Can the "Clear Skies Initiative" Reduce the Coordination Failures in New Source Review and Cooperative Federalism Under the Clean Air Act?

Todd B. Adams*

Coordination failures occur when two or more parties fail to act in ways that could benefit all parties due to a lack of information or a lack of trust.[1] In the *prisoners' dilemma game*,[2] for example, where two

* Adjunct Professor, Michigan State University—Detroit College of Law; Assistant Attorney General of Michigan. The opinions expressed in this Article are the author's alone and should not be attributed to the State of Michigan or anyone else.

1. JOHN BLACK, OXFORD DICTIONARY OF ECONOMICS 91 (1997). Coordination failure can also be defined more technically as when the "realized equilibrium outcomes [of a coordination game] . . . are Pareto-suboptimal relative to other equilibria." RUSSELL W. COOPER, COORDINATION GAMES, at xi (1999).

2. COOPER, *supra* note 1, at x.

prisoners "must each decide whether to confess without knowing what the other will say" and "a lighter penalty follows if you confess when the other does not,"[3] ignorance of the other's choice causes the two prisoners to both confess and, therefore, receive heavier penalties than they would have received if neither confessed.[4] Similarly, if both know each other's stated intent not to confess but distrust it,[5] then both are likely to confess to their mutual detriment.[6] Similar coordination failures[7] have slowed progress and increased costs[8] in meeting the National Ambient Air Quality Standards (NAAQS)[9] under the Clean Air Act.[10] In particular, the New Source Review (NSR) regulations (NSR Program)[11] suffer from coordination failures caused by scarce and asymmetrical information, uncertainty, and distrust.[12] The principal-agent issues embedded in the Clean Air Act's cooperative federalism[13] also increase costs for all parties because there are too many agents and too many incentives for acting uncooperatively.[14] Surprisingly, the uniform nature of the NAAQS[15] may

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3. BLACK, *supra* note 1, at 367-68.

4. *Id.*

5. The lighter penalty a confessing prisoner receives if he or she is the only one to confess provides a strong incentive to cheat and for the second prisoner not to trust the stated intentions of the first prisoner.

6. Experimental evidence in coordination games shows that people may not choose the best alternative, or Pareto-optimal equilibrium, but instead choose a less desirable alternative. *See* COOPER, *supra* note 1, at xi.

7. "Despite consistent public support for more stringent public regulation, the conviction that the 'command/and/control' regulatory system has failed miserably dominates the debate at the national level." Rena I. Steinzor, *Devolution and the Public Health*, 24 HARV. ENVTL. L. REV. 351, 352-53 (2000) (notes omitted).

8. Professors Ackerman and Stewart made the classic statement of this view which has become largely accepted: "The present regulatory system wastes tens of billions of dollars every year, misdirects resources, stifles innovation, and spawns massive and often counterproductive litigation." Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law*, 37 STAN. L. REV. 1333, 1333 (1985).

9. Clean Air Act (CAA) § 109, 42 U.S.C. § 7409 (2000).

10. CAA §§ 101-617, 42 U.S.C. §§ 7401-7671(q).

11. *See* CAA §§ 161-168, 42 U.S.C. §§ 7470-7478 (addressing the NSR Program for Attainment areas); CAA §§ 171-173, 42 U.S.C. §§ 7501-7503 (addressing permitting requirements for areas not meeting the NAAQS for any pollutant). The main regulatory provisions are at 40 C.F.R. § 52.21 (2001) for areas meeting attainment, with additions at 40 C.F.R. § 52.24 for nonattainment areas. For one history of the NSR Program, see, e.g., Requirements for Preparation, Adoption and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plan, Standards of Performance for New Stationary Sources, 57 Fed. Reg. 32,313, 32,315-16 (July 21, 1992) [hereinafter Requirements].

12. *See* Ackerman & Stewart, *supra* note 8, at 1335-36.

13. *See* CAA § 101(a)(3), 42 U.S.C. § 7401(a)(3) (discussing the role of states and local government); CAA § 101(a)(4), 42 U.S.C. § 7401(a)(4) (discussing the leadership role of the federal government); CAA § 102, 42 U.S.C. § 7402 (encouraging cooperative activities).

14. *See* Ackerman & Stewart, *supra* note 8, at 1336-38.

actually promote economic efficiency by eliminating or gravely weakening health-based arguments used by those opposing new or increased sources of air pollution. "Cap-and-trade" air pollution programs covering large geographic areas such as the Acid Rain Program[16] and as proposed by President Bush in his "Clear Skies Initiative"[17] may benefit both economic efficiency and environmental protection by eliminating or reducing many reasons for coordination failures. Parties may still act uncooperatively, however, in cap-and-trade programs unless the government vigorously inspects sources and corrects any violations.[18]

I. THE UNIFORM NATURE OF THE NAAQS MAY SERVE TO INCREASE ECONOMIC EFFICIENCY RATHER THAN TO DECREASE IT

Through the years experts have argued that industry has exaggerated the cost of meeting the NAAQS,[19] that compliance costs relatively little in most industries,[20] or that the Clean Air Act does not

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15. The NAAQS are uniform only in the sense that they establish a statutory minimum level of ambient air quality, but more stringent state standards are not preempted. CAA § 116, 42 U.S.C. § 7416. In practice, the NAAQS have not produced uniform ambient air quality across the country. *See* James Krier, *On the Topology of Uniform Environmental Standards in a Federal System—And Why It Matters*, 54 MD. L. REV. 1226, 1237 (1995). Ambient air quality obviously differs between attainment and nonattainment areas. Even within these areas, however, ambient air quality differs. Congress has formally acknowledged this by ranking nonattainment areas based on how close they are to attainment. CAA § 181-193, 42 U.S.C. §§ 7511-7515. The setting of dates for areas to comply with the NAAQS may take into account "the severity of nonattainment and the availability and feasibility of control measures." CAA § 172(a)(2)(A), 42 U.S.C. § 7502(a)(2)(A). The Prevention of Significant Deterioration Program (PSD Program) has distinct classification areas in attainment areas. CAA § 162, 42 U.S.C. § 7472.

Furthermore, uniform federal policies implemented to achieve the NAAQS may have very different regional effects. For example, instituting a cap-and-trade program for power plants will likely have the greatest cost savings for older, power plants in the Midwest that burn high sulfur content coal and fewer benefits for newer power plants or for those burning low sulfur content coal.

16. CAA § 401, 42 U.S.C. § 7651.

17. EPA, *Clear Skies Legislation Introduced in Congress: Proposal Will Improve Air Quality, Prevent Premature Deaths, Illnesses* (July 29, 2002), *at* http://www.epa.gov/epahome/headline_072902.htm (last visited Aug. 15, 2002).

18. Kathryn Harrison, *Talking with the Donkey: Cooperative Approaches to Environmental Protection*, 2 J. INDUS. ECOLOGY 51, 59 (1999) ("Therein lies the paradox of a cooperative voluntary approach: A coercive government is often a necessary prerequisite for cooperative agreements." (citation omitted)).

19. HART HODGES, FALLING PRICES: COST OF COMPLYING WITH ENVIRONMENTAL REGULATIONS ALMOST ALWAYS LESS THAN ADVERTISED 1 (1997).

20. *See* MARTIN FREEDMAN & BIKKI JAGGI, AIR AND WATER POLLUTION REGULATION: ACCOMPLISHMENTS AND ECONOMIC CONSEQUENCES 220 (1993). The overall evidence provided by the findings suggests that there has been no significant association between the reduction in pollution emissions and higher costs.

affect most decisions about where to locate a plant.[21] Other experts have argued that the uniform nature of the NAAQS promotes economic inefficiency because they fail to account for local differences in the cost of control,[22] topology,[23] and benefits from the polluting activity.[24] More empirical research[25] is needed on these issues,[26] but the argument that the NSR Program and compliance with NAAQS does not affect the behavior of individual polluters or impose at least some costs on sources and the economy seems doubtful. Further, the uniformity of the NAAQS does not necessarily greatly hinder economic efficiency.[27] Instead, the uniform NAAQS may reduce the costs of complying with the Clean Air Act by supporting larger markets through weakening local opposition to new or increased sources based on health effects.

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21. *See* Randy Becker & Vernon Henderson, *Effects of Air Quality Regulations on Pollution Industries*, 108 J. POL. ECON. 379, 383 (2000) (discussing literature).

22. *See, e.g.*, James Krier, *The Irrational National Air Quality Standards: Macro- and Micro-Mistakes*, 22 UCLA L. REV. 323, 326-27 (1974); William F. Pederson, *Turning the Tide on Water Quality*, 15 ECOLOGY L.Q. 69, 83 (1988). This has been repeated so many times that even supporters of the traditional command-and-control NSR Program and the NAAQS repeat it without questioning. *See, e.g.*, Wendy E. Wagner, *The Triumph of Technology-Based Standards*, 2000 U. ILL. L. REV. 83, 107 (note omitted) (noting that "national standards are inefficient").

