of those cities is below.[89]



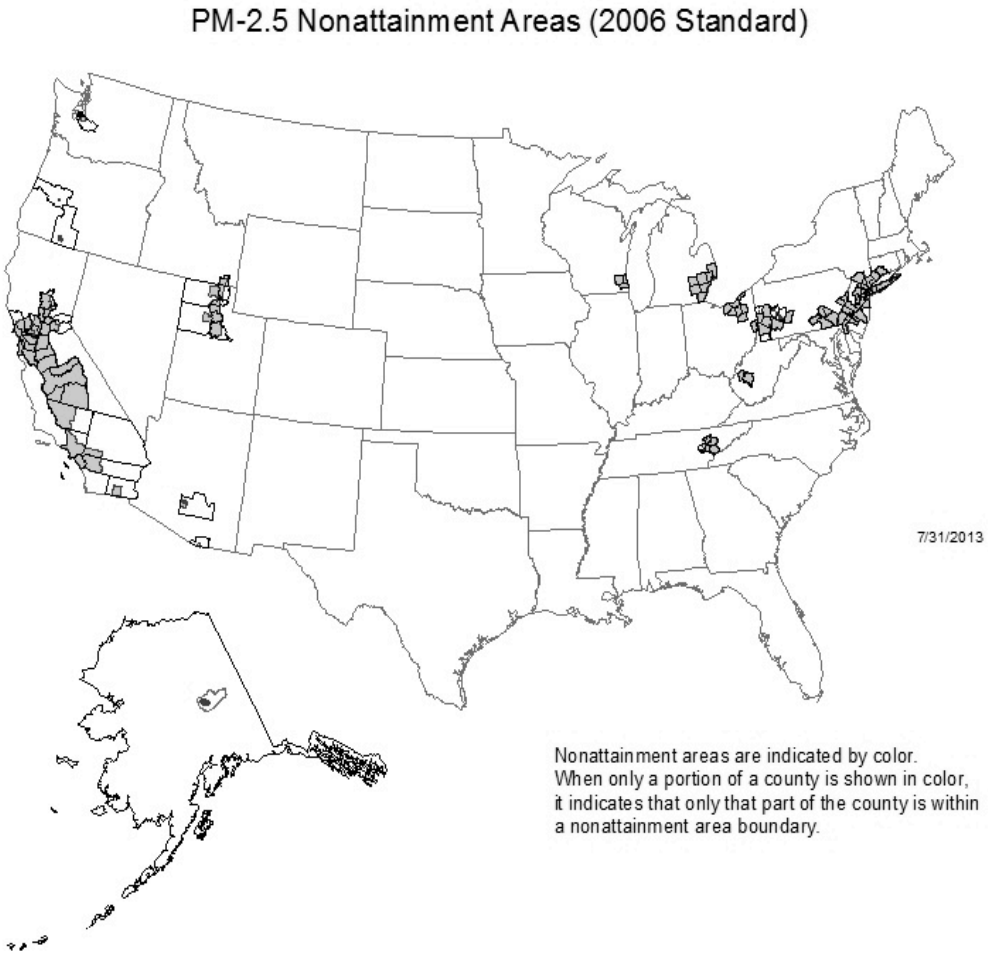
[86] *See e.g. Ground-Level Ozone: Health Effects*, EPA.GOV http://www.epa.gov/glo/health.html (last visited April 14, 2014).
[87] *Id.*
[88] *See National Ambient Air Quality Standards (NAAQS)*, EPA.GOV, http://www.epa.gov/air/criteria.html. The standard is defined as the annual fourth highest daily maximum 8-hour concentration, averaged over three years.
[89] *Green Book, 8-Hour Ozone Nonattainment Areas*, EPA.GOV, http://www.epa.gov/airquality/greenbk/map8hr_2008.html (last visited April 14, 2014).

$PM_{2.5}$ is extremely dangerous and can get deep inside the lungs and cause health problems. These problems include:

- premature death in people with heart or lung disease,
- nonfatal heart attacks,
- irregular heartbeat,
- aggravated asthma,
- decreased lung function, and
- coughing and difficulty breathing.[90]

The NAAQS for $PM_{2.5}$ is currently 12 micrograms per cubic meter ($\mu g/m^3$) (annual) and 35 $\mu g/m^3$ (24-hour).[91] Many areas of the country are in nonattainment for $PM_{2.5}$, and a map of those cities is below.[92]

[90] *See Particulate Matter: Health*, EPA.GOV, http://www.epa.gov/airquality/particlepollution/health.html (last visited April 14, 2014).
[91] *See National Ambient Air Quality Standards (NAAQS)*, EPA.GOV, http://www.epa.gov/air/criteria.html (last visited April 14, 2014). The annual $PM_{2.5}$ standard is an annual arithmetic mean, averaged over 3 years. The 24-hour standard is the 98th percentile of days, averaged over 3 years.
[92] *PM-2.5 Nonattainment Areas (2006 Standard)*, EPA.GOV, http://www.epa.gov/airquality/greenbook/mappm25_2006.html (last visited April 14, 2014).



SO_2 is also controlled by the Title IV of the CAA.[93] However, the purpose of that section is acid rain reduction. Controlling $PM_{2.5}$ in the eastern United States requires additional SO_2 reductions. Since $PM_{2.5}$ occurs by a different mechanism than acid rain, it is unsurprising that controlling $PM_{2.5}$ requires significant additional reductions in SO_2 emissions.

[93] 42 U.S.C. § 7651, *et seq*.

Overall, 27 states contribute to nonattainment for ozone, $PM_{2.5}$, or both in downwind states.[94] These states cover most of the central and eastern United States, with the exception of New England, whose pollution goes out to sea.

B. Economic Theory and the Interstate Transport of Air Pollution

The pollutants regulated by CSAPR and CAIR (SO_2, NO_x, $PM_{2.5}$, and ozone) are all part of a class of pollutants (non-uniformly mixed assimilative pollutants) where the policy target is specified in terms of air quality criteria expressed in a ceiling on the permissible ambient concentration of the pollutant measured at different locations (the NAAQS).[95]

Unlike some other pollutants (most notably greenhouse gases like carbon dioxide), pollution concentrations are sensitive to both the location and quantity of emissions. We can use this information to develop a mathematical solution for an idealized pollution market.

The cost-effective allocation of a non-uniformly mixed assimilative pollutant is that allocation that minimizes the cost of pollution control subject to the condition that the NAAQS are satisfied at all points.[96] We set up this problem by minimizing the cost subject to two sets of constraints: (1) the NAAQS, and (2) pollution reduction at any point cannot be less than zero.[97]

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[94] CSAPR, 76 Fed. Reg. at 48.208.
[95] *See e.g.*, T.H.H. Tietenburg, EMISSIONS TRADING: PRINCIPLES AND PRACTICE 33 (2006).
[96] *Id.*
[97] In equation form, this is:

- $\min \sum_{j=1}^{J} C_j(r_j)$ (minimize total cost of pollution reduction)
- s.t. $A_i \geq a + \sum_{j=1}^{J} d_{ij}(\overline{e}_j - r_j)$ $i = 1, \dots, I$ (NAAQS)
- and $r_j \geq 0$ $j = 1, \dots, J$ (pollution reduction cannot be less than zero)
    - where A_i is the concentration level measured at the *i*th receptor,
    - a_i is the background pollution level at that receptor,
    - d_{ij} is a transfer coefficient that translates emission increases or decreases by the $_j$th source into changes in the concentration measured at the *i*th receptor,
    - $\overline{e}_j$ is the expected emission without pollution controls at point *j*,
    - r_j is the pollution control at point *j*,

Solving these equations leads to a few conclusions:[98]

1. Each source should equate its marginal cost of emissions reduction with a weighted average of the marginal cost of concentration reductions (λ_j) at each affected receptor.[99] The weights are the transfer coefficients (effect of pollution emissions on deposition at different locations) associated with each receptor.[100] If the cost-effective pollutant concentration is lower than the ceiling at a receptor, then the λ associated with that receptor would be zero and the receptor would be nonbinding. For any binding receptor, the associated λ would be positive.
2. The marginal costs of concentration reduction at each receptor location are equalized, not the marginal costs of emissions reduction across sources (as in CAIR and CSAPR).
3. Seasonality can affect both the amount of allowable emissions and the marginal costs of concentration reduction at each receptor location.[101] Therefore, allowance prices will vary by both season and deposition location. This is important here because ozone is seasonal; it results from the combination of NO_x, VOCs, and sunlight. Since there are

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I is the number of receptors, and $C_j(r_j)$ is the cost of pollution reduction of *r* amount at point *j*.[97]

[98] The Kuhn-Tucker conditions which satisfy these equations are:

- $\frac{\partial C_j(r_j)}{\partial r_j} - \sum_i^I d_{ij}\lambda_i \geq 0 \qquad j = 1, \dots, J$
- $r_j\left[\frac{\partial C_j(r_j)}{\partial r_j} - \sum_i^I d_{ij}\lambda_i\right] = 0 \qquad j = 1, \dots, J$
- $\overline{A_i} \geq a_i + \sum_{j=1}^J d_{ij}(e_j - r_j) \qquad i = 1, \dots, I$
- $\lambda_i\left[\overline{A_i} \geq a + \sum_{j=1}^J d_{ij}(e_j - r_j)\right] = 0 \qquad i = 1, \dots, I$
- $r_j \geq 0; i \geq 0 \qquad j = 1, \dots, J$ i=1,…,I

[99] *Id* at 34.
[100] *Id.*
[101] *Id.*

more VOCs and more sunlight in the summer, control of NO_x to prevent ozone is seasonal.

An optimal system to control emissions for non-uniformly mixed assimilated pollutants is called an ambient permit system.[102] The system involves a separate permit market for each receptor, and each source would have to obtain sufficient permits in each market which receives its pollution to cover its emissions. A market could be a metropolitan or sub-metropolitan area.[103]

Faced with the need to acquire permits from *I* markets, the source will choose so to minimize its costs.[104] As long as the control authority issues the appropriate number of permits for each market, the equivalence of supply and demand would ensure that the price of a permit would equal the marginal cost of emission reduction ($P_i = \lambda_i$) in each market. This is a perfectly efficient outcome.

According to the Coase Theorem, the initial allocation of allowances is irrelevant in the absence of transactions costs or income effects.[105] Therefore, in theory there is no ideal initial distribution of allowances. In practice, the regulator should distribute allowances to minimize necessary trading and market dominance of allowances. The post-trading equilibrium depends on the marginal cost curves of each source. The regulator doesn't know the shapes of those curves; in fact, if he did know those curves he could effectively use command-and-control regulation. But he doesn't, and therefore cap-and-trade is theoretically more efficient.

