BANKING ON ALLOWANCES: THE EPA'S MIXED RECORD IN MANAGING EMISSIONS-MARKET TRANSITIONS

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Table of Contents

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INTRODUCTION

Since the 1990s, emissions-trading markets—mainly in the form of cap-and-trade programs regulated by the U.S. Environmental Protection Agency (EPA)—have become a leading federal policy mechanism in the United States for achieving reductions in pollution. For at least a few major air pollutants, most notably nitrous oxides (NO_x) and sulfur dioxide (SO_2) emissions from fossil fuel power plants, markets have supplemented traditional command-and-control regulation as a major regulatory tool. Cap-and-trade also has been advanced as a likely vehicle for regulating greenhouse gases from a broad range of sources.[1]

One key advantage of an emissions-trading system over command-and-control regulation is the reduction in costs made possible by shifting compliance burdens to those facilities with the lowest costs of compliance. This reduction in compliance costs should, in turn, allow an emissions-trading program to achieve greater emissions reductions than a command-and-control system.

Similarly, allowing the banking of allowances—that is, allowing sources to save excess allowances for future time periods—increases the efficiency of an emissions-trading program by shifting reductions to lower-cost time periods and smoothing price variations between different allowance vintages. Banking also encourages early reductions in emissions and early improvements in air quality.[2]

Because emissions allowances convey certain rights, it is important that emissions-trading programs maintain clear and consistent rules on the use of allowances in order to limit uncertainty and assure a smoothly functioning market.[3] After the

[1] *See, e.g.*, American Clean Energy and Security Act, H.R. 2454, 111th Cong. (2009). Commonly known as Waxman-Markey, this bill would have created a nationwide cap-and-trade system for greenhouse gas emissions.

[2] *See generally* HARRISON FELL ET AL., PRICES VERSUS QUANTITIES VERSUS BANKABLE QUANTITIES (RFF Discussion Paper 08-32, 2008), *available at* http://www.rff.org/RFF/Documents/RFF-DP-08-32-REV.pdf; *see also* Dallas Burtraw, *Appraisal of the SO_2 Cap-and-Trade Market*, *in* EMISSIONS TRADING: ENVIRONMENTAL POLICY'S NEW APPROACH 133, 139 (Richard F. Kosobud ed., 2000).

[3] Governing statutes and EPA regulations make it clear that its emissions-trading programs do not convey formal property rights. *See infra* note 5 and accompanying text.

basic rules for an emissions-trading program are in place, changes by regulators in the rules governing the use of allowances can significantly affect the certainty and credibility of the emissions-trading programs and the value of allowances. Such changes may lead to undesirable market behavior, including an emissions increase as sources use up or dump their banked allowances. In addition, such changes also may undermine the credibility of other trading programs within the jurisdiction of the regulator.

The treatment of banked allowances in the transition from one emissions-trading program to a more stringent trading program creates a similar challenge for regulators. If a decision is made to terminate an existing program without the transfer of banked allowances (or their expected economic value in some other form) to the new program, sources will have an incentive to use their banked allowances—increasing their emissions—in the waning months of the existing program. Sources will also be unlikely to make early reductions to smooth the transition to the new program. Thus, it is important for the regulator to consider the consequences of decisions regarding banked allowances made during the transition in order to preserve well-functioning markets within the existing and new trading programs.

These same considerations are also important when new markets are created. Regulators have sometimes created incentives for "early reductions" by allowing sources to generate credits for additional allowances in the new program. Allowing these credits to be transferred into the new program can smooth the transition by reducing uncertainty and providing a "thicker" market.

These issues are important in large part because transitions between trading markets are frequent. Caps on emissions generally have been tightened over time as new information about the adverse effects from pollutants has become known or costs of control have declined. The tightening of caps and expansion of programs' geographic scope has resulted in new programs with new sets of rules. Court decisions and broader policy changes also have spurred creation of new programs that supplant or modify existing ones. In all these transitions, treatment of banked allowances has been an issue.

This Article examines the several transitions between NO_x emissions-trading markets created by EPA regulation: Part III.A discusses the start-up of the Ozone Transport Commission (OTC) NO_x Budget Program, and the 2003 transition from the OTC NO_x

Budget Program to the NO_x SIP Call; Part III.B discusses the 2009 transition from the SIP Call to the seasonal NO_x market in the Clean Air Interstate Rule (CAIR), and the creation in CAIR of a new annual NO_x market. In addition, Part IV discusses the recent transition in SO_2-trading programs between the Clean Air Act (CAA) Title IV program created by Congress to the CAIR program created by the EPA. In Part V, e also more briefly discuss further transitions that would take place if either the EPA's proposed replacement to CAIR (the Transport Rule) or new pollution control legislation currently under consideration (the "3P bill") were implemented.

In most of these transitions, the newer markets included stricter emissions caps than their predecessors. This creates a fundamental tension between the rights and value associated with banked allowances and the environmental goal of reduced emissions. If banked allowances are used in the new, stricter program, emissions will be greater than desired in the short term until those banked allowances are drawn down. If the new caps are substantially stricter than the old ones, delays before emissions match the new caps will be perceived as problematic and will create pressure to reduce or eliminate these "excess" allowances. As discussed above, doing so has consequences for the stability and effectiveness of the market (and possibly other markets).

Striking the right balance is not easy, and the EPA has faced this issue through all the transitions between markets discussed in this paper. Though the problems have been consistent, the EPA's response has not. When the EPA has restricted the exchange of banked allowances, when it has revealed its plans for exchange only after banking decisions have been made, or when courts have blocked EPA plans for simple transitions, market distortions—very high or very low allowance prices and price volatility—have been the result. If EPA's handling of transitions in the NO_x and SO_2 markets leads to uncertainty for regulated entities about the credibility of allowance banking, these actions will adversely affect market behavior in the future, reducing the effectiveness and cost savings of market-based programs.

I. EMISSIONS-TRADING PROGRAMS AND BANKING OF ALLOWANCES

A. *Allowance Banking*

As many scholars have identified, creation of property rights is associated with more efficient use of resources.[4] The CAA and EPA regulations explicitly state, however, that the emissions allowances created do not convey property rights.[5] One way to understand allowances, therefore is to view them as carrying some (but not all) of the rights in the property bundle. For example, holders can exclude others from using allowances they hold. But the statutory provisions and government agency decisions that create allowances limit allowance holders' rights in some respects. More precisely, emissions allowances have all the traditional rights associated with property except one—the right of owners to be compensated if allowances are either seized or rendered valueless by government action. Takings Clause claims based on emissions allowances will fail.[6] In other respects, allowances are

[4] *See, e.g.*, 2 WILLIAM BLACKSTONE, COMMENTARIES ON THE LAWS OF ENGLAND *2–11 (1766); RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 36 (5th ed. 1998) (stating that "legal protection of property rights creates incentives to exploit resources efficiently").

[5] *See, e.g.*, 42 U.S.C § 7651b(f) (2006) (stating that a Title IV SO_2 allowance "does not constitute a property right."); *see also* Clean Air Interstate Rule, 70 Fed. Reg. 25,162, 25,345 (proposed Mar. 10, 2005) [hereinafter CAIR] ("A CAIR NO_x allowance does not constitute a property right.").

[6] Courts would be highly unlikely to treat them as property, for example, by finding that program changes reducing or eliminating their value violate the Takings Clause of the Constitution. For a more detailed discussion of Takings Clause issues as they relate to emissions permits, see Susan A. Austin, *Tradable Emissions Programs: Implications Under the Takings Clause*, 26 ENVTL. L. 323, 352 (1996) ("Even if the government is not careful in drafting statutes and regulations to prevent property rights in tradable emissions permits from vesting, courts will probably apply a presumption against vesting and the government will not be liable for a takings claim. Moreover, precedent suggests that a company's reliance on tradable emissions permits will not be considered 'reasonable' in light of the government's traditional authority to regulate pollution. The potential for successful takings claims based on diminution in land value is greater because the law is in flux. Under current law, however, a takings claim probably would not be successful even if the government repossessed the permits or if the permits became so expensive that some companies had to shut down."). Here, Congress *has* been careful in drafting the relevant statute—the CAA explicitly specifies that Title IV allowances are not property. The statute does not explicitly protect EPA-created allowances such as those for NO_x emissions in CAIR, but the agency does attempt to do so in the rule. In any case they are likely protected from takings claims by the general principles Austin notes.

indistinguishable from property. Allowances, walk, talk, and quack like ducks, but Congress (and EPA) have emphatically declared that they *are not ducks.* [7]

However emissions allowances are characterized, the design of emissions markets governs how they can be used and exchanged. An important element of this design is whether allowances can be banked—that is, whether they can be saved for use in the future. Banking has straightforward advantages. It lets sources reduce emissions in one period and save their unused allowances for future time periods or sell to others for their use, leading to cost savings and greater efficiency.[8] It also stabilizes allowance markets by providing a pool of allowances that can be used in periods when allowances are relatively scarce and by reducing price differences that would otherwise exist between different allowance vintages.[9] Another advantage offered by

[7] This is a clever statutory move. While Congress obviously could not overrule the Takings Clause in legislation, declaring that allowances are not property places them outside the clause's protection.

[8] Banking provides regulated sources with additional flexibility in timing the installation of pollution control equipment. This flexibility provides cost savings because the optimal path for replacement of equipment varies widely across sources. In addition, it spreads out compliance projects and expenditures over time rather than concentrating the demand for equipment, etc. at a single point in time. *See* T. H. TIETENBERG, EMISSIONS TRADING: PRINCIPLES AND PRACTICE 108 (2d ed. 2006); *see also* NAT'L. RESEARCH COUNCIL, AIR QUALITY MANAGEMENT IN THE UNITED STATES 207 (2004); A. DENNY ELLERMAN ET AL., MARKETS FOR CLEAN AIR: THE U.S. ACID RAIN PROGRAM 282 (2000) (estimating that the banking provisions in the Title IV SO_2 cap-and-trade program yielded a cost savings of $1.3 billion). In addition, electric utilities operate under the principle that they must provide generation to meet demand. Given the uncertainties associated with various external factors (e.g., periods of extreme weather, shutdown of such critical units as nuclear power plants, and increases in natural gas prices) that can affect the demand for electricity and utility operations, electric utilities will seek to hold extra emissions allowances above those required to cover current emissions to provide flexibility in meeting future power demand.

[9] *See* TIETENBERG, *supra* note 8, at 108 ("Banking also has the potential to reduce price instability. Storing permits for unanticipated outcomes. . .can reduce future uncertainty considerably."). Some observers have cited the very limited temporal flexibility provided in California's RECLAIM program as one of the factors contributing to the price instability in that market in 2000–2001. *See* NAT'L. RESEARCH COUNCIL, *supra* note 8, at 207; s*ee also* TIETENBERG, *supra* note 8, at 114–15 (citing R. Godby et al., *Experimental Test of Market Power in Emission Trading Markets, in* ENVIRONMENTAL REGULATION AND MARKET POWER (E. Petrakis et al., eds., 1999) (finding that banking virtually eliminated price instability in laboratory experiments while scenarios in the experiment where banking was not allowed exhibited substantial price instability)).

systems that allow for banking of allowances is that by giving emitting sources with banked allowances a vested interest in the control program, such systems may more effectively align the interests of regulators and emissions sources. This should contribute to the long-term viability and political acceptability of the control program.[10]

Although the economic case for banking is compelling, the environmental benefits are less certain. If banking has the effect of spreading emissions across time periods in a fairly even way, then there are likely to be environmental benefits. If, on the other hand, banked allowances make it possible for emissions in the future to exceed the cap, then there may be adverse effects on air quality.[11] Environmental advocates, some state environmental agencies, and the EPA itself have at one time or another expressed significant concerns with allowing banking for this reason.[12]

Actual experience, though, suggests that banking has promoted early reductions that have resulted in a reasonably efficient pattern of emissions (with reduced temporal clustering).[13] In addition, the absence of banking in a program does not assure

[10] *See* NAT'L. RESEARCH COUNCIL, *supra* note 8, at 202.

[11] *See* TIETENBERG, *supra* note 8, at 108 ("Allowing [banking and/or borrowing] can either ameliorate or exacerbate pollutant concentrations. If firms use the flexibility to disperse emissions through time, concentrations will be diminished. However, if this flexibility results in clustered emissions, concentrations will be worsened.").

[12] *See, e.g.*, Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assesment Group Region for Purposes of Reducing Regional Transport of Ozone, 63 Fed. Reg. 57,356, 57,430 (Oct. 27, 1998) (to be codified at 40 C.F.R. pt. 51) [herinafter Ozone Rulemaking] (stating that "[t]he EPA also requested comment on options for managing the use of banked allowances in order to limit the potential for emissions to be significantly higher than budgeted levels because of banking."). States facing ozone and particulate matter pollution have also expressed concerns about banked allowances. *See Detailed Comments from the Northeast States for Coordinated Air Use Management (NESCAUM) on the U.S. EPA's Supplemental Proposal for the Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Clean Air Interstate Rule)* at 3-4 (2004), *available at* http://www.nescaum.org/documents/comments040726iaqr-attacha.pdf (documenting comments from states suggesting that the EPA more aggressively reduce the value of banked SO_2 allowances in CAIR). To some extent, the perceived problem arises from a short time horizon—even if banking is allowed, emissions over the entire period controlled by the emissions-trading system cannot exceed the sum of the annual caps.

