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I. Introduction

Congress continued its war on air pollution with the passage of the Clean Air Amendments of 1970 (the Act).[1] The Environmental Protection Agency (EPA) was charged with strict orders to reduce air pollution. A rigid command and control statutory framework coupled with citizen suit provisions assured that EPA would carry out the work left undone by the states and industry.[2] Almost immediately EPA had trouble carrying out its mandate. Politically objective, technology-based control standards proved difficult to develop; EPA would be sued by environmentalists if standards appeared too weak and by industry if they appeared too tough. As the deadlines of the 1970 Act passed, some areas faced complete moratoriums on construction of new plants. A severe recession caused by the Arab oil embargo placed pressure on Congress and EPA to relax the Act. In order to avoid the direct sacrifice of environmental goals for economic necessity, EPA proposed allowing new sources in non-attainment areas provided that emission increases from new plants were offset by emission decreases at existing sources.[3] Through the force of political pressure, the offset policy sprung up through the rigid structure of the Act. Emissions trading has now become an important element of air pollution regulation in the 1980's.

At the same time air pollution regulation was modified to include emissions trading, the effects of acid rain became the focus of increasing scientific and political concern. In the early 1970's, evidence began to gather from throughout the world of

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1. Clean Air Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676 (codified at 42 U.S.C. §§ 7401-7626 (1982)).

2. 42 U.S.C. §§ 7408-12, 7471-73, 7501-03, 7604 (1982 & Supp. IV 1986).

3. *See infra* note 27.

the possible effects of acid rain on the forests and lakes.[4]

A broader term, "acid deposition," has come to describe instances when any acidic pollution falls back to earth. Combustion of fuel initiates the environmental chain reaction which creates acid deposition. Sulfur in the fuel reacts with oxygen in the air to form sulfur dioxide (SO_2). The high temperatures of combustion fuse nitrogen and oxygen into nitrogen oxides (NO_x. Once in the air, SO_2 and NO_x gradually react with oxygen and sunlight to form sulfate and nitrate particles. "Wet deposition" results when the sulfates and nitrates combine with moisture in the air to form acids. The acids then become part of clouds, fog, mist, snow, hail and rain. Acid rain can be ten to thirty times more acidic than normal rain. "Dry deposition" occurs when gravity or wind cause the sulfates and nitrates to settle directly out of the air. "In the moist climates of the eastern United States, wet and dry deposition occur nearly in equal amounts. In the dry climates of the West, the amount of dry deposition may be as much as fifteen times that of wet deposition."[5]

As the scientific data has gathered on the effects of acid deposition, the political debate over what to do about acid deposition heated up. Studies estimated the cost of controlling acid deposition could be as much as four to five billion dollars annually[6] incurred mostly by utility customers in the Midwest. Costs would be especially high if wet-scrubbing were mandated. A rift opened up in Congress between the Midwestern states emitting the pollutants and the Northeastern states receiving the deposition. Acid deposition reduction bills proposed by politicians from the Northeast would be blocked by politicians from the Midwest. How to distribute the enormous costs of control remains a large stumbling block. One bill proposed to distribute some of the costs of control

4. Postel, *Air Pollution, Acid Rain and the Future of Forests:* Part I, Am. Forests, July 1984, at 25.

5. Winslow, *Acid Deposition: Back to Square One and Beyond*, 11 Environs 1, 6, U.C. Davis School of Law (1987).

6. Off. of Tech. Assessment, U.S. Cong., Rep. No. OTA-0-204, *Acid Rain and Transported Air Pollutants, Implications For Public Policy* 169 (June 1985) [hereinafter OTA Report].

through a nationwide utility tax.[7] Many rejected that approach because the polluter would not have to pay for the pollution control.[8]

Interstate emissions trading was proposed as a means to reduce the cost of control in order to help alleviate the political stalemate. Currently, Senate Bill 316 includes interstate emissions trading provisions in order to increase state flexibility in controlling emissions and to encourage cost-effective emission reduction techniques.[9]

The promise and problems of interstate emissions trading are unknown. However, the experience of current emissions trading on the local level can serve as an example of the potential for interstate trading. This article explores the potential promise and problems of interstate trading. Section II of this article reviews the current system of local emissions trading. Section III looks to see whether the promises and problems of local trading will be transplanted or magnified in interstate trading. Section IV recommends environmental standards and administrative mechanisms to enhance the promise of emissions trading while minimizing the problems. Concluding remarks are given in Section V.

II. Local Trading

A. *Overview of EPA's Current Emissions Trading Policy*

Emission trading involves the creation of surplus emission reductions at one source to provide a credit toward necessary emission reductions at another source.[10] As a result, plant managers have the flexibility to choose the most cost-effective methods to reduce emissions.[11] States have the choice whether or not to adopt emission trading programs.

The terms emission offset, netting, bubbles, banking and generic trading rules describe specific parts of EPA's emission trading program. Emission offsets permit construction of new

7. H.R. 4567, 99th Cong., 2d Sess. (1986).
8. S. 316, 100th Cong., 1st Sess., 133 Cong. Rec. 849,855 (1987).
9. *Id.* §§ 185, 188.
10. 51 Fed. Reg. 43,814, 43,830 (1986)[hereinafter 1986 Policy].
11. *Id.* at 43,830.

major sources in non-attainment areas if the new source secures sufficient surplus emission reductions to offset new emissions.[12] Netting exempts modifications of existing sources from new source review requirements so long as no significant plant-wide emission increase occurs.[13] Bubbles allow existing plants to meet emission reduction requirements on plant-wide basis rather than unit-by-unit. Plants may increase emissions from one unit in exchange for compensating surplus decreases at others.[14] Plants can be imagined to be enclosed in a bubble with a single emissions stack;[15] plant managers seek to have emissions from the imaginary bubble meet one plant-wide emission standard rather than having to meet emission standards for each individual unit. Emissions Reduction Banking allows states to establish banks in which firms may store emission reduction credits for later use in offset, netting or bubbling transactions.[16] Generic Trading Rules provide a

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12. EPA promulgated its first offset policy in December 1976 (41 Fed. Reg. 55,525 (1976)) after pressure to amend the Clean Air Act to allow steel plants to offset emissions from plant expansions. The courts struck down the initial policy but Congress adopted the concept in the 1977 Clean Air Act Amendments. For the evolution of the early offset policy *see* R. Liroff, Air Pollution Offsets (1980). The current offset policy is codified at 40 C.F.R. § 51 (1986).

13. Offsetting emissions from modifications within a plant became known as netting.

14. 1986 Policy, *supra* note 10, at 43,830. The 1986 Policy replaced EPA's original bubble policy adopted in 1979 under the name of the Alternative Emissions Reduction Option (AERO policy). 44 Fed. Reg. 71,780 (1979). EPA defined a source not as an individual emissions point but as an entire plant or plants. *Id.* at 71,786. EPA's definition as applied to netting was upheld in Chevron U.S.A., Inc. v. Natural Resource Defense Council, Inc., 467 U.S. 837 (1984).

The AERO policy required SIP review and EPA approval for each bubble; consequently, that review process took an average of eighteen months. Levin, *Building a Better Bubble at EPA*, 9 Reg. 33, 38 (Mar./Apr. 1985). Modelling was required to show SIP equivalence. EPA adoption of generic rules streamlined the bubble review process assuring swifter approval. *See infra* note 17. However, the AERO policy still did not allow existing sources in non-attainment areas to bubble.

15. Raufer & Feldman, *Emissions Trading and What it May Mean for Acid Deposition Control*, Pub. Util. Fort., Aug. 16, 1984, at 19.

16. 1986 policy, *supra* note 10, at 43,831. EPA's first offset policy did not include banking. EPA quickly realized that without banking, sources would operate high-polluting facilities simply to preserve emission reductions for offsetting. Note, *Emissions Offset Banking*, 128 U. Pa. L. Rev. 937, 943 (1980). Subsequently, EPA adopted banking for offsets. 44 Fed. Reg. 3,274, 3,280 (1979).

streamlined mechanism for the approval of individual emission trades. In a way, EPA pre-approves trades meeting certain criteria set forth in EPA approved local rules thus avoiding the need for case-by-case State Implementation Plan (SIP) review and federal approval of each trade.[17] EPA and the public must still be provided an opportunity to comment on emission trades under generic rules before they occur.[18]

Emission reduction credits (ERCs) are the common currency of emission trading activity. Only surplus, enforceable, permanent and quantifiable reductions can qualify as ERCs.[19] Surplus emissions reductions are those reductions not required by current SIP regulations nor relied upon in SIPs to meet other regulatory requirements. The lower of either the actual or allowable emissions generally serves as the baseline to calculate surplus emission reductions;[20] the 1986 policy adopted this method to deter "paper trades."[21] Any ERC transaction must be approved by the state and be federally enforceable;[22] enforceable compliance instruments are used to mandate recordkeeping and assure the permanence of reductions. States are required to establish a reliable and consistent method to calculate and quantify reductions.[23]

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17. 1986 policy, *supra* note 10, at 43,831. EPA eliminated the need for SIP review under the AERO policy by allowing states to adopt generic rules. The first rules EPA approved were New Jersey's in 1981. 46 Fed. Reg. 20,551 (1981).