23. *See Krier*, *supra* note 15, at 1228. I do not maintain that uniformity does not impose costs. It does, but the questions of whether uniformity might serve economic efficiency as well and whether it is uniformity or the strictness of the standard that imposes the most costs seems worth further analysis.

24. *See* Steinzor, *supra* note 7, at 364-65. Professor Steinzor provides a useful summary of the literature and arguments that support giving states and local governments more power to regulate the environment.

25. *See* Lee Epstein & Gary King, *Exchange: Empirical Research and the Goals of Legal Research: The Rules of Inference*, 69 U. CHI. L. REV. 1, 2 (2002). Following Professors Epstein and King, I use the term "empirical research" to include both quantitative and qualitative (nonquantitative) research into facts. Thorough qualitative research has value even though it produces no mathematically precise models or statistics. On the other hand, merely because research takes the form of quantitative research does not mean it has great value.

26. *See, e.g.*, Harrison, *supra* note 18, at 69. Scholars and others have repeatedly called for more empirical research on the complex environmental issues to determine what works. The United States Environmental Protection Agency (EPA) has taken steps to address this, *id.*, but the theoretical and practical problems of such research can be immense.

27. This Article explores the economic efficiency of uniform ambient air quality standards and not the economic efficiency of complying with a particular NAAQS. The stringency of the NAAQS could, however, affect the economic efficiency of having uniformity. For example, very stringent NAAQS could impose very heavy costs to protect the environment but improve the ability of sources to choose economically efficient locations by limiting local opposition. On the other hand, less stringent NAAQS could impose more moderate costs to protect the environment but lose some of the increase in economic efficiency through variations in local standards and increased local opposition.

A. Compliance with the Clean Air Act and the NSR Program Creates Costs That Change the Behavior of Sources

Determining the full economic cost of compliance with the Clean Air Act for an individual source of pollution or for society is difficult because sources have incentives for not revealing their true costs to governments or competitors.[28] Nonetheless, the available evidence and theories suggest that significant costs related to NSR cause sources to alter their behavior.[29]

Arguments to the contrary are weak. For example, stating that the relative cost of pollution control technology is small for most industries is not enough.[30] On the margin, the difference in pollution control cost may change a source's decision about where to locate.[31] Stating that "[c]lean air is also compatible with other policy goals such as a strong economy,"[32] while important, does not answer the question of whether society could better invest in other activities than pollution control. Studies showing simultaneous reductions in air pollution and strong economic growth, while equally important, also fail to show that compliance with the Clean Air Act has little cost.[33] Economic growth may have increased even more if air pollution had stayed the same or increased.

To determine the full cost of NSR, researchers must adequately address the elusive costs of lost opportunities and uncertainty.[34] A plant that opens in seven months[35] instead of one month often loses the income it could have made during those six months of delay.[36] Greater or lesser uncertainty over the cost and nature of required pollution control may affect a source's choice of where to locate or the size of the investment

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28. *See* Harrison, *supra* note 18, at 55.

29. *See, e.g.*, Howard Latin, *Ideal Verses Real Regulatory Efficiency: Implementation of Uniform Standards and "Fine Tuning" Regulatory Reforms*, 37 STAN. L. REV. 267 (1985).

30. *See, e.g.*, Krier, *supra* note 22, at 326-27.

31. *See* Krier, *supra* note 15, at 1228-29.

32. GARY C. BRYNER, BLUE SKIES, GREEN POLITICS: THE CLEAN AIR ACT OF 1990 AND ITS IMPLEMENTATION, at xvi (2d ed. 1995).

33. *See* FREEDMAN & JAGGI, *supra* note 20, at 220 ("[I]t is possible to reduce air pollution and still have a thriving economy.").

34. EPA, NSR 90-DAY REVIEW BACKGROUND PAPER 1 (2001) (Document II-A-O1 & Docket No. A-2001-19), *available at* http://www.epa.gov/air/nsr-review/nsr-review.ppdf [hereinafter NSR 90-DAY].

35. *See id.* at 7. The "average time needed to obtain a major NSR or PSD permit, across all industries, is approximately seven months from receipt of the complete permit application." *Id.*

36. *Cf.* Steinzor, *supra* note 7, at 383. Where a source wants to operate in the same manner as before, the expiration of a permit costs little because the source can continue to operate so long as it has submitted the required administrative complete permit application. *Id.*

made.[37] Even if an individual source and society recoups its lost opportunity costs in some manner, delay and uncertainty have caused a change in the investment and the resulting economic structure.[38]

Experience strongly suggests that complying with the Clean Air Act changes the behavior of sources because of cost. The United States Environmental Protection Agency (EPA) estimates that the direct cost of NSR can run as high as $33,000.[39] The EPA has also allowed sources to avoid NSR by voluntarily agreeing to federally enforceable limits on air emissions that keeps the source below the level of emissions necessary to trigger NSR.[40] There are several possible explanations for this behavior that limits emissions,[41] but by voluntarily limiting the emissions, the source has imposed some cost on itself. This implies that undergoing NSR has costs.

Recent quantitative and other evidence bears out this analysis. One study shows:

> [T]here has been a significant relocation of polluting industries from more to less polluted areas to avoid stricter regulation in more polluted areas; there has been relative proliferation of small-scale, less regulated enterprises in some industries . . . and the . . . timing of plant investments by new plants has been dramatically altered.[42]

The study also found differences in source behavior between counties complying with the NAAQS and those not complying.[43]

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37. *See* Becker & Henderson, *supra* note 21, at 385-86.

38. *Id.*

39. EPA "anticipates annualized direct costs to sources for the NSR program to be approximately $41 million." DANIEL CHARLES MUSSATTI, EPA, INFORMATION COLLECTION REQUEST FOR 40 CFR PART 51 AND 52 PREVENTION OF SIGNIFICANT DETERIORATION AND NONATTAINMENT NEW SOURCE REVIEW REGULATORY REFORM 1-2 (2002). Average costs per source range from $368 (minor NSR review) to $33,000 (Sources in Attainment Areas). *Id.* at 1-2. The EPA estimates states and local agencies will spend approximately $12 million reviewing those applications. *Id.* at 2. The EPA has also estimated the cost per ton of pollution reduced from pollution control technology. NSR 90-DAY, *supra* note 34, at 19-20.

40. "[O]ften sources have accept[ed] federally enforceable limits on post-modification emissions or operations to avoid major NSR." Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR), Part II, 61 Fed. Reg. 38,250, 38,254 (proposed July 23, 1996) (to be codified at 40 C.F.R. pts. 51-52) [hereinafter Prevention].

41. First, the cost of the required pollution control technology to keep the source from triggering NSR may be less than the cost of technology required after NSR. Second, the direct and lost opportunity costs from going through NSR may justify the source voluntarily agreeing to limit its emissions more than necessary. Finally, as will be discussed in some detail in Part I.B in connection with the modification of an existing source, the source may not intend to emit the emissions necessary to trigger NSR. Voluntarily agreeing not to emit pollutants that the source does not anticipate emitting has a low expected cost, but it can prove costly if the source later determines that emitting more will increase profit.

42. Becker & Henderson, *supra* note 21, at 380.

43. *Id.* at 389, 402-03, 407, 411, 415-16.

Administrations have sought to reform NSR by increasing economic efficiency for many years. President Bush's "Clear Skies Initiative" follows prior efforts by other administrations and Congress.[44] Strictly this only supports that sources believe NSR has significant costs, but the belief has consistency and endurance.

Theory and evidence supports the proposition that complying with NSR and the Clean Air Act imposes significant costs on sources. It is difficult to estimate, however, the exact costs to sources and to society.

B. The NAAQS Weaken Local Opposition Based on the Health Effects of Criteria Pollutants

The Clean Air Act requires the EPA to set the primary NAAQS to "protect the public health."[45] In doing so, the EPA must "[allow] an adequate margin of safety."[46] The EPA has interpreted an "adequate margin of safety" to mean that the NAAQS must protect a very high proportion of the most sensitive group of the population.[47] It adjusts the NAAQS in light of likely exposure from other sources of the pollutant.[48] The EPA has further interpreted this to mean that it can "[seek] not only to prevent pollution levels that have been demonstrated to be harmful but

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44. *See* Prevention, *supra* note 40, at 38,250 (discussing proposed changes to the NSR Program to reduce costs and regulatory burdens for permit applicants during President Clinton's administration).

45. CAA § 109, 42 U.S.C. § 7409(b)(1) (2000). The national secondary ambient air quality standard "shall specify a level of air quality the attainment and maintenance of which in the judgment of the Administrator, based on such criteria, is requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air." CAA § 109(b)(2), 42 U.S.C. § 7409(b)(2).