[13] *See* TIETENBERG, *supra* note 8, at 114 (citing various evaluations of the Title IV SO_2 program).

an inviolate cap. Adjustments to California's RECLAIM program in response to the electricity crisis of 2000-2001 illustrates the problem. The RECLAIM program had very limited temporal flexibility and little in the way of stored allowances to provide a safety margin for the crisis, In response to the crisis, California regulators administering the program created a "mitigation fund" that injected an estimated additional one million tons of allowances into the market.[14] If regulators respond to short-term volatility and other events that cause political or economic pressure by allowing emitters to breach emissions caps, then any environmental benefits from eschewing banking disappear.

Emissions-trading programs, however, do change over time. Most include an emissions cap that declines, usually in stages that are disclosed when the program is initiated. Political changes and new information (on emissions, abatement costs, or harms from pollutants) may also lead to changes or even the creation of entirely new programs. A tension exists between these changed environmental goals and the expectations banked allowances create. If allowances banked in one version of an emissions-trading system cannot be used in subsequent revisions, or if program changes otherwise undermine their value, these expectations will also be undermined

In transitions between trading programs where existing stocks of banked allowances threaten the maintenance of the cap in future years, a regulator could end the existing emissions-trading program (rendering allowances useless) or limit use of banked allowances (reducing their value). The way in which regulators handle these transitions is critical because allowances only retain value to the extent that regulators credibly promise not to undermine them. If those that hold allowances no longer believe they will be useful in the future, they will not make continuing early reductions in emissions, and the efficiency benefits of banking will be unrealized.

It is even possible that these effects may carry over between different emissions-trading programs with the same repeat players. For example, EPA administers most emissions-trading programs

[14] *See* STEPHEN P. HOLLAND & MICHAEL R. MOORE, WHEN TO POLLUTE, WHEN TO ABATE? INTERTEMPORAL PERMIT USE IN THE LOS ANGELES NO_X MARKET 5-6 (Univ. of Cal. Energy Inst. Ctr. for the Study of Energy Mkts., Working Paper No. 178, 2008), *available at* http://www.ucei.berkeley.edu/PDF/csemwp178.pdf.

for various pollutants in the United States, and the predominant emissions sources in most of these programs are similar—large fossil fuel electricity generation plants and some industrial facilities. EPA actions that undermine the value of banked allowances in one program might lead a rational emitter to predict that the EPA will behave similarly with respect to other programs and markets and adjust its trading and banking behavior accordingly.

Decisions by regulators that reduce or, especially, eliminate the value of banked allowances are not problematic in that they are "unfair"—a stricter cap or other changes to a trading system are arguably no more or less fair than institution of a cap for a previously unrestricted pollutant in the first place. Both are likely to undercut the value of existing investments. But an unanticipated government action that substantially reduces the value of existing allowances risks damaging the function of emissions-trading markets themselves. In short, the issue is not fairness but efficiency—what is problematic is the potential effect of such alterations on market-participant behavior (along with the political impact of reduced participant buy-in). Unanticipated government interference with banked allowances can also have direct impacts that go beyond reduced efficiency: as described above, when participants believe that banked allowances will disappear or lose value in the future, they are less likely to make early reductions and bank credits and more likely to dump allowances already banked in a way that increases emissions.[15] If this happens, a trading program will be less effective in achieving the expected abatement benefits at lowest cost. Spillover effects between repeat players in multiple markets may extend these adverse effects to other trading programs.[16] In short, the more emitters come to believe their banked allowances will lose their value due to policy changes, the less likely they are to bank; at the extreme, if they

[15] Early reduction (and, conversely, "dumping") of emissions allowances matters. Early reductions mean early health benefits. Since the relationship between pollution and health is often nonlinear, emissions "spikes" over a short time period, particularly of precursor pollutants like NO_x and SO_2, can lead to disproportionately large health and welfare impacts.

[16] *See, e.g.*, Bård Harstad & Gunnar S. Eskeland, *Trading for the Future: Signaling in the Permit Markets*, 94 J. PUB. ECON. 749, 754 (2010), *available at* http://www.kellogg.northwestern.edu/faculty/harstad/htm/trading.pdf (finding that economic distortions associated with government intervention in emissions markets are exacerbated in scenarios with repeat players).

believe banked allowances are likely to lose all their value they will not bank at all. If this happens, the efficiency (and, indirectly, environmental) benefits of banking are lost.

An important and underemphasized element of regulatory design during changes in emissions-trading systems is therefore the need to minimize disruption by maximizing confidence among participants that the rights and value embodied by banked allowances will be preserved as much as possible. This does not mean that changing conditions or new information on risks should not lead to program changes, some of which affect banked allowance value. But environmental goals should be balanced with expectations about banked allowances. The next sections examine the extent to which transitions between U.S. emissions-trading programs over the last decade have met this goal.

It is important to be precise about what we mean when we refer to the value of banked allowances. The expected value of a banked allowance in the transition to a new cap-and-trade program depends on the exchange ratio—that is, the number of allowances required in exchange for one ton of emissions—and the expected price at which the allowance could be sold (generally, the marginal cost of control) under the new program with a more stringent cap. An exchange ratio other than 1:1 between two programs may not lead to a difference in allowance value: if two old allowances must be exchanged for each new one, but the new allowances are twice as costly because of a tighter emissions cap, there is no change in total allowance value.[17] With one exception, the transitions between EPA emissions trading have had either 1:1 exchange ratios for allowances banked before the transitions were announced, or have not allowed any exchange at all, simplifying these issues greatly. Our discussion below will distinguish between changes to the exchange rate in terms of the number of allowances required to per ton of emissions and the expected value of an allowance.

[17] Similarly, if the exchange ratio between two programs is 1:1 but a tighter cap makes allowances worth more, holders of banked allowances will see an *increase* in their value.

B. *The History of U.S. Emissions-Trading Markets*

1. *The 1990 Clean Air Act Amendments*

The history of emissions trading in the United States is well-documented elsewhere.[18] The general story is that by the late 1980s, dissatisfaction with the costs associated with traditional command-and-control regulation paired with a realization that substantial environmental goals remained unreached led to compromises in Congress. These compromises took legislative shape in the 1990 amendments to the CAA. The amendments explicitly created one emissions-trading market, the Title IV Acid Rain Program for SO_2. During the 1990s, the states and the EPA created additional trading programs for NO_x using CAA authority. While emissions-trading systems for greenhouse gases are the most frequent topic of current discussion, and the market for SO_2 created by the 1990 amendments to the CAA is the most well-known current market, markets for NO_x emissions have the most complex regulatory history.

2. *EPA Emissions-Trading Markets*

The primary driver for the initial NO_x control programs—the OTC NO_x Budget Program and the NO_x SIP Call—was nonattainment of the ozone National Ambient Air Quality Standards (NAAQS) in a number of major metropolitan areas in the eastern United States.[19] For these nonattainment areas, the long-range transport of ozone and NO_x—a precursor pollutant in the formation of ozone—was a key factor contributing to widespread nonattainment of the ozone NAAQS during the

[18] *See, e.g.*, DALLAS BURTRAW & SARAH JO SZAMBELAN, U.S. EMISSIONS TRADING MARKETS FOR SO_2 AND NO_X (RFF Discussion Paper 09-40, 2009), *available at* http://www.rff.org/RFF/Documents/RFF-DP-09-40.pdf; *see generally* ELLERMAN ET AL., *supra* note 8.

[19] *See* EPA, NITROGEN DIOXIDE, http://epa.gov/air/nitrogenoxides/ (last visited Sept. 24, 2009). The EPA listed ground-level ozone as a "criteria pollutant" in 1978 and has established successively more stringent NAAQS for it. *See* 42 U.S.C. § 7409 (2006). Under the CAA, each state is charged with meeting the NAAQS set by the EPA. § 7410(a)(1). States or areas that fail to do so are in "nonattainment" and are subject to penalties and increasingly strict regulation. § 7410(a)(2)(D)(i)(I) (stating that plans to meet the NAAQS set by the EPA must prohibit nonattainment); *see also* § 7410(m) (stating that failure to meet plan requirements can result in sanctions).

summertime in the eastern United States.[20]

In 2005, EPA adopted the Clean Air Interstate Rule in an attempt to further reduce SO_2 and NO_x emissions because of concerns with meeting the fine particulate matter (PM2.5) NAAQS in the eastern United States (both pollutants are precursors in the formation of fine PM).[21] CAIR established two new cap-and-trade programs for NO_x. First, CAIR incorporated a seasonal cap-and-trade program that in many respects was an extension of the NO_x SIP Call program to reduce summertime ozone. Second, CAIR created an annual NO_x cap-and-trade program to reduce the formation of fine PM.[22]

CAIR also established a new SO_2 cap-and-trade program in the eastern United States to reduce the interstate transport of SO_2 as a precursor in the formation of fine PM.[23] This SO_2 program substantially modified—and in many states effectively replaced—the historic (and storied) Title IV program created by the 1990 CAA amendments. The DC Circuit struck down CAIR in 2008, throwing the future of NO_x and SO_2 trading markets into some confusion.[24] Congress and the EPA recently have moved to address this confusion, but it is as yet uncertain what form the future program will take—placing us once again on the cusp of a major transition to a new trading program.

As described in detail in the sections that follow, this succession of new programs with stricter caps and broader reach provides a fertile history of transitions that provide the basis for our analysis in this paper.

This series of markets and the transitions between them are shown in Figure 1, and described in detail in the sections that follow.

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[20] More stringent NO_x emissions regulations on stationary sources were adopted in the CAA amendments, and while these restrictions did result in additional reduction in ozone concentrations, many areas were projected to continue to be in nonattainment. *See* BURTRAW & SZAMBELAN, *supra* note 18, at 16.

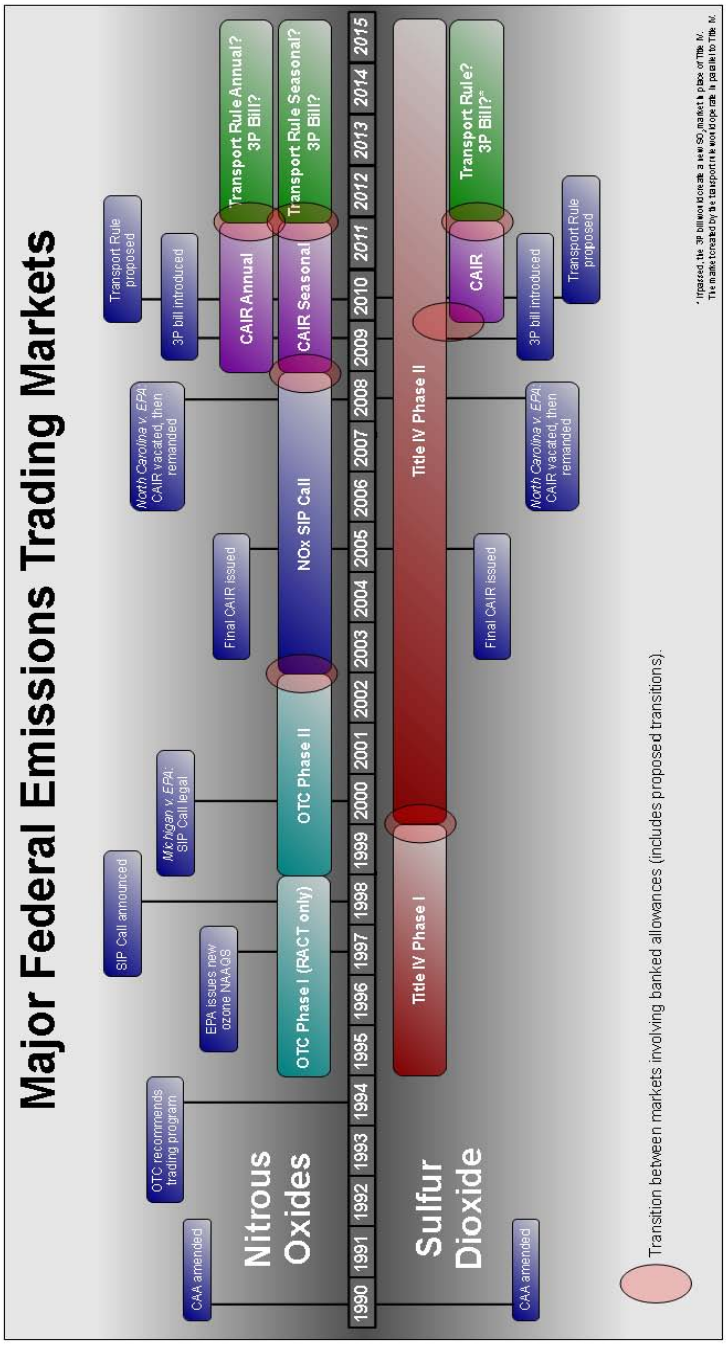
[21] CAIR, *supra* note 5, at 25,162 (finding that "28 States and the District of Columbia contribute significantly to nonattainment of the national ambient air quality standards (NAAQS) for fine particles ($PM_{2.5}$) and/or 8-hour ozone in downwind States").

[22] *Id.*

[23] *Id.*

[24] *See generally* North Carolina v. EPA, 531 F.3d 896 (D.C. Cir. 2008) (vacating CAIR for ignoring pertinent provisions of the CAA).