18. 1986 policy, *supra* note 10, at 43,853. Public comment on trades under generic rules was not required under previous policies.

19. *Id.* at 43,832.

20. *Id.* Sources may use allowable emissions if they demonstrate those values are used in SIPs to demonstrate attainment or if they demonstrate by modelling that no NAAQS (National Ambient Air Quality Standard) violation will occur. *Id.* Baseline emissions for any source are the product of three factors: the emission rate per unit, the plant production capacity, and the hours of operation. *Id.* For a description of EPA's difficulties in determining emission baselines, see Levin, *supra* note 14, at 37.

21. The 1986 Policy clarified the method to calculate emission baselines. Under the 1982 interim policy some sources used allowable emissions to calculate ERC baselines although their actual emissions were lower. Consequently, those sources could then trade ERCs without decreasing actual emissions resulting in so called "paper trades."

22. 1986 Policy, *supra* note 10, at 43,832. Means of making emission limits federally enforceable include SIP revisions, EPA approved generic rules and new source preconstruction permits. *Id.*

23. Emissions Trading: Technical Issues Document. 51 Fed. Reg. 43,837 (1986)

ERCs may be used in offset, netting and bubbling transactions; however, ERCs from existing sources may not be used to meet new source performance standards.[24] Each trade must involve the same pollutant.[25] All trades must satisfy applicable ambient air tests to assure maintenance or attainment of the National Ambient Air Quality Standards (NAAQS). The tests vary depending on the dispersion characteristics of the pollutant; NO_x and volatile organic compound (VOCs) trades within an air basin can generally occur without detailed ambient modelling; SO_2, carbon monoxide (CO) and particulate trades generally require ambient modelling; trades with significant ambient impacts require modelling of all nearby major sources. In non-attainment, area trades must result in a twenty percent excess reduction in order to show reasonable further progress towards attainment.

Only emission reductions which qualify as ERCs can be deposited in EPA-approved banks.[26] States can accept and evaluate requests to certify ERCs, maintain a public registry of ERCs and track transfers and withdrawals from the bank. State banking rules may establish ownership rights in ERCs and may guarantee banked ERCs against full or partial reduction provided that the state uses other means to obtain any emission reductions necessary to attain the NAAQS. Banking of an ERC does not assure the owner of the ERC that use of the ERC will not be limited by trading rules or other special limitations. Banked emissions are treated as if they are "in the air;" states cannot count banked ERCs toward emissions reductions necessary to attain the NAAQS.

[hereinafter Technical Issues Document]. These methods include use of emission factors, stack tests, monitored values or process inputs. *Id.*

24. 1986 Policy, *supra* note 10, at 43,832-33.

25. *Id.* This could unnecessarily restrict acid deposition trading. Theoretically, trades between NOx and SO2 could occur on a two NOx for each SO2 basis (SO2 has twice the acidification potential as NOx).

26. 1986 Policy, *supra* note 10, at 43,834-35.

B. *The Promise and Problems of Regional Trading*

1. *The Promise*

Institution of emissions trading helped to mitigate the direct clash of environmental values against economic goals. Emissions trading softened the Act in order to allow economic growth.[27] The strict command and control regime of the Act would have required plant closures and construction bans in non-attainment areas without regard to the economic consequences.[28] EPA would have committed political suicide if it took such steps in the midst of an already severe recession. Pressure from proposals such as the 1976 steel amendment proposal prodded EPA to adopt offsets and other emission trading reforms.[29]

At the same time, EPA could not adopt a fine-tuning strategy using variance procedures. During the late 1970's a conservative, anti-government, anti-bureaucracy political shift began to occur culminating in Ronald Reagan's election in 1980.[30] Emissions trading was more in tune with that philosophy than increased variance proceedings.

As a result of those constraints,[31] emissions trading was

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27. Offsets could be considered a weakening of the Act since the 1970 Act prevented new construction in non-attainment areas. *See* Clean Air Amendments of 1970, 42 U.S.C. § 7410(a)(4) (1982).

28. Meidinger, *On Explaining the Development of Emissions Trading in U.S. Air Pollution Regulation*, 7 Law & Pol'y Q., 447, 456 (1985).

29. R. Liroff, Air Pollution Offsets: Trading, Selling, and Banking 6-7 (1980).

30. Meidinger, *supra* note 28, at 462.

31. Meidinger presents a further explanation of the development of emissions trading. Administrators adopted emissions trading on their own initiative as well as in reaction to political and economic pressures. Technology-based emission standards proved impossible to determine by the scientifically objective standards envisioned in the Act. Supposedly objective scientists and engineers presented information favoring their own particular viewpoints which conflicted with those of other experts. Administrators began to realize that science could not objectively provide standards; they had to choose between different points-of-view. Constantly choosing between conflicting points of view increases the political pressures on administrators while diminishing their political support. As a result, administrators seek a steady regulatory framework which satisfies the opposing views as much as possible and minimizes the opportunity for policy battles. Emissions trading provided that type of framework; EPA could respond to the demands from industry for flexibility and cost-effectiveness while calming environmentalists' fears that EPA or Congress would weaken the

adopted. The most important principle of the emissions trading policy is that trades must not alter overall air quality requirements.[32] Therefore, a well administered program should achieve the goals of the Act as effectively as the command and control approaches as well as allowing more economic solutions to be found.

Emissions trading allows for more cost-effective pollution control by giving more decision-making power to source operators. Without emissions trading, EPA or local agencies would set uniform emission standards applying to a large number of firms. Some firms, depending on the size and location, would suffer disproportionate burdens; others would enjoy competitive advantages.[33] EPA could try to set precise plant-by-plant standards; however, neither EPA nor local agencies could ever know the pollution control opportunities within a plant as well as the plant operators.[34] Furthermore, even if EPA tries to get all the necessary information, plant managers would have an incentive to inflate costs in order to avoid stricter controls.[35] A plant could gain a competitive edge if its competitors had to use stricter controls. Therefore, under command and control regulation, those with the responsibility have

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Act. Also, emissions trading provided fewer opportunities for opponents to battle over emission controls and helped diffuse debate when standards were set. *Id.* at 463-67.

32. 1986 Policy, *supra* note 10, at 43,814.

33. *See* Stewart, *The Discontents of Legalism: Interest Group Relations in Administrative Regulation*, 3 Wis. L. Rev. 655, 671 (1985); Pashigian, *How Large and Small Plants Fare Under Environmental Regulation*, 7 Reg. 19 (Sept./Oct. 1983); Miller, *The Bubble-Concept A Feasible Emission Reduction Alternative?*, 9 U. Dayton L. Rev. 65, 69-71 (1983).

In addition, while employed by the California Air Resources Board, the author, Stephen Winslow, had noted that small refiners had considerably higher compliance costs for leaded gasoline standards as compared to larger refiners because they had less process flexibility and little excess cracking capacity. *See* Public Hearing to Consider Amendments to Section 2253 and Adoption of Title 13, California Administrative Code Regarding Lead in Gasoline, State of California Air Resources Board, Stationary Source Control Division (Sept. 1982).

34. Palmissano, *Emissions Trading Reforms: Successes and Failures*, 78th proceeding of the Air Pollution Control A., 85-45.1 at 4 (1985) [hereinafter Palmissano-1985].

35. Tietenberg, *Emissions Trading: An Exercise in Reforming Pollution Policy* 15 (1985). A plant operator may risk fines for giving obviously false data. Favorable but accurate data is much harder to detect.

neither the information nor the economic incentive to set cost-effective standards. On the other hand, those who must provide the information and who must comply with the standards have an incentive to avoid cost-effective controls.