46. CAA § 109(b)(1), 42 U.S.C. § 7409(b)(1).

47. *See, e.g.*, NAAQS for Lead, 43 Fed. Reg. 46,246, 46,247, 46,252 (Oct. 5, 1978) (to be codified at 40 C.F.R. pt. 50). For example, the primary NAAQS for lead is set to protect "young children (age 1-5 years) [who] should be regarded as a group within the general population that is particularly sensitive to lead exposure." *Id.* In setting the primary NAAQS to protect young children, the EPA "concludes that the maximum safe level of blood lead for an individual child is 30mg Pb/dl in order to place 99.5 percent of children below 30mg Pb/dl." *Id.* In revising the NAAQS for ozone, the EPA identified "active children and outdoor workers who regularly engage in outdoor activities and individuals with preexisting respiratory disease (e.g., asthma, chronic obstructive lung disease)" and "individuals [who] are unusually responsive to O3" as the population subject to the most acute adverse affects of ozone. NAAQS for Ozone, 62 Fed. Reg. 38,855, 38,859 (July 18, 1997) (to be codified at 40 C.F.R. pt. 50). The NAAQS for ozone is set to assure that "less than 0.2 percent of outdoor children are likely to experience" excessive exposure to ozone. *Id.* at 38,863.

48. *See* NAAQS for Lead, 43 Fed. Reg. at 46,247. In setting the primary NAAQS for lead, the EPA found that "[t]here are multiple sources of lead exposure. In addition to air lead, these sources include: lead in paint and ink, lead in drinking water, lead in pesticides, and lead in fresh and processed food." *Id.* The EPA concluded that most of the lead exposure to the most sensitive population would come from nonair sources and reduced the primary NAAQS for lead to allow for this exposure. *Id.* at 46,252-53.

also to prevent lower pollutant levels that she finds may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree."[49] Setting the NAAQS[50] in this manner gravely weakens any local opposition to a new or increased source of pollution and supports larger markets. Both of these effects support economic efficiency.

The easiest way to show these possible effects is to imagine what would happen if many state and local governments set stricter standards on criteria pollutants than the NAAQS.[51] These standards would serve as a tax on a source locating in the area.[52] Many different standards would impose additional costs to gather information. Sources would face the uncertainty of how each local environmental standard and regulation would be applied and enforced in practice. Uniformity, on the other hand, improves economic efficiency by lessening uncertainty and reduces barriers to relocating a source to a new area.

Specifically, the NAAQS severely weaken any challenge by local groups to new or increased sources of pollution.[53] First, a prestigious scientific committee reviews the scientific data and makes recommendations on the safe level.[54] Next, the EPA conducts an

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49. NAAQS for Particulate Matter, 62 Fed. Reg. 38,652, 38,653 (July 18, 1997) (to be codified at 40 C.F.R. pt. 50).

50. EPA also has a statutory duty to review the NAAQS every five years, 42 U.S.C. § 7409(d)(1), although review has not occurred every five years. For example, the EPA initiated the review leading to the revision of the ozone standard in 1992. NAAQS for Ozone, 62 Fed. Reg. at 38,857. EPA received over "50,000 written and verbal comments . . . on the propose[d] revision to the O3 NAAQS." *Id.* at 38,858. The United States Supreme Court ruled on the challenge to this standard in 2001. *See* Whitman v. Am. Trucking Ass'n, 531 U.S. 457 (2001). The EPA initiated the review leading to the revision of particulate matter standards in 1994. NAAQS for Particulate Matter, 62 Fed. Reg. 38,654. It also received "over 14,000 calls and over 4000 electronic messages." *Id.* at 38,568 (stating these statistics related to both ozone and particulate matter). "Over 400 citizens and organizations testified during these public hearings." *Id.* Numerous public hearings and workshops were held. *Id.* The EPA responded in writing to the comments. *Id.* The court challenge to the primary NAAQS for Particulate Matter ended in 2001. *See Whitman*, 531 U.S. at 457.

51. CAA § 116, 42 U.S.C. § 7416. States and local governments have the authority to set stricter standards on stationary sources than the NAAQS. *Id.*

52. *See* Richard A. Posner, *Taxation by Regulation*, 2 BELL J. ECON. MGMT. SCI. 22, 23 (1971) (referencing nonenvironmental contexts). *Id.* Regulation can be viewed as a form of taxation or income redistribution. This approach highlights the fact that environmental regulation shifts the costs of pollution from the most sensitive populations and local communities to other groups. *Id.* There are, of course, positive effects from industrial growth for local communities.

53. *See* John Brehm & James T. Hamilton, *Noncompliance in Environmental Reporting: Are Violators Ignorant, or Evasive, of the Law?*, 41 AM. J. POL. SCI. 444, 446 (1996) (stating that sources incorporate the costs associated with local political opposition); NSR 90-DAY, *supra* note 34, at 7 (relating to power plants).

54. CAA § 109(d)(2), 42 U.S.C. § 7409(d)(2).

elaborate notice-and-comment rulemaking to set the NAAQS.[55] Not only is the standard utilized in setting the NAAQS highly protective of the public health, but courts have reviewed and approved many of them.[56] Therefore, the process creates a strong presumption that meeting the NAAQS protects the public health and stops most challenges on health grounds to a source in an area where the NAAQS are met. Even in an area where the NAAQS are not met, the combination of the NAAQS and the EPA permitting requirements make the debate more about compliance with the NSR Program than about the health effects of new sources.

Repeating the process of setting standards at the regional, state, or local level would greatly increase administrative costs.[57] It is doubtful that state and local governments would have the information, resources, and incentives necessary to set a standard initially or to resist challenges by sources. Moreover, any state or local standard would probably become out-of-date over time and lose some of its economic efficiency or trigger costly procedures to set a new standard.[58] Finally, the uniformity of the NAAQS reduces potential political conflict between localities over pollution externalities.[59]

It is possible, of course, for the EPA to set regional, state, or local ambient air quality standards.[60] However, such a process would likely raise profound and difficult questions over the science of the standards because the EPA would have to justify several different standards at the same time.[61] The EPA would likely also find itself in a political quagmire

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55. CAA § 109(a)(1)(A)-(B), 42 U.S.C. § 7409(a)(1)(A)-(B).

56. *Id.*

57. The high cost of gathering information to set the NAAQS and technology-based standards is well-known. *See, e.g.*, Ackerman & Stewart, *supra* note 8, at 1330-40. At this point, I assume that the local, state, and regional agencies can evaluate the social costs and benefits of particular ambient air quality levels as well as the EPA can. This assumption seems overly optimistic in most cases. I postpone, however, this discussion until I address how NSR works in the context of federalism. *See* discussion *infra* Part III.

58. New ambient air quality standards are unlikely to happen very often. *See* ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION 552 (3d ed. 2000) ("The regulatory burden involved in establishing NAAQS is so demanding that EPA has strong incentives to avoid making frequent changes in such standards, much less to promulgate new ones."). Even so, state and local standards may vary less from the true economically efficient result than a uniform federal ambient air quality standard. People may select where to live based on environmental quality. They may accept state or local standards more easily than a federal standard. They may value autonomy or other values absent any change in environmental quality.

59. *See* Daniel C. Esty, *Toward Optimal Environmental Governance*, 74 N.Y.U. L. REV. 1495 (1998).

60. *See* Krier, *supra* note 15, at 1237.

61. This would allow challengers to focus on perceived inconsistencies between standards and demand more scientific precision from the EPA than often possible. *See* Am. Trucking

as various groups and interests challenge the legality of the EPA making essentially "local" decisions and the equity of any nonuniform standard. Further, the EPA would consume valuable resources on setting "local" standards instead of addressing previously unaddressed or new issues. Delay would likely result as the necessary information gathering and rulemaking proceeded. Individual groups[62] particularly harmed by the NAAQS would thwart the implementation of a standard that might be economically efficient on a societal level. The uniform NAAQS is effective in avoiding some of these costs as well.

C. Conclusion

The uniform NAAQS promote economic efficiency in several ways while hindering it in other ways. Empirical research may shed further light on exactly how well the NAAQS serve economic efficiency, but it appears unlikely that the uniformity of the NAAQS is a major source of economic inefficiency in the Clean Air Act. In fact, the uniform NAAQS may actually increase social economic efficiency by supporting larger geographic markets, reducing administrative costs, and co-opting health-based challenges to source location made by local groups.[63] There may be, however, gains in economic efficiency by tailoring the geographic area of ambient air quality standards to the relevant pollutant's effect or to the creation of competitive markets as discussed in Part IV *infra*. Furthermore, there may also be gains in economic efficiency by using a few, highly motivated agents with the same standard[64] as discussed in Part III *infra*.

Ass'n, Inc. v. EPA, 175 F.3d 1027, 1051-56 (D.C. Cir. 1999), *rev'd sub nom.* Whitman v. Am. Trucking Ass'n, 531 U.S. 457 (2001) (discussing how challengers shaped their challenge around the inability of EPA to precisely explain why it rejected other similar NAAQS). Such a challenge may theoretically serve economic efficiency and environmental protection, but it is difficult to believe that it will lead to anything other than obfuscation and delay in the real world.

62. *See, e.g.*, Steinzor, *supra* note 7, at 375-82. This can be an industry or source that faces extraordinary costs from complying. Variance procedures exists to accommodate this concern. It could be a group seeking to protect federalism, justice, or simply its profits at the expense of society in general. *See, e.g.*, Harrison, *supra* note 18, at 55-58.