Figure 1. Timeline of Major U.S. Emissions-Trading Markets



II. BANKED ALLOWANCES AND PROGRAM TRANSITIONS: NO_X

A. *The OTC NOx Budget Program and the NOx SIP Call*

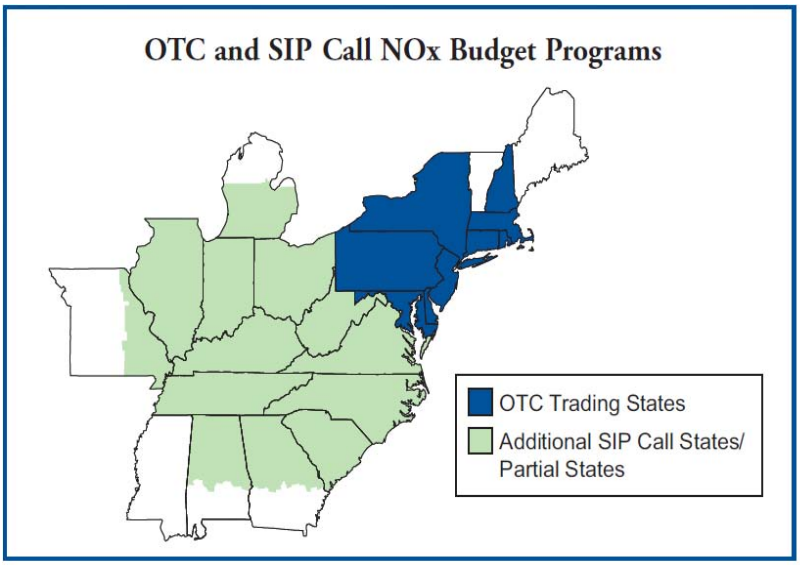
1. *The OTC NOx Budget Program*

By the late 1980s, areas in the Northeast found compliance with the NAAQS particularly problematic, in part because long-range interstate transport of ozone made it impossible for independent state-level regulation to adequately deal with the problem.[25] In recognition of this issue, the 1990 CAA amendments created an Ozone Transport Commission charged with recommending regional controls for the Northeast to the EPA. The OTC covered 12 states—Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Virginia, and Vermont—plus the District of Columbia (see Figure 2).[26]

[25] *See* EPA OZONE TRANSPORT COMMISSION, NO_X BUDGET PROGRAM: 1999–2002 PROGRESS REPORT 2 (2003), *available at* http://www.epa.gov/airmarkt/progress/docs/otcreport.pdf (hereinafter Progress Report). *See also* 63 Fed. Reg. 57,356, 57,360–61; BURTRAW & SZAMBELAN, *supra* note 18, at 16–17.

[26] 42 U.S.C. § 7511c (2006)*; see also* Ozone Rulemaking, *supra* note 12, at 57,360.

Figure 2. States included in the OTC and SIP Call Programs[27]



Upon the recommendation of the OTC, these states (with the exception of Virginia) entered into the multi-phase NO_x Budget Program (hereinafter the OTC program) for NO_x emissions reductions from stationary sources, aimed at meeting the NAAQS for ozone.[28] Phase I of the OTC program began in 1995 and required compliance with the 1990 CAA amendments' Reasonably Available Control Technology (RACT) standards.[29] The emissions-trading program was initiated in Phase II of the OTC program beginning in 1999. It created seasonal (May 1–September 30) caps on NO_x emissions beyond those imposed by RACT standards.[30] Phase II of the OTC program operated between 1999 and 2002, before being superseded by the NO_x SIP Call program in 2003 (See Figure 1 above). Phase II achieved additional reductions beyond Phase I of roughly 70,000 tons in seasonal NO_x emissions.[31] Phase III would have instituted a tighter emissions cap

[27] EPA OZONE TRANSPORT COMMISSION, *supra* note 25, at 13.

[28] BURTRAW & SZAMBELAN, *supra* note 18, at 17. *See also* EPA OZONE TRANSPORT COMMISSION, *supra* note 25, at 1.

[29] EPA OZONE TRANSPORT COMMISSION, *supra* note 25, at 3–4.

[30] *Id.* at 4–5.

[31] BURTRAW & SZAMBELAN, *supra* note 18, at 21. *See also* EPA OZONE TRANSPORT COMMISSION, *supra* note 25, at 4. Phase I of the program—the

in 2003 but was superseded by the EPA's NO_x SIP Call program discussed below.[32]

Market Structure

In the OTC Phase II emissions-trading program, states distributed allowances up to the seasonal limit. Sources had to show that they had one allowance for each ton of NO_x emitted. These allowances could be sold or, critically for purposes of this analysis, banked for use in future years.[33] Banked allowances could be used on a one-to-one basis (that is, one allowance for one ton of NO_x emitted) exactly like current-vintage allowances, subject to a set of restrictions called "progressive flow control" (PFC). Under this system, if the volume of banked allowances exceeded 10 percent of the total budget for a given year, PFC would limit the amount of allowances that could be exchanged at a one-to-one basis. Once this threshold was exceeded, further banked allowances could still be used, but only on a two-to-one basis.[34] The purpose of PFC was to limit the extent to which emissions exceeded the seasonal NO_x cap due to a draw-down of large amounts of banked allowances. While PFC is a somewhat technical rule within the larger program, it is significant for an analysis of banked allowances. Because PFC was triggered throughout the course of the OTC program, banked allowances generally traded at a discount of $150 to $250 per ton less than current-vintage allowances, which could always be used on a one-to-one basis.[35]

Allowance Prices during the OTC Program

In the months immediately preceding the transition into the Phase II OTC NO_x market, NO_x allowance prices rose to more than $5,000 per ton—a level well above the estimated marginal

technology-based RACT requirements—achieved a reduction of roughly 180,000 tons in seasonal NO_x emissions before any emissions-trading system was implemented.

[32] EPA OZONE TRANSPORT COMMISSION, *supra* note 25, at 4–5.

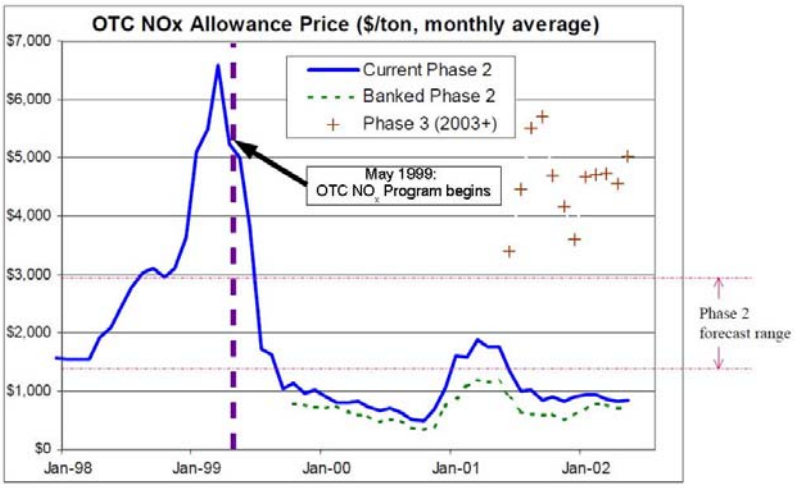
[33] *Id.* at 3.

[34] *Id.* at 15–16.

[35] *See* EPA, PROGRESSIVE FLOW CONTROL IN THE OTC NO_x BUDGET PROGRAM: ISSUES TO CONSIDER AT THE CLOSE OF THE 1999-2002 PERIOD 10 (2004), *available at* http://www.epa.gov/airmarkt/resource/docs/flowcontrolOTC.pdf.

cost of NO_x control under Phase II of the program—because of concerns that the utilities would not be able to install sufficient control equipment to meet the emissions cap in 1999 (see Figure 3).[36] The market in this period was relatively thin, with relatively few transactions between different firms.[37] However, additional early-reduction allowances coming into the market in the spring of 1999 expanded supply, resulting in a drop in allowances prices to around $1,000 per ton by the beginning of 2000. Prices for current-vintage allowances largely settled—with the exception of a six-month excursion up to $2,000 per ton in 2001—at a price somewhat below $1,000 per ton through the end of the OTC program.

Figure 3. OTC NO_x Allowance Prices, 1998-2002[38]



[36] Projections of NO_x control costs for the program were on the order of $1,500 per ton. ALEXANDER FARRELL, CALIFORNIA ENERGY COMMISSION, REVIEW OF MARKET-BASED INCENTIVES FOR CONSIDERATION OF APPLICATIONS IN CALIFORNIA 20 (2005), *available at* http://www.energy.ca.gov/2005publications/CEC-500-2005-025/CEC-500-2005-025.PDF.

[37] *See id.*

[38] ALEX FARRELL, NATIONAL ENERGY TECHNOLOGY LABORATORY, NO_x EMISSION TRADING IN THE NORTHEAST: TRENDS AND OUTLOOK 10 (2002), http://www.netl.doe.gov/publications/proceedings/02/scr-sncr/Farrell.pdf.

2. *The NOx SIP Call*

While the OTC program reduced NO_x emissions, ozone levels continued to be a problem—many areas were still unable to meet the NAAQS. In 1995, the Ozone Transport Assessment Group (OTAG), a state–EPA partnership, was created to review policy options for further NO_x emissions reductions.[39] In 1997, the EPA made a decision, based on new scientific evidence, to tighten the NAAQS for ozone, adding to the challenge these areas faced in complying with the NAAQS. While OTAG deliberations did not result in an agreement between the parties, the EPA incorporated analysis developed by OTAG into its review of CAA State Implementation Plans (SIPs) for compliance with the ozone NAAQS. In 1998, the EPA required 22 states, including all the OTC states except Maine, New Hampshire, and Vermont, to submit new SIPs that included plans for further NO_x reductions (see Figure 2).[40] This action was termed the "NO_x SIP Call."

Under the SIP Call, the EPA set a seasonal cap on each participating states' NO_x emissions from a specific set of stationary sources. States were then given the flexibility to comply with these caps however they might choose.[41] The EPA, however, created a "model" emissions-trading program—the NO_x Budget Trading Program (NBP)—in the SIP Call rulemaking and encouraged states to adopt it as a means to meet the caps set by the EPA.[42] Some regulated states challenged the SIP Call on a variety of grounds, but the D.C. Circuit Court of Appeals upheld the legality of the program in 2000 in *Michigan v. EPA*.[43] Following the litigation, the SIP Call rule was implemented for those states that participated in the OTC program beginning in 2003, effectively replacing the third phase of that program. States that had not participated in the OTC program joined the SIP Call program in June of 2004.[44]

All the OTC Program states chose to participate in the EPA's model emissions-trading program for the SIP Call. In many

[39] Ozone Rulemaking, *supra* note 12, at 57,361.

[40] *Id.* at 57,358.

[41] *Id.*

[42] *Id.* at 57,456.

[43] 213 F.3d 663, 670 (D.C. Cir. 2000) (stating that the EPA did not impermissibly intrude on the ability of states to create their own SIPs).

[44] Burtraw & Szambelan, *supra* note 18, at 24.

respects, this program was very similar to the emissions-trading system under the OTC program. Allowances continued to be allocated by states, caps were imposed annually for the May 1–September 30 season, and PFC continued to limit the use of banked allowances. The transition between the two programs was complex, however, particularly with respect to banked allowances.

3. *The OTC–SIP Call Transition*

Banking and Early Reductions in the NOx SIP Call

In its NO_x SIP Call, the EPA recognized the advantages of allowing banking to provide flexibility, ease the costs of the transition to a more stringent regulatory regime, and promote early reductions. [45] At the same time, though, the agency was concerned that banking could result in a significant increase in emissions above the cap and jeopardize the NO_x SIP Call goal of limiting NO_x emissions during the ozone season.[46] As a result, the EPA made two decisions severely restricting the transfer of banked OTC allowances into the NBP.

First, the EPA limited the size of the Compliance Supplement Pool (CSP) to 200,000 tons and the use of the CSP allowances to the first two years of the program.[47] Second, the agency also

[45] *See* Ozone Rulemaking, *supra* note 12, at 57,428; The EPA also noted that commentators provided several reasons for including a banking program: it would encourage early and cost-saving emissions reductions, help to avoid end-of-season emissions spikes (because unused emissions have value in future years), encourage more expedient development of NO_x emissions control technology, and allow sources flexibility to save allowances in years when costs are relatively low for use in high cost years when, for example, nuclear and hydro capacity are more limited. *Id.* at 57,430.

[46] *Id*. at 57,431 (the EPA states that "the flow control mechanism . . . discourages the 'excessive use' of banked allowances or credits by establishing either an absolute limit on the number of banked allowances or credits that can be used each season or a rate discounting the use of banked allowances or credits over a given level." Because the flow control mechanism focused on the use of credits over the entire ozone season, it was not well suited to address the real problem—that is, episodic violations associated with hot weather that contribute significantly to ozone formation.).