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[102] *Id.* at 34-35.

[103] *See* EPA, *The Green Book Nonattainment Areas for Criteria Pollutants*, (Dec. 5, 2013) *available at* http://www.epa.gov/oaqps001/greenbk/.

[104] This can be expressed as $\min_{r_j} C_j(r_j) = \sum_{i=1}^{I} P_i \left[d_{ij}(\overline{e}_j - r_j) - q_{ij}^0 \right]$ where P_i is the price that prevails in the *i*th permit market and q_{ij}^0 is the *j*th source's initial allocation of concentration units at the *i*th receptor.

[105] *See generally*, Ronald Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960).

This uncertainty means that judicial review of initial allocations should be extremely deferential. Judges should not overturn an initial allocation if the regulator can explain why they made the initial allocation with reasoning that is not just a (arbitrary or capricious) pretext of favoring one place, organization, or business over another.

Under an ambient permit system, over-control (as defined by *North Carolina* and *EME Homer City* Generation) is impossible. Every airshed (attainment or nonattainment area) has the number of allowances that translate to the NAAQS, and if an area has air quality that is better than the NAAQS, that is because that was necessary for other airsheds to attain the NAAQS. Furthermore, under-control is impossible as allowances for each airshed are limited so the NAAQS will be attained.

However, an ambient permit system would have very high transactions costs due to the need to purchase allowances in every airshed in which pollution deposits. In most cases (as we discuss in-depth below) this will make an ambient permit system impractical.

C. Detailing the EPA's Choices in Mitigating Interstate Transport of Air Pollution

As stated above, the theoretically optimal way to regulate interstate transport of smog precursors is through an ambient permit system, where polluters buy allowances to pollute in every market in which they pollute that is either in nonattainment or in danger of nonattainment. However, the very large transactions costs associated with such an approach may make it impractical. Therefore, the EPA needs to choose among a wide variety of (mostly second-best) approaches to regulating interstate transport of smog precursors. These options include:

- Command-and-control (default CAA approach)
- Taxes

- Cap-and-trade
    - Ambient permit markets (many markets)
    - Emissions trading (one market)
    - Emissions trading (several markets; could be restricted to within-states)
    - Emissions trading (exchange rates)
    - Emissions trading (directional or restricted trading)
- Regulatory tiering (more than one of the approaches above)

Note that market-based (taxes or cap-and-trade) approaches to the good neighbor provision of the CAA are layered on top of its current command-and-control structure. This is currently true within the Acid Rain Program (ARP) and CAIR; eligible sources are subject to both technology standards and the cap-and-trade programs.

1. Why Command-and-Control Isn't Enough to Control Interstate Transport of Air Pollution

In general, command-and-control standards under the CAA are technology standards, mandating an emissions rate for different types of plants, like coal power plants, natural gas power plants, cement plants, etc. Such standards can be inefficient because different polluters have different costs of fulfilling a technology or a technology standard. Costs are minimized when all polluters have the same costs of compliance.

The near-exclusive use of command-and-control to control smog has a long record of failure. Currently, about 123 million Americans (out of a 2010 population of 309 million) live in ozone nonattainment areas, and 74 million live in $PM_{2.5}$ nonattainment areas.[106] This compares very poorly to other criteria pollutants; only 29 million Americans live in PM_{10} nonattainment

[106] EPA, *Summary Nonattainment Area Population Exposure Report* (Dec. 14, 2012), *available at* http://www.epa.gov/oaqps001/greenbk/popexp.html.

areas and less than ten million Americans live in nonattainment areas for any other pollutant.[107] Continuing to limit ourselves to command-and-control measures to control smog would likely lead to continued nonattainment for areas with a significant percentage of America's population.

Controlling interstate transport of air pollution using just command-and-control regulation is very difficult, if not impossible.[108] Such a strategy would include (1) much more stringent technology (Reasonably Achievable Control Technology – RACT) standards for existing sources within nonattainment areas and (2) § 126 petitions from affected downwind states.[109] States embroiled in a § 126 process can expect extensive legal proceedings that will take several years to get results.[110] Since about 200,000 Americans die from air pollution every year, delay equals death.

The EPA cannot directly control sources under § 126. Instead, an affected downwind state would petition the EPA under § 126 that the good neighbor provision was being violated by a "major source or group of stationary sources."[111] The EPA could either find that the source or sources are in violation of the good neighbor provision or deny such a petition.[112] If the EPA denies the petition, that denial is subject to judicial review under an arbitrary and capricious standard.[113] If the EPA makes the finding, it has to shut down the source or sources within three years, at the latest.[114]

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[107] *Id.*
[108] *See* Thor W. Ketzback, *CAIR Decisions Create Regulatory Uncertainty and Require a Quick Solution*, 40 NO. 3 ABA TRENDS 12 (2009).
[109] *Id.*; *see also* 42 U.S.C. § 7426 (2012) (§ 126 of CAA).
[110] *See* Ketzback, *supra* note 106, at 13.
[111] 42 U.S.C. § 7426(b) (2012).
[112] *Id.*
[113] 42 U.S.C. § 7607.
[114] 42 U.S.C. § 7426(c).

Furthermore, several downwind states (at least) would sue the EPA under § 126. Each state would likely sue separately based on the details of pollution reaching affected downwind states. This litigation would clog the courts, could result in numerous rounds of litigation for multiple states, and would make it extremely difficult to enforce the CAA and mitigate the interstate transport of air pollution.

Regulatory uncertainty would be costly for regulated parties. Section 126 proceedings may make it difficult for new or modified sources in upwind states to get permits.[115] Regulatory uncertainty would also make it very difficult for energy companies to plan their investments, and public utilities might not be able to recover the costs of their investments in ratemaking cases.[116]

Over the years, the EPA has understood why command-and-control regulation alone is insufficient to fully mitigate the interstate transport of smog precursors. Therefore, the EPA has turned to market-based pollution control rules to supplement the command-and-control base of the CAA.

2. Why Using Taxes to Control Interstate Transport of Smog Precursors is Probably Unlawful

Taxes could conceivably be used to control interstate emissions. Taxes can set an optimal price of emissions so that producers will face the socially optimal price of pollution and make decisions to pollute accordingly. This is called a Pigouvian tax and is used in Australia and British Columbia to control carbon dioxide emissions.[117] Under uncertainty, a tax sets the

[115] *See Id.*
[116] *See* Ketzback, *supra* note 106, at 13.
[117] *See generally*, ARTHUR PIGOU, THE ECONOMICS OF WELFARE (1920).

price but allows the quantity of pollution to vary. This is the opposite of cap-and-trade systems, which set quantities and allow the price of those allowances to fluctuate.[118]

This response to uncertainty likely makes using taxes to control interstate transport of SO_2 and NO_x emissions unlawful. Regulators tend to oppose such taxes for several reasons: (1) the difficulty in gathering the information necessary for designing an effective tax rate; (2) the difficulty in accurately gauging the level of pollution that industry will actually emit under a given tax rate, and therefore the accompanying uncertainty about the actual health and environmental benefits resulting from the tax; and (3) the political unattractiveness (and questionable legality) of direct taxation.[119] A tax cannot assure that a transport rule will abate pollution from upwind states that causes downwind states to violate the NAAQS. Therefore, using a tax to control interstate emissions under the good neighbor provision of the CAA is probably unlawful.

3. Why Cap-and-Trade Is Needed to Control Interstate Emissions of Smog Precursors

The failure of command-and-control systems to adequately control interstate transport of air pollution has led to a growing consensus around the use of cap-and-trade programs to control such pollution. In 1990, that consensus was enacted into law as the Acid Rain Program, part of the 1990 Amendments to the CAA. That consensus has been extended to climate change mitigation, under both the Kyoto Protocol and domestic efforts like California's AB32.[120] Most

[118] Some regulatory systems have elements of both emissions trading and taxes. For example, the American Clean Energy and Security Act, H.R. 2454, 111th U.S. Congress, 2009, established an emissions market with a price floor and ceiling.
[119] *See* Harry Moren, *The Difficulty of Fencing in Interstate Emissions: EPA's Clean Air Interstate Rule Fails to Make Good Neighbors*, 36 ECOLOGY L.Q. 525, 542 (2009).
[120] CAL. HEALTH & SAFETY CODE § 38500 *et seq.* (West 2007).

importantly for this paper, that consensus exists for controlling interstate transport of smog precursors under programs like CAIR and CSAPR.

Specifically, cap-and-trade programs to control interstate pollution:

1. Decide on a pollution cap (total pollution allowed)
2. Allow the states to allot the cap among them, or if there are too many states involved, the EPA allots the cap among states using some technological standard (heat input, cost of pollution abatement, etc.)
3. Give out yearly pollution allowances to polluters, which are reduced over time. Each polluter must have a pollution allowance for each ton of pollution emitted (or deposited, in the case of ambient permit markets).
4. Allow polluters to trade allowances to each other.

Cap-and-trade programs have significant advantages and are often supported by regulators, environmental organizations, and regulated entities.[121] Cap-and-trade regulations are typically more efficient than command-and-control regulations for controlling interstate air pollution and allow for deeper reductions in emissions. Therefore, EPA has attempted to use cap-and-trade programs to mitigate interstate air pollution under the good neighbor provision of the CAA.

Cap-and-trade programs achieve pollution reductions that command-and-control regulations alone cannot, like:

- Shifting capacity to less polluting facilities
- Run control equipment at maximum capacity, and

[121] McCubbin, *supra* note 51, at 3-4.

- Encourage organizations to find new ways to reduce emissions.[122]

Cap-and trade systems can deliver these benefits because the licenses to pollute are transferable from those who value the licenses the least to those who value them the most. A command-and-control permit, required under Title V of the CAA, is also a license to pollute. However, some societal gains are lost because command-and-control licenses are not transferable.

The EPA needs much less information to run a cap-and-trade program that a command-and-control program. Evaluating effective options for pollution abatement in a command-and-control system involves evaluating a variety of characteristics for each pollution source, including nature, design, and age.[123] Each source is somewhat unique, meaning that regulators need a huge volume of information to determine how best to implement pollution controls at each source.[124] State and federal regulators don't know how much emissions reduction costs individual units in the regulated industry or how much benefit society gets from cleaning up pollution.[125] Source operators usually have much more information than regulators and are therefore better situated than regulators to determine cost-effective control equipment.[126] Operators are also better situated for optimal timing of investments.[127]

Cap-and-trade approaches are also preferable to command-and-control approaches because markets usually are better at stimulating innovation in control technologies and procedures. In a cap-and-trade system, if a polluter can utilize advanced technology to reduce

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[122] *See* Sonja L. Rodman, *Legal Uncertainties and the Future of U.S. Emissions Trading Programs*, 24 SPG NAT. RESOURCES ENV'T 7 (2010).
[123] *Id.*
[124] *Id.*
[125] *See Id.*
[126] *Id.*
[127] *Id.*

emissions, he can sell his excess emissions at a profit.[128] This does not usually happen in a command-and-control system.[129] Under cap-and-trade, compliance burdens are shifted to those facilities with the lowest costs of compliance.[130] Cap-and-trade systems can add additional pollution reductions that command-and-control system cannot reach.[131]

Regulated entities like the flexibility of cap-and-trade systems. Under a cap-and-trade system, many plants that would have to close if they were forced to adopt controls can purchase permits and stay open.[132] Regulated entities can make more financially optimal decisions under a cap-and-trade system.