Enter emissions trading. Emissions trading puts the force of the marketplace behind environmental goals.[36] EPA or local officials set general emissions standards which provide the baseline for trades. Plant operators must now meet those limits as inexpensively as possible in order to stay competitive; they may even buy rights from each other. Emissions trading rewards companies using innovative control technology by giving them credit for surplus emission reductions.[37] Under command and control regulations, EPA or local districts specify the type of controls to be used. If a company installs more effective controls it receives no credit. Technology-based standards discourage innovation and are even more problematic. A company which installs an innovative control technology, more effective than the current technology-based standard, may later find that it has to install the innovation at all of its plants. As a result, the company installs the standard controls rather than take that chance.[38] With emissions trading, companies receive credit for surplus emissions reductions. They can use the credits to cut costs elsewhere or sell them to other firms.

Emissions trading deflects potential litigation over the correct technological standard to apply.[39] Under command

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36. Lowering compliance costs also decreases the economic benefit of violating the standards or delaying compliance through litigation. Levin, *supra* note 14, at 34-35.

37. U.S. Envtl. Protection Agency, *Brokering Emissions Reduction Credits: A Handbook*, PB 81-214249 at 3 (1981).

38. Raufer & Feldman, *supra* note 15, at 23. While employed by the California Air Resources Board, the author, Stephen Winslow, encountered a situation where a source had installed a ten million dollar NOx reduction system which had been proven effective in Japan. Monitoring equipment problems arose that prevented the utility from operating the system as desired. The author's impression and those of the other ARB engineers , was that the utility was not trying whole-heartedly to solve the problem. *See* Jones, *Review of United States NOx Abatement Technology*, 78th proceedings of the Air Pollution Control Ass'n, 85-55.2 at 8 (1985).

39. Of course many lawsuits over the validity of the bubble under the Act would not arise under Senate Bill 316. *See supra* note 14.

and control regulation, a company excessively burdened by specific control standards has no choice but to sue in order to block its application. With more at stake in administrative hearings, agencies become more cautious and spend more time detailing the bases of their decisions. With emissions trading, less focus falls on specific control technologies; companies know they have the flexibility to meet the standards in other ways. With less of their time spent developing specific standards or guarding against lawsuits, administrators can focus more of their attention on auditing existing programs, enforcing emission limits and achieving the overall goals of cleaner air.[40]

2. *Environmental Concerns*

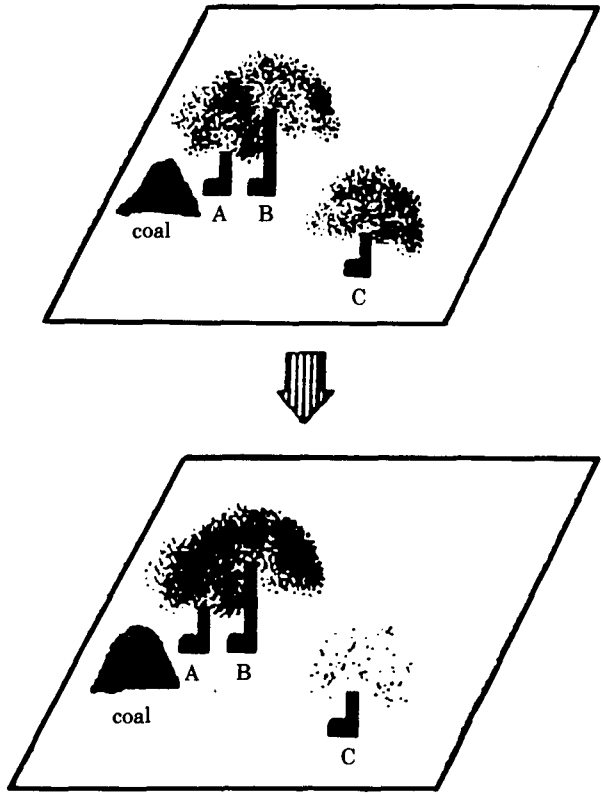
Trading could result in the excessive transfer of pollutants to a small area creating a "spatial hotspot" of locally increased ambient pollutant concentrations. Spatial hotspots could result at locations where the cost of trading for pollutants was less than the cost of control. For instance, figure 1 shows three plants which burn coal. Plants A and B locate near the coal deposit creating a spatial hotspot. If emission standards were implemented and trading were allowed, plants A and B could use the savings from their advantageous location to purchase emission rights from plant C located away from the spatial hotspot. Without some ambient constraint, trading can thwart the goals of an air pollution program. Spatial hotspot concerns are particularly important for pollutants such as SO_2 and CO which tend to concentrate near the source. For those pollutants, Tietenberg[41] suggests allowing trading of ambient impacts rather than straight emissions trades.

40. Levin, *supra* note 14, at 39. Other commentators worry that emissions trading increases administrative and enforcement burdens. *See* Latin, *Ideal Versus Real Regulatory Efficiency: Implementation of Uniform Standards and "Fine-tuning" Regulatory Reforms*, 37 Stan. L. Rev. 1267, 1270 (1985).

41. Tietenberg, *supra* note 35, at 24.

Figure 1

Creation of Local Hotspots



The current emissions trading policy deals with spatial impacts by restricting trades which adversely affect air quality, i.e., those which could cause violation of the NAAQS. Modelling of the ambient impacts of trades is required for SO_2 depending on the amount of the impact.

If banking of ERCs is allowed, a "temporal hotspot" could be created if banked ERCs are used up during a short period of time. Of special concern would be the cumulative, long-term banking of ERCs. For instance, in figure 2, if all plants began using their banked ERCs at the same time, ambient air concentrations could increase overall even if a spatial hotspot was not created. Of course, temporal hotspots could be created locally as in figure 1. Eventually, enough ERCs could be banked that they greatly exceed the emissions required to maintain air quality. Under the worst scenario, air control agencies could not require emission reductions since sources were only using ERCs to emit; the agency's only alternative would be to buy the rights.

The current emissions trading policy prevents temporal hotspots by prohibiting the use of ERCs if they would interfere with air quality goals.[42] States are prohibited from counting banked rights as emission reductions in their SIPs. In addition, some states confiscate banked rights after ten years and prohibit banking of rights from plant shutdowns for over one year.[43] Other states discount banked rights if further emission reductions are required.[44]

Turning to implementation and enforcement, Latin[45] complains that the proponents of emissions trading and other market solutions to environmental problems have glorified the theoretical economic advantages of market solutions without considering the implementation and enforcement problems.[46]

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42. 1986 Policy, *supra* note 10, at 43,834-35.

43. *See* Kostow & Kowalczyk, *A Practical Emissions Trading Program*, 33 J. Air Pollution Control A. 982 (1983).

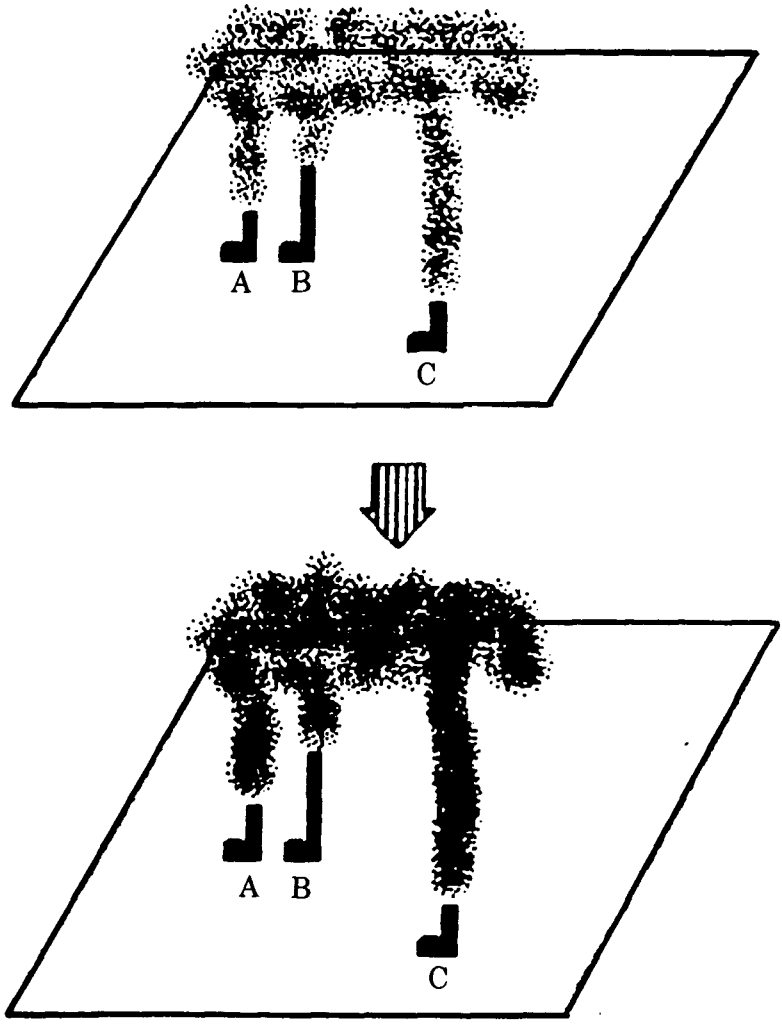
44. 1986 Policy, *supra* note 10, at 43,834-35.