[47] The Compliance Supplement Pool ("CSP") was created by the EPA as part of the NOx SIP Call to address concerns that adequate NOx controls might not be in place in the early years of the program and to help smooth the transition. The CSP was comprised of 200,000 allowances in the NBP. States could distribute their share of CSP allowances based on a showing of need and/or to reward early reductions. *See id.* at 57,429.

allocated the CSP to states in proportion to the emissions reductions each state was required to achieve under the NO_x SIP Call. The EPA based this allocation on its view that the need for a supplemental allocation was directly related to the size of the reduction required.[48] With more than 90 percent of CSP allowances allocated to states outside the OTC (since most emissions reductions would come in those newly-included states), this decision placed a significant constraint on the transfer of banked allowances between programs and limited the total transfer of OTC banked allowances to roughly 25,000 tons.[49]

In addition, the EPA adopted a flow control provision nearly identical to that in the OTC program.[50] The flow control restrictions applied when the use of banked allowances exceeded 10 percent of the ozone season budget. While states had some flexibility, flow control measures under the NBP required sources to give up two banked allowances for every ton of emissions when the use of banked credits exceeded the 10 percent threshold.[51] The flow control provisions applied to all banked credits—including banked CSP credits—at the beginning of the second year of the program.[52]

In making the transition through the CSP, the OTC states placed additional limits in 2001 on the transfer of banked allowances.[53] In determining the pro-rata distribution of CSP allowances, none of the OTC states allowed credit for 1999 vintage-year allowances. In addition, Pennsylvania did not allow credit for 2000 vintage year NO_x allowances. Finally, Maryland used an early-reductions program as a basis for distributing CSP allowances, instead of using banked OTC allowances.[54] As a result, these OTC allowances became "use-or-lose" credits within the OTC program. EPA reports that these were the predominant source of allowances surrendered on a two-to-one basis under the

[48] *Id.* at 57,429.

[49] The NO_x SIP Call therefore allowed—but did not require—the non-OTC States to set up programs to grant early reduction credits. *Id.* at 57,432.

[50] *Id.* at 57,431.

[51] EPA, NO_x BUDGET TRADING PROGRAM REPORT: 2007 COMPLIANCE AND ENVIRONMENTAL RESULTS 26-27 (2008), http://www.epa.gov/airmarkt/progress/docs/2007-NBP-Report.pdf.

[52] *See* Ozone Rulemaking, *supra* note 12, at 57,431.

[53] *See* Farrell, *Review of Market Based Incentives*, *supra* note 36, at 22.

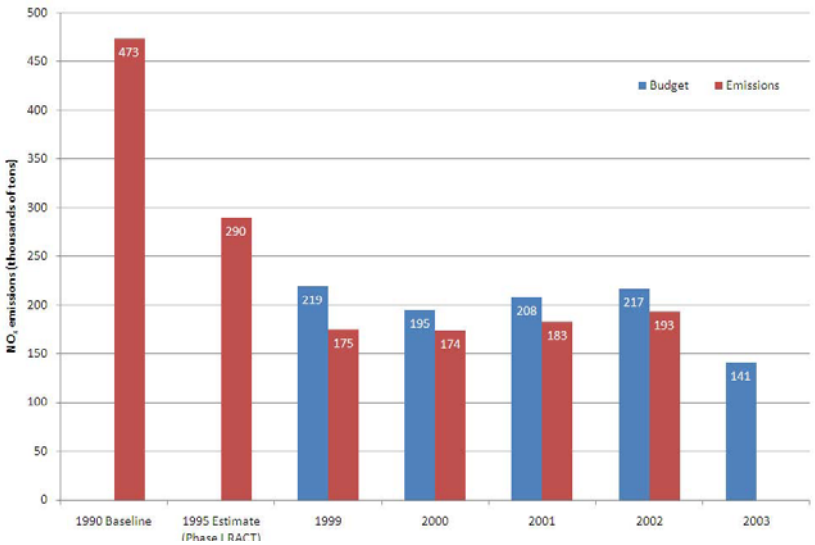
[54] *See* EPA, Progressive Flow Control in the OTC NO_x Budget Program, *supra* note 35, at 6.

OTC PFC requirements.[55]

The Transition from the OTC to the NOx SIP Call in Practice

The EPA established the requirements for the NBP in October 1998, six months before the OTC trading program began on May 1, 1999. Therefore, the details for the OTC–NBP transition were already known before sources made their decisions on whether to bank excess allowances in the OTC program.[56] Over the 1999–2002 period, sources in the OTC region continued to accumulate OTC banked allowances even though the total bank substantially exceeded the CSP allowances that could be transferred into the NBP program. Even in the final year of the OTC program, sources banked additional allowances (see Figure 4). In the end, the transfer ratio in the OTC was on the order of nine OTC credits to two NBP allowances.

Figure 4. NO_x emissions and budgets, OTC NBP 1990–2003[57]



[55] *See id.* at 7.

[56] The NO_x SIP Call was the subject of litigation, including a claim that EPA should not have restricted the size of the CSP. This challenge was rejected by the D.C. Circuit. *Michigan v. EPA*, 213 F.3d at 694.

[57] For source data, *see* EPA, 2002 OTC NO_x BUDGET PROGRAM COMPLIANCE REPORT 2 (2003), http://www.otcair.org/document.asp?fview=Report#.

Although the transition between these two programs did not preserve a one-to-one exchange value for OTC allowances, the fact that participants were aware before the program started that the exchange rate would be substantially less than one-to-one means that, in general, the terms of exchange were established in advance, at least at the level of federal policy, and that settled expectations were not significantly disrupted in the market. Some disruption of expectations did occur, however, with the decision by the OTC to prohibit the use of early-vintage allowances in the conversion to CSP allowances and with the decisions by Pennsylvania and Maryland to further limit the eligibility of OTC banked allowances for conversion to CSP allowances.

Allowance Prices during the OTC–SIP Call Transition

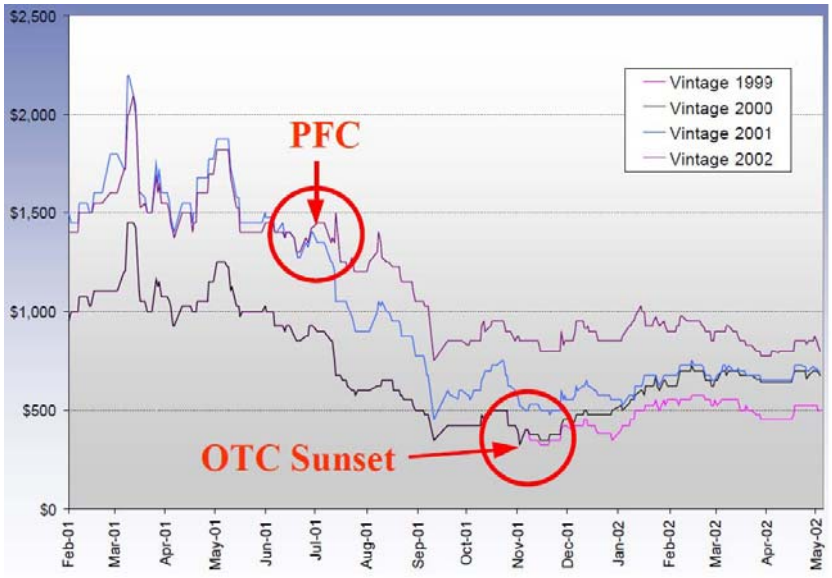
A review of allowance prices in the transition period suggest that prices behaved consistently with the constraints placed by the PFC requirements on the use of banked allowances in the OTC program and by the CSP requirements governing the transfer of banked allowances to the NO_x SIP Call program. During the final year of the OTC program, the prices for 1999 vintage allowances were roughly 60 percent of the price for then-current (2002) vintage allowances (see Figure 5). This discount reflects the decision by the OTC states to prohibit the use of 1999-vintage allowances in determining the allocation of CSP allowances for use in the NBP. As a result, banked 1999-vintage allowances became "use-or-lose."—emitters had to use them before the end of the OTC program, and then only at 2:1 since PFC had been triggered. While the 2000 and 2001 vintage allowances also were subject to the PFC use ratio, they could also be used in an exchange for CSP allowances for use in the 2003 NO_x SIP Call market, and saved for a future year in which PFC might not be triggered.[58]

[58] It is true that Pennsylvania did not provide CSP credit for 2000 vintage NO_x allowances. *See* EPA, Progressive Flow Control in the OTC NO_x Budget Program, *supra* note 35, at 6. These allowances could still be exchanged for CSP credit elsewhere. Reccall that the SIP Call program, implemented through EPA's Model Rule and state SIPs based on it, allowed interstate trading. *See* Ozone Rulemaking, *supra* note 12, at 57,456–58. Pennsylvania sources could therefore trade their allowances to sources in other states that would then be able to exchange any Pennsylvania allowances they held for CSP allowances, circumventing Pennsylvania's CSP restriction.

Holders of banked 2000- and 2001-vintage allowances therefore faced a choice: convert those allowances into 2002 allowances at the PFC ratio, or convert them into 2003 allowances at the CSP ratio. Because 2003-vintage allowances were trading in the forward markets at $4,000–$6,000 per ton in 2002, the 2000- and 2001-vintage OTC allowances traded in the range of $700 per ton, a price slightly lower but roughly commensurate with the CSP exchange ratio.

Conversion to 2003 allowances also granted more flexibility since the 2003 vintage allowances freed up by use of CSP allowances could be banked for future SIP Call years. Finally, the 2002 vintage allowances traded at $800–$900 per ton, a price consistent with the marginal cost of control to meet the then-current OTC seasonal NO_x cap.

Figure 5. NO_x Seasonal Allowance Prices, 2001-2002[59]



[59] MATT WILLIAMSON, DYNAMICS OF THE NO_X ALLOWANCE MARKET 12 (May 2002), http://www.netl.doe.gov/publications/proceedings/02/scr-sncr/Williamson.pdf.

Figure 6. Seasonal NO_x Allowance Prices, 2000–2005[60]

The other key feature of the data in this transition period is the much higher price for 2003 allowances in the initial months of the SIP Call (see Figure 6). Prices in the range of $4,000–$6,000 per ton substantially exceeded the EPA's estimate of the marginal cost of NO_x control at the cap levels in the program. In discussing these higher-than-expected prices, market observers have suggested that they reflected the uncertainty in the market over the ability of the regulated entities to get adequate NO_x control into place for the 2003 ozone season and the availability of NO_x allowances for compliance in 2003.[61] As noted above, the CSP early-reduction incentive program only provided roughly 25,000 tons of additional NO_x allowances in the OTC states.[62] It is likely that a more liberal approach to the transfer of banked allowances between the OTC

[60] Data provided by Gary Hart (on file with author). Dotted lines represent periods where limited price data are available.

[61] *See* Farrell, *Review of Market Based Incentives*, *supra* note 36, at 22.

[62] When the EPA issued the final NO_x SIP Call rule in 1998, the 2003 start date for the program applied to all the covered states. However, challenges to the EPA rule by the non-OTC states delayed the start date for those states by one year. Since most of the 200,000 CSP allowances were allocated to the non-OTC states, these allowances were not available until 2004. EPA, EVALUATING OZONE CONTROL PROGRAMS IN THE EASTERN UNITED STATES: FOCUS ON THE NO_x BUDGET TRADING PROGRAM 9 (2004), http://www.epa.gov/airmarkets/progress/docs/ozonenbp.pdf.

and SIP Call programs would have resulted in less uncertainty, lower price volatility, and a smoother transition between the programs—though at the cost of higher short-term emissions.This balancing illustrates the tension inherent in most emissions market transitions.

B. *The NOx SIP Call and CAIR*

1. *CAIR*

By 2003, it became clear that the contribution of the interstate transport of NO_x and SO_2 emissions to particulate matter levels was an ongoing and significant environmental problem requiring EPA intervention.[63] Responding to these concerns, the EPA in 2005 issued the Clean Air Interstate Rule, establishing cap-and trade programs limiting annual SO_2 and NO_x emissions in the eastern U.S.[64] In addition, because of a continuing concern that many areas would fail to meet the ozone NAAQS, CAIR included a seasonal NO_x market as a successor to the NO_x SIP Call program to address the long-range downwind transport of ozone and NO_x that affect summertime ozone levels.[65]

The CAIR rule established stringent annual SO_2 and NO_x emissions caps for roughly 30 eastern states and provided model trading rules for a regional cap-and-trade program for SO_2 and NO_x emissions from electric generating units.[66] States could elect to adopt these rules to comply with their emissions reduction obligations.[67] While states could adopt a different approach, CAIR was structured to give states a substantial incentive to adopt EPA's model trading rules because EPA would manage the trading programs based on its model trading rules (reducing the burden on the states of administering a program). EPA also provided a draft of a prepared SIP that required minimal effort for approval in a

[63] *See* CAIR, *supra* note 5, at 25,168–69.

[64] *See generally id*.

[65] *Id*. at 25,165–66.

[66] *See generally id*. To participate in the EPA-administered trading programs, states were required to adopt EPA's model cap-and-trade rules. This requirement provided states with the flexibility to modify sections regarding NO_x allocations and adopt individual-unit opt-in provisions. *Id.* at 25,274.

[67] States were given the flexibility to modify sections regarding NO_x allocations and whether to adopt individual unit opt-in provisions. *See id*. at 25,274.

context where the states faced a tight deadline for submitting their CAIR SIPs.[68]

CAIR set state obligations for SO_2 and NO_x emissions reductions in two phases. Phase I established caps for NO_x in 2009 and for SO_2 in 2010; Phase II required additional reductions for both NO_x and SO_2 to meet more stringent emissions caps in 2015.[69] EPA projected that CAIR would achieve reductions of more than 60 percent for NO_x and more than 70 percent from 2003 emissions levels for SO_2 when the program was fully implemented.[70]

CAIR also set up model trading rules for annual NO_x and SO_2 emissions and for seasonal NO_x emissions. The CAIR annual trading rule for SO_2 builds on the existing Title IV program established by the 1990 Clean Air Act Amendments, requiring the exchange of two Title IV SO_2 allowances for every ton of SO_2 emissions for 2010–2014 vintage allowances, and in the ratio of 2.86 to 1 in Phase 2 for 2015 and later vintage allowances. Under this phased approach, earlier-vintage banked allowances (pre-2010) would be expected to have a higher market value.[71] The annual CAIR NO_x trading rule was new; there was no existing annual NO_x program in place. The seasonal NO_x cap-and-trade rule replaced the existing NO_x SIP Call program with seasonal

[68] *See id.* at 25,263. CAIR SIPs were due within 18 months of publication of the rule—i.e., November 2006. SIPs to implement the ozone NAAQS were due June 15, 2007, and SIPs to implement the PM2.5 NAAQS were due April 5, 2008. EPA argued that the tight deadline for the CAIR SIP was necessary to allow EPA and the states to develop the SIPs needed to implement the 1997 NAAQS.