Furthermore, cap-and-trade programs (properly run) guarantee emissions reductions because emissions are permanently capped well below baseline levels.[133] A command-and-control program does not guarantee this as increases in number and fuel usage of sources can overwhelm technological emission controls. Instead, under command-and-control abatement costs are higher and emissions reductions are lower.[134]

The most serious argument against cap-and-trade regulatory approaches (esp. those like CAIR, as I'll discuss below) is uncertainty in location of polluters and pollution.[135] Since polluters in different locations can trade with each other, there is a possibility of "hot spots"

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[128] *Id.*
[129] There are limited circumstances where command-and-control regulation stimulates more technological innovation than cap and trade. See Juan Pablo Montero, *Permits, Standards and Technology Innovation*, 44 J. ENVTL. ECON. & MGMT. 23, 31-39 (2002); Joel F. Bruneau, *A Note on Permits, Standards, and Technological Innovation*, 48 ENVTL. ECON. & MGMT. 1192, 1198 (2004).
[130] *See* Arthur G. Fraas and Nathan Richardson, BANKING ON ALLOWANCES: THE EPA'S MIXED RECORD IN MANAGING EMISSIONS-MARKET TRANSACTIONS, 19 N.Y.U. ENVTL. L.J. 303, 304 (2012).
[131] *Id.*
[132] McCubbin, *supra* note 51, at 4-5.
[133] Kati Kiefer, *A Missing Market: The Future of Interstate Emissions Trading Programs after North Carolina v. EPA*, 54 ST. LOUIS U. L.J. 635, 668-69 (2010).
[134] *Id.* at 669.
[135] Moren, *supra* note 117, at 545.

where polluters tend to congregate. The hot spots may occur disproportionately in disadvantaged communities, raising environmental justice questions.[136] The seriousness of the "hot spot" problem depends on the pollutant and the nature of the polluters and the market.[137] Pollutants with strong local effects, like mercury, are more likely to create hot spots and are therefore command-and-control programs may be preferred.[138]

Trading systems of SO_2 and NO_x sometimes have hot spots. The Acid Rain Program and Northeastern NO_x budget programs did not have them, or at least had fewer of them than many other similar cap-and-trade programs.[139] However, the Regional Clean Air Incentive Market (RECLAIM) program in the Los Angeles area had severe hot spots in mostly Hispanic neighborhoods.[140]

Hot spots would not exist in an ambient permit market. However, since the transactions costs of an ambient permit market are likely to be high, other cap-and-trade systems, although second-best theoretically, would likely be better in practice. By definition, there is no optimal second-best system. In fact, there is no theoretical means to compare the performance of second-best systems; which design is better depends on the characteristics of each individual market.

Cap-and-trade systems under the CAA try to deal with this problem by subjecting sources to both command-and-control and cap-and-trade regulations (regulatory tiering). Command-and-control regulations limit both emissions from a particular source and concentration of sources. Cap-and-trade is then used to reduce emissions even further in an economical fashion. This

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[136] *Id.*
[137] *Id.* at 545-46.
[138] *Id.*
[139] *Id.* at 546.
[140] *See* Richard Drury et al, *Pollution Trading and Environmental Injustice: Los Angeles' Failed Experiment in Air Quality Policy*, 9 DUKE ENVTL. L. & POL'Y. FORUM 231, 235 (1999).

allows sources where control is expensive to purchase allowances from sources where control is less expensive.

D. EPA's Available Cap-and-Trade Choices to Regulate Interstate Transport of Smog Precursors

The EPA has several cap-and-trade-based options to regulate the interstate transport of smog precursors. These options can be compared by five criteria: (1) theoretical efficiency, (2) legality, (3) transactions costs, (4) market design, and (5) excess price variation. Legality is determined partially by court decisions, so a discussion of legality is left until later in this paper. These criteria interact; changes made to programs to ensure that they survive judicial review can make them less efficient, increase transactions costs, or lead to less efficient markets.

Along with the command-and-control base of the CAA, a variety of emissions markets have been used in national, regional, and local cap-and-trade programs. Conceivably, an emissions market could include (1) the entire region, (2) subsets of the region, (3) individual states, or (4) directional markets with trading restrictions. Under this definition, CAIR and the NO_x SIP Call set up region-wide emissions markets, and CSAPR, with its assurance provisions, was a type of directional trading.

In an ambient permit market, the EPA would issue permits for every nonattainment area or area in danger of nonattainment. The EPA would have to decide how large each airshed should be; an airshed could be an entire metropolitan area or as small as a county. The implementation of an ambient permit system is far from trivial. In theory, since typical laws mandate that the ambient standards be met everywhere, complete assurance that violations would not occur requires a very large number of receptor locations.[141] However, in practice, only about

[141] *See* Tietenburg, *supra* note 87, at 76.

nine or ten receptors are needed to cover a typical urban airshed.[142] Either a separate market could be set up for each location, or fewer markets could be set up, possibly leaving some parts of the urban area unprotected.[143] Each pollutant would have a different set of permits, so each polluter would have to purchase three sets of allowances (NO_x annual, NO_x ozone season, and SO_2) multiplied by the number of ambient markets.

In contrast, an emissions trading system like CAIR or CSAPR only requires the purchase of one type of permit for each pollutant. This is much easier, and transactions costs are likely significantly less. Currently, there is no single market for pollution allowances; instead specialist brokers buy and sell allowances. Since a polluter only has to buy one permit for each pollutant, and the markets are large and regional, it is fairly easy to find buyers and sellers. Many ambient permit markets would be large as well (esp. those in major cities), but they would not be as large or as fluid as the current emissions markets set up by CAIR.

1. Efficiency

In theory, the most efficient market design is an ambient permit system. The system can be perfectly designed so that all markets fulfill the NAAQS at the lowest possible cost. With an ambient permit system, the more markets there are, the more efficient the system will be, excluding transactions costs. If the markets are larger, the system will be less efficient, but transactions costs will be reduced as polluters have to purchase permits in fewer markets.

Emissions markets are second-best solutions that reduce transactions costs. These markets vary greatly in efficiency for regulating pollutants like SO_2 and NO_x. Most emissions markets, like CAIR, have been designed as if location doesn't matter, even when it clearly does.

[142] *See Id.*
[143] *See Id.*

Other markets have restrictions on trading. CSAPR uses assurance provisions to limit emissions from each state. RECLAIM had directional trading, so that inland sources couldn't trade to coastal sources. States have also created markets that only existed in a state or part of a state (like RECLAIM).

Emissions trading of NO_x and SO_2 is inefficient in several ways. First, it costs more because it requires more emissions control than necessary to satisfy the standards.[144] Second, it can lead to "hot spots," where lots of polluters congregate.[145] Third, an emissions permit approach fails to affect the locations of new sources.[146] An ideal system would both encourage new sources to locate in areas where they don't lead to nonattainment, and encourage old sources to close (or drastically reduce their emissions) in places that lead to nonattainment.[147]

The necessity of CSAPR-like assurance provisions limits the over-control necessary to satisfy standards. However, this is not necessarily a reason to support ambient permit programs over emissions trading. The current NAAQS are probably too lenient, so reductions slightly below the NAAQS also likely save lives. The amount of over-control in an emissions trading system is an empirical question, and therefore difficult to evaluate theoretically.

A regional emissions trading program like CAIR or CSAPR for NO_x and SO_2 is less likely to lead to hot spots because similar programs, like the Acid Rain Program have had few hot spots.[148] This is directly relevant because both the Acid Rain Program and CAIR/CSAPR control SO_2. Therefore, it is less likely that an emissions trading program will lead to hot spots.

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[144] *Id.* at 86.
[145] *Id.*
[146] *Id.* at 87.
[147] *Id.*
[148] *Id.* at 88; *see also*, Dallas Burtraw & Eric Mansur, *Environmental Effects of SO_2 Trading and Banking*, 33 ENVTL. SCI. TECH. 3489, 3489 (1999).

However, CSAPR (and ostensibly any replacement transport rule), would have reduced SO_2 emissions far below the amounts allowed by the Acid Rain Program. Therefore, CSAPR might be different enough from the Acid Rain Program to result in hot spots. Since CAIR and CSAPR are structured similarly, empirical work on the effects of CAIR would provide evidence for whether a new transport rule would lead to hot spots and under which conditions.

However, intrastate trading programs could lead to hot spots; intrastate programs like RECLAIM have had them. Whether an intrastate trading program leads to hot spots depends on the specific details of the program, and it can very difficult to characterize a post-trading equilibrium.

Under programs like CAIR and CSAPR, the prices for allowances in each airshed are certainly incorrect. However, those markets have much lower transactions costs than ambient permit markets. The need to use second-best designs for programs suggests that the EPA should receive significant deference in deciding how to design programs under the good neighbor provision of the CAA.

2. Transactions Costs

Transactions costs for a CSAPR-like system would likely be similar to transactions costs with the current system, CAIR. The only difference might be that more trades would have to be made because the D.C. Circuit's required proportional distribution of allowances is farther from a post-trading equilibrium than the EPA's methodology.

Current CAIR markets (SO_2, seasonal NOx, and annual NOx) have significant transactions costs. Currently, for example, the annual NOx bid price is $35.00, while the ask

price is $40.00.[149] These transactions costs are small enough to maintain a viable pollution market, but are very large compared to bid/ask prices in widely traded stocks. For example, General Motors stock (as of 9/28/13) has a bid price of $36.38 and an ask price of $36.57.[150] This small gap in bid and ask prices allows an individual, or an individual entity, to hold many different socks and diversify their investment portfolio. On the other hand, the significant gap between bid and ask prices in current markets suggests that ambient permit markets, which would be less liquid, would probably be unsustainable due to much higher transactions costs. Ambient permit markets, if used at all, would likely have to be limited to very few markets, probably those that are most heavily affected by interstate emissions.