63. Latin, *supra* note 29, at 1271.

64. Having different requirements for areas further away from the applicable NAAQS is not, in and of itself, bad and may save costs. *See* CAA § 182(d), 42 U.S.C. § 7511a(d) (2000) (mandating different requirements for areas in severe noncompliance with the ozone standard). There is a danger, however, that the complexity of mandating different requirements will only multiply the number of principal-agent problems. *See infra* Part III.

II. THE NSR PROGRAM IS A COORDINATION GAME PRONE TO FAILURE

It is now common knowledge that sources have information about controlling pollution that governments do not have.[65] Given that much of the sources' information has value outside environmental regulation, sources are unlikely to disclose the information in a timely fashion, if at all. Lack of information and uncertainty plague both sides, however, and make the NSR Program prone to coordination failures that increase cost and lessen environmental protection.

A source may have information that governments do not have, but a source also faces a lack of information and uncertainty when it seeks an air pollution control permit:[66] What type of pollution control equipment will the permitting authority require? How long will the permitting authority take to make the final decision? Will there be local opposition or support? If so, what will its effect be on the required pollution control equipment and the length of time necessary to get the required permit? Where the EPA has delegated permitting authority to a state, will the EPA ratify the state decision?[67] How long and costly will the EPA ratification process be? How will the decision on this source affect pending or future NSRs? Will the decision change? Reducing uncertainty over the likely pollution control technology and delay will help a source decide which options to pursue.[68] Uncertainty will play a larger role in a source's decision if, as some research suggests, sources choose less risky strategies in coordination games.[69]

The complexity and obscurity of the trigger for when a source must undergo NSR exacerbates the source's need to gather information in

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65. *See* Harrison, *supra* note 18, at 57.

66. The focus is on the lack of information and uncertainty involved in gaining an environmental permit and not on the more general informational problems faced by a company in making a business decision to build a new plant or modify an existing plant.

67. This is an example of a principal-agent issue inherent in cooperative federalism. *See, e.g.*, John P. Dwyer, *The Role of State Law in an Era of Federal Preemption: Lessons from Environmental Regulation*, 60 L. & CONTEMP. PROBS. 203 (1996).

68. Two-way "preplay communication" where the parties send signals or information to each other before playing the game may be "quite effective in overcoming coordination problems." *See* COOPER, *supra* note 1, at 6-7. Viewed from this perspective, informal contacts between the government and the source before permit application lose much of the appearance of regulatory capture. *See* Harrison, *supra* note 18, at 58.

69. *See* COOPER, *supra* note 1, at 11-12 (discussing theoretical research in an academic setting). Intuitively, a source building a $1 billion plant with the opportunity for large profits from its operation may well want to ensure the building of the plant in a timely fashion even if it costs somewhat more. This may explain some of the controversy over the EPA's approach to environmental justice which adds a new, separate, and indefinite process to permit issuance.

making economic decisions about source location and operations.[70] If set too lightly, the trigger will require repetitive, costly NSRs that do not benefit the environment.[71] If set too heavily, the trigger will not require the reductions in emissions necessary to protect the environment.[72] Initially, the EPA set the trigger for NSR very lightly to protect the environment by requiring as many sources as possible to undergo NSR.[73] Air quality was bad and few sources had effective pollution control.[74] The congressional exemption for sources that continued to operate as they had been operating, based on the theory that installation of pollution control technology would be more effective and less costly when sources underwent change,[75] threatened to create a large loophole in the NSR Program.[76] The EPA therefore required, and still generally requires, a source to undergo NSR when the difference between its potential-to-emit[77] as built or modified[78] exceeds its actual emissions[79] before being

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70. Wis. Elec. Power Co. v. Reilly, 893 F.2d 901, 909 (7th Cir. 1990) ("[T]he permit program . . . represented a balance between 'the economic interests in permitting capital improvements to continue and the environmental interest in improving air quality.'" (citation omitted)).

71. No advances have occurred in pollution control technology since the last NSR. *See* Prevention, *supra* note 40, at 38,256 (discussing a possible exclusion to NSR if a source has recently installed pollution control technology).

72. *See id.*

73. *See id.* at 38,253.

> The reference to "any physical change" in section 111(a)(4) of the Clean Air Act [in the definition of modification in CAA § 111(a)(4), 42 U.S.C. § 7411(a)(4) (2000)] could—read literally—encompass the most mundane activities at an industrial facility (even the repair or replacement of a single leaky pipe, or an insignificant change in the way the pipe is utilized). However, EPA has recognized that Congress did not intend to make every activity at a source subject to major new source requirements . . . . As a result, the EPA has adopted several exclusions.

Id.

74. *Id.*

75. *See* NSR 90-DAY, *supra* note 34, at 2; *Wis. Elec. Power Co.*, 893 F.2d at 909.

76. *See Wis. Elec. Power Co.*, 893 F.2d at 909.

77. A source's potential-to-emit does not mean the amount of pollutants the source expects to emit, but, rather, "the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation . . . shall be treated as part of its design if the limitation . . . would be Federally enforceable." 40 C.F.R. § 52.21(b)(4) (2001). As previously discussed, a source may agree to federally enforceable limits on its potential-to-emit to a level below that necessary to become a major source subject to NSR. This is called a "synthetic minor."

78. A major modification triggering NSR is "any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act." *Id.* § 52.21(b)(2)(i); CAA § 111, 42 U.S.C. § 7411(a)(4) (defining "modification" in an attainment area). Modification means the same in nonattainment areas. CAA § 171(4), 42 U.S.C. § 7501(4).

79. 40 C.F.R. § 52.21(b)(3).

built[80] or modified (actual-to-potential methodology)[81] exceeds regulatory thresholds.[82]

The actual-to-potential methodology proves difficult to apply in practice. Emissions of a specific pollutant rise and fall depending on the product being made, the process used, and the source's economic decisions. This may cause confusion in determining the baseline of actual emissions and requires a complex and often contentious process of "netting" out the increases and decreases in pollutants over a period of years.[83] The source has control of this information, but it must convince the EPA of the correctness of its netting process.[84] The incentives for sources to choose the information and to interpret that information in the

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80. A new source has actual emissions of zero. Memorandum from the EPA, Proposed Netting for Modifications at Cyprus Northshore Mining Corporation, Silver Bay, Minnesota 3 (Aug. 11, 1992). One technical problem in the regulations is that the definition of "actual emissions" includes emissions that a source has the potential to emit. 40 C.F.R. § 52.21(b)(21) (providing regulations of actual emissions used in attainment areas).

81. *See* Requirements, *supra* note 11, at 32,316-18 (describing the actual to potential methodology in contrast to the change being made to "actual-to-future actual" method for electric utility steam generating units in light of court decisions and the Acid Rain Program); *see also* NSR 90-DAY, *supra* note 34, at 2-5. The EPA rejected comparing the source's potential-to-emit as currently operating with the source's potential-to-emit as modified because a source might increase actual emissions, thereby increasing pollution. The EPA stated in 1980: "A computation of an existing source's potential emissions could give a figure considerably higher than what it is actually emitting. This would be especially true if the source operated only a small part of the time. . . . Such an approach would therefore create a 'paper offset' that could permit actual air quality to deteriorate seriously, while the change which increased actual emissions avoided NSR." Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans, Final Rule, 45 Fed. Reg. 52,676, 52,700 (Aug. 7, 1980).

82. The EPA set thresholds to ease its administrative burden. *See* Prevention, *supra* note 40, at 38,253. Some of the debate over cap-and-trade programs seems aimed more at whether the environment should be considered a factor of production than at whether cap-and-trade programs are better than the traditional command-and-control NSR Program in achieving a specific environmental goal.

83. 40 C.F.R. § 52.21(b)(3). The source must determine

> the amount by which the sum of the following exceeds zero: (a) Any increase in actual emissions from a particular change or change in method of operation at a stationary source; and (b) Any other increases and decreases in actual emissions at the source that are contemporaneous with the particular change and are otherwise creditable. . . . (iii) An increase or decrease in actual emissions is creditable only if the Administrator has not relied on it in issuing a permit . . . (v) An increase in actual emissions is creditable only to the extent that the new level of actual emissions exceeds the old level. (vi) A decrease in actual emissions is creditable only to the extent that: (a) The old level of actual emissions or the old level of allowable emissions, whichever is lower, exceeds the new level of actual emissions; (b) It is federally enforceable . . . . (c) It has approximately the same qualitative significance for public health and welfare as that attributed to the increase from the particular change.

Id.

84. The analysis in this Part applies equally to the states and local governments as environmental protection agencies. *See, e.g.*, *id.* § 51.165(a)(1)(A).

manner most likely to avoid the cost of installing new pollution control technology gives the EPA ample reason to distrust the source's netting process on principle.[85]

Sources also control the information about how they will operate. Once sources trigger the threshold for NSR, they have strong incentives in the permitting process to overstate their projected emission because failure to comply may result in penalties.[86] If overstating pollution eases the regulatory burden in the future or creates a property right, then the source has further incentive to overstate its projected pollution.[87] While some disincentives to overstate exist,[88] the EPA cannot know in any particular instance whether incentives or disincentives predominate and to what degree.[89]

The complexity of the regulatory definitions of the required pollution control technological standard,[90] of many modern industrial

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85. *See* Esty, *supra* note 59, at 1508-12.