[69] *See id* at 25,167. To implement these reductions, CAIR adopted state-specific emissions caps and required states to adopt monitoring requirements for their electric-utility generating units as a part of their SIPs.

[70] EPA, *Clean Air Interstate Rule: Basic Information*, http://www.epa.gov/cair/basic.html (last visited Sept. 1, 2010). Phase I of CAIR established a 2009 NO_x annual cap of 1.5 million tons and a seasonal cap of 0.6 million tons. The 2010 CAIR SO_2 emission cap for Phase I was 3.6 million tons. In Phase II, CAIR established a 2015 NO_x annual cap of 1.3 million tons and a seasonal cap of 0.5 million tons. The 2015 CAIR SO_2 cap for Phase II was 2.5 million tons. *See* CAIR, *supra* note 5, at 25,165, 25,212.

[71] Pre-2010 allowances would have a higher market price under CAIR relative to post-2010 allowances. The superior exchange ratio of pre-2010 allowances would have made them more valuable than post-2010 allowances whatever the cap in CAIR. In addition, CAIR's tighter SO_2 cap also means that pre-2010 allowances would have been—absent the D.C. Circuit decision— more valuable in the CAIR market than they would have been in the existing Title IV market.

caps that were somewhat more stringent than the existing program. The most significant changes from the NO_x SIP Call seasonal program to the CAIR program included the elimination of PFC.[72] All the states included in CAIR adopted the essential elements of EPA's model trading rules in their SIPs, and EPA now administers the markets for these model trading programs.

After promulgation of CAIR, North Carolina and several power companies filed challenges with the D.C. Circuit.[73] After hearing arguments on CAIR, the court issued its decision, finding "more than several fatal flaws in the final rule" in July 2008, and vacated the rule in its entirety (we discuss this decision in more detail below when we address CAIR's successor, the proposed Transport Rule).[74] The EPA responded to the Court decision by requesting either a re-hearing on two issues or, in the alternative, a remanding of the rule to EPA to allow the agency to address the concerns identified in the opinion. The nominally victorious plaintiffs supported EPA's request.[75] In response, the D.C. Circuit took the unusual step of changing its earlier ruling and remanded CAIR to EPA in December 2008 to allow EPA to address its legal flaws.[76] The effect of this decision is to leave CAIR in place and require the states to comply with the provisions of CAIR, at least until the EPA crafts a replacement rule. States had to comply with the NO_x requirements beginning in 2009 and with the SO_2 requirements beginning in 2010.

2. *The NOx SIP Call–CAIR Transition*

A Simple Exchange

In contrast to the OTC–SIP Call transition, the process for exchange of banked allowances between the SIP Call and CAIR

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[72] CAIR, *supra* note 5, at 25,283.

[73] *See North Carolina v. EPA*, 531 F.3d at 896.

[74] *Id*. at 901.

[75] *North Carolina v. EPA*, No. 05-1244, Document: 01215418702 (D.C. Cir. 2008) (based on petitions for rehearing filed by both EPA and plaintiffs, the court determined that the environmental benefits of CAIR were sufficient grounds to preserve it while EPA repaired the flaws identified in the orginal decision. As the court noted, "Here, we are convinced that, notwithstanding the relative flaws of CAIR, allowing CAIR to remain in effect until it is replaced by a rule consistent with our opinion would at least temporarily preserve the environmental values covered by CAIR.")

[76] See *id.* at 3.

programs was straightforward. As the EPA states in the CAIR rulemaking, "pre-2009 NO_x SIP Call allowances can be banked into [CAIR] and used by CAIR-affected sources for compliance with the CAIR ozone-season NO_x program."[77] In other words, NO_x SIP Call allowances could be exchanged one to one for CAIR allowances—though any allowances of vintage years 2009 and later that may have been bought in advance could not be used at all.

Note that this one-to-one exchange for allowances applied only to the seasonal NO_x emissions-trading program within CAIR. CAIR also created an annual program. Since there was no comparable existing program, no transfer of banked allowances was possible.

However, EPA did provide a program to support early reductions in annual NO_x emissions through a CSP. The CSP—similar in structure to the earlier program provided in the NO_x SIP Call—consisted of 200,000 tons of NO_x allowances. The CSP allowances were distributed to the states on a pro-rata basis and were to be used either to address certain "hardship" cases where a utility was unable to meet the January 1, 2009, deadline or to be distributed among sources making early reductions.[78]

EPA originally proposed to establish only an annual CAIR NO_x program—ending the seasonal NBP created by the SIP Call—because the annual NO_x limit would reduce "NO_x emissions sufficiently enough to not warrant a regional ozone season NO_x cap."[79] Indeed, EPA projected that the CAIR annual NO_x program would dominate the seasonal NO_x trading program, so that the seasonal CAIR program would have a surplus of NO_x allowances, prices for seasonal NO_x allowances would be zero, and there would be little or no banking.[80] At the final rule stage, however, EPA reversed course and established a seasonal NO_x cap-and-trade market even though EPA modeling continued to project that the

[77] *See* CAIR, *supra* note 5, at 25,274.

[78] Distribution of the CSP was based on each state's share of final NO_x reductions required by CAIR. *See id*. at 25,286.

[79] *See id.* at 25,256.

[80] EPA developed its analysis using the Integrated Planning Model, a multi-regional, dynamic, deterministic linear programming model of the U.S. electric power sector. *See id*. at 25,196. *See also* EPA, *CAIR 2004 Final: Regional Summary Report*, http://www.epa.gov/airmarkt/progsregs/epa-ipm/cair/docs/cair2004_final.zip (last visited Aug. 26, 2010).

annual NO_x market would dominate NO_x control decisions and the price of NO_x allowances in the seasonal market would be zero. EPA noted that commenters remained very concerned that the CAIR annual NO_x program would not be sufficient to assure the reductions required for ozone attainment. In its final rule, EPA recognized that a seasonal cap would provide certainty[81] and agreed that was "very important in the effort to help areas achieve ozone attainment."[82]

Other studies predicted, however, that the seasonal CAIR cap would continue to be binding (even with the CAIR annual NO_x program) and projected positive seasonal NO_x allowance prices.[83] In addition, as noted above, electric utilities have a strong incentive to maintain a reserve of banked allowances to provide operational flexibility. Data available for the NBP shows that seasonal NO_x allowance prices remained positive at around $700 per ton and sources banked additional allowances—as reflected by NO_x emissions reductions below the NO_x NBP emissions cap—in the period after promulgation of the CAIR rule up to the start of the CAIR seasonal NO_x program in 2009. In the three years after adoption of the CAIR rule (2006-2008), covered sources in the NBP banked roughly 90,000 additional seasonal NO_x allowances; see Figure.[84] These early reductions in advance of CAIR yielded

[81] For reasons of chemistry, tropospheric ozone is essentially a summer-season problem; in EPA's opinion, therefore, a seasonal cap would focus the trading program more directly on summertime emissions that are most likely to have adverse health effects.

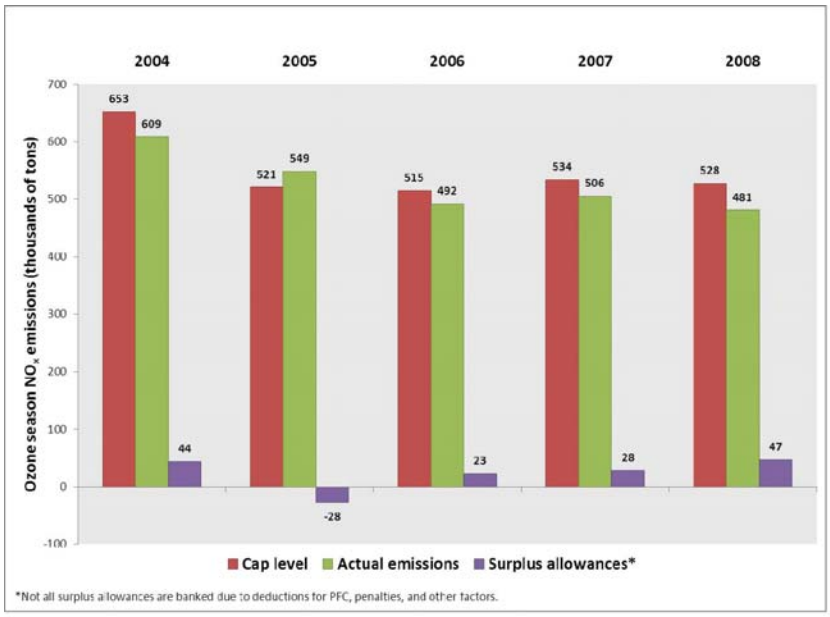
[82] *Id*. at 25,256. The CAIR rulemaking and related documents do not offer much additional explanation for the decision to allow a simple one-to-one exchange for banked seasonal NO_x allowances. The final CAIR rule simply notes that the one-to-one exchange is consistent with its proposal and final action with respect to the treatment of Title IV SO_2 allowances. However, since EPA believed that the annual market would dominate the seasonal market and that banking would have a negligible role, the agency had little reason to be concerned with the transfer of banked NO_x allowances to the CAIR seasonal NO_x market. *See id.* at 25,227 (tables indicate EPA models showed that drawdown of pre-CAIR banked allowances would result in emissions exceeding the rule's annual caps, but not its seasonal caps).

[83] Karen Palmer, Dallas Burtraw & Jhih-Shyang Shih, *The Benefits and Costs of Reducing Emissions in the Electricity Sector*, 83 J. ENVTL. MGMT. 115, 124–25 (2009).

[84] *See* EPA, *NOx Budget Trading Program: Compliance and Environmental Results (2005-2008)*, http://www.epa.gov/airmarkt/progress/progress-reports.html (last visited Aug. 26, 2010). The EPA reports that sources transferred a total bank of 275,000 NO_x NBP allowances—the post CAIR–announcement emissions reductions combined with banked emissions from

early air quality improvements in 2007 and 2008. Therefore, the EPA's decision to create a seasonal CAIR NO_x market with the transfer of banked NBP allowances had real consequences in the form of early reductions that were not anticipated by the EPA's modeling.

Figure 7. Seasonal NO_x Allowance Banking In the Transition to CAIR[85]



Allowance Prices

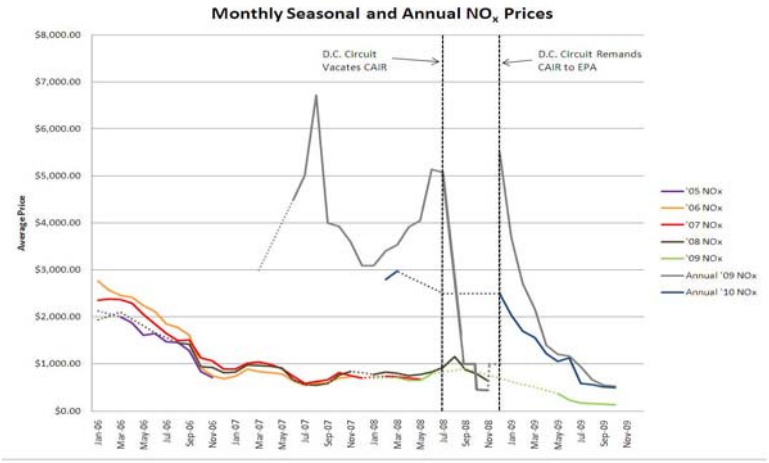
While prices in the seasonal NO_x market experienced a decline in 2005 and 2006, the EPA reported that the market for SIP Call allowances continued to be active throughout the transition period to the start of the CAIR program in 2009 (see Figure 7). The NO_x allowance price approaching the transition to the CAIR seasonal NO_x program remained relatively stable in the range of $700 per ton up to the July 2008 D.C. Circuit decision. The

earlier years–for future use in the CAIR ozone-season NO_x cap-and-trade program.

[85] *Id.*

transition was not marked by sharp price spikes or drops for NO_x allowances in the years leading up to the CAIR seasonal NO_x market—unlike the substantial premiums for NO_x allowances in the transitions associated with establishing the earlier OTC and NBP programs. We believe that a variety of factors account for the stability in NO_x allowance prices with this transition: the change in the seasonal cap was relatively small, the available projections suggested that the new cap could be met readily, and sources were able to carry a substantial "bank" of NO_x allowances (roughly 50 percent of the cap) into the new CAIR seasonal NO_x program.[86]

Figure 8. Seasonal NO_x Allowance Prices, 2006-2009[87]



Prices for 2009 CAIR annual NO_x allowances in the 15 months preceding the start of the CAIR program were high relative to EPA estimates of the marginal cost of NO_x control under CAIR. These prices fluctuated between $3,000 and $6,000 per ton in the forward markets prior to the July 2008 D.C. Circuit decision to vacate CAIR and rebounded in the early months of 2009 to $4,000

[86] Gary Hart, *The Roller Coaster Ride of the NO_x Allowance Market*, 1 ICAP ENERGY–ENVTL. MARKETS BRIEF 1, 2 (2009); *see also* EPA, 2009 THE NO_x BUDGET TRADING PROGRAM: 2008 EMISSION, COMPLIANCE, & MARKET DATA 3, http://www.epa.gov/airmarkets/progress/NBP_1/NBP_2008_ECM_Data.pdf (noting that emitters carried over 273,000 banked NOx allowances into CAIR).