Furthermore, in an ambient permit system, a polluter would have to purchase allowances in multiple markets at once.[151] If each market had enough participants to have transparent prices in some clearinghouse, then this would be fairly easy.[152] However, if any of the markets is thin, then the polluter would have trouble determining its costs and therefore its demand for allowances.[153] Transactions costs could rise significantly in the case of thin markets.

This problem is exacerbated when control technologies can control both SO_2 and NO_x.[154] In that case, the desired number of permits for one pollutant would depend on the number of credits obtained for the other pollutant as well.[155]

[149] Evolution Markets, http://www.evomarkets.com/environment/emissions_markets (quote from Sept. 27, 2013).
[150] MSN, http://investing.money.msn.com/investments/stock-price/?symbol=GM (9/28/13).
[151] *See* Tietenburg, *supra* note 87, at 76-77.
[152] *See Id.*
[153] *See Id.*
[154] *See Id.*
[155] *See Id.*

3. Market Design

In general, most studies have found that market power in emissions (or ambient) markets aren't much of a problem.[156] Few permit markets contain a large number of direct competitors in the output market. A typical airshed contains a number of different sources, and in many permit markets the industrial sources emitting a particular pollutant in a given area rarely have much overlap in product markets.[157]

Commonly used distribution rules are beneficial in protecting sources from predators.[158] Initial allocations are generally feasible and existing sources can't be forced out of business even if no other source were willing to sell them permits. Any distribution rule that allocates a disproportionate share of permits to only a few sources could be vulnerable to the use of market power.[159]

An intrastate system could give certain producers too much market power, and therefore distort the market for allowances. Market power can lead to market manipulation, which can be a serious problem in trading markets. The most serious example of market manipulation was probably that of California in 2000 and 2001 after it deregulated its electricity markets, separating generation from transmission and distribution.

An intrastate system is likely to have fewer problems than electricity markets with market manipulation because allowances can be banked, unlike electricity. Furthermore, allowances are given out on a yearly basis and the highest electricity demand is in the summer, so companies have time to plan if they are using too many of their allowances. However, if one company (or

[156] *See Id.* at 157-58.
[157] *See Id.*
[158] *See Id.* at 159.
[159] *See Id.*

cartel) has all of the stored allowances for a particular state, it could charge monopoly prices for those allowances, leading to inefficiency. This is less likely when trading markets are regional or national. It is even much less likely in an ambient permit system because interstate pollution generally comes from many areas and producers.

The EPA could attempt to mitigate this problem by strictly regulating the sale of intrastate allowances if one company or cartel has too much market power; but this would involve the EPA setting prices instead of the free market, losing much of the information advantages that emissions trading produces. Furthermore, attempts to regulate antitrust issues concerning emissions trading through the courts would be difficult, unpredictable, and costly. It is better to design a market to prevent issues with market power than trying to resolve such issues as they arise.

4. Excess price variation

In the face of uncertainty, a cap-and-trade system keeps constant the number of available allowances, while the price of those allowances fluctuates. Some cap-and-trade rules have price floors and ceilings to minimize price variation, but *North Carolina* and *Homer City* probably forbid these for the same reason an emission fee or tax is likely unlawful.[160] A price ceiling would allow the issuance of more allowances if the price reached a certain (high) level, but this is likely forbidden because of the need to assure that emissions are mitigated. A price floor, which would force surrender or banking of allowances once the price reached a certain (low) level, would also be unlawful because of the judicial rules against over-control. Therefore, excess price variation is a hazard of cap-and-trade programs to enforce the good neighbor provision of the CAA.

[160] *See infra*, Section IV.

Both excessively low and excessively high allowance prices can be a serious problem. Very low prices can cause a market to collapse as extremely low prices severely impair the credibility of the system, as it is no longer needed.

Excessively high prices can be both catastrophic and inefficient. Excessively high allowance prices can be catastrophic to regulated entities as they may have neither the cash flow to pay the excess cost nor the ability to pass the extra cost on to consumers in regulated markets. This is especially true for electrical utilities. Excessively high prices can be inefficient if they are higher than the prices to reduce pollution by other means. SO_2 and NO_x come from a variety of sources, most of which are not included in cap-and-trade programs. CAIR and CSAPR decided not to regulate emissions from mobile sources (cars and trucks) because emissions reductions from such sources were much more expensive than reductions from power plants and industrial sources.[161] If allowance prices spike for any significant period of time, then emission reductions from other sources would be, at least temporarily, more efficient.

Restricting trades to within a state could lead to excess price variation. Different states produce very different levels of pollution. Some states have more power plants than others, and states also have very different levels of industrial SO_2 and NO_x pollution. This is likely to create a situation where allowance prices vary greatly from one state to another. Furthermore, these prices would have very little to do with downwind NAAQS; instead the prices would be driven by power plant and industrial mix in a particular state, as well as electricity demand.

[161] *See* CAIR, 70 Fed. Reg. 25,162, 25,213-15 (May 12, 2005); CSAPR, 76 Fed. Reg. 48,207, 48,210 (Aug. 8, 2011).

An example of excess price variation in an intrastate pollution market is the Los Angeles area's RECLAIM. [162] Under RECLAIM, each of the 400 major polluters in the district was given an annual pollution limit for NO_x and SO_2.[163] This limit decreased 5%-8% per year and could be traded among polluters.[164] The initial years of the program had fairly generous limits, so most companies had more credits than they needed from 1993-99. During the summer of 2000, problems with California's electricity market spilled over into the RECLAIM market, causing credit prices to increase tenfold, from about $4,300 per ton to over $45,000 per ton.[165] The district responded by temporarily pulling power plants out of the program and instituting a mitigation fee as a safety valve, which was then invested in emission reduction projects.[166]

RECLAIM's unique characteristics may have led to excess price variation. Trading within the program was limited spatially by the creation of trading zones for coastal and interior regions.[167] Also, RECLAIM was linked to a dysfunctional deregulated electricity market.

Other than RECLAIM, the only other programs to see large price fluctuations are climate change cap-and-trade programs, most notably the European Union – Emissions Trading System (EU-ETS).[168] In that case, initial allocations were generous, and the near-collapse of the world economy (and the actual economic collapse of several countries in southern Europe) reduced greenhouse gas emissions so much that the allowances are now worth little.

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[162] *See e.g.* David Harrison, *Ex Post Evaluation of the RECLAIM Emissions Trading Programmes for the Los Angeles Air Basin*, in TRADABLE PERMITS: POLICY EVALUATION, DESIGN, AND REFORM 45 (2004).
[163] *See* Tietenburg, *supra* note 87, at 12.
[164] *Id.*
[165] *See e.g.* Harrison, *supra* note 160, at 45.
[166] *Id.* This is a very high price. The assumed cost of mitigation in CAIR and CSAPR is around $500/ton in 2011 dollars for NO_x and SO_2 (Group 1) and $2,300/ton for Group 2 SO_2. CSAPR, 76 Fed. Reg. 48,208, 48,246-71.
[167] *See* Tietenburg, *supra* note 87, at 13.
[168] *Id.; See e.g.*, *ETS, RIP?,* ECONOMIST (Apr. 20, 2013) (detailing fluctuations in EU-ETS market).

Recent experience with cap-and-trade programs suggests that excess price variation is rare except for massive economic and/or regulatory dislocations. These dislocations are probably more likely at a state/local level simply because smaller areas are more prone to dislocation. However, it's not clear that even state-level cap-and-trade programs have a significant risk of excess price variation.

E. Evaluating the EPA's Options to Mitigate Interstate Transport of Air Pollution

The EPA does not have any perfect options to mitigate interstate transport of air pollution. The theoretically perfect solution, an ambient permit market with separate markets for each area in nonattainment or in danger of nonattainment, is probably not feasible due to transactions costs, except possibly to mitigate pollution in very few areas. That means that any solution the EPA develops to mitigate the interstate transport of air pollution is a second-best solution.

Furthermore, command-and-control alone is likely insufficient to mitigate interstate transport of smog precursors. Smog has been a serious problem since before the 1970 CAA, and command-and-control efforts alone have not been successful. Cap-and-trade approaches allow sources to economically reduce their emissions because it allows sources with higher cost of control to purchase allowances from sources with lower costs of control.

However, setting up a cap-and-trade program is difficult for the EPA because it may not know before the program whether the program will (1) set up a liquid market and (2) will lead to hot spots.

A program similar to CSAPR might be the EPA's best choice, but CSAPR still has disadvantages. The advantages of a program like CSAPR are that it (1) has a fairly liquid

market, (2) is less likely to lead to hot spots because (a) it has higher costs of control for emissions sources from states that are likely to cause the most damage, and (b) has assurance provisions that limit emissions from any one state.

However, the advantages of a program similar to CSAPR could be counterbalanced by several disadvantages. First, some states are so large that trading within states can cause hot spots. For example, sources from New York City, the New York suburbs, and Long Island strongly affect air quality in Connecticut, while sources from upstate New York have less effect there. Second, the EPA needs to approximate a post-trading equilibrium in distributing allowances to states, because if it doesn't, that could lead to large, unhealthy price swings.

Without considering court cases interpreting the good neighbor provision, the EPA has options to fully mitigate interstate transport of smog precursors. However, recent court cases likely foreclose those options.

III. Court Cases Interpreting the Legality of Cap-and-Trade Programs under the Good Neighbor Provision

Three court cases, *Michigan, North Carolina,* and *Homer City*, interpret the good neighbor provision of the CAA. *Michigan* largely upheld the EPA's interpretation of the provision along with its use of cap-and-trade programs to mitigate interstate transport of air pollution. *North Carolina* and *Homer City* state that cap-and-trade programs under the good neighbor provision are legal, but restrict these programs so much that they are impossible in practice. These restrictions are:

- The EPA cannot require upwind states to reduce their emissions more than necessary for downwind states to achieve their NAAQS;

- If more than one upwind state contributes to nonattainment in a downwind state, responsibility for pollution reduction must be split proportionately to each state's contribution to nonattainment; and
- "the 'amounts which will…contribute' to a downwind State's nonattainment are at most those amounts that travel beyond an upwind State's borders and end up in a downwind State's borders and end up in a downwind State's nonattainment area,"

A. *Michigan v. EPA*

In *Michigan v. EPA*, eight of the 23 upwind states along with dozens of industries challenged the NO_x SIP Call.[169] The petitioners argued that EPA's identification of significant emissions improperly focused on the cost and availability of highly cost-effective pollution controls, rather than air quality data.[170] The petitioners representing some of the upwind states argued that the statute prohibited the EPA from considering cost at all.[171]

In *Michigan*, the court rejected the petitioner's concerns, stating that although Congress had not explicitly authorized the EPA to consider control costs, nothing in the text of §110(a)(2)(D), the overall structure of the CAA, or the CAA's legislative history forbid this.[172] The Court also asked how the EPA would determine "significance" if it didn't consider cost and strongly suggested that significance often can't be determined without considering costs.[173]

[169] *See Id.* at 667-68 (D.C. Cir. 2000).
[170] *Id.* at 675-76.
[171] *See Id.* at 676.
[172] *Id.* at 679.
[173] *Id.* at 677-78 (citing STEPHEN G. BREYER ET AL, ADMINISTRATIVE LAW AND REGULATORY POLICY 65 (4th ed. 1999)).