86. Overstating emissions may trigger NSR for a new source. EPA considers only "actual" emissions in the baseline for determining whether a "major modification" has occurred. *See* 40 C.F.R. § 52.21(b)(2)(1).

87. The actual-to-potential methodology reduces the incentive to overstate projected emissions because the projected and permitted levels do not establish the right to emit at those levels. On the other hand, sources have incentives to continue to emit more pollutants than necessary to avoid going through NSR. *See* Requirements, *supra* note 11, at 32,317.

88. *See id.* The source may understate projected emissions in order to reduce delay or to allow continued operations. In a nonattainment area, the need to purchase offsets for increased pollution serves as a disincentive for overstating emissions. The actual-to-potential methodology also reduces the incentive to overstate projected emissions because a source has no right to emit to its potential level for the purpose of determining whether a major modification has occurred.

89. *See, e.g.*, Roland Strausz, *Delegation of Monitoring in a Principle-Agency Relationship*, 64 REV. ECON. STUD. 337 (1997).

90. In nonattainment areas, new or modified sources subject to NSR must comply with the lowest achievable emission rate (LAER), CAA § 173(a)(2), 42 U.S.C. § 7503(a)(2) (2000). The LAER is that rate of emissions that reflects:

> (A) the most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or (B) the most stringent emission limitation which is achieved in practice by such class or category of source, whichever is more stringent.

CAA § 173(3)(A)-(B), 42 U.S.C. § 7501(3)(A)-(B).

In an attainment area, new or modified sources subject to NSR must install Best Available Control Technology.

> "Best Available Control Technology" (BACT) means an emissions limitation [including a visible emission standard] based on the maximum degree of reduction of each pollutant subject to regulation [under the Clean Air Act which would be emitted from any proposed major stationary source or major modification which the U.S. EPA Administrator,] . . . on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility [or modification] through application of production processes or available methods, systems, and techniques, including fuel cleaning, clean fuel, or treatment or innovative

production processes,[91] and of pollution control technology itself also create the need to gather information, reduce uncertainty, and encourage strategic behavior. Sources determine their production processes.[92] In attainment areas, sources initially propose the pollution control technology.[93] Sophisticated or experienced sources may have more specific information about how any pollution control technology works. They have more resources and material incentives to gather information than the often overworked environmental regulators.[94] If a source wants to use a particular pollution control technology, the source emphasizes its virtues.[95] If a source does not want to use a particular technology then it emphasizes the cost, the small environmental benefits, and the technical difficulty of applying that technology to it.[96]

Large, multi-source[97] companies[98] often have strategic reasons, not completely related to the specific NSR, for advocating particular pollution control technology. A company's agreement to install a particular pollution control for one source may cause regulators to

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> fuel combustion techniques for control of each such pollutant. In no event shall application of "best available control technology" result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard . . . [under 40 CFR parts 60 and 61.]

CAA § 169, 42 U.S.C. § 7479(3).

If the Administrator determines that technology or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide compliance by means which achieve equivalent results. CAA § 111(h)(1), 42 U.S.C. § 7411(h)(1).

91. "A second way that voluntary programs might advance environmental objectives is through development of networks that provide opportunities for technology transfer and sharing of environmental expertise." *See* Harrison, *supra* note 18, at 58.

92. This means that sources may choose a production process that emits more pollution, even with the required technology, than another production process for economic or strategic reasons.

93. *See* NSR 90-DAY, *supra* note 34, at 7 (implying delay in the review process occurs from "selection of a BACT option that the permitting authority believes to be less stringent that required").

94. *See id.*

95. *See id.*

96. *See id.*

97. Each "emissions unit" within a plant may have to undergo NSR. 40 C.F.R. § 52.21(b)(7) (2001).

98. *See id.* There may be many sources within one plant. Determining the number and size of the "sources" in one plant can also be difficult.

require it for other similar sources of the company.[99] This may prevent a company from agreeing to economically efficient and environmentally protective solutions otherwise in the company's interest.[100] Even where the sources are truly different, a company must consider the cost in time and money of convincing the EPA that the sources are different.[101] The company must also face the prospect of failing to convince the EPA because the EPA lacks the necessary expertise or information to evaluate the technology.[102] The EPA may also reject the company's legitimate arguments simply because the EPA knows that the company has strong incentives to warp its information gathering and analysis in one direction.[103] As with overstating the projected emissions, the EPA often has little information and less certainty about the trustworthiness of any particular company.[104] On the other hand, governments have information about social benefits and costs that sources may not have, or, if they do, have less incentive to use to maximize social benefit. Sources that are for-profit companies respond to price signals from the market.[105] The

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99. "The risk . . . [of voluntary programs] . . . is that sectoral or cross-sectoral businesses will use the opportunity to participate in policymaking to collectively resist environmental change, as they often have with respect to ecolabeling." Harrison, *supra* note 18, at 58.

100. *See id.* Another fruitful way of making this point is to consider the source's negotiators as agents not only of that particular source but of the whole company or industry. The interests of the company or industry as a whole narrow the ability of negotiators for the single source to find creative solutions for the individual source. Roger Fisher & Wayne Davis, *Authority of an Agent: When Is Less Better?*, *in* NEGOTIATING ON BEHALF OF OTHERS 62 (Robert N. Mnookin et al. eds., 1999).

101. *See id.*

102. The source may also not want to give the information necessary to evaluate the technology because it has value in the marketplace. Many environmental laws now provide for protection of trade secrets, but not all trade secrets are protected and not all valuable information is a trade secret.

103. *See* Esty, *supra* note 59, at 1508-13.

104. States and local governments may well know more about the general trustworthiness of any particular source or company. This is an argument for local control or cooperative federalism. As discussed in Part III below, however, the EPA may distrust the reliability of the information provided by a state or local government for any number of reasons. *See* John T. Scholz & Wayne B. Gray, *Can Government Facilitate Cooperation? An Informational Model of OSHA Enforcement*, 41 AM. J. POL. SCI. 693, 698 (1997).

105. This response is based on a theoretical approach to economics:

> Economic theory suggests that a free market will produce an efficient and welfare-maximizing level of resource use, production, consumption, and environmental protection if the prices of resources, goods, and services capture all of the social costs and benefits of their use. Where, however, private costs which are the basis for market decisions, deviate from social ones, market failures occur, resulting in allocative inefficiency in general and suboptimal resource consumption or pollution levels in particular. Thus, every bit of air pollution shot out of a smokestack represents a problem.

Esty, *supra* note 59, at 1503.

presence of social costs external to the source and buyer makes these price signals incomplete from the social perspective.[106]

Given the source's control over information, incentives not to disclose certain information to the EPA, the uncertainty that arises from the source's control and incentives, the greater governmental knowledge of social cost, and the history of air pollution in the United States, it is not surprising that the EPA initially chose a light trigger[107] and then excluded categories in order to save administrative resources,[108] to promote economic efficiency,[109] to encourage innovative technology,[110] and for other good reasons.[111] The lightness of the trigger caused sources to view the EPA regulations as irrational.[112] This likely led to sources providing less valid information because they distrusted the EPA. In turn, the EPA had further reason to distrust sources.

The exclusions helped in individual circumstances but increased complexity overall.[113] The complexity increased the perceived irrationality and arbitrariness of the system, thereby limiting the coordination. The lack of valid information and trust caused the NSR Program to become "stuck" in the socially undesirable position of having higher than necessary economic cost and lower than desired reductions in emissions.[114] Neither sources nor the EPA felt comfortable to deviate[115] because of the fear that the benefits of cooperation would not be shared.[116]

Experience shows that all parties involved in the NSR Program have worked to gather information and to reduce uncertainty and that, over

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106. Some scholars have attempted to equate the market or wealth with social preferences. *See, e.g.*, RICHARD POSNER, THE ECONOMICS OF JUSTICE 61 (1983).

107. *See* Prevention, *supra* note 40, at 38,253.

108. Only "major" new or modified sources that emit a certain level of emissions must undergo NSR. 40 C.F.R. § 52.21(b)(23)(i) (2001).

109. *Id.* § 52.21(b)(3)(i) (discussing netting).

110. *Id.* § 52.21(v).

111. *E.g.*, *id.* § 52.21(b)(2)(iii)(b) (using authorized alternative fuel).

112. *See* Harrison, *supra* note 18, at 55-57 (discussing coordination failures in the CAA).

113. JERRY L. MASHAW, GREED, CHAOS, AND GOVERNANCE 147 (1997) ("There are indeed some critical gaps in this statute [Clean Air Act] and its many amendments that leave substantial policy discretion to administrators. On the other hand, the statute goes on for hundreds of pages, many of them containing hypertechnical provisions that few citizens could possibly understand.").