45. Latin, *supra* note 40, at 1270.

46. For an example of the simplifying assumptions economists use, *see* Tschirhart, *Transferable Discharge Permits and Profit-Maximizing Behavior*, Economic Perspectives on Acid Deposition Control 157, 159-65 (T. Crocker ed. 1984).

Figure 2

Creation of Temporal Hotspots



Market approaches rely heavily on precise environmental data; for example, emissions trading relies more on modelling and monitoring of emissions than command and control regulations.[47] Market proponents overlook constraints caused by the complexity of ecosystems which prevent accurate determination of environmental impacts. As a result, administrators must adopt a second best approach to environmental regulation based on uniform standards. Monitoring techniques are complicated and imprecise. Modelling results are often ambiguous and easily manipulated.[48] Both monitoring and modelling can be extremely expensive. Administrators must carefully review models and can only cross-check monitoring by expensive methods. Thus, emissions trading shifts complexity and costs from industry to regulators. Also, the increased complexity allows industry to manipulate requirements to avoid compliance.[49]

Proponents of emissions trading have responded that no program can ever achieve theoretical efficiency.[50] Monitoring and modelling problems exist with any air quality problem.[51] The current emissions trading policy sets forth the same quantification methods used for calculating emissions in command and control regulation.[52] Therefore, enforcement of trades should not be any more difficult than command and control methods. Though EPA recognizes the difficulties of modelling the impacts of trades, EPA appears to be prepared to thoroughly review the models if necessary.[53]

The earlier emissions trading policy permitted trading of

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47. Gonzalez, *Markets in Air: Problems and Prospects of Controlled Trading*, 5 Harv. Envtl. L. Rev. 377, 388-95 (1981).

48. *See generally*, Air Pollution Control Dist. v. U.S. Envtl. Protection Agency, 739 F.2d 1071, 1083 (6th Cir. 1984).

49. Gonzalez, *supra* note 47, at 384.

50. Tietenberg, *supra* note 35, at 40.

51. Saideman, *An Overview of the Bubble Concept*, 8 Col. Envtl. L. Rev. 137, 158 (1982).

52. 1986 Policy, *supra* note 10, at 43,832. Quantification based on emission factors, stack tests, monitored values, operating rules, averaging times, process or production inputs, modelling or other reasonable measurement practices are essentially the same methods used for calculating command and control requirements.

53. Technical Issues Document, *supra* note 23, at 43,856.

allowable emissions rather than requiring real emission reductions. EPA has responded to those concerns by restricting trades to actual emission reductions in most circumstances.[54] However, even proponents of emissions trading admit that significant amounts of hardware-based innovation have not occurred.[55] Of course, no indication exists that command and control would do better.

Some environmentalists have expressed concern that allowing people to pay to pollute is morally offensive and may inhibit future emission control.[56] However, the objective of emissions trading is the same as command and control regulation even though the means may differ.[57] Although EPA policy has allowed states to establish ERC ownership rights, all banking must be consistent with attainment of the NAAQS. States, if they wish to protect ERCs, must produce reductions elsewhere.[58] One countervailing problem is that giving polluters less than absolute rights to use ERCs undermines the incentive to produce ERCs.[59]

Emissions trading provides fewer opportunities for the public and environmental groups to comment on air pollution regulation. The 1982 policy failed to require public access to the emissions trading review process. Environmentalists fear that government and industry could sell out environmental values without close scrutiny. The 1986 policy remedies that problem by providing for more EPA review and for public notification of emissions trading.[60] However, greater review of

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54. *Id.* at 43,843-52.

55. Palmissano-1985, *supra* note 34, at 2; Tietenberg, *supra* note 35, at 198.

56. Meidinger, *supra* note 28, at 460.

57. *See* Saideman, *supra* note 51.

58. Technical Issues Document, *supra* note 23, at 43,848-50. *See also* Weiss, *Emissions Trading: Who Pays Just Compensation?* (available through AER*X Corp., Los Angeles). Meidinger speculates that ERCs could become as vested as landholdings did after William the Conqueror distributed them in 1066. Meidinger, *supra* note 28, at 470-71.

59. *See generally*, Palmissano, *Have Programs for Trading Emission Reduction Credits Failed or Succeeded?*, presented Aug. 1982 Emissions Trading Conference, Los Angeles (Available through AER*X Corp., Washington D.C. and Los Angeles)[hereinafter Palmissano-1982].

60. Technical Issues Document, *supra* note 23, at 43,853.

emissions trading will inevitably increase transaction costs. Meidinger's greatest concern about market mechanisms is that they favored moneyed interests over interests of the poor.[61] Groups with money could buy ERCs to protect their interest; the poor could not. On the other hand, command and control regulation has not been shown to protect the interest of the poor any better than emissions trading would. Money also buys access to command and control decision-making. Emissions trading requires determination of the public interest in clean air; the interest of the poor can be taken into account at that time.

3. *Market Concerns*

The enthusiastic cheerleading of the proponents of emissions trading in the late 1970's and early 1980's has given way to more somber discourse.[62] Complaints about weak markets and hoarding of ERCs were initially explained as part of a learning curve or the result of economic stagnation;[63] trading would pick up as firms learned the value of emissions trading and the economy recovered. However, markets have continued to be weak despite more knowledge about emissions trading and a revived economy.

Due to regulatory uncertainty in the administration of emissions trading,[64] industry has adopted a conservative "wait and see" approach. EPA has issued new emissions trading guidelines every three to four years since the 1976 offset policy including the 1979 AERO policy, the 1982 interim policy and the 1986 final policy.[65] This does not even consider the shifts that have occurred at the state and local levels. The AERO policy represented a conservative first step upon which

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61. Meidinger, *supra* note 28, at 470.

62. *Compare* Palmissano-1982, *supra* note 59, with Palmissano-1985, *supra* note 34.

63. Raufer & Feldman, *supra* note 15, at 21, 22. For the concern about thin-markets, see Mendrick, *Regulating with a Carrot: Experimenting with Incentives for Clean Air*, 31 Buffalo L. Rev. 193, 207-10 (1982). For a response, see Palmissano-1982, *supra* note 59.

64. Levin, *supra* note 14, at 39.

65. *See supra* notes 10-26 and accompanying text.

the 1982 policy expanded. The 1986 policy retreated from the expansion of the 1982 policy and tried to answer the questions the 1982 policy left unanswered. EPA's four year failure to produce a final policy caused a regression in emission trading at the local level. Some areas considered using growth margins instead while others waited for EPA's final policy before adopting their own.[66]

Meanwhile, court challenges brought emissions trading transactions to a halt.[67] The D.C. Circuit struck down netting in non-attainment areas.[68] A number of states stopped writing generic rules and approving new bubbles while awaiting the Supreme Court's decision.[69] Interim application of trading rules proved difficult.

Even where trading occurred, local trading rules and modelling requirements unnecessarily inhibited trading; trading between distant sources was especially affected. Generic trading rules streamlined the emissions trading approval process by eliminating layers of review. However, generic rules which require excess offsets and permanent trades can inhibit trading. An offset ratio determines the amount of excess emission reductions that must be produced before a trade is allowed.[70]

Also, uncertainty and regulatory constraints inhibit short term trades of ERCs and encourage hoarding.[71] Currently, a short term trade or "lease" would be treated as a trade in both directions. The offset ratio would discount the emissions

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66. Palmissano-1985, *supra* note 34, at 12-16.

67. Tietenberg, *supra* note 35, at 201.

68. Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc., 467 U.S. 837, 859 (1984); *see supra* note 14.