Furthermore, the court stated that it was lawful for the EPA to force states with very different levels of actual contribution to nonattainment to achieve similar pollution reductions.[174] Also, the EPA was under no obligation to maximize health benefits for a particular cost.[175]

The court also rejected the petitioners' claims that the EPA violated the states' rights under the cooperative federalism mandated by the CAA.[176] Under the CAA, the EPA cannot compel states to impose any particular control scheme. Instead, each state chooses which sources to regulate and which measures to adopt, and the EPA may not question a state's choices as long as the state is in compliance with the NAAQS.[177] The NO_x SIP call gave states a choice about whether or not to join the multistate trading program set up by the EPA. The EPA gave each state an amount they had to reduce their NO_x emissions by, and states could choose to fulfill their good neighbor obligations to other states by other means, like reduction of NO_x emissions from automobiles. The *Michigan* court found that since states didn't have to adopt the EPA's recommended highly cost-effective controls, the NO_x SIP Call didn't violate the CA's design of cooperative federalism.[178] Overall, *Michigan* upheld the NO_x SIP Call and the ability of the EPA to use cost of pollution controls to determine significant contribution under the good neighbor provision of the CAA.

Michigan was a good decision. The D.C. Circuit's use of *Chevron* deference in *Michigan* gave the EPA freedom to design a workable solution to the problem of interstate transport of air pollution. Since there is no first-best solution, the EPA needs the freedom to design a solution that it thinks might work. Also, allowing the EPA to use cost to determine significant

[174] *Id.* at 679.
[175] *Id.*
[176] *Id.* at 685-88.
[177] *See Id.* at 686-87 (citations omitted).
[178] *Id.* at 688.

contribution is extremely important. Without the consideration of cost, there is no single solution to the problem of interstate transport. In fact, there is no obvious non-arbitrary way to determine how best to allocate allowances without considering cost.

B. *North Carolina v. EPA*

In 2005, the EPA promulgated CAIR to control both ozone and $PM_{2.5}$. The NO_x SIP Call only regulated ozone (by reducing NO_x emissions). The state of North Carolina wanted to make sure that the trading programs actually reduced air pollution in North Carolina.[179] Several industries disagreed with adjustments EPA made to the state budgets.[180] Those parties filed suit at the D.C. Circuit to win improvements in CAIR and not overturn it entirely.[181] Instead, in *North Carolina v. EPA* (2008), the D.C. Circuit vacated CAIR before reconsidering its decision and remanding CAIR back to the EPA without vacatur.[182] CAIR is still in effect until the EPA comes up with a rule that will survive judicial review. CAIR has a similar design as the NO_x SIP Call, but a different D.C. Circuit decided that CAIR was unlawful.

The *North Carolina* court rejected several elements of CAIR. The most important in terms of designing a viable interstate transport rule are:

- Trading programs for pollution allowances for SO_2 and NO_x lacked reasonable measures to assure that upwind states would abate their unlawful emissions;
- The EPA has no authority to adjust Title IV allowances so that sources in CAIR had to pay multiple allowances for every ton of SO_2 emitted; and.

[179] *North Carolina*, 531 F.3d at 906.
[180] *Id.* at 916.
[181] *See* McCubbin, *supra* note 51, at 11.
[182] *North Carolina*, 531 F.3d 896 (D.C. Cir. 2008) (vacating CAIR); *North Carolina*, 550 F.3d 1176 (D.C. Cir. 2008) (amending earlier decision and remanding CAIR to EPA without vacatur).

- The budgets for SO_2 and NO_x trading programs and region-wide cap were arbitrary and capricious because states were forced to share their significant contributions with other states.

North Carolina shocked and surprised the EPA, state environmental regulatory agencies, industry, and environmental advocates.[183] The original *North Carolina* decision gave a remedy (vacating the rule in its entirety) that the plaintiffs didn't even want.[184] The state of North Carolina wanted CAIR to be stricter, and vacating CAIR made the environmental regime less strict. The D.C. Circuit soon changed course and remanded CAIR back to the EPA instead of vacating it, but most affected parties were still concerned by the decisions.[185]

The court in *North Carolina* stated that CAIR must "achieve[] something measurable toward the goal of prohibiting sources 'within the State' from contributing to [pollution] 'in any other State.'"[186] Therefore, some commentators thought the EPA might be able to satisfy the court by using market analyses to demonstrate that each state will, in fact, be taking responsibility for eliminating at least some of its offending emissions.[187] At a minimum, the EPA must ensure some emissions reductions in every upwind state, possibly by studying the practical limits of the allowance market or by imposing regulatory limits on the use of out-of-state allowances.[188] The EPA would then have to avoid the appearance to imposing policy goals

[183] *See* Thor W. Ketzback, *CAIR Decisions Create Regulatory Uncertainty and Require a Quick Solution*, 40 NO. 3 ABA TRENDS 12 (2009).
[184] *See North Carolina* , 550 F.3d at 1177-78.
[185] *See* Ketzback, *supra* note 176.
[186] *See North Carolina*, 531 F.3d at 907-08.
[187] *See* McCubbin, *supra* note 51 at 20-21.
[188] *Id.* at 21-22.

on a multi-state region without carefully demonstrating how these goals relate to actual conditions in each state.[189]

In *North Carolina,* the D.C. Circuit felt that in CAIR, the EPA broke the link between each state's significant downwind emissions and their responsibility to mitigate those emissions. Instead, the EPA more or less set goals for the 28-state regions as a whole and not individual states.

The D.C. Circuit ruled that the good neighbor provision prevents interstate emissions trading if that trading does not assure that areas affected by downwind pollution gain relief. Under CAIR, a regulated facility doesn't have to eliminate its own emissions, but could buy emissions from other states. The judges gave the example of sources in Alabama that contribute to high $PM_{2.5}$ levels in Davidson County, NC.[190] They feared that upwind sources would purchase enough NO_x and SO_2 allowances to cover their current emission, resulting in no change to Alabama's contribution to pollution in Davidson County.[191]

Overall, those who believed that *North Carolina* required smaller changes would suggest that a revised CAIR only needed to: (1) have assurance provisions to make sure that states actually eliminate their own emissions that cause downwind pollution that interfere with a downwind areas attaining the NAAQS; and (2) assign budgets in such a manner that is connected to states' contribution to downwind pollution that interferes with NAAQS attainment.

That said, *North Carolina* was a huge departure from *Michigan*, and in fact, may not even view *Michigan* as binding precedent. The Court, in *Michigan*, notes that the legality of cap-and-

[189] *Id.* at 22.
[190] *Id.* at 907.
[191] *Id.*

trade under the good neighbor provision of the CAA was not at issue because the plaintiffs in *Michigan* had not argued against it. In this case, *North Carolina*'s statement that a trading program must do "something measurable" to mitigate North Carolina's air pollution from other states suggests that a trading program that doesn't guarantee this reduction is unlawful. In other words, market analyses are not sufficient to make lawful an interstate cap-and-trade program that does not completely guarantee that interstate emissions will not significantly contribute to nonattainment in downwind states.

The implications of *North Carolina* were unclear at the time and created a lot of regulatory uncertainty, which was accentuated because a command-and-control solution to the problem of interstate transport of air pollution was inefficient and impractical, at best. In the event that a market-based program could pass judicial review, it would have to be very different from CAIR and completely guarantee that interstate emissions will not contribute to nonattainment in downwind states.

After *North Carolina*, Congress attempted to update the CAA to make CAIR legal.[192] Congress was unsuccessful, resulting in continuing regulatory uncertainty.

North Carolina is deeply problematic for several reasons. First, the *North Carolina* court was mistaken when it decided that the trading programs for SO_2 and NO_x lacked reasonable measures to assure that upwind states would abate their upwind emissions. The most significant gap in its decision was that it wasn't clear that North Carolina was going to be harmed by CAIR. As mentioned above, there is no way to create a theoretically perfect cap-and-trade system. The best system design for a particular situation is an empirical question, not a theoretical one.

[192] *See* Clean Air Act Amendments of 2010, S. 2995, 111th Cong. (2010)

For a case to be decided under American law, the plaintiff must have standing and the issue must be ripe. Standing requires injury-in-fact, which requires an actual injury.[193] It is not clear that the state of North Carolina actually was injured by CAIR.

Furthermore, North Carolina's injury was not ripe for discussion. Often, a regulation is fit for judicial consideration when it is final. However, that is not the judicial standard deciding whether a case is ripe for adjudication. Pre-enforcement review of a regulation depends on both the (1) fitness of issues for review and (2) the hardship of denying review.

The fitness of issues for review depends on whether the case presents purely legal questions[194] and whether the court or agency would benefit from postponing review until the policy in question has sufficiently "crystallized" by taking a more definite form.[195] The *North Carolina* court stated that "EPA is not exercising its [good neighbor] duty unless it is promulgating a rule that achieves something measurable toward the goal of prohibiting sources 'within the State' from contributing to nonattainment or interfering with maintenance 'in any other State'"[196] However, the D.C. Circuit didn't know if North Carolina was actually being harmed by CAIR. The EPA stated that its modeling showed that CAIR will lead North Carolina to attain its ozone NAAQS. There was no way that the D.C. Circuit could contradict the EPA and accurately state that North Carolina wouldn't in nonattainment, and thereby harmed. The D.C. Circuit couldn't even clearly state that North Carolina wouldn't be helped by trading, as sources upwind to North Carolina might have reduced their emissions more after-trading than expected after initial allocation of allowances. The D.C. Circuit couldn't state that North

[193] *See Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560 (1992).
[194] *See NRDC v. EPA*, 22 F.3d 1125, 1133 (D.C. Cir. 1994).
[195] *See City of Houston, Tex. v. HUD*, 24 F.3d 1421, 1431 (D.C. Cir. 1994).
[196] *North Carolina*, 531 F.3d at 907.

Carolina would be harmed due to the uncertainty within any feasible transport rule, even one based on command-and-control regulation.

Furthermore North Carolina wouldn't be significantly harmed by a court denying review until it was clear that North Carolina was actually harmed. North Carolina was not them harmed by pollution from other state as a result of CAIR, whether it would be harmed was uncertain and contingent on trading,[197] and if indeed North Carolina was later harmed by pollution from other states, it could file a § 126 petition for relief. Therefore, the D.C. Circuit should have denied North Carolina's petition for relief for lack of ripeness.