114. "This gives some content to the theme, often expressed in macroeconomics, that an economy may be 'stuck' at an inefficient equilibrium. While all agents in the economy understand that the outcome is inefficient, each, acting independently, is powerless to coordinate the activities of other agents to reach a Pareto-preferred equilibrium." COOPER, *supra* note 1, at ix.

115. *Id.*

116. *See* Harrison, *supra* note 18, at 58-59 (noting that environmentalists fear regulatory capture and businesses respond to profit not moral incentives).

time, limited trust and coordination occurred.[117] Sources gather information through a variety of techniques. They obviously can review any of their experiences with the permitting authority. They can also check the previous and current dealings of the permitting authority with other similar sources.[118] The source can approach the permitting source informally before filing a permit application or immediately thereafter more formally.[119] In response to this information gathering by sources, governments are setting explicit goals to disseminate information better[120] and to improve the number of permits issued.[121]

Governments and sources have also attempted to reduce uncertainty in the NSR Program. Sources actively seek to increase local political support. Many states have voluntarily agreed not to enact stricter standards than the federal government[122]—presumably to provide sources with greater certainty that they will not have to install new pollution control technology just because the standards change. Besides the exclusions to NSR made by the EPA, governments set time limits on governmental review in the permitting process.[123] State and local governments regularly compete to lessen a source's uncertainty over locating in their jurisdiction through the by-now-familiar newspaper and billboard statements about the importance of the source and its environmental friendliness to the locality.[124] Limited amnesty for sources that voluntarily discover and report their own violations[125] may be viewed as a governmental attempt to elicit valid, private information from sources through cooperation and the sharing of benefits. The recently

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117. *See* NSR 90-DAY, *supra* note 34, at 7.

118. EPA maintains a national pollution control technology clearinghouse. *See* CAA § 173(d), 42 U.S.C. § 7503(d) (2000).

119. For example, the Michigan Department of Environmental Quality urges "early discussion with district staff" in determining site location and the contents of the permit application. MICH. DEP'T OF ENVTL. QUALITY, MICHIGAN AIR QUALITY PERMIT REGULATIONS: A CITIZEN'S GUIDE TO OBTAINING AN AIR USE PERMIT (Aug. 4, 2002), *available at* http://www.michigan.gov/deq.

120. *See* NSR 90-DAY, *supra* note 34, at 7; MICH. DEP'T OF ENVTL. QUALITY, STRATEGIC PLANNING TARGETS: FISCAL 2002 (2002), *available at* http://www.michigan.gov/deq.

121. MICH. DEP'T OF ENVTL. QUALITY, STRATEGIC PLANNING TARGETS: FISCAL 2002 (2002), *available at* http://www.michigan.gov/deq.

122. *See* Steinzor, *supra* note 7, at 373 (stating that such agreements support the conclusion that a "race-to-the-bottom" occurs). Their agreements also support the idea that the federal government set its national standards too high in the opinion of many.

123. Mussatti, *supra* note 39, at 4.

124. *See* Harrison, *supra* note 18, at 59 (discussing "[g]overnment recognition of industry's voluntary efforts").

125. *See* Steinzor, *supra* note 7, at 389-91.

recommended changes to the NSR Program[126] represent the EPA's continued effort to improve cooperation.

Theory and experience support the proposition that coordination failures from asymmetrical information, uncertainty, and incentives to act uncooperatively play a major role in the economic inefficiency and lessened emission reductions under the Clean Air Act.[127] Efforts to improve coordination have brought only partial success.[128]

III. COOPERATIVE FEDERALISM CREATES UNCERTAINTY AND INCENTIVES FOR UNCOOPERATIVE BEHAVIOR THAT LEAD TO COORDINATION FAILURES

The Clean Air Act relies on "cooperative federalism"[129] to achieve the NAAQS.[130] Environmentalists argue that the federal government needs to protect the environment.[131] Others decry the loss of local control implied by the oversight of the federal government.[132] Still others argue that states and local governments can bring more economic efficiency into pollution control.[133] In any event, cooperative federalism is another coordination game where "confidence and expectations are critical elements."[134] The goal is to achieve and maintain the NAAQS in an economically efficient manner.[135] However, mixed signals,

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126. *See* EPA, NEW SOURCE REVIEW: RECOMMENDATIONS (2002), *available at* http://www.epa.gov/air/nsr-review/nsr_recommendations.pdf (last visited Jan. 15, 2003) [hereinafter NEW SOURCE REVIEW].

127. Professor Wagner has made the contrary argument that "[t]echnology-based standards are also more enforceable and predictable than most alternative approaches to pollution control." *See* Wagner, *supra* note 22, at 100. Professor Wagner supports this crucial point by reference to administrative regulations based on twenty-five years worth of experience. *Id.* Experience has undoubtedly made technology-based standards easier to apply. *See* NSR 90-DAY, *supra* note 34, at 7. There is a world of difference, however, between administrative regulations and practice. For example, Professor Wagner's reliance on the new source performance standards does not account for BACT and LAER determinations exceeding the new source performance standards. Second, there is always a tradeoff between ease of regulation based on administrative, known technological standards and innovation.

128. *See, e.g.*, Daniel C. Esty, *Revitalizing Environmental Federalism*, 95 MICH. L. REV. 570, 584-97 (1996).

129. *Id.*

130. *Id.*

131. *See, e.g.*, Richard B. Stewart, *Pyramids of Sacrifice? Problems of Federalism in Mandating State Implementation of National Environmental Policy*, 86 YALE L.J. 1196, 1211-19 (1977); *see also* Steinzor, *supra* note 7, at 373 (summarizing the current debate).

132. *See* Stewart, *supra* note 131, at 1211-19.

133. *See id.*; *see also* Jonathan H. Adler, *A New Environmentalism*, 13 F. FOR APPLIED RES. & PUB. POL'Y 55, 56-57 (1998).

134. COOPER, *supra* note 1, at viii.

135. Throughout this Article, I avoid philosophical issues about human use of the environment and environmental equity not because they are unimportant or wrong but because

counterproductive choices, and difficult principal-agent problems[136] have so far, greatly weakened the effectiveness of cooperative federalism in meeting this goal. Fewer, more highly motivated states with more freedom may work better to protect the environment at lower cost than the present system.

The rationale[137] for cooperative federalism in the Clean Air Act runs something like this: states have more information about local environmental conditions, sources, and local preferences than does the federal government.[138] States also share the mutual goal of improving air quality with the federal government.[139] The better local information possessed by the states and mutual interest of the states and the federal government justify a degree of autonomy to the states in designing their State Implementation Plans (SIPs)[140] for achieving and maintaining the

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others have made these points so well. *See, e.g.*, Steinzor, *supra* note 7, at 370-72 (discussing distributive justice). I am also attempting to show how reforming NSR will benefit everyone in practice if they behave as cooperatively as possible. *See id.* at 462-63 (discussing that "the best hope for reform is to convince the disparate constituencies of environmental regulation that devolution, taken to its logical extreme" is bad for everyone).

136. There are other, well-known, principal-agent problems among voters, interest groups, municipalities, states, regulatory agencies, and sources. This Article does not focus on these problems.

137. The rationale is based on analysis and not on an assertion that Congress intended or even knew of all these effects.

138. *See* Steinzor, *supra* note 7, at 364. A claim that state and local governments may know more of this information than the federal government appears uncontroversial if made reasonably. *See* Roy Radner, *The Organization of Decentralized Information Processing*, 61 ECONOMETRICA 1109, 1110 (1993) ("The decentralization of information-processing is dictated by the large scale of modern enterprises, which makes it impossible for any single person to manage everything."). The consequences arising from this claim are, however, always controversial.

139. Esty, *supra* note 128, at 590-91. Reducing the effects of interstate pollution and avoiding paying more-than-desired to attract industry are two common interests that states may share. Uniform federal environmental standards may help to achieve both, although states have many ways to compete for industry.

140. The EPA conspicuously and regularly reviews and approves SIPs for nonattainment areas. CAA § 172(b), 42 U.S.C. § 7502(b) (2000). The EPA has also promulgated rules pursuant to CAA § 172(d), 42 U.S.C. § 7502(d). *See* 40 C.F.R. pt. 51 (2001). Native American Tribes may also submit Tribal Implementation Plans. CAA § 301(d), 42 U.S.C. § 7601(d). This Article will only refer to SIPs primarily because the most experience under the Clean Air Act has been with SIPs and the relationship between Native American Tribes and the United States is different from that of the states to the United States and deserves separate discussion. The SIP must include a "comprehensive, accurate, current inventory of actual emissions from all sources." CAA § 172(c)(3)-(4), 42 U.S.C. §§ 7502(c)(3)-(4). The states must also show that implementation of the SIP will make "reasonable further progress," toward attainment of the NAAQS by a date set by the EPA, CAA § 172(c)(2), 42 U.S.C. § 7502(c)(2), obtain required permits prior to construction or modification of a certain source, and meet other requirements. *See* CAA §§ 172(c)(2), 172(c)(5)-(9), 42 U.S.C. §§ 7502(c)(2), 7502(c)(5)-(9).