[87] Data provided by Gary Hart (on file with author) and supplemented by *Id.* at 4. Dotted lines represent periods where limited price data are available.

per ton after the court reversed its decision and remanded the rule to EPA (see Figure 8). In contrast, the EPA estimated marginal costs of $1,300 per ton for NO_x control in 2009.[88] These high prices for 2009 vintage NO_x annual allowances reflected the uncertainty associated with the extent to which adequate NO_x control would be in place in the first year of the CAIR program. While acknowledging that cost increases and shortages in the installation of NO_x control influenced forward market prices, EPA reported that risk aversion and thin markets also played a role in driving up prices for 2009 annual NO_x allowances.[89] In addition, the D.C. Circuit's decisions in July and December of 2008 contributed to the volatility of prices and uncertainty in the market.

III. BANKED ALLOWANCES AND PROGRAM TRANSITIONS: SO_2

A. *Title IV Phases I and II*

1. *Title IV Program Structure*

As discussed briefly in Part II.A above, one of the most significant innovations in the 1990 CAA amendments was Congress' explicit and detailed creation of a cap-and-trade system for SO_2 emissions. The program is implemented in Title IV of the CAA (the program is commonly referred to as the Title IV program). Title IV itself is quite detailed, including specific emissions caps and a detailed table of allocations to individual emissions sources.[90] Unlike the EPA NO_x programs discussed above, Title IV is a nationwide program.[91]

The program included two phases. In Phase I, in effect from 1995 to 1999, the 263 largest SO_2 emissions sources were required to reduce emissions by about 3.5 million tons per year.[92] This was achieved by allocating a declining number of allowances to these sources over the course of Phase I (see Figure 9). Emitters were free to buy and sell allowances, but were required to surrender one

[88] *See* CAIR, *supra* note 5, at 25,209.

[89] CLEAN AIR MKTS. DIV., EPA, UPDATE ON CAP AND TRADE PROGRAMS FOR SO_2 AND NO_x 17–18 (2007), http://www.epa.gov/airmarkt/presentations/docs/ema07/Napolitano%20Fall%20EMA%20-%2011.29.07.pdf.

[90] *See* 42 U.S.C. § 7651b(a), § 7651c(e).

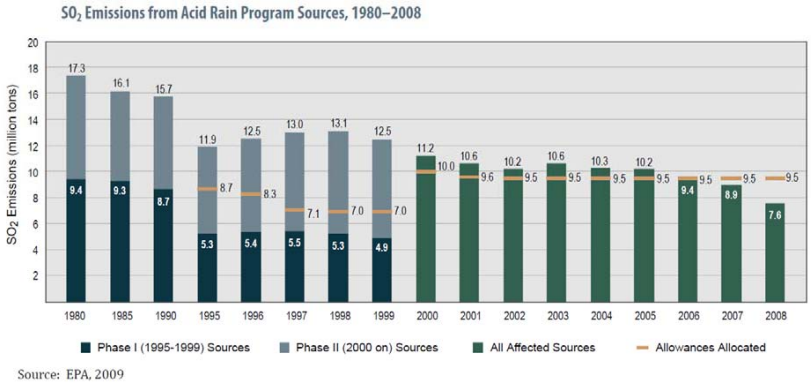
[91] With the exception of Alaska and Hawaii. *See* § 7651a(14).

[92] ELLERMAN ET AL., *supra* note 8, at 6.

for each ton of SO_2 emissions at the end of each year. Banking was permitted, but borrowing was not—allowances of a previous vintage year could be used, but those of future vintage years could not.[93]

In Phase II, in effect beginning in 2000, the Title IV program expanded to include almost all fossil fuel electricity generating plants.[94] The Phase II cap was greater than the Phase I cap to account for the inclusion of many new sources, but similarly declined over time before leveling off at 9.5 million tons of SO_2 emissions per year. (see Figure 9).

Figure 9. SO_2 Emissions under the Acid Rain Program[95]



Source: EPA, 2009

2. *Banking in Title IV and the Phase I–Phase II Transition*

As Figure 9 indicates, the SO_2 emissions sources regulated in Phase I of the Title IV program substantially overcomplied with the cap, creating a large bank of allowances before the program expanded in Phase II. The early years of Phase II were marked by a draw-down of this bank, with emissions slightly exceeding the cap until 2006. From 2006 on, emissions continued to decline and

[93] The availability of banking (and not borrowing) is concisely established by the definition of Title IV allowances. *See* § 7651a(3) (stating that "the term 'allowance' means an authorization . . . to emit, during or after a specified calendar year, one ton of sulfur dioxide.").

[94] *See* § 7651d(a).

[95] EPA, 2008 EMISSION COMPLIANCE AND MARKET ANALYSES (2009), http://www.epa.gov/airmarkt/progress/ARP_2.html.

increasing numbers of allowances were banked.[96]

The transition of banked allowances between Phase I and Phase II was simple. In fact, it is somewhat inaccurate to call it a transition at all: allowances banked by Phase I sources could be used on a 1:1 basis by those sources in Phase II, sold, or held in reserve with no penalty. Indeed there is no such thing as a "Phase I allowance" or "Phase II allowance"—the only thing distinguishing the two is the vintage year, which has no impact on the relationship between allowances and emissions. To the extent that the two Phases can be considered a banked-allowance transition, the exchange ratio between the two was 1:1. Since the transition between the phases was understood even before the Title IV program began in 1995, there was no chance of unsettled expectations during the transition.

This transition is different from those discussed above between EPA NO_x programs (and that discussed below between Title IV and CAIR) in that the EPA had relatively little discretion over the structure of the Title IV program—and no discretion over the exchange ratio between the phases—because these details were specified by Congress in the CAA itself. Title IV allowances are created by statute, and the relationship between them and SO_2 emissions is fixed at 1:1.[97] Because of this legal limitation, the Phase I-Phase II transition provides no insight into the EPA's policy preferences for transition of banked allowances. It does, however, supply some evidence that simple, 1:1 exchange ratios contribute to market stability.

3. *The Title IV Market During the Phase I–Phase II Transition*

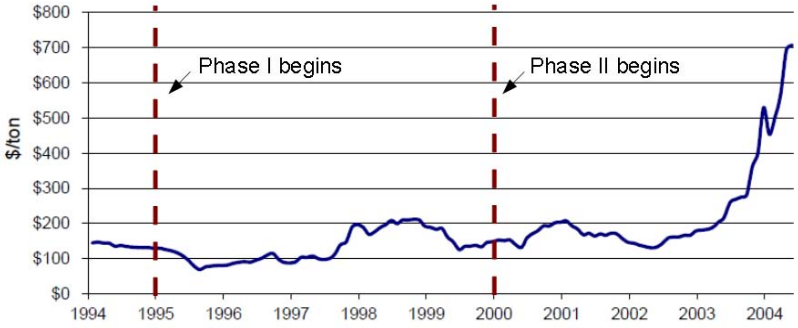
The simple transition of banked allowances between the two phases of the Title IV program was associated with the relatively smooth operation of the Title IV allowance market. The availability of the significant bank created in Phase I enabled sources to exceed the Phase II cap in the short term. If this had not been possible, the incorporation of a large number of new sources in Phase II may have resulted in a significant spike in allowance prices. Between 1998 and 2001, prices fluctuated around the $100-$200 range, but the changes were neither abrupt nor dramatic (see Figure 10). Thus, the 1:1 transition and availability of an

[96] *Id.*

[97] *See* § 7651a(3).

allowance bank likely served to moderate price volatility in this transition.[98]

Figure 10. SO_2 Allowance Prices, 1994-2004[99]



From an environmental perspective, the transition of banked Phase I allowances into Phase II made substantial early emissions reductions possible, with corresponding benefits to the public[100]—though environmental groups might also criticize the "windfall" revenues Phase I sources received from using selling banked allowances in Phase II. Phase I sources banked allowances in each year; had these allowances not been useful in Phase II, or had they been subject to a limited exchange, these early reductions would have likely been smaller. While the early years of Phase II were marked by a draw-down of the bank created in Phase I (and,

[98] It is not possible to determine to what extent the relative stability of the Title IV allowance market was due to the availability of banked allowances rather than other factors. Unlike most other emissions market transitions discussed in this paper, the transition to Phase II involved not a declining cap but the addition of a large number of additional sources. The marginal cost of controlling emissions under Phase II therefore could have been substantially different (and harder for the market to predict). The fact that prices remained relatively stable through 2003 likely has much to do with continuity in these underlying costs, though the presence of the bank still probably moderated the transition.

[99] Dallas Burtraw et al., *Economics of Pollution Trading for SO_2 and NO_x* 15 (RFF Discussion Paper 05-05, 2005), *available at* http://www.rff.org/publications/pages/publicationdetails.aspx?publicationid=17379.

[100] *See* ELLERMAN ET AL., *supra* note 8, at 320 (stating that "[e]missions were reduced well beyond what was required to meet the Phase I cap, without new legislation or regulation, because these reductions were cheap ex post and because the allowances thus saved could be banked for use in Phase II, when marginal compliance cost was expected to be higher.").

therefore, emissions above the Phase II cap), the emissions trend continued downward and, with the adoption of CAIR, sources began to bank SO_2 allowances once again in anticipation of the new, more stringent CAIR caps (see discussion in the next section). At no point during the Title IV program has the bank of emissions allowances been exhausted.

As Figure 10 (above) and Figure 11 (below) indicate, the price stability that characterized the Phase I-Phase II transition was only upset when the EPA began to consider modifications to Title IV in CAIR to address environmental problems associated with interstate transport of SO_2.

B. *Title IV and CAIR*

As discussed above, by 2003, it had become clear that the contribution of the interstate transport of NO_x and SO_2 emissions to particulate matter levels was an ongoing and significant environmental problem requiring EPA intervention.[101] Responding to these concerns, the EPA in 2005 issued the Clean Air Interstate Rule, establishing cap-and trade programs limiting annual SO_2 and NO_x emissions in the eastern U.S. Just as it acted to preserve the value of banked NO_x allowances in the CAIR program, the EPA also adopted a phased approach in the exchange rate per ton of SO2 emissions for Title IV SO2 allowances to avoid significantly undermining the value of banked allowances under the CAA Title IV SO_2 (acid rain) program. Firms subject to this program had been free to bank allowances since the inception of the program in 1995. Under CAIR, the EPA proposed significant cuts in SO_2 emissions caps, creating similar challenges to those created by lowering NO_x caps in other program transitions.

In CAIR, the EPA required regulated sources to use Title IV allowances to comply with the new, stricter CAIR caps by increasing the number of such allowances sources had to surrender for each ton of SO_2 emissions.

1. *Transition of Title IV Allowances*

The EPA's approach to this transition was similar to that taken in CAIR for the seasonal NO_x program—the existing exchange relationship of 1:1 for banked allowances was preserved

[101] *See* CAIR, *supra* note 5, at 25,168–69.

through 2009, while 2010 vintage (and later) allowances would be exchanged at a ratio other than 1:1.[102] Specifically, each allowance of vintage 2009 and earlier could be exchanged for one ton of SO_2 emitted after 2009—that is, an exchange ratio of one to one. CAIR required an exchange of two Title IV allowances of 2010–2014 vintage for each ton of SO2 emitted. After 2014, CAIR required an exchange of 2.86 allowances per ton of SO2 emitted.[103] Since the final CAIR rulemaking was published in 2005, this provided a four-year adjustment period. With the one-to-one exchange of pre-2010 allowances, CAIR created an important incentive for early reductions. EPA projected that "[t]hese reductions take place on a glide slope that includes early emissions reductions as well as some use of the SO_2 allowance bank as sources gradually reduce emissions toward the cap levels."[104]

EPA projected that covered sources would significantly reduce SO_2 emissions in the years prior to 2010[105] and carry a substantial bank of over 12 million Title IV allowances into the CAIR SO_2 cap-and-trade program.[106] Early reductions before 2010 (after the EPA issued CAIR) would improve air quality in nonattainment areas and help some of these areas reach attainment in advance of the 2010 deadline for the fine PM NAAQS.[107] However, the EPA also estimated that with the resulting "glide slope," SO_2 emissions in 2010 and 2015 would exceed the Phase I and Phase II caps in CAIR by roughly 1.5 million tons.[108]

Data available on SO_2 emissions over the 2005–2008 transition period show significant reductions in emissions as the utility sector approaches the 2010 Phase I cap (see Figure 8). This pattern of emissions reductions is consistent with EPA's projection of a "glide path" as electric generating units approach the Phase I cap. Over the period 2006–2008, electric utilities banked more than 2.5 million tons of Title IV allowances. At the end of 2008, the total bank was 8.6 million Title IV allowances—that is, the

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[102] *See* CAIR, *supra* note 5, at 25,258.

[103] *Id.*

[104] *Id.* at 25,284.

[105] *Id*.

[106] *See* EPA, Federal Implementation Plans To Reduce Interstate Transport of Fine Particulate Matter and Ozone, 75 Fed. Reg. 45,210, 45,338 (Aug. 2, 2010) [hereinafter *Transport Rule*].

[107] *See* CAIR, *supra* note 5, at 25,228.