Also, the notion that CAIR was unlawful because it forced each state to share each other's "significant contribution" violates *Chevron* deference by defining "significant contribution" in an unnecessarily restrictive manner. [198] According to *Chevron*, when a court reviews a regulation to make sure it has followed a statute, it determines: (1)"whether Congress has spoken directly to the precise question at issue," and (2) whether the regulation is "based on a permissible construction of the statute."[199]

If significant contribution is defined by the excess pollution emitted by not using highly cost-effective controls, then each state isn't sharing each other's significant contribution. Since neither the good neighbor provision nor any other part of the CAA defines significant contribution, under *Chevron* the EPA should be able to define it in the reasonable fashion that they did in CAIR.

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[197] *See* W.R. Grace 7 Co.-Conn. v. EPA, 959 F.2d 360, 364 (1st Cir. 1992) (claims involving uncertain and contingent events are not ripe).
[198] *See generally*, Mark E. LeBel, *Lack of Judicial CAIR: Chevron Deference and Market-Based Environmental Regulations*, 20 N.Y.U. ENVTL. L.J. 277 (2013).
[199] *Chevron v. NRDC*, 467 U.S. 837, 842-43 (1984).

Furthermore, "contribute significantly" may have nothing at all to do with how do divide responsibility for emissions among states. CAIR and CSAPR both have a two-step process for determining state responsibility for reducing downwind emissions. The first step is to decide which upwind states are emitting amounts that "contribute significantly to nonattainment" in downwind states. The second step then divides necessary emissions reductions among states. "Contribute significantly" arguably references the first step, and not the second. If this is true, then any division of emission responsibility among states that are properly included in the first step is lawful unless it is arbitrary and capricious.[200]

C. *EME Homer City Generation v. EPA*

Homer City vacated CSAPR in 2012, holding that the EPA exceeded its statutory authority under the good neighbor provision of the CAA.[201] The D.C. Circuit wrote:

> First, the statutory text grants EPA authority to require upwind states to reduce only their own significant contributions to a downwind State's nonattainment. But under the Transport Rule, upwind States may be required to reduce emissions by more than their own significant contributions to a downwind State's nonattainment. EPA has used the good neighbor provision to impose massive emissions reduction requirements on upwind states without regard to the limits imposed by the statutory text.[202]

Homer City is based on a fundamental misunderstanding of the CAA and the good neighbor provision's place in it. The court states:

> It seems inconceivable that Congress buried in …the good neighbor provision—an open-ended authorization for EPA to effectively force every power plant in the upwind States to install every emissions control technology EPA deems "cost-effective." Such a reading would transform the narrow good neighbor provision

[200] *See* 42 U.S.C. § 7607(d)(9) (2012).
[201] *EME Homer City Generation, L.P. v. E.P.A.*, 696 F.3d 7 (D.C. Cir. 2012), rehearing denied (hereinafter Homer City).
[202] *Id.* at 11.

> into a "broad and unusual authority" that would overtake other core provisions of the Act. *Gonzales v. Oregon,* 546 U.S. 243, 267 (2006).[203]

In *Gonzales v. Oregon*, the Supreme Court decided that Congress intended the Controlled Substances Act (CSA) to prevent doctors only from engaging in illicit drug dealing, not to define general standards of state medical practice.[204] Furthermore, the Supreme Court stated that the CSA did not authorize the Attorney General of the U.S. to declare a medical practice authorized under state law to be illegitimate.[205] In contrast, the CAA is about control of air pollution and the good neighbor provision is a crucial part of the structure of the CAA.

As mentioned above, the CAA is designed as cooperative federalism. The EPA sets NAAQS and then the states determine technology-based controls for major sources of air pollution and are charged with making sure that all areas with the states attain the NAAQS. However, when downwind states receive significant amounts of air pollution from other states, this structure of cooperative federalism would break down if there was no good neighbor provision to prohibit such pollution. The good neighbor provision is enforced by downwind states' ability to file § 126 petitions, and for the ability of courts to review a denial of such petitions. The interstate transport of smog precursors in the Eastern half of the United States is possibly the most significant air pollution problem in the United States.[206] A CAA that cannot solve this problem is a CAA that has failed the purposes set to it by Congress, even though Congress has given the EPA authority to solve the problem through the good neighbor provision. Unfortunately, the D.C. Circuit does not seem to understand the CAA.

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[203] *Id.* at 28.
[204] 546 U.S. 243, 260 (2006).
[205] *Id.* at 258.
[206] The only other air pollution problems that compare in severity are smog in California and climate change.

The Court in *Homer City* adopts a very restrictive tone early in its decision. It notes that "[t]he 1998 NO_x Rule did not define 'amounts which will…contribute significantly to nonattainment' solely on the basis of downwind air quality impact, as one might have expected given the statutory text."[207] As I note above, you actually would not expect "significant amounts" to be determined solely on the basis of downwind air quality impact, and in fact, there's no clear non-arbitrary method of doing so. The Court then noted that *Michigan* found that the EPA can "consider differences in cutback costs, so that, after reduction of all that could be cost-effectively eliminated, any remaining 'contribution' would not be considered 'significant.'"[208] The Court then stated that "in other words, EPA could use cost considerations to lower an upwind State's obligations under the good neighbor provision."[209]

The D.C. Circuit overturns *Michigan* in *Homer City*. The Court tries to state otherwise, but misstates its own precedent. *Michigan* clearly stated that it was lawful for the EPA to force states with very different levels of actual contribution to nonattainment to achieve similar pollution reductions.[210] In contrast, the court in *Homer City* ruled that the statutory text grants EPA authority to require upwind states to reduce only their own significant contributions to a downwind State's nonattainment, and that they are following *Michigan* because the EPA is allowed to use cost to decrease significant contribution, not increase it. However, the NO_x SIP Call was designed very similarly to CAIR, so it's hard to believe that the NO_x SIP Call didn't increase significant contributions from some states by the Court's definition. Furthermore, the court in *North Carolina* states that the EPA has to assure downwind states are not polluted by upwind states, and in *Homer City* states that EPA cannot force states to decrease their emissions

[207] *Homer City*, 696 F.3d at 14.
[208] *Id.* at 14 (citing *Michigan*, 213 F.3d at 677).
[209] *Id.*
[210] *Id.* at 679.

more than necessary. So, the court in *Homer City* leaves no good way for the EPA to design a CAIR-like program to mitigate interstate emissions.

Similar to *North Carolina, Homer City* disregards *Chevron* deference. "Significant contribution" is not defined in the CAA, so the EPA should have a lot of discretion in how it defines "significant contribution" and how these contributions are divided among states. There is no theoretically obvious way to determine significant contribution when multiple states contribute to pollution downwind in a particular location. In fact, the Coase Theorem states that in the absence of transaction costs and income effects, the initial distribution of allowances in a trading system don't matter for efficiency.[211] Since transactions costs in CAIR and CSAPR are relatively low, "arbitrary and capricious" distributions of permits should be limited to situations where a party or parties are being treated blatantly unfairly, or if the EPA has no reasons for its actions. Here, the EPA had a rationale for how it was distributing permits, and that rationale wasn't blatantly unfair or arbitrary. In the NO_x SIP Call, CAIR, and CSAPR, the EPA decided to use an "effort" requirement where the cost of compliance would be consistent across space. Other non-arbitrary means could also be used, but the D.C. Circuit's reasoning here is poor and itself arbitrary.

In *Homer City*, the Court stated that how much pollution each State had to eliminate was not related to how much the upwind state contributed to downwind states' pollution problems.[212] Instead, the EPA modeled different costs per ton for preventing emissions and chose the lowest cost that would lead to downwind states attaining the NAAQS.[213] The EPA applied a $500/ton threshold for ozone-season and annual NO_x, as well as $500/ton (seven states) and $2,300/ton for

[211] *See generally* Coase, *supra* note 103.
[212] *Id.* at 17.
[213] CSAPR, 76 Fed. Reg. 48,208, 48,246-71.

SO_2 (16 states).[214] The EPA then determined the amount of SO_2, annual NO_x, or ozone-season NO_x that each covered state could eliminate if all its power plants installed all cost-effective emissions controls, and used that to develop budgets for each state.[215]

However, when multiple upwind states significantly contribute to nonattainment in multiple downwind states, there is no clear way to determine a single state's significant contribution. Therefore, the D.C. Circuit in Homer City misunderstands the difficulty of the problem faced by the EPA in CSAPR.

Later in *Homer City*, the D.C. Circuit details its "red lines that cabin EPA's authority."[216] These "red lines" are:

- "First, and most obviously, the text of Section 110(a)(2)(D)(i)(I) tells us that the 'amounts which will…contribute' to a downwind State's nonattainment are at most those amounts that travel beyond an upwind State's borders and end up in a downwind State's borders and end up in a downwind State's nonattainment area,"
- "Second, under the terms of the statute and as we explained in *North Carolina*, the portion of an upwind State's contribution to a downwind State that 'contribute[s] significantly" to that downwind State's 'nonattainment' necessarily depends in the relative contributions of that upwind State, of other upwind State contributors, and of the downwind State itself. Each upwind State may be required to eliminate only its own "amounts which will…contribute significantly" to a downwind State's 'nonattainment.'…Therefore, if the downwind State would attain the NAAQS but for upwind States' contributions–that is, if the entire above-NAAQS amount is attributable to upwind States' emissions–then the upwind States' *combined* share is the entire amount by which the downwind State exceeded the NAAQS. And as we said in *North Carolina*, when EPA allocated that burden *among* the upwind States, EPA may not force any upwind State to 'share the burden of reducing other upwind states' emissions…the collective burden must be allocated among the upwind States in proportion to the size of their contributions to the downwind State's nonattainment."

[214] CSAPR, 76 Fed. Reg. at 48,264.
[215] CSAPR, 76 Fed. Reg. 48,208, 48,246-71.
[216] *Homer City*, 696 F.3d at 19.