NAAQS.[141] Better local information can, therefore, help achieve the NAAQS more quickly by targeting polluters better.[142] It can also help do so in a more cost efficient manner by targeting less expensive reductions first.[143]

However, there are several reasons why delegation of all federal authority to implement the Clean Air Act to the states would not work to achieve the NAAQS or economic efficiency. First, too much diversity in ambient air quality or pollution control technology standards imposes repetitive administrative costs, limits the ability of sources to choose their site location, and causes delay and uncertainty for sources as discussed in Part I.[144] Second, the states also have legitimate reasons for not wanting to achieve the NAAQS.[145] For example, states may believe that the EPA set the NAAQS more stringently than necessary to protect the public health or that complying with the NAAQS will impose more social costs than benefits for states or the nation.[146] States may believe that they can and should balance the social costs and benefits of polluting activities for the citizens of their state. States may also simply wish to avoid dealing with the EPA because of the EPA's oversight role.[147] Third, the states may honestly seek to achieve the NAAQS but fail to do so for several reasons. Just as states compete for industry by reducing uncertainties, they may also reduce pollution standards requirements on pollution control technology in order to compete.[148] The complexity, scarce information,

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141. The EPA lacks the authority to reject a state plan to achieve the NAAQS based on technological or economic infeasibility. *See* Union Elec. Co. v. EPA, 427 U.S. 246, 265-66, 269 (1976).

142. *See* Dwyer, *supra* note 67, at 217-19. If the states have existing programs or are prompted to set up one, then this benefits environmental protection and economic efficiency because of local knowledge and more resources available for the task.

143. *See id.*

144. *See* Ackerman & Stewart, *supra* note 8, at 1330-40; Esty, *supra* note 59, at 1495.

145. "In reality, all representatives will have some independent interests. To the extent that they legitimately seek to advance these separate interests, they move up the continuum from the agency role, ultimately toward acting just on their own interests, in effect becoming a principal." Joel Cutcher-Gershenfeld & Michael Watkins, *Toward a Theory of Representation in Negotiation*, *in* NEGOTIATING ON BEHALF OF OTHERS, *supra* note 102, at 28.

146. Lawrence E. Susskind, *The Shifting Role of Agents in Interest-Based Negotiations*, *in* NEGOTIATING ON BEHALF OF OTHERS, *supra* note 100, at 54 ("The agent might acquire new information that leads the agent to realize that the principal has made a miscalculation.").

147. *Cf.* Harrison, *supra* note 18, at 59 ("Even a firm committed to similar environmental regulations may wish to avoid inflexible regulations.").

148. *See* Steinzor, *supra* note 7, at 372-74. Professor Steinzor provides a useful summary of the arguments that states compete on pollution control standards. This does not necessary make competition or its results economically detrimental. It depends on whether there are systematic reasons for believing that state and local governments compromise the public health or will issue, on balance, more suboptimal permits from the societal perspective than the federal government. *See* Richard L. Revesz, *Rehabilitating Interstate Competition: Rethinking the*

and informational asymmetries make it unsurprising that states sometimes err by overestimating the social benefits of a business and underestimating the social cost of pollution. Underestimating the social cost of pollution would seem particularly likely given the presence of externalities.[149] Considering the extent to which economic growth provides immediate and obvious benefits to many voters through jobs and the new services that can be established from increased taxes compared to the uncertain, future risk of harm from increased pollution to many voters, states would systematically overestimate the social benefits compared to the social costs.[150] State governments, like any other agent, will likely overstate the net benefits of their decisions on air quality to the public and federal government.[151]

The federal government has different, sometimes more effective, resources for solving pollution problems.[152] Its greater geographic size and population enables the federal government to incorporate more externalities and moderate the influence of local interest groups.[153] Furthermore, its ability to gather information nationwide, as compared to states' abilities, provides the federal government an advantage in

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"Race-to-Bottom" Rationale for Federal Environmental Regulation, 67 N.Y.U. L. REV. 1210, 1244-47 (1992).

149. *See supra* text accompanying note 88; *see also* Steinzor, *supra* note 7, at 369-70 (discussing transboundary pollution).

150. *See* Dwyer, *supra* note 67, at 227-28; *see also* Esty, *supra* note 128, at 587-97.

151. *See* Giovanni Maggi & Andrés Rodriguez-Clare, *Costly Distortion of Information in Agency Problems*, 26 RAND J. ECON. 675, 675-76, 685 (1995) (noting that agents with private information distort information given to principals for various reasons, and thereby increase costs and decrease social welfare).

152. *See* Steinzor, *supra* note 7, at 367-69, 380-81; Paul S. Weiland, Comment, *Federal Preemption of Environmental Law*, 24 HARV. ENVTL. L. REV. 237, 239-41 (2000). *But see* Dwyer, *supra* note 67, at 226 ("For a generation, policymakers have assumed that states were technically and politically unable to make environmental policy . . . . Over the last generation, state agencies have surpassed federal agencies in resources and often in technical expertise, and many of the most innovative programs now originate in the states. While defects in the state political processes (not to mention interstate externalities) exist, . . . [there exist] similar defects in federal regulatory practice."). Professor Dwyer's conclusion that states may have more technical expertise, if meant in the broadest sense of "more," does not necessarily follow if one accepts either that states have better local information or that more than one agent can produce a number of interesting solutions that the principal alone cannot produce anymore than it necessarily follows that the federal government always makes better decisions or knows more information than states. *See* MASHAW, *supra* note 113, at 30 ("Few human attempts at governance have been unquestionably effective or enduring.").

153. *See* Steinzor, *supra* note 7, at 366-75 (discussing rationalizing principles for the existing role of the federal government). This does not mean, of course, that the federal government always makes better decisions than state and local governments on standards; it means only that on average it does in the current historical situation. If money corrupts the federal process for setting national standards too much, then this analysis may fail.

comparing the risks and benefits of pollution.[154] The federal government's oversight of the states may also assure the public that the states are protecting the environment.[155]

Cooperative federalism may benefit both the environment and economic efficiency because the federal government can use the agency relationship between itself and the states. The Clean Air Act, specifically the NSR Program, allows the federal government to take the "best" result of any of its agents and make the result a new national standard.[156] Diversity and local authority allow the states to test a variety of pollution control methods.[157] The EPA's retention of the right to ratify individual permits and enforcement decisions likely strengthens the bargaining position of the states in imposing pollution control technology standards and other permit requirements.[158] The EPA can also "wink" at necessary compromises with less sacrifice of the overall national goal.[159] The pervasive unknowns, asymmetries, and better local information all

154. *See* Krier, *supra* note 15, at 1230-31.

155. *See* Scholz & Gray, *supra* note 104, at 698 ("[M]onitors paid for by one party are not likely to be credible to the others. Government monitoring provides this public good to augment private monitoring.").

156. *Cf.* Steven D. Levitt, *Optimal Incentive Schemes When Only the Agents' 'Best' Output Matters to the Principal*, 26 RAND J. ECON. 744, 744-45 (1995) (explaining how the principal's schemes to provide incentives to agents might change where "only one agent's output is eventually used by the principal").

157. This is the concept captured by describing states "as laboratories for social and economic experiment." Garcia v. San Antonio Metro. Transit Auth., 469 U.S. 528, 546 (1985).

158. More formally, a ratification requirement "magnifies [bargaining strength] asymmetries, because a ratification requirement is a more potent measure for the stronger part." Hans Haller & Steinar Holden, *Ratification Requirement and Bargaining Power*, 4 INT'L ECON. REV. 825, 826 (1997) (stating that in international negotiations the United States may obtain better terms "just because of the difficulties in obtaining the necessary majority" in the Senate). This is popularly known as the "bear-in-the-closet" strategy in environmental protection. There is also, of course, the possibility that others will refuse to negotiate with the agent because the agent cannot effectively bind the principal. Harrison, *supra* note 18, at 63.

159. *Cf.* Strausz, *supra* note 89, at 338.

> The private nature of the information [obtained from the monitoring process] implies that the monitor has to decide whether to make the information public or to withhold it. This causes delegation to have a commitment-effect. . . . As the monitor, the principal [here the United States] . . . has an incentive to withhold information that indicates that the agent's performance was high [the source unless the State has delegated power] that the agent's performance was high. When the principal employs an independent supervisor [a State], this problem does not occur. . . .

Id. More informally, winking at compromises or the withholding of private information does not commit the United States to the policy adopted by the state or the source. Similarly, the United States can continue to motivate sources elsewhere to do better by not acknowledging that one source has done well.

increase the desirability of not committing the EPA or the federal government to any method too soon.[160]

The use of states as agents can also improve economic efficiency if desired and politically possible. The federal government simply redefines "best" results to include some level of economic efficiency.[161] It has done so explicitly in the pollution control technology standard for attainment areas.[162] Increased economic efficiency already occurs by allowing the states to implement the Clean Air Act[163] and the trigger for NSR. Congress may also change the statutory balance between environmental protection and economic efficiency if it desires. In theory, therefore, cooperative federalism may successfully harmonize the various skills, knowledge, and interests among the states and the federal government.[164]

In practice, however, cooperative federalism costs more and protects less than desired.[165] Information gaps, uncertainty, and asymmetrical information caused the federal government to set high NAAQS in order to provide an adequate margin of safety.[166] The pollution control technology standards were also set to emphasize protecting the environment over economic costs.[167] The states' historical failure to protect ambient air quality prompted distrust of the states' willingness and ability to work toward the NAAQS.[168] Furthermore, the ambient air quality and technology standards must be set high to provide room for high-achieving states and sources. High standards, even impossibly high standards, would impart a sense of urgency and need to the states and thereby promote some improvement.

Unfortunately, the incentives necessary to motivate the highest achieving states impose high costs on all states, not just on the highest

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160. *See id.*

161. *See* CAA § 169, 42 U.S.C. § 7479(1) (2000).

162. *See id.*

163. *See* Dwyer, *supra* note 67, at 228.

164. *Id.* (noting that "present hybrid system of national standards and state implementation and enforcement may be a reasonable accommodation of national and state interests").

165. *Cf.* Trond E. Olsen, *Agency Costs and the Limits of Integration*, 27 RAND J. ECON. 479, 497 (1996) (stating that in a simple production model with private information certain integration costs "may be sufficiently large to act as an effective limit for integrations that are otherwise beneficial").

166. *See* Levitt, *supra* note 156, at 745.

167. *See* Revesz, *supra* note 148, at 1210-11.

168. *See* Dwyer, *supra* note 67, at 223 (noting the need to "jump-start a program of environmental regulation" because of the failure of the states).

achieving states[169] or the state that needs the most environmental improvement. The difference in attainment status lowered the high costs but then the rationale for requiring an expensive permit program and pollution control technology in attainment areas is less compelling: In areas where the NAAQS are met, the air quality is supposed to be safe.[170] Uncertainty to both states and sources results from the EPA's ability to change attainment dates,[171] to impose sanctions on states if they fail to change a SIP,[172] and to require SIP changes in response to modification of any NAAQS.[173] Uncertainty imposes costs on states and lessens the incentive to commit to a particular strategy for fear that the EPA will then increase the standard.[174]

The requirement to use the traditional command-and-control NSR Program[175] with substantial EPA oversight lost most or all of the benefits of using agents.[176] The narrow, written,[177] proscriptive instructions of the NSR Program limit the ability of states to discover equally or more valuable alternatives.[178] It may also prevent the EPA from recognizing the

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169. *See* Levitt, *supra* note 156, at 748. A dual way to describe this issue is that the principal must pay the highest performing agent a higher rent than it pays to other agents. *See* Olsen, *supra* note 165, at 480.

170. *See* CAA § 109(b)(1), 42 U.S.C. § 7409(b)(1) (2000).

171. *See* CAA § 172(a)(2)(A), § 7502(a)(2)(A).

172. EPA may force revisions to inadequate an SIP. CAA § 172(d), 42 U.S.C. § 7502(d). If EPA finds a SIP "substantially inadequate," then it may impose sanctions related to federal highway projects and on other issues. CAA § 172, 42 U.S.C. § 7502; CAA § 179(b)(1), 42 U.S.C. § 7509(b)(1).

173. CAA § 179, 42 U.S.C. § 7509 (dealing with sanctions in nonattainment areas).

174. *See* Olsen, *supra* note 165, at 479-80 (discussing that the principal's inability to commit irrevocably raises integration costs where agents have private information).

175. *See* Prevention, *supra* note 40, at 38,253 ("In the past, EPA has essentially required States to follow a single applicability methodology.").

176. Fisher and Davis discuss the problem as follows:

> For our purposes, it does not matter whether the judgment risk [the possibility that the agent will commit to something that the principal would not have, had the principal been there at the negotiation] arises from misaligned incentives, the agent's incomplete understanding of the principal's preferences, the principal's incomplete understanding of the stakes being negotiated on his behalf, or some other reason. Whatever the cause, the principal's attempt to moderate the judgment risk by giving this type [narrow] instruction produces a potentially more severe risk: that of making premature, ill-informed decisions that diminish the . . . outcomes more favorable to the principal.

Fisher & Davis, *supra* note 100, at 65.

177. *See* Haller & Holden, *supra* note 158, at 840 ("[M]any negotiations deal with highly complex issues, where important details in possible agreements are difficult to foresee. Thus it may be problematic to write down a law or statute that specifies a minimum requirement of the agreement.").

178. *See* Fisher & Davis, *supra* note 100, at 62 ("Narrow instructions may also limit the agent's practical ability to explore creative solutions outside the scope of the original information and thinking that informed the instructions."). "In terms of its effect on the bargaining outcomes,

value of alternative state approaches.[179] When combined with sources that have narrow instructions because they effectively represent the whole company or industry and not just a single source, the effects are "multiplied."[180] The range of acceptable alternatives to legal action for both sources and the EPA decrease dramatically.[181] Legal delay causing economic inefficiency and lessened environmental protection becomes more likely.

Narrow instructions also create legitimate arguments for all governments to blame another government[182] for the economic inefficiency and lessened environmental protection. The federal government cannot reasonably expect to chastise states for perceived failings[183] without lowering the states' motivation to serve as the "eyes and ears" of the EPA.[184] The narrow instructions of the NAAQS and the

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a ratification requirement amounts to reducing the feasible set . . . [of outcomes]." Haller & Holden, *supra* note 158, at 840.

179. *Cf.* Susskind, *supra* note 146, at 53. Consider Susskind's contrary argument:

> If representatives [here States] are trusted by constituents [the principal—here the Federal government], they will be better able to create value [here more environmental protection and economic efficiency], but the more extensively that they [here the States] are involved in creating value, the harder it is to persuade constituents [here the Federal government] that these activities are appropriately advancing their [the Federal government's] interests.

Id. Professor Susskind feels that this dilemma "was overdramatized" because negotiations should create enough value for everyone in the negotiations to settle. *Id.* The "jobs vs. environment" paradigm of environmental protection makes many perceive environmental protection as a zero-sum game where negotiators cannot create more value. People who legitimately believe that the environment has some value extrinsic to humans or involves other fundamental moral concepts may view environmental protection in this manner. Their commitment to environmental protection may result in their becoming environmental regulators and higher-level regulators more often than people willing to make more compromises. Politics also has an element of a zero-sum game about it because raw power—not the power to do something constructive but power in the sense of doing what you want and preventing the other person from doing what they want—seems very much a zero-sum game theoretically.

180. Fisher & Davis, *supra* note 100, at 67.

181. *Id.*

182. States feared being blamed for poor results by both the public and the federal government. *See id.* at 54. On the other hand, states could legitimately blame the federal government for any failure because severely limiting instructions might have "prevented from exercising . . . [their] . . . creativity, flexibility, and professional judgment to get the best possible deal." *Id.* at 62. In the event itself, the states and the federal government often blamed one another. Steinzor, *supra* note 7, at 375-82.

183. "Corrections" of states by the federal government may embarrass states and state regulators. Steinzor, *supra* note 7, at 388-89 (referring to in the case of overfiling).

184. *Id.* at 389. Political differences make the problem much worse. There is a more formal way of stating this.

> When the agent learns new information that suggests the original instructions ought to be reconsidered, he is likely to consider the risks and transaction costs of seeking new instructions from the principal. The more specific—and positional [rather than based

NSR Program alone give the impression that the federal government does not generally trust the states.[185] Successfully receiving federal delegation removes some of the implication of distrust for an individual state, but requiring federal approval of SIPs and SIP changes indicates that a level of distrust continues. The extensive federal oversight of the NSR Program does little to relieve the "fear that the principal intends to micromanage the agent"[186] or that the states will experience high transaction costs in serving as agents of the EPA.[187]

The federal government must also respond strongly to any widespread failure or open defiance by a state if it expects states to pursue the federal government's goals rather than their own goals.[188] Slippages in attainment dates[189] and the difficulties the EPA experienced when it tried to impose its own federal implementation plan in California[190] are two examples of the federal government losing credibility with states and sources. More modest sanctions[191] and

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> on interests or goals to be achieved]—the original instructions, the greater the transaction costs of renegotiation the agent may anticipate. This, in turn, is likely to inhibit the agent's creativity. . . . In effect, the agent declines to explore even modestly 'out of bounds' ideas because he considers it likely that the principal will reject them anyway.

Fisher & Davis, *supra* note 100, at 67.

185. *See id.* at 62 ("The agent also fears being accorded too little authority. The agent, of course, does want to be taken seriously by the other side.").

186. *Id.*

187. *Id.* This can be viewed as a problem of the principal's reputation. *See* Philippe Aghion & Jean Tirole, *Formal and Real Authority in Organizations*, 105 J. POL. ECON. 1, 3 (1997) (stating that an agent will achieve the