69. Tietenberg, *supra* note 35, at 201.

70. For example, both Los Angeles and San Francisco have rules which calculate offset ratios for NOx trades based on the distance between sources; a pollutant where location of the source is not critical at the local level. In Los Angeles the offset ratio is calculated as: 1.2 for trades less than eight kilometers (five miles) and 1.2 + 0.01d for trades over eight kilometers, where d = distance in kilometers. *Id.* at 86-88. For a trade between sources twenty kilometers (12.5 miles) apart, the trading ratio would be 1.4; the source would need to cut back 1.4 tons of emissions for every ton of ERC traded.

71. Raufer, *Emissions Trading and Acid Deposition Control: The Need for ERC Leasing*, 36 J. Air Pollution Control A. 574 (1986) [hereinafter ERC Leasing].

on the initial trade and on the return trade resulting in a substantial discount of emissions.[72] In addition, third parties would never consider purchasing ERCs for investment purposes since they could not obtain rental income while they await a sale.

Trades involving SO_2 are restricted by modelling requirements. Trades involving substantial ambient increases require full-scale modelling of all local sources. Trades involving hilly terrain require SIP review. Those requirements increase the transaction costs of the trades and lengthen the review process.

The individualized nature of each interplant trade increases trading complexity and creates higher transaction costs, thin markets and uncertain prices. Each company in an interplant trade operates with a unique set of equipment, conditions and objectives; therefore trades must be tailored to serve the unique needs of both traders. Imposed upon the trade are conditions which ensure the trade will not degrade air quality. The trade will be scrutinized by local and perhaps federal officials before being finalized. Environmental groups may oppose certain trades. As a result, each trade is distinct from other trades. Obtaining an ERC will not be as easy as calling your broker and ordering stock. Comparing trades to determine a market price becomes difficult.[73] Traders will be cautious since each trade is determined on a case-by-case basis.[74] The individualized nature of emissions trades inhibits development of free-wheeling markets.

Weak markets further discourage transactions. Third-

72. For example, a utility plans to open a new plant in five years. Currently it operates an old plant emitting 288 tons per day (tpd) of pollutants. If it applied more advanced controls it could reduce that to 144 tpd. The utility plans to install the advanced controls to offset the new plant. The reduction could be used for five years by another company in the interim. If the offset ratio is 1.2, the utility could receive credit up to 120 tpd on a trade. However, on the return trade it would only be entitled to use 100 tpd. The 144 tpd intraplant credit is discounted to 100 tpd interplant credit by the sale-and-return transaction, a thirty percent reduction. The utility would almost certainly decide to hold onto the ERC rather than try a short term trade.

73. *See* Raufer & Feldman, *supra* note 15, at 20.

74. Tietenberg, *supra* note 35, at 51.

party investors are reluctant to purchase such speculative investments. Companies also fear that they will not be able to obtain ERCs in the future so they hoard the ones that they have.[75]

The uncertain legal status of ERCs makes firms reluctant to rely on them. Public and private interests conflict; government fears that granting entitlements to emissions will inhibit future control efforts;[76] private interests desire certain and clear rights upon which they can rely and which will not be confiscated without compensation.[77] So far, EPA policy prohibits trades from interfering with air quality control efforts.[78] States may protect ERCs only by requiring reductions by other sources. Despite such possible protections, states have confiscated ERCs in order to obtain reductions needed for attainment.[79] Companies may not obtain any rights upon shutdown. Oregon denies the use of ERCs created by shutdowns if they are not traded within a year.[80] The tax status of ERCs has remained uncertain.[81]

The myriad of different local emissions trading approaches creates greater complexity, increased transaction costs and possible inefficiency. Each individual state has the option of adopting generic rules and individual trades.[82] EPA policy only provides general guidelines for state generic rules.[83] Consequently, many different trading requirements have been adopted.[84] Local banks have greater administrative

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75. Raufer & Feldman, *supra* note 15, at 23; Note, *Emission Offset-banking: Accommodating Industrial Growth with Air Quality Standards*, 128 U. Pa. L. Rev. 937, 947-64 (1980).

76. 1986 Policy, *supra* note 10, at 43,834-35.

77. Raufer & Feldman, *supra* note 15, at 20.

78. 1986 Policy, *supra* note 10, at 43,843-48.

79. Palmissano-1985, *supra* note 34, at 12.

80. Kostow & Kowalczyk, *supra* note 43, at 984. EPA does not prohibit use of shutdown ERCs so long as the SIP did not count them towards attainment. 1986 policy, *supra* note 10, at 43,841.

81. U.S. Envtl. Protection Agency, *Tax Considerations Related to the Creation, Financing, Banking Use and Disposition of ERCs in Controlled Trading Approaches to Air Pollution*, pb83-148361 (Jan. 1982).

82. 1986 Policy, *supra* note 10, at 43,831.

83. *Id.* at 43,836.

84. For a brief comparison of ten rules, see Hahn, *Trade-offs in Designing Mar-*

costs than state banks.[85] Traders must inquire at multiple banks to compare prices; comparison may be impossible if the banks have different reporting requirements.[86] All of these complexities lead to higher transaction costs.

III. Interstate Trading

A. *Current Rules*

The 1986 emissions trading policy allows interstate trading in limited circumstances.[87] The trades must be between sources in neighboring states. The trade must meet the substantive requirements of the more stringent state. Each trade must be implemented through case-by-case SIP revisions and must meet all other trading requirements. Impliedly, each state can reject the trade.

B. *Interstate Trading Under Senate Bill 316*

Senate Bill 316 proposes a two-step emission reduction process resulting in a fifty percent SO_2 emissions decrease. In 1992, major fossil-fuel fired boilers would be limited to 2 pounds of SO_2 emissions per million BTUs of heat on a statewide basis (2 lbs./M-BTU; BTU = British thermal unit, a measure of the heating capability of a fuel) and 1.2 lbs./M-BTU in 1997. Also, statewide emissions will be limited based on the amount of BTUs produced in 1980. The EPA may recommend changes in the second phase to Congress. The program will be implemented through the SIP process. If states fail to produce plans, the individual sources will be responsible for meeting the specified limits. Continuous emissions monitoring is mandated to assure compliance with emission limits. States may re-allot emission reductions between themselves. States or source operators may choose to meet the re-

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kets with Multiple Objectives, 13 J. Envtl. Econ. Mgmt. 1, 8-9 (1986).

85. *See* Mendrick, *supra* note 63, at 223.

86. Many banks do not require cost information to be included. Tietenberg, *supra* note 35, at 40. Even EPA is uncertain of the extent of current emissions trading activities since it does not learn of many trades until state approval. Levin, *supra* note 14, at 34.

87. 1986 Policy, *supra* note 10, at 43,814.

quirements of the bill by alternative programs including intrastate and interstate emissions trading.[88]

Trades cannot increase emissions and must involve actual emission reductions brought about by fuel substitution, enforceable continuous emission reduction techniques, coal-washing or shutdowns. Trades are enforceable by the federal government, by states in which the ERCs are produced, and by citizen suits. Both the states and EPA may establish banks to facilitate trading.

1. *The Promise*

Local emissions trading has prevented the direct sacrifice of environmental values for economic goals. In contrast, interstate emissions trading is being used affirmatively to further environmental goals by mitigating the economic impact of acid deposition controls.[89] Uniform requirements for scrubber installation to reduce acid deposition would burden Midwestern utilities with the highest SO_2 emissions. Such proposals have created a political and economic outcry from utilities.[90] Interstate trading is politically advantageous because it does not burden utilities with specific technology requirements leaving them no choice but to raise rates. Therefore, interstate trading offers political advantages antithetical to those which led to the development of local trading.

Interstate trading can be more cost-effective than technology forcing requirements and intrastate trading. Numerous studies have been developed showing the cost advantages of intrastate trading over technology-based standards.[91] A study for Congress estimated that the cost of reducing SO_2 emissions would be substantially increased if utilities are required

88. S. 316, 100th Cong., 1st Sess. § 188 (1987).

89. Hartman, *Alternatives for Regulatory Control of Acid Rain in the Northeastern United States*, 11 Fordham Urb. L. J. 455, 481-82 (1983).

90. *Id.* at 480 n.153.