> "Third, to conform to the text of the statute, EPA must also ensure that the combined obligations of the various upwind States…do not go beyond what is necessary for the downwind States to achieve the NAAQS."[217]

According to the Court in *Homer City,* the EPA must avoid over-control because the good neighbor provision targets emissions from upwind states that "contribute significantly to nonattainment," so the EPA cannot use the good neighbor provision to seek to achieve air quality levels in downwind states that are well below the NAAQS.[218]

The Court illustrates its principles with two examples. In the first example, the NAAQS is 100 units, the downwind State's nonattainment area contains 150 units, the downwind state contributes 90 units, and the three upwind states contribute 20 units each.[219] The Court states that the downwind state is limited to 50 units of relief and that relief must be distributed in a manner proportional to obligations, so if the three upwind states contribute 10, 20, and 30 units respectively, the three states' significant contributions would be at most 8 1/3, 16 2/3, and 25 units, respectively.[220]

In the second example, the NAAQS is 100 units and the downwind State's air contains 180 units; 120 from the downwind state and 20 from three different upwind states. In that case, all states' significant contributions would be 20 units.[221]

The D.C. Circuit's "red lines" are unsupported by the wording of the good neighbor provision of the CAA. The good neighbor provision only states that a SIP must:

> contain adequate provisions (i) prohibiting…any source of other type of emissions activity within the State from emitting any air pollutant in amounts which will (I)

[217] *Id.* at 20-22.
[218] *Id.* at 22.
[219] *Id.* at 21.
[220] *Id.*
[221] *Id*. at fn. 15.

> contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any [NAAQS]…[222]

The good neighbor provision does not define "contribute significantly," "adequate," or the precise limits to EPA's authority in its enforcement of the provision. The D.C. Circuit notes that the EPA disagreed with the Court's notion of "obvious" – that the "'amounts which will…contribute' to a downwind State's nonattainment are at most those amounts that travel beyond an upwind State's borders and end up in a downwind State's borders and end up in a downwind State's nonattainment area." The EPA is correct to disagree with the D.C. Circuit; given that 27 states and DC are part of CSAPR, it might be necessary to reduce some states' pollution well below the NAAQS in order so that the transport rule be adequate and every metropolitan area satisfy the NAAQS.

Similarly, there are several reasons to doubt that the CAA requires that "significant contribution" should be divided proportionately when multiple upwind states contribute to downwind nonattainment. First, dividing the "significant contribution" proportionately has nothing to do with the cost of or responsibility for mitigating pollution. If one state has dirtier electricity and industrial production than another state, it is logical to want the "dirtier" state to have greater responsibility for cleanup. It is likely less expensive for the state with more heavily polluting power plants to apply controls and gain reductions. It also usually provides larger benefit to society of doing so, especially when multiple upwind states pollute multiple downwind states.

Since the CAA is silent on how to divide responsibility when more than one upwind state contributes to downwind pollution, the only requirement should be that the division of

[222] 42 U.S.C. § 7410(a)(2)(D)(i)(I) (2012).

responsibility not be "arbitrary and capricious," which CSAPR's method of dividing significant contributions was not. Lastly, proportionate division of responsibility is likely impossible. This is because pollution from one place goes to different areas. Reducing upwind emissions to ensure downwind fulfillment of the NAAQS is very likely to require some states to take more proportionate responsibility for emission reduction in some markets.

The D.C. Circuit's third red line, that the EPA not force reduction of pollution more than necessary to allow attainment of the NAAQS, is difficult, but more reasonable. However, *North Carolina* states that "interfere with maintenance by" has independent meaning, which means that upwind reductions have to be enough to not "interfere with maintenance by" "any other state" but also not be so much as to "over-control" upwind emissions.[223] The D.C. Circuit has left little guidance how to achieve both of these goals at once. Also, the EPA models interstate air pollution under uncertainty, therefore it is difficult to know whether or not the EPA is forcing a state to "over-control" its emissions.

D. Summary of legal requirements from the D.C. Circuit

To summarize, *Michigan*, *North Carolina*, and *Homer City* allow market-based mechanisms and the consideration of costs in satisfying the good neighbor provision of the CAA, but place stringent restrictions on such programs. These restrictions are:

- The EPA cannot require upwind states to reduce their emissions more than necessary for downwind states to achieve their NAAQS;
- If more than one upwind state contributes to nonattainment in a downwind state, responsibility for pollution reduction must be split proportionately to each state's contribution to nonattainment; and

[223] *North Carolina*, 531 F.3d at 908-12.

- "the 'amounts which will…contribute' to a downwind State's nonattainment are at most those amounts that travel beyond an upwind State's borders and end up in a downwind State's borders and end up in a downwind State's nonattainment area,"

These restrictions are so stringent that it is unlikely any market-based program can fulfill them.

E. Why Costs Should Be Considered in Initial Allocation

Theoretically, as described earlier in this paper, the EPA has a lot of different ways it could mitigate interstate transport of smog precursors. No matter what choice it makes, the EPA must find a way to assign significant contribution to states. Without considering cost, there is no clear, non-arbitrary way to do so.

Returning to the first example the D.C. Circuit provided in *Homer City,* the Court states that if the NAAQS is 100 units, the downwind State's nonattainment area contains 150 units, the downwind state contributes 90 units, and the three upwind states contribute 20 units each, then the downwind state is limited to 50 units of relief and that relief must be distributed in a manner proportional to obligations. So if the three upwind states contribute 10, 20, and 30 units respectively, the three states' significant contributions would be at most 8 1/3, 16 2/3, and 25 units, respectively.[224] This is arbitrary when the same upwind states are contributing to other downwind states. Even worse, in some cases it's impossible.

The toughest case is when a state is near the NAAQS from emissions from its own state, and also has a lot of emissions entering from other states. In that case, almost all out-of-state emissions sources would have to shut down for that state to attain its NAAQS. The most

[224] *Homer City, 696* F.3d at 21.

sensible way out of this problem is to use cost to allocate emissions reductions among states. This could include allocation based on the cost of emission, or if there are only a few problem areas, the cost of deposition into those areas (ambient permit markets).

Another tough case is when emissions from other states themselves are sufficient, or almost sufficient, to violate the NAAQS. In that case, the necessary emission reductions may be so overwhelming that asking the receiving state to reduce its emissions is the only option available so that enough electricity is produced to satisfy demand. The Court in *Homer City* neither considers nor seems to understand this problem.

The Coase Theorem states that initial allocation is irrelevant for efficiency in the absence of transactions costs and income effects.[225] However, since transactions costs clearly exist, ideally a regulator should attempt to distribute initial allowances to minimize the necessity of trading. In order to do this, the regulator should estimate polluters' marginal cost curves and distribute initial allowances accordingly. The regulator is not going to know those curves exactly, which is why cap-and-trade is more efficient than command-and-control regulation. However, a regulator has some idea of the costs of abatement, and should use that knowledge to minimize transactions costs. To do that, they need to use cost in determining initial allocation. The NO_x SIP Call, CAIR, and CSAPR estimate the marginal costs of abatement and use that information to develop state budgets and distribute allowances accordingly.

In *Homer City*, the D.C. Circuit acts if there is a single correct initial allocation. There is not, and to come close to the correct allocation requires the consideration of abatement costs. Furthermore, the idea that considering costs forces states to share their pollution abatement

[225] *See* Ronald Coase, *The Problem of Social Cost,* 3 J. L. & ECON. 1 (1960).

burdens is absurd. In a rule like CAIR or CSAPR, initial allocations are made to attempt to decrease transactions costs. States don't have ownership of the status quo, especially given the need to integrate 28 states into a single market-based pollution control program.

The idea that initial allocation needs to be proportional has no meaning in this context. Emissions are translated into pollution by a matrix of transfer coefficients. Since multiple upwind states pollute multiple downwind locations, there is no way to translate those transfer coefficients in some proportional manner. Proportional allocations will result in very different divisions of emissions among states, and there is no principled, non-arbitrary means of accomplishing the D.C. Circuit's requirement of proportional allocation.

Furthermore, under its criteria, the D.C. Circuit would have no way to tell if an area had been over-controlled. Some areas will always have pollution levels below the NAAQS, and in a regulated system it is hard to tell whether that is from "over-control," or underlying economic realities. It is difficult (if not impossible) to determine before an allocation all of the areas in which the NAAQS won't be binding. Therefore, judicial review has to focus on the entire system rather than on particular areas in isolation.

If the EPA cannot use cost to allocate emissions reductions among states, there is no clear non-arbitrary way to do so. If there are no ways to allocate emissions among states, then there is no method available for the EPA to evaluate SIPs to make sure that they conform to Congressional demands in the good neighbor provision. This not only makes market-based regulation impossible, but makes any regulation of interstate transport of emission uncertain under judicial review.

F. The Goldilocks Problem

The problem of how to allocate pollution reductions among states is the most difficult problem from *North Carolina* and *Homer City,* but it is not the only problem standing in the way of the EPA promulgating a new transport rule. The other major problem can be called the "Goldilocks Problem"—the Court has stated that reduction can't be too small (or the EPA is subject to § 126 petitions, which themselves are subject to judicial review), and can't be too large (under *North Carolina*). However, earlier this paper notes that the only theoretically perfect approach, an ambient permit program, is untenable due to transactions costs.[226] That means that any feasible option is going to either lead to over-control or under-control. And since under-control is expressly forbidden by the CAA, any feasible option to control interstate transport of smog precursors is going to lead to over-control, sometimes significant over-control, in some locations. Therefore, no new transport rule can likely survive judicial review.

G. The Status Quo is Not a Viable Long-Term Option

The status quo is not a viable long-term option. CAIR is currently in effect until the EPA promulgates a new transport rule, but CAIR will not suffice forever. In fact, CAIR is insufficient now to fully mitigate interstate transport of smog precursors. We know this is true because the EPA made SO_2 emissions standards more stringent in some states in CSAPR, increasing the projected cost of emissions reductions from $500/ton to $2,300/ton. Therefore, the vacating of CSAPR already probably leads to thousands of deaths per year.[227]

[226] As stated above, the EPA could conceivably use ambient permit programs for a small number of especially polluted areas. However, their use in the entire region covered by CAIR/CSAPR would be impossible because of high transactions costs.

[227] *See* NATIONAL RESOURCES DEFENSE COUNCIL, *Divided U.S. Appeals Court Rejects EPA Air Protections for 240 Million Americans*, (Aug. 21, 2012), *available at* http://www.nrdc.org/media/2012/120821a.asp.

Furthermore, the ozone and $PM_{2.5}$ NAAQS are likely to get more stringent over time. Fairly soon, the EPA has to review its ozone standard.[228] The current effective standard is 75 parts per billion (ppb).[229] However, the EPA's own scientists state that the standard should be between 60 ppb and 70 ppb.[230] Furthermore, Canada is planning to reduce their ozone standard from 65 ppb to 62 ppb.[231]

The $PM_{2.5}$ standard may also become stricter when it is next reviewed. The current NAAQS for $PM_{2.5}$ is 12 $\mu g/m^3$ (annual) and 35 $\mu g/m^3$ (24-hour).[232] Canada's new standard will be 8.8 $\mu g/m^3$ (annual) and 27 $\mu g/m^3$ (24-hour).[233] While the U.S. and Canada shouldn't be expected to have the exact same environmental standards, the standards are set similarly using similar laws and the same scientific information.[234] Therefore, we can expect that future NAAQS for ozone and $PM_{2.5}$ will be significantly stricter than current standards.