[108] *See id.* at 25,226–27.

existing bank (in 2005) plus the additional post-2005 (CAIR-related) reductions in advance of the Phase I SO_2 cap.[109] Thus, the provisions governing the transition from Title IV (including the provision for one-to-one exchange of banked pre-2010 vintage allowances in CAIR) worked as expected to yield early reductions in SO_2 emissions.

However, the D.C. Circuit found fault with this approach in its *North Carolina v. EPA* decision because it changed the relationship specified in Title IV of the CAA of one allowance for one ton of emissions.[110] While the allowances in the NO_x OTC and SIP Call programs were created by EPA regulation, SO_2 allowances are specifically created by statute—Title IV of the Clean Air Act.[111] The court ruled that the EPA lacked statutory authority to "terminate or limit" these allowances.[112] Since the court later remanded CAIR and charged the EPA with revising it, 2010 and 2011 Title IV allowances must be used at a 2:1 exchange ratio for compliance with CAIR until that rule is replaced.

In light of the court's ruling, however, it appears that congressional action is required to modify the exchange ratio of Title IV allowances in the future. For this reason, the EPA's recently proposed replacement for CAIR, the Transport Rule, avoids this problem by creating an entirely new program and prohibiting any carryover of Title IV SO_2 allowances to the new program[113] (see Section IV.A). Nevertheless, the EPA's interim approach in the CAIR rule for Title IV SO_2 allowances provides a relevant example—however truncated—of the treatment of banked allowances between emissions-trading markets.

2. *Allowance Prices*

With the adoption of the final CAIR rule in March 2005, the SO_2 Title IV allowance market became the CAIR SO_2 market, at

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[109] EPA, 2008 EMISSION COMPLIANCE AND MARKET ANALYSES , *supra* note 95.

[110] *See North Carolina v. EPA*, 531 F.3d at 922, (ruling that EPA "lacks authority to terminate or limit Title IV allowances, either through a trading program under section 110(a)(2)(D) . . . or by requiring that SIPs have allowance retirement provisions").

[111] *See* 42 U.S.C. § 7651b(a)(1) (stating that the EPA must allocate emissions allowances to SO_2 emitters).

[112] *See North Carolina v. EPA*, 531 F.3d at 922.

[113] *See Transport Rule*, *supra* note 106, at 45,338.

least for those states included in CAIR. Actual price behavior for SO_2 Title IV allowances has been characterized by a period of relative stability from 2006 through to the 2008 D.C. Circuit decision, bookended by two periods of marked price volatility.[114] (see Figure 10). Over the period 2004–2005, Title IV SO_2 prices were volatile with a sharp rise in prices at the end of 2005. The EPA has attributed this volatility to the uncertainty associated with the rulemaking process in adopting the more stringent CAIR requirements.[115] The agency also reported that other market factors played an important role in the sharp rise in prices in 2005—citing the effect of hurricanes Katrina and Rita and the associated sharp rise in natural gas prices.[116] Others have also pointed to these hurricanes as key factors in this increase in allowance prices.[117] Title IV allowance prices dropped back and steadied in the range of $400–$600 per allowance for 2006 and 2007—a level commensurate with EPA's estimate of CAIR SO_2 allowance prices.[118]

Thus, even though CAIR established a significantly more stringent cap for SO_2, the SO_2 market was relatively stable—at least up to the July 2008 court decision—because there was a well-established market and a substantial pool of banked SO_2 allowances available to smooth the transition.

However, The D.C. Circuit Court decision in July 2008—as revised in December 2008 to remand the CAIR rule to EPA—resulted in an additional period of volatility with a sharp drop in Title IV allowance prices to roughly $70 per allowance in 2009.[119]

As with the transition discussed above to CAIR NO_x markets, a reduction in uncertainty would likely have reduced price

[114] By early 2008, the leading candidates of both major parties were on the record as supporting some form of climate policy; a position that had significant implications for the use of coal-fired powerplants. This may have been a factor explaining the decline in SO2 allowance prices in 2008 prior to the D.C. Court decision.

[115] EPA, ALLOWANCE MARKETS ASSESSMENT: A CLOSER LOOK AT THE TWO BIGGEST PRICE CHANGES IN THE FEDERAL SO2 AND NOX ALLOWANCE MARKETS 3 (2009), http://www.epa.gov/airmarkets/resource/docs/marketassessmnt.pdf.

[116] *Id.* at 5.

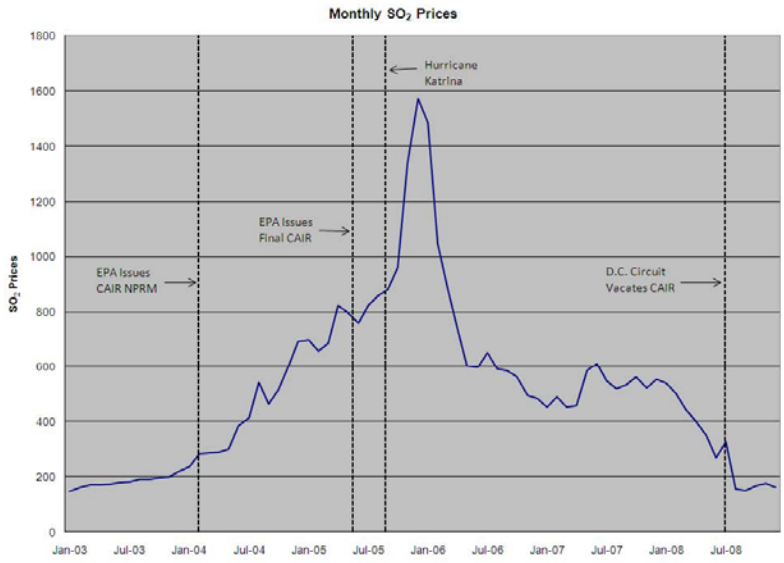
[117] Burtraw et al., *supra* note 18, at 10.

[118] In 2007, EPA estimated that the 2010 price for an SO_2 allowance at a one-to-one exchange rate would be on the order of $533 per ton. See EPA, *supra* note 89, at 13.

[119] *See* EPA, *supra* note 95.

volatility. The most significant source of this uncertainty, however, was the D.C. Circuit's ruling in *North Carolina v. EPA*. By creating uncertainty about whether banked Title IV allowances could be used in the CAIR program(a concern that was eventually confirmed by the EPA in CAIR's successor, discussed in Section IV. A below), the court decision resulted in a disruptive loss of confidence in the long-run viability of Title IV SO_2 allowances and a corresponding drop in prices. In retrospect, it appears the EPA could have done little to avert this; its planned transition in the CAIR rule, with one-to-one exchange of pre-2010 vintage Title IV allowances and a phased reduction in the exchange ratio beginning in 2010, would almost certainly have been smoother.

Figure 11. Monthly SO_2 Allowance Prices, 2005-2008[120]



IV. POSSIBLE FUTURE TRANSITIONS

The D.C. Circuit's rejection of CAIR in *North Carolina v.*

[120] Data provided by Gary Hart, supplemented by EPA, CAP AND TRADE PROGRAMS: AN UPDATE 10 (2007), http://www.epa.gov/airmarkets/presentations/docs/EMA2007.pdf.

EPA has created substantial uncertainty about future regulation of NO_x and SO_2 emissions through emissions-trading programs. Members of Congress and the EPA have both reacted to this uncertainty with proposals for new cap-and-trade programs for these pollutants. The EPA has issued a proposed Transport Rule under existing CAA authority to replace CAIR and comply with the court decision. Two senators (along with 18 co-sponsors) have proposed a bill that would codify CAIR in the short term and create new national and regional cap-and-trade programs for SO_2, NO_x, and mercury beginning in 2012.

While neither proposal has been implemented and either could change significantly before being finalized or passed, discussing them is still useful. Both proposals would create new markets and therefore face questions about transition from current programs and the treatment of banked allowances from those existing markets. Despite addressing the same underlying problems with CAIR, the two proposals take vastly divergent approaches to the transition question.

A. *EPA's CAIR Replacement: the Proposed Transport Rule*

The EPA issued its proposed Transport Rule on August 2, 2010, almost exactly two years after the initial ruling in *North Carolina v. EPA*.[121] The rule, when and if it is finalized, would replace CAIR. Like CAIR before it, the Transport Rule would create new cap-and-trade programs: two programs for SO_2 (one for core coal-using states and another for peripheral states), one for ozone-season NO_x, and one for annual NO_x. It is almost entirely a creature of the *North Carolina v. EPA* decision in that most of its provisions are carefully worded and constructed so as to comply with the holdings in that case. Perhaps most notably, the rule would sharply restrict or eliminate interstate trading of SO_2 and NO_x allowances because the EPA determined that doing so would be the only way to comply with the court's requirement that each state's emissions not interfere with NAAQS compliance in downwind states.

1. *Transition of Banked Allowances*

Each equivalent CAIR program allowed the continued banking of allowances. These existing banks are substantial: 12

[121] Transport Rule, *supra* note 113 at 45,210.

million tons of SO_2 (Title IV) allowances, 600,000 ozone-season NO_x allowances, and 720,000 annual NO_x allowances.[122] As the EPA puts it, "Substantial emissions reductions have occurred as a result of the CAIR programs. These reductions are greater than were expected when the rule was promulgated."[123]

Because of its concern with the size of these banks, the EPA proposes not to allow exchange of CAIR or Title IV SO_2 allowances into the Transport Rule programs at all. For SO_2 allowances, the agency cites specific reasons for its legal concerns.[124] As discussed in Part III.B.2 above, the EPA attempted in the CAIR rule to provide a continuing role for existing Title IV allowances in the new CAIR SO_2 market (by requiring the exchange of two or more Title IV allowances for each ton of SO_2 emissions in the CAIR region). The *North Carolina v. EPA* court rejected this approach, holding that the EPA lacked authority under the CAA to modify the 1:1 relationship between Title IV allowances and tons of SO_2 emissions specified in the CAA. Any attempt by the EPA to modify this in the Transport Rule would presumably be deemed illegal as well. This is a somewhat perverse result because the tighter SO_2 cap created by the Transport Rule in the 27 states it covers would render Title IV allowances held by emitters largely valueless[125]—seemingly a more significant interference than modifying the statutorily-specified relationship or exchanging Title IV allowances for new Transport Rule allowances would be. Nevertheless, the result of *North Carolina* appears to be that the EPA has the authority to create a new SO_2 trading program but no authority to allow the use of Title IV SO_2 allowances in that new program with an exchange ratio that differs from 1:1.

It is not clear from the *North Carolina* decision and EPA's legal analysis in the Transport Rule why the agency would be unable to base allocation of new Transport Rule SO2 allowances on the volume of banked Title IV allowances held. Such an approach would be conceptually and perhaps practically similar to the Compliance Supplement Pool system used in the OTC–NOx

[122] *Id*. at 45,338–39.

[123] *Id*. at 45,338.

[124] *Id.*

[125] Title IV allowances might not be entirely without value since those allocated for emissions above the Transport Rule cap amount could be traded to emitters in states not covered by the transport rule.

SIP Call and SIP Call-CAIR seasonal NOx transitions. This would not modify the relationship between Title IV allowances and tons of emissions specified in the CAA since emitters would still hold and use their Title IV allowances, but could preserve the expectations embodied in banked Title IV allowances in a new form for use in complying with tighter Transport Rule emissions caps.

A counterargument is that such a move would be a too-clever-by-half rebranding of the same meddling with Title IV allowances that the North Carolina court rejected. Nevertheless, it would be a much more modest interference with Title IV allowances than the Transport Rule as written would be. If compliance with the spirit as well as the letter of Title IV is required, such a CSP approach would be problematic, but so would the Transport rule's treatment of SO2 allowances, as EPA projects that Title IV allowances will trade at market prices close to zero.

Somewhat surprisingly, the EPA also proposes prohibiting any exchange of CAIR NO_x allowances for either the seasonal or annual markets. This decision, in contrast to that for SO_2 allowance exchange, appears to be driven not by legal necessity, but by policy preference—though the agency also cites some legal concerns (more modest than those identified for SO_2 allowances).[126] In the proposed rule, the EPA states that the size "of the banks are so large that they might significantly reduce the amount of emissions reductions that would otherwise be achieved in the proposed Transport Rule NO_x programs, particularly in the earlier years[.]"[127] In response to these concerns, the EPA sets out a predictable set of options for banked allowance exchange: one-to-one exchange, less than one-to-one exchange, and no exchange.[128] The agency has selected no exchange as its proposed

[126] Specifically, the agency points out that the method for allocation of allowances in the Transport Rule would differ from the "fuel-adjustment factors" method used in CAIR and struck down by the D.C. Circuit. The EPA claims "some parties" may feel that allowing one-to-one exchange of banked CAIR NO_x allowances would advantage those sources who received more allowances under the CAIR allocation method than under the Transport Rule method and who banked substantial numbers of CAIR NO_x allowances (primarily coal plants). The agency does not claim that it lacks the legal authority to implement a one-to-one exchange of NO_x allowances, however—whereas it does make such a claim regarding SO_2 allowances. *See* Transport Rule, *supra* note 106, at 45,339.

[127] *Id.*

[128] *Id.*

option, stating that it "would avoid the potential legal and practical problems raised by the other approaches."[129]

Regulated entities were not totally without warning of this move: Sam Napolitano, director of the EPA's Clean Air Markets Division, notified them via email and the EPA website in March of 2009 that "EPA's continued recording of CAIR NO_x allowances does not guarantee or imply that any allowances will continue to be usable for compliance after a replacement rule is finalized or that they will continue to have value in the future."[130] This information may have tempered expectations about the value of allowances banked in 2009 and 2010, but regulated entities had no such warning for CAIR allowances banked before then.