91. OTA Report, *supra* note 6; Argonne National Laboratories, *Controlling Acidic Deposition: Targeted Strategies for Reducing Sulfur Dioxide Emissions*, ANL/EES-TM-282 (1984) [hereinafter Argonne Report]; Streets, *A Regional, New Source Bubble Policy: Its Advantages Illustrated for the State of Illinois*, 34 J. Air Pollution Control A. 25 (1984).

to install control technology wet scrubbers.[92] Interstate trading creates a bigger market for ERCs than intrastate trading because more trading combinations can create a greater potential for cost savings. Argonne National Laboratories estimates that interstate emission tradings can save fifty percent when compared to intrastate trading; in addition, acid deposition in the Northeast would be reduced between 10 and 30 percent.[93]

Interstate trading rewards the use of innovative control technologies in the same manner as local trading.[94] Also, administrators will not need to develop specific control standards as in the past.

2. *Environmental Concerns*

Trading of acid deposition control rights could create hotspots at locations where acid deposition increases. For instance, in figure 3,[95] a trade from plant A with a short emission stack to plant B with a tall emission stack would increase the amount of acid deposition at the mountain. Also, a trade from plant A far away from the mountains to Plant C located closer could result in increased acid deposition at the mountain.

Implementation and enforcement of interstate emissions trading may become more complex than that of intrastate trading. Trades may involve states with different methods of quantifying ERCs creating a bias favoring trading with states with liberal ERC creation policies over states with more restrictive ones. Current EPA policy attempts to alleviate this problem by applying the most stringent rule. Senate Bill 316 proposes continuous emissions monitoring to alleviate quantification concerns. Paper trades may be less of a problem under interstate trading since the new EPA policy and Senate Bill 316 require actual emission reductions to be traded.

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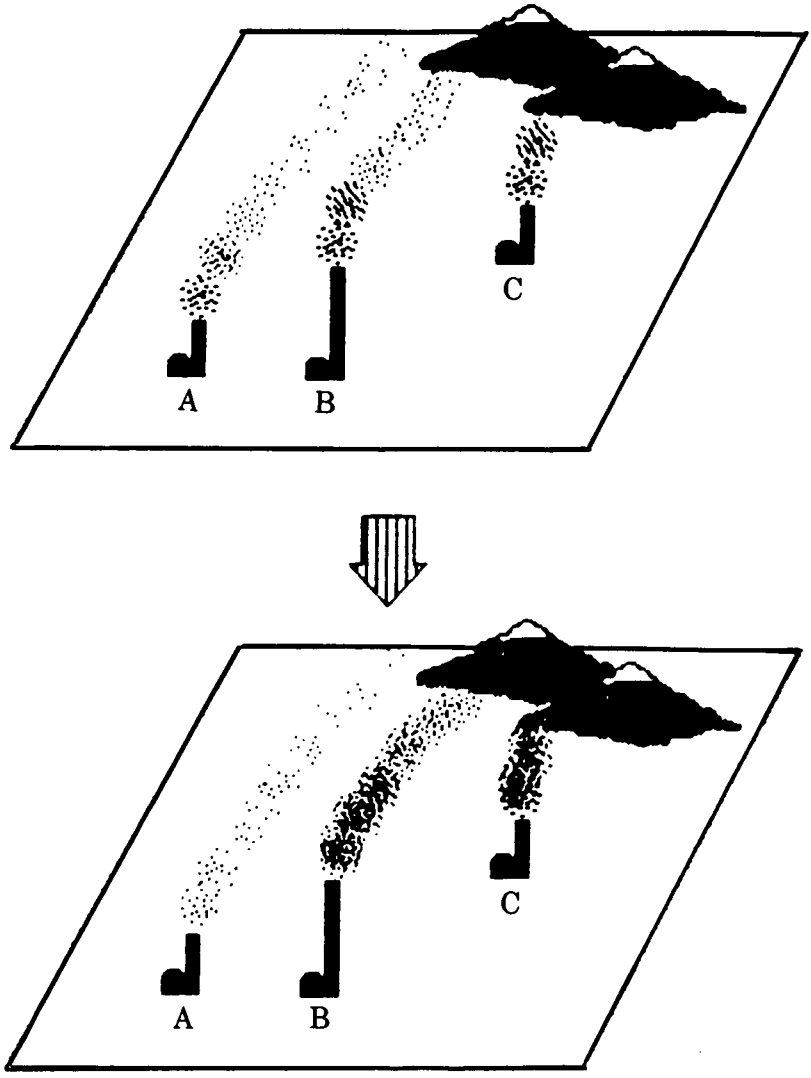
92. OTA report, *supra* note 6, at 169.
93. Argonne Report, *supra* note 91, at 46.
94. *See supra* text accompanying notes 36-40.
95. *See* figure 3 following.

Figure 3

Increased Acid Deposition Impacts
Caused by Emission Trading



Interstate emissions trading relies more heavily on modelling than local emissions trading. The models used in interstate emissions trading will be even more speculative and open to manipulation than those used in local emissions trading.[96] Individual sources or states could manipulate the models to show decreased environmental effects.

Interstate trading may have enforcement gaps. Coordination between states would be required to insure ERCs traded to one state are not used by the creator in another state. Unfortunately, interstate coordination has proven very ineffective in the past in dealing with air pollution problems. States which lack areas sensitive to acid deposition have less incentive to enforce ERCs traded to other states; enforcement of ERC trades will not benefit the state but could increase utility costs and political problems for the enforcing agency.

Interstate trading may be hampered by the uncertainty in the amount of acid deposition emission reductions required. The emissions reductions specified by Senate Bill 316 were calculated by rolling back emissions, not by estimating the amount of reductions required to prevent harm from acid deposition.[97] Therefore, those reductions do not ensure an adequate solution to the acid deposition problem. Future scientific studies may reveal that further reductions are required. In fact, Senate Bill 316 proposes a two-step reduction process with the second step occurring if scientific evidence indicates that such a step is necessary.[98] Therefore, granting vested rights to emit acid deposition would be premature because more reductions may be required in the future. However, without vested rights, acid deposition ERCs would be speculative and difficult to trade.

The complexity of environmental problems such as acid deposition may prevent the government from ever granting absolutely vested rights. The government could never assure itself that the correct level of emissions reduction has been achieved. An unavoidable tradeoff exists between the in-

96. Argonne Report, *supra* note 91, at 8.
97. S. 316, 100th Cong., 1st Sess. § 183 (1987).
98. *Id.* §§ 184, 185.

creased marketability of assured rights and the necessity of limiting rights to insure they do not conflict with environmental quality.[99] However, trading rights could be protected by requiring reductions elsewhere or proportionately reducing all rights.[100]

Interstate trading could decrease public access to the decision-making process if no local hearings are held. The final decision-makers may be in another region or in Washington, D.C., far removed from the control of local citizens.

Interstate trading could impact the poor more readily than local trading. Just as interstate trading creates a bigger market with greater potential for cost-savings, interstate trading increases the opportunity to shift the burdens of pollution to the poor. The poor have less money to spend on access to decision-making and no money to purchase ERCs.

3. *Market Concerns*

Interstate trading could greatly magnify regulatory uncertainty because of the greater number of jurisdictions involved. On the one hand, Congressional adoption of interstate trading of acid deposition emissions would avoid the legal uncertainty which initially hampered local trading.[101] On the other hand, Senate Bill 316 lacks a clear conception of how interstate trading should be administered; both the EPA and states are authorized to establish banks and brokerages to facilitate trading. Conflicting state and federal programs could inhibit both local and interstate trading. Comparability of ERCs could be difficult. Rules for creating ERCs may use different baselines, calculation methods or monitoring techniques. ERCs could be stored in both local and federal banks creating further confusion and undermining their value. Different reporting requirements would make price comparison more difficult.

Current EPA policy calls for using the state with the strictest standards when evaluating interstate trades and SIP

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99. Hahn, *supra* note 84.

100. 1986 Policy, *supra* note 10, at 43,834-35.

101. *See supra* note 14.

review for all interstate trades. ERCs from one state may need to be re-evaluated under another state's rules thereby increasing transaction costs. A SIP review for each trade would be time consuming and increase transaction costs. The experience with SIP review before the adoption of generic rules is a perfect example of the problems with that process; reviews took an average of 18 months.[102]

Cooperation and coordination between local air pollution agencies would be necessary. Unfortunately, cooperation in controlling interstate air pollution has been almost non-existent.[103] Bills such as Senate bill 316 have been proposed to remedy the interstate air pollution problems which have not been solved by cooperation. Surveyed utilities cited animosity and the prior lack of cooperation between states as a potential impediment to interstate emissions trading.[104] Under Senate bill 316, state governors can choose whether or not to enter into agreements to reallot or trade ERCs.[105] Therefore, this may allow uncooperative states to refuse any trades or selectively favor sales or purchases of ERCs.