The EPA will have to develop a new transport rule when ozone and $PM_{2.5}$ standards become stricter. *North Carolina* and *Homer City* could result in tens of thousands of unnecessary deaths from air pollution if a new transport rule after stricter standards cannot pass judicial review. This is especially true given the inability of just command-and-control to mitigate the interstate transport of air pollution.

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[228] *See* Associated Gen. Contractors of America, U.S. EPA Work to Revise Federal Ozone Standard Elicits Much Debate, August 28, 2013, *available at* http://news.agc.org/2013/08/28/u-s-epa-work-to-revise-federal-ozone-standard-elicits-much-debate/.
[229] National Ambient Air Quality Standards for Ozone; Final Rule, 73 Fed. Reg. 16,435, 16,436 (Mar. 27, 2008).
[230] *See Mississippi v. EPA*, 723 F.3d 246, 267 (D.C. Cir. 2013)
[231] Objectives for Ambient $PM_{2.5}$ and Ozone [Canadian Ambient Air Quality Standards (CAAQS) for $PM_{2.5}$ and Ozone], Canada Gazette, Vol. 147 No. 21 (May 25, 2013).
[232] National Ambient Air Quality Standards for Particulate Matter, 78 Fed. Reg. 3086, 3086 (Jan. 15, 2013).
[233] *Canadian Ambient Air Quality Standards*, ENVIRONMENT CANADA, *available at* http://ec.gc.ca/default.asp?lang=En&n=56D4043B-1&news=A4B2C28A-2DFB-4BF4-8777-ADF29B4360BD.
[234] *See* Environment Canada, *A Guide to Understanding the Canadian Environmental Protection Act* (1999), http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=E00B5BD8-1&offset=9&toc=show.

IV. Why the Supreme Court Was Right to Overturn *Homer City*

A. Appeal to the Supreme Court

Homer City was appealed to the Supreme Court, and surprisingly, the Supreme Court granted cert.[235] Both the EPA and the American Lung Association led appeals; the Supreme Court combined both appeals, but decided to only answer the questions posed by the EPA. For this paper, the two important questions are:

> 1. Whether the court of appeals lacked jurisdiction to consider the challenges on which it granted relief…
>
> 3. Whether the EPA permissibly interpreted the statutory term "contribute significantly" so as to define each upwind State's "significant" interstate air pollution contributions in light of the cost-effective emission reductions it can make to improve air quality in polluted downwind areas, or whether the Act instead unambiguously requires the EPA to consider only each upwind State's physically proportionate responsibility for each downwind air quality problem.[236]

The Supreme Court could have accepted the strong dissent from *Homer City* and decide that the D.C. Circuit didn't have jurisdiction to hear the case. In that case, CSAPR would have been the law, leading to several thousand fewer deaths per year from air pollution. Given that CSAPR is phased in over several years, the EPA could then have hoped that a new D.C. Circuit (four new members were added after *Homer City* was decided)) would give the EPA more deference than the current Court when the EPA has to promulgate a new transport rule due to stricter NAAQS for ozone and/or $PM_{2.5}$.

As it was, the Supreme Court reached the merits of the case, and was right to allow the EPA to consider cost in determining significant contribution. As stated above, if the Court had not allowed the EPA to consider the cost of pollution control, the EPA would have had no clear

[235] *EPA v. EME Homer City Generation*, 133 S.Ct. 2857 (cert. granted); *see also* Lawrence Hurley and Valerie Volcovici, *U.S. Justices to Hear EPA Appeal over Air Pollution Rule*, REUTERS (Jun. 24, 2013), http://www.reuters.com/article/2013/06/24/us-usa-court-pollution-idUSBRE95N0OX20130624 ("The high court tends to avoid weighing in on highly technical cases involving the federal Clean Air Act").
[236] Petition for Writ of Certiorari, Homer City, 133 S.Ct. 2857 (No. 12-1182)

way to allocate emissions reductions among upwind states affected by the good neighbor provision. Furthermore, allowing the use of cost in determining significant contribution is more efficient and incorporates the use of *Chevron* deference.

B. Lessons for Judicial Review of Future Cases

In general, ambiguous statutory language in environmental statutes should be interpreted in such a way to allow more efficient solutions, and not to foreclose them as the D.C. Circuit did in *North Carolina* and *Homer City.*

As a reminder, the good neighbor provision states that SIPs must:

> contain adequate provisions (i) prohibiting…any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will (I) contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any [NAAQS]…[237]

As I wrote earlier, "contribute significantly" may have nothing at all to do with how to divide responsibility for emissions among states; instead, the phrase may determine which states have to revise their SIPs or submit to a FIP because of emissions that travel to other states. In that case, any distribution of emissions among states is OK as long as it isn't arbitrary and capricious.

The D.C. Circuit went astray in *North Carolina* and *Homer City* when they attempted to apply textualism in a situation where the text doesn't give clear direction to the agency. In *Homer City,* the court states: "The statute is not a blank check for EPA to address interstate

[237] 42 U.S.C. § 7410(a)(2)(D)(i)(I) (2012).

pollution on a regional basis without regard to an individual State's actual contribution to downwind air quality."[238]

However, since there are multiple allocations of emissions reductions among states that solve the problem of smog in the Eastern half of the United States, a court should not attempt to enforce a single allocation. The notion advanced in *Homer City* that there is a single correct (proportional) method is wrong.

Legislative history is also insufficient here; if Congress had specifically thought about this issue, it likely would have enacted more specific regulatory regimes like Title IV (Acid Rain Program) and Title VI (Stratospheric Ozone Protection) of the CAA.[239]

Instead of relying on textualism or legislative history in cases like these, courts should note the purposes of a statute and make sure that a regulation does not explicitly violate or clearly frustrate the wording provided by Congress. The core purpose of the CAA is to protect the public health and welfare by mitigating air pollution.[240] CAIR and CSAPR are reasonable solutions to mitigate smog in the Eastern half of the United States, and they don't violate or frustrate the wording set out by Congress in the good neighbor provision.

Continued Congressional gridlock may result in future cases like this one, where an agency has to use a creative solution to solve a problem that Congress has demanded that it solve without providing much guidance. The complicated nature of the CAA and difficulty in regulating greenhouse gas (GHG) emissions will certainly require such regulations. The Tailoring Rule, limiting the sources covered by GHG regulation under the CAA to those sources

[238] *Homer City*, 696 F.3d at 20.
[239] *See* 42 U.S.C. § 7651 *et seq.* (2012) (Title IV) and 42 U.S.C. § 7671 *et seq.* (2012) (Title VI)
[240] *See* 42 U.S.C. § 7401(b)(1).

emitting more than 75,000 tons per year carbon dioxide equivalent, is one (probably unlawful) example of such regulation.[241] Future regulations on existing sources of GHGs will likely be another example, as the breadth of the EPA's authority to regulate existing sources is unclear, but possibly quite far-reaching.[242]

CONCLUSION

Smog, composed of ozone and $PM_{2.5}$, kills about 200,000 Americans every year. Currently, about 123 million Americans (out of a 2010 population of 309 million) live in ozone nonattainment areas, and 74 million live in $PM_{2.5}$ nonattainment areas.[243]

Command-and-control regulation has failed to effectively limit interstate transport of smog precursors (NO_x and SO_2) and has forced the EPA to use cap-and-trade programs to satisfy the CAA's good neighbor mandate. The good neighbor provision provides little guidance for the EPA and judicial review, and therefore the D.C. Circuit has determined the lawfulness of different transport rules in *Michigan*, *North Carolina*, and *Homer City*.

The D.C. Circuit's decisions in *North Carolina* and *Homer City* are so flawed that they bring into question the D.C. Circuit's grasp of precedent, *Chevron* deference, mathematics, and common sense. In *Homer City,* the D.C. Circuit created a requirement of proportional "fair" reductions that has no basis in the CAA or precedent.[244] Therefore, *Homer City* introduces

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[241] Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 Fed. Reg. 31,514 (June 3, 2010) (Tailoring Rule); *see also*, Albert Monroe, *Using Building Codes to Rewrite the Tailoring Rule and Mitigate Climate Change*, 30 PACE ENVTL. L. REV. 58 (2012) (explaining why the Tailoring Rule is probably unlawful).
[242] *See generally* INIMAI CHETTIAR AND JASON SCHWARTZ, THE ROAD AHEAD: EPA'S OPTIONS AND OBLIGATIONS FOR REGULATING GREENHOUSE GASES, INSTITUTE FOR POLICY INTEGRITY (April 2009).
[243] EPA, SUMMARY NONATTAINMENT AREA POPULATION EXPOSURE REPORT (Dec. 14, 2012), *available at* http://www.epa.gov/oaqps001/greenbk/popexp.html.
[244] *See* Victor B. Flatt, *Frozen in Time: The Ossification of Environmental Statutory Change and the Theatre of the (Administrative) Absurd*, 24 FORDHAM ENVTL. L. REV. 125, 146-47 (2013). Flatt mentions *Homer City* as one case out of several showing how the near-total lack of new environmental laws have made both administration and judicial review of current laws very difficult. Flatt believes that *Homer City* shows that administration of the CAA has become so complicated that the federal courts are incapable of interpreting it properly.

significant legal uncertainty about whether any market-based transport rule can survive judicial review.

Homer City effectively overturned past precedent and probably invalidated any transport rule similar to CAIR. A new transport rule either had to revise CSAPR to allot allowances to states in an artificially proportional pattern, restrict trading to within states, or require polluters to purchase permits for each market in which they pollute, in contrast to the current rule, which attempts to equalize the cost of pollution reduction across polluters. All of these choices were problematic, and the D.C. Circuit's poorly reasoned decisions have unreasonably narrowed the EPA's choices in regulating interstate transport of smog precursors, and have made the EPA's choices significantly less efficient at best, and unworkable at worst.

Soon, the EPA will have to make stricter the ozone and (probably) $PM_{2.5}$ NAAQS. Afterwards, the EPA will have to promulgate a new transport rule. After *North Carolina* and *Homer City*, the EPA's choices for doing so were suboptimal. After the Supreme Court's reinstatement of CSAPR, the EPA can use a revised version of it to promulgate a new transport rule, which it may not have been able to do had the D.C. Circuit's *Homer City* decision stood.

Courts should interpret complex statutes in accord with its purposes and only vacate regulations from those statutes if they clearly contradict the text of such statutes. This is especially true in cases like the good neighbor program where Congress demands an agency to regulate but does not provide clear direction on how to regulate.

The Supreme Court was right to overturn *Homer City*. Its decision will save the lives of thousands of Americans soon, and likely many more in the future.