The decision not to transition banked NO_x allowances at all is only thinly justified and is at odds with the EPA's traditional attitude toward banked allowances (as illustrated by the inter-program transitions discussed above). Each successive NO_x trading program has included more stringent caps on NO_x emissions, but only in the Transport Rule has the EPA deemed allowance banks a sufficient threat to achievement of planned reductions to justify blocking exchange entirely. If the proposed Transport Rule is implemented, emissions will likely increase in the short term as emitters must "use or lose" banked allowances and lack incentive to make early emissions reductions. While it is less certain, it is possible that prohibiting the exchange of banked allowances would result in lower long-term banking of allowances and a broader loss of buy-in to cap-and-trade systems.

2. *Allowance Prices*

After the EPA announced the proposed Transport Rule, NO_x

[129] The EPA's decision to present a variety of options may indicate that it is at least open to some exchange of banked allowances, despite its stated preference for no exchange. Prospects for one-to-one exchange are dim at best, however. In fact, even if the EPA were to select a one-to-one exchange, "assurance provisions" in the Transport Rule markets designed to ensure that each state achieves a planned level of reductions would likely apply. These provisions would force surrender of allowances if state emissions exceeded a set level, indirectly reducing the value of the total allowance allocation provided to each emitter, if not the banked allowances themselves. These assurance provisions also might affect emitters other than those that had chosen to exchange and then draw down banked allowances, a concern that the EPA mentions when discussing one-to-one exchange in its proposed rule. *See id.*

[130] EPA, *Trading of CAIR Allowances*, http://www.epa.gov/airmarkt/business/cairallowancestatus.html.

and SO_2 prices fell in response to the EPA proposal to prohibit the transfer of banked allowances to the new Transport Rule programs. CAIR annual NO_x allowances dropped from $465 to $200 per ton in the following days—a drop of more than 50 percent. CAIR SO_2 allowances dropped from $15 per ton to around $3–4 per ton.[131] Allowance prices then rebounded to some extent—perhaps in part because of hopes that some variant of the Senate bill will pass,[132] possibly as a component of broader energy legislation.[133] They have since fallen again; prices as of October 2011 are about $1-2 per ton for a 2011 vintage SO_2 allowance and $75 per ton for a 2011-vintage annual NO_x allowance.[134]

B. *The "Three-Pollutant" Bill*

North Carolina has led some in Congress to advocate legislation that would give the EPA new regulatory authority to implement a CAIR-style cap-and-trade program. Senators Tom Carper (D-Del.) and Lamar Alexander (R-Tenn.) have proposed one such bill, S. 2995, though it failed to pass in 2010.[135] This bill would have reduced emissions of three regulated pollutants—SO_2, NO_x, and mercury—and is accordingly referred to as the "three-pollutant" or "3P" bill. The bill would largely codify CAIR in the short term (until 2012), abrogating *North Carolina v. EPA*. After 2012, it would establish new EPA-administered cap-and-trade programs to achieve further SO_2 and NO_x emissions reductions. These programs would start in 2012 and supplant the existing

[131] Jennifer Zajac, *Outlook 'Very Bleak' for SO_2, NO_x Markets; Carper-Alexander Holds Promise*, SNL FINANCIAL (July 14, 2010), http://www.snl.com/InteractiveX/article.aspx?CDID=A-11442921-13873&KPLT=2.

[132] *See* discussion i*nfra* Part V.B.

[133] One market observer suggests that extreme summer heat in 2010 and associated increased demand for electricity has contributed to the increase in annual NO_x prices. But this observer states that "[a]nnual NO_x prices should trend downward because the allowances will lose their value after 2011." EVOLUTION MARKETS, NEW CLEAN AIR RULES TAKE MARKETS ON A DETOUR (AUG. 10, 2010), http://new.evomarkets.com/pdf_documents/New%20Clean%20Air%20Rules%20Take%20Markets%20on%20a%20Detour.pdf.

[134] Evolution Markets Homepage, http://new.evomarkets.com/ (last visited October 20, 2011).

[135] S. 2995, 111th Cong. (2010). The bill has a number of co-sponsors as well. *See* Press Release, Sens. Carper, Alexander Introduce Bill to Clean Air, Protect Public Health and Promote Job Creation (Feb. 4, 2010), http://carper.senate.gov/press/record.cfm?id=322121 (last visited August 26, 2010).

programs created by Title IV and CAIR.[136] This would obviously create a transition between the existing and new markets and require decisions about the treatment of banked allowances.

The bill does address the issue of banked allowance transition directly: the treatment of banked SO_2 and NO_x allowances is not left to EPA discretion. In general, existing banked allowances can be used on a one-to-one basis in the 3P markets. This parallels the transition discussed above between NBP and CAIR, and the fact that it is specified explicitly in the bill may reflect Congress's awareness that preserving existing banked allowance value is important.[137]

For NO_x, the 3P bill would create a new annual cap-and-trade program supplanting the interim CAIR annual market. Allowances banked under the CAIR market could be exchanged on a one-to-one basis in the new 3P system.[138] For SO_2, the bill would create a market replacing the Title IV trading system created by the 1990 CAA amendments. Transition of banked allowances between these two markets is slightly more complex. Banked allowances of vintage year 2009 or earlier could be exchanged in the new market on a one-to-one basis. Banked vintage 2010 or later allowances could also be exchanged in the new market, but only at two to one.[139]

This more complex transition is very similar to that specified in CAIR for SO_2 allowances, as discussed in Section III.B above. The reason for treating the two classes of allowances differently is simple: it preserves the exchange ratio of allowances as understood by market participants at the time those allowances were banked, while allowing the agency to pursue environmental goals more aggressively in future time periods. If the 3P bill had passed in the

[136] S. 2995, 111th Cong. §417 (2010). The bill would largely codify CAIR in the short term, overturning the *North Carolina v. EPA* decision.

[137] This sentiment may extend beyond the senators who wrote and sponsored the bill in its original form. A series of changes to the 3P bill proposed by Senator George Voinovich (R-Ohio) would substantially alter core elements of the bill but would leave the treatment of banked allowances intact. *See* John Walke, *Dirty Power: Attack on Clean Air Protections Planned in Senate*, NRDC SWTICHBOARD BLOG (July 27, 2007), http://switchboard.nrdc.org/blogs/jwalke/dirty_power_explosive_attack_o.html (citing Amendments to S. 2995, 111th Cong. (2010), *available at* http://switchboard.nrdc.org/blogs/jwalke/2010/07/27/Voinovich%20Amendments%20to%20Carper-Alexander%20bill.pdf).

[138] S. 2995, 111th Cong. § 419(f)(5)(A) (2010).

[139] S. 2995, 111th Cong. § 418(d)(5) (2010).

111th Congress, participants would have been fully aware in advance that post-2010 vintage allowances would be subject to a two-to-one exchange ratio in the new future market. If the bill is reconsidered, it is likely that the start dates of the new trading markets and the cutoff vintage year for one-to-one exchange of banked allowances would be changed to reflect the expectations created by banking of 2010 and later allowances, but the principles discussed above could easily be maintained.

While the 3P legislation would address the immediate issues with CAIR that flow out of the 2008 *North Carolina* decision, it does not address likely future EPA actions under other CAA provisions: §110(a)(2)(D), §129, and §112. In order to establish a viable, longer-term cap-and-trade program for NO_x and SO_2, this legislation would need to address these other CAA requirements. Otherwise, future EPA actions would likely require substantial emission reductions that would effectively preempt the 3P caps.

CONCLUSIONS

In our discussion above, we noted that emissions allowances do not convey full-fledged property rights but instead carry some (but not all) of the rights in the property bundle. One key element in the property bundle is the extent to which banked emissions allowances hold value as emissions caps decline and new programs are created. Our discussion of the transition between cap-and-trade programs for NO_x and SO_2 highlights this issue. State policies, EPA policies, and federal court decisions have limited the use of banked allowances over the course of these programs, significantly altering their value and introducing a substantial element of uncertainty in the markets for emissions allowances. The decision by the OTC states to "sunset" 1999 vintage NO_x allowances, the D.C. Circuit decision to vacate the CAIR rule, and the EPA's recent proposed Transport Rule to replace CAIR have each had impact on the value of NO_x and SO_2 allowances and the stability of allowance markets.

There is a tension between the environmental objectives of these cap-and-trade programs and their operational efficiency. The EPA's traditional position has been that it ". . .strives to make these markets as efficient, effective and transparent as possible to

realize the greatest reductions at lowest cost,"[140] and it further claims to recognize that a ". . .gradual phase-in of new programs to lower emissions should reduce price jumps."[141] But the EPA's recent proposal to prohibit the transfer of banked allowances from the CAIR NO_x markets to the Transport Rule represents a shift in the opposite direction that can only be detrimental to the overall efficiency of the EPA's cap-and-trade programs.

One lesson of this history is that transitions to new trading programs can be difficult, as reflected by the high reported prices for allowances in the months preceding the startup of new programs. These high prices were associated with uncertainty within the regulated industry over the availability of allowances. Observers have reported that the initiation of new environmental programs brings some degree of "fear" and "uncertainty" to the regulated community.[142] The transition periods have been characterized by thin markets (i.e., there are relatively few transactions) and little or no mechanism for price discovery.[143] Substantial price volatility in these new markets—the OTC NO_x market (1999), the transition to the NBP (2003), and the CAIR annual NO_x market (2009)—adversely affect trading activity and the overall efficiency of the program.

In contrast to these three "difficult" transitions, the transitions between Phases I and II of Title IV, and in the SIP Call and Title IV SO_2 markets following the adoption of the CAIR rule, were relatively orderly—at least up to the D.C. Circuit Court decision in July 2008. The reasons are readily apparent: the markets were well-established, a substantial pool of banked allowances could be transferred into the new phase or program on a one-to-one basis, and expectations with respect to future control measures were relatively settled.

A second lesson in this historical record is that regulators sometimes consider the rights embodied in banked emissions allowances to be subordinate to the environmental requirements of

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[140] EPA, ALLOWANCE MARKETS ASSESSMENT, *supra* note 115, at 10.

[141] *Id.*

[142] Hart, *supra* note 86, at 2; *see also id.* at 5–9.

[143] *See* Farrell, *Review of Market Based Incentives*, *supra* note 36, at 19–20; see also ALEX FARRELL, EMISSIONS MARKETS-CHARACTERISTICS AND EVOLUTION at 20 (2005), http://www.energy.ca.gov/2005publications/CEC-500-2005-024/CEC-500-2005-024.PDF; EPA, ALLOWANCE MARKETS ASSESSMENT, *supra* note 115, at 7–8.

these programs. The states' 1999 OTC "sunset" is one example, but EPA's proposed Transport Rule is the most extreme, and represents a break with the agency's historical treatment of banked allowances during market transitions.

This has been a hard lesson to absorb. The Title IV SO_2 allowances are now essentially without value—they can be purchased for the price of a lottery ticket—representing a loss to holders of banked allowances of $3 billion dollars. The price of CAIR NO_x allowances also has declined substantially, with an attendant loss to holders of as much as $1 billion. With this history, it would not be a surprise to find a loss of confidence in banking and trading emissions allowances on the part of the regulated community —electric utilities. Instead, each utility system is likely to respond to future programs by switching fuels, installing pollution control equipment, and/or adjusting their operations in other ways to assure compliance with their emissions caps within their own system. Thus, utilities will minimize their reliance on banking and trading as a method of compliance, giving up the cost savings that could be realized by a cap-and-trade program.

More generally, real-world transitions between emissions-trading programs are sometimes sufficiently complex that the simplest options available for transition of banked allowances—one-to-one exchange or no exchange—inadequately balance the competing interests at stake. The rights created by allowances are defined by the expectations of the emitters that choose to bank them, and those expectations are controlled by the information the regulator makes available. Where the regulator sets the terms of exchange between programs in advance, as the EPA did with the NO_x SIP Call rulemaking, the regulated community has the opportunity to adjust their emissions reduction and banking decisions to accommodate the transition. There are no surprises and only limited (if any) adverse effects on the trading program. Where regulators make decisions to restrict the use of banked allowances after a program is in place and banking decisions have been made (as the EPA has indicated it plans to do in the proposed Transport Rule), regulatory actions are significantly more detrimental to the long-term performance of the emissions trading program.

Finally, we are not ready to close the book on the history of emissions-trading programs—particularly cap-and-trade programs.

They have been successful in reducing pollution at relatively low cost, and other pollutants—most notably carbon dioxide—could well be regulated with broadly similar tools. Just as with regulation of SO_2 and NO_x, these new programs will not be static. New information about the adverse effects of emissions and the function of markets, international agreements, and other economic and political changes will require adjustments of these programs. These adjustments will likely create challenges similar to those faced by EPA in the NO_x and SO_2 transitions described above—primarily, a need to strengthen caps in the face of substantial reserves of banked allowances. Whenever such adjustments are made, the issues discussed in this Article will arise. Allowances will have been banked in one program, and regulators will face a decision on how to incorporate them into its successor.

The transitions between the programs discussed here provide evidence that these transitions are manageable—but also that regulatory decisions affecting these transitions can have large, disruptive effects on allowance markets if expectations of the value of banked allowances are not respected and early reductions go unrewarded.