Lack of direction from EPA could also inhibit interstate trading. Many states may wait for an EPA policy. EPA's delay in issuing a final emissions trading policy inhibited trading.[106] Lack of strong federal leadership has also contributed to the failure of interstate air pollution. EPA has refused to recognize the complaints of states affected by acid deposition under the interstate provisions of the Act and has failed to use its discretionary authority. If cooperation or federal leadership are lacking, litigation may be required to clarify the roles of the states and the EPA. Trading would be blocked until the litigation is resolved. Without a clear administrative approach, interstate trading could become as ineffective as the interstate air pollution provisions of the Act.

Interstate trading could be halted if overly restrictive

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102. Levin, *supra* note 14, at 38.
103. Winslow, *supra* note 5, at 9.
104. Raufer & Feldman, *supra* note 15, at 24.
105. S. 316, 100th Cong. 1st Sess. § 186 (1987).
106. Palmissano-1985, *supra* note 34, at 12-16.

trading rules or modelling requirements are adopted. Many current trading rules greatly discourage long-distance trading.[107] As a result, trades which shift acid deposition impacts away from sensitive areas could essentially be blocked. Local modelling requirements may unnecessarily inhibit trading. Trading under an acid deposition program mainly involves securing the right to continue polluting at the current level. Emission increases should not occur, making local modelling requirements unnecessary. If local modelling is required, it would increase transaction costs and inhibit trading.

Probably the biggest difficulty in allowing interstate trading is determining whether to use trading ratios or modelling to determine the amount of offsets required. Trading ratios lower modelling requirements and transaction costs.[108] However, trading ratios based on the distance between sources could eliminate beneficial trades, if not all trades. The effect of stack heights should be considered as well as prevailing wind patterns. Trading ratios could become so complicated they effectively become crude dispersion models.

The requirement for permanent trades once again inhibits trading especially when coupled with trading ratios. Utilities are one of the major sources of acid deposition. They desire to save ERCs for future customers.[109] A phased reduction program such as that provided in Senate Bill 316 creates the potential for increased savings through leasing. For example, Utility A cannot achieve the first reduction step without installing controls capable of controlling to the second step (scrubbers for instance). Utility B could meet the first step by installing some temporary equipment (a coal washer for instance). If Utility B could lease Utility A's surplus reduction for the time being it could avoid installing the coal washer. Without leasing, Utility A may be reluctant to sell and may operate the new equipment without a large over-control margin. A sell and buy-back arrangement could greatly decrease

107. Raufer & Feldman, *supra* note 15, at 19; Tietenberg, *supra* note 35, at 86-88.

108. Raufer & Feldman, *supra* note 15, at 19-20.

109. ERC Leasing, *supra* note 71, at 574.

the size of the ERC. With leasing, Utility A can lease the ERC for a profit. However, the short duration of leases could raise transaction costs and make enforcement more problematic.

Interstate trades will inevitably involve higher transaction costs than local trading. Negotiation costs will increase due to the increased transportation and communication costs. Locating trading partners could be more difficult especially if no centralized brokerage exists. Modelling, if required, will be more expensive. More public hearings could be involved. Review might be required by three or more agencies.

The legal and tax status of ERCs could vary from state to state magnifying their uncertain status.[110] Sources may be reluctant to rely on other states to protect their interests. Could one state confiscate an ERC produced within its state? Could a state require a purchaser of an out-of-state ERC to reduce emissions anyway if the state failed to adequately reduce emissions? Sources may be doubly wary about trading if those questions remain unanswered. Uncertainty in the amount of future reductions required increases fear of confiscation.[111]

Hoarding occurs because those who give up ERCs have no assurance that they can obtain an ERC for a fair price later. Public utilities use condemnation proceedings to obtain rights-of-way for expansion of generation and transmission facilities. No such mechanism exists to acquire ERCs. As a substitute for condemnation, the current Act allows localities to create growth margins to assure that new facilities can obtain offsets. Senate Bill 316 grants no authority to assure that ERCs will be available in the future.

C. *Special Interstate Issues*

The status of new sources under Senate Bill 316 is unclear. In one section the bill states that new sources are exempt from its requirements.[112] In another section, the bill creates statewide bubbles on total emissions.[113] Whether the new

110. Raufer & Feldman, *supra* note 15, at 20.
111. *Id.*
112. S. 316, 100th Cong., 1st Sess., § 181 (1987).
113. *Id.* § 183.

sources would need to offset the amount of new emissions they create is unclear. If they do not need to offset, the bill may unintentionally favor new sources. A utility could simply build a new generator rather than having to offset emissions. A utility could trade ERCs from one old facility to another. A new plant could be opened causing a net increase in emissions. Companies may argue that modifications create "new" sources and therefore they can sell the ERCs to somebody else, reversing arguments used to avoid New Source Performance Standards (NSPS) review of modifications.

Different treatment of trading by state public utility commissions (PUCs) could complicate interstate trading. An acid deposition control program will especially impact public utilities since they account for a large share of the SO_2 and NO_x emissions. The cost of acid deposition control will be distributed to the customers through the rate-making process. Different cost accounting methods could affect the value to utilities of creating and using ERCs.[114] Under original cost accounting, a utility's rate of return is calculated based on the purchase price of property and equipment. The bill gives ERCs to existing sources for free; therefore, a utility may not be entitled to any return on the sale of ERCs created by plant shutdowns. Also, customers may insist that profits from interstate emissions trading pass through to them as lower rates.[115] Pass through already occurs in some states for profits created by interstate power sales.

PUCs may serve as another conduit for political action to block interstate emissions trading. Ratepayers may object to paying for emission reductions in other states without receiving the environmental benefits.[116] However, the ratepayers do receive an economic benefit of reduced rates.

The corporate culture of public utilities may inhibit interstate trading. Utilities tend to have conservative business philosophies which emphasize system reliability and providing

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114. Raufer & Feldman, *supra* note 15, at 21.

115. Trisko & Wayland, *Acid Rain Control and Public Utility Regulation*, Pub. Util. Fort., Aug. 30, 1984, at 20-21.

116. *Id.* at 20-21; Raufer & Feldman, *supra* note 15, at 25.

for future growth over cost-minimization.[117] Therefore, utilities may not become strongly involved in interstate trading. One study indicated that utilities preferred to hold ERCs rather than trade them.[118] ERC leasing could offer a trading environment more conducive to utilities.

IV. Recommendations

A. *Environmental Review Standards*

Acidic emissions trading should be allowed to the extent it does not increase acid deposition in certain sensitive areas. The main concern of acid deposition legislation is the impact of acid deposition in certain sensitive areas.[119] Trades which would increase deposition in those areas should be prohibited. Either modelling or trading ratios could assure that acid deposition does not increase in sensitive areas. Otherwise, no net increase in acidic emissions should be allowed. Senate Bill 316 already sets a cap on overall emissions from plants existing in 1980. However, the cap excludes new sources. A loophole may exist which favors new sources over modification of old sources. Senate Bill 316 should be modified to include a cap on emissions from all sources. Acidic emissions trading must also meet the requirements of the NAAQS. Emission ceilings for each source could assure NAAQS attainment and decrease local modelling requirements for interstate trades. Emission ceilings could be set close to current emission levels or the baseline levels used to calculate 1980 emissions under Senate Bill 316. Trading under an acid deposition program will mainly involve securing the right to continue polluting since Senate Bill 316 proposes emission reductions in excess of those needed to obtain the NAAQS. Therefore, emission increases should not occur and emission ceilings would assure the attainment of the NAAQS. Limiting local modelling to situations involving emission increases above the emission ceil-

117. Raufer & Feldman, *supra* note 15, at 22; ERC Leasing, *supra* note 71, at 574.

118. Raufer & Feldman, *supra* note 15, at 22-23.

119. *See supra* notes 4, 5.

ings will reduce transaction costs, streamline review and prevent temporal hotspots.

B. *Administration*

EPA should promulgate uniform rules for quantification and monitoring. Uniform rules for creation and monitoring of acid deposition ERCs would alleviate bias created by non-uniform rules, increase regulatory certainty and decrease transaction costs. Purchasers could not look for states with lax rules on ERC creation to purchase cheap ERCs. Honest purchasers would be more certain of what they are buying and could more readily compare ERCs. Sellers and buyers would not have to try and figure out which state rule is the toughest. The EPA would not need to review ERCs under two sets of rules. Trading would not have to wait until courts decide who has authority to permit trading. Each state would not need to spend money developing their own rules.[120]

EPA could develop a uniform dispersion model (or models) to determine the impacts of trades. Perhaps the model could be privatized. Trades which decreased the impact of acid deposition on sensitive areas would be allowed on a one-to-one basis. Other trades could only occur to the extent they do not increase acid deposition in sensitive areas. Using one model would decrease transaction costs and thwart efforts to manipulate modelling results. EPA staff would not need to constantly review individual models thereby reducing delay. Updates could readily be performed as researchers develop more scientific data. Although modelling for individual

120. EPA could possibly assure the protection of sensitive areas by not adopting any special acid deposition trading policy. The no policy option discourages environmentally unfavorable long-distance trades. Interstate acid deposition trades would be reviewed by the EPA under the SIP process on a case-by-case basis. EPA would apply the rules of the strictest state. The more intricate SIP review process would increase the transaction costs for interstate trades as compared to intrastate trades. Sources would first seek intrastate trades to save time and money. As a result, less interstate trading would occur. Also, trades between non-neighboring states are prohibited under EPA's current policy. However, the no policy option could also discourage interstate trades which decrease deposition on sensitive areas and could snuff out interstate trading altogether.

sources may be very inaccurate, trading ratios are also very crude and can unnecessarily restrict trading. Trading ratios must rely on modelling data in any case to determine multiplication factors. Trading ratios may be more favorable than modelling due to their simplicity and lower costs. Trading ratios based on the distance between sources will unnecessarily discourage trades from sources located near sensitive areas to sources removed from sensitive areas. Therefore, trading ratios should be based on the distance the source is from the nearest sensitive area. The OTA and Argonne National Lab reports can be used to identify sensitive areas.[121] Also, trading ratios should consider stack height since taller stacks will increase the amount of acid deposition received by sensitive areas. A factor taking into account prevailing wind patterns at each of the sources should be included. The formula would look like:

Deposition Factor = Distance to Nearest Sensitive Area + Stack Height + Wind Factor

The deposition factor could be calculated for each source prior to trading and would not vary from trade to trade. The trading ratio for a trade would be:

Trading Ratio = User's Deposition Factor ÷ Seller's Deposition Factor

If the trading ratio was less than one (i.e. the trade decreases deposition at the sensitive area), trading could occur on a one-to-one basis. Referring back to figure 3,[122] a trade from plant C to plant A or B would meet this criteria. If the trading ratio exceeded one (i.e. the trade increases deposition at the sensitive area), the trading ratio would be used to calculate the excess emissions reductions required. In figure 3 trades from plant A to plants B or C would be reduced using the trading ratio. One potential problem exists with this method. Basing the trading ratio on the distance to the nearest sensitive area might overburden sensitive areas located

121. OTA Report, *supra* note 6; Argonne Report, *supra* note 91.
122. *See* figure 3 *supra* p. 319.

near cheap high sulfur coal. Sources in those areas could purchase ERCs from sources which could switch to low-sulfur coal and which are located approximately the same distance from a different sensitive area. That problem could be resolved by creating smaller trading regions. Of course, that could create a smaller, thinner market for ERCs.

Leasing of ERCs would be allowed for periods over three years. Shorter leases would create time burdens for regulators and produce enforcement difficulties. Leases would undergo the same review process as trades. However, discounts of the ERC from modelling or trading rules would apply only to the lessee. The lessor would be entitled to use the entire ERC provided no further emission reductions have been required.

Public hearings and local review would ensure that environmental values protected by an acid deposition reduction program are not sacrificed for economic gain. EPA uniform rules for quantification and trading would streamline review and assure trades are reviewed under the same standards. Hearings could be held near the buying and selling source by the local agencies. Either local agency could veto the sale. However, the buyer or seller could appeal to the EPA. If the trade met the criteria set forth in the EPA rules, the local agency would have the burden of proving the trade should not occur. The EPA would review the local records and decide. This type of review process would maximize public impact while decreasing transaction costs as compared to SIP review; fewer arbitrary decisions will occur at the local level.

The 1986 EPA policy allows states to choose whether or not to adopt emission trading programs. My proposal admittedly takes away the states' choice to decline acid deposition trading. Fairness and equity dictate that states should be allowed to achieve the savings from interstate trading envisioned in any political compromise concerning acid deposition; only a federal program could assure those savings are achieved without arbitrary local decisions. Allowing individual states veto power over interstate trades is less justifiable in the acid deposition context than in the NAAQS context. NAAQS are designed to improve and protect local ambient air quality. Each locality has an interest in preserving its own air quality.

Any acid deposition reductions will be designed to reduce acid deposition in areas far removed from the location of the emissions; therefore, the local agencies may not have as strong an interest in allowing trading. Acid deposition is much more of an interstate problem than achievement of the NAAQS. In areas where interstate pollution is a problem under NAAQS, states have failed to cooperate and the EPA has failed to require any emission reductions.[123]

Sources would be required to modify their local operating permits to ensure both local and federal enforceability. Monitoring would be carried out along with standard enforcement measures. EPA would audit local ERC banks and enforcement programs. Handling enforcement through existing programs will increase administrative efficiency and regulatory certainty.

C. *Banking*

A central federal bank and brokerage would track the creation of all ERCs and the completion of all trades. Uniform reporting criteria would include the price paid for the ERC, the size of the emission reduction, the cost of creating the ERC and the savings from the purchase. Local agencies or states could operate local branches which could facilitate intrastate or interstate trades.

Banked ERCs would be protected for a period of five years, assuring sources their investments are protected but allowing for future reductions if necessary. After five years, ERCs could be discounted if future reductions are necessary. After twenty years, the ERC would be forfeited to the state of origin. These time periods will allow utilities to plan for future plants,[124] reduce the possibility of temporal hotspots, discourage hoarding and assure that administrators can reduce emissions in the future if necessary. A five year absolute protection allows time to review the success of current reductions. The following fifteen years give utilities some certainty in

123. Winslow, *supra* note 5, at 9.
124. Raufer & Feldman, *supra* note 15, at 21.

planning for future plants. The confiscation assures that large numbers of ERCs do not accumulate over time.

D. *Special Concerns*

EPA could delegate part of its authority to establish a brokerage for ERCs to the Federal Energy Regulatory Commission (FERC). Since FERC already regulates interstate electricity transmission rates,[125] it has the expertise to review utility price structures. Hearings could be held and questionnaires sent to PUCs and utilities to determine the best accounting method for handling the emission trading transactions of public utilities. FERC could then issue guidelines to the state PUCs on accounting methods for interstate emission trades involving public utilities. Using FERC's expertise to set accounting guidelines would decrease regulatory uncertainty and avoid non-uniform treatment of ERCs by PUCs which would inhibit trading.

V. Conclusion

An emissions trading program must preserve the fundamental environmental value of the overall environmental program. In the case of acid deposition, emissions trading must not increase the amount of acid deposition in sensitive areas. Also, acid emissions trading must also assure attainment of the NAAQS. Implementation must assure that ERCs are uniformly created, that sources do not excessively manipulate modelling and monitoring techniques and that agencies can enforce ERCs as effectively as uniform controls. The public must have access to the decision-making process to ensure that trading preserves environmental goals, considers local concerns and does not burden poor people. Trading and banking cannot create vested rights which could inhibit future reductions.

Trading should be allowed since it increases the chance of passing an acid deposition control bill, decreases the cost of acid deposition reductions and allows greater flexibility to

125. 16 U.S.C. §§ 824-824k (1982 & Supp. IV 1986).

sources. An interstate emission trading policy should clarify the conflicting authority of state and federal programs. Trading rules intended to preserve environmental values should not be unnecessarily restrictive of long-distance or short-term trades. The administrative review process should be clarified and streamlined to decrease delay and transaction costs. Legal rights in ERCs should be clarified as much as possible. If future adjustments are necessary, discounting of ERCs should be preferred to confiscation.

A clear and uniform interstate emissions trading policy will decrease both regulatory uncertainty and transaction costs and provide uniform standards for review of trades. A well designed interstate emissions policy can enhance the political desirability of acid deposition reductions without sacrificing environmental values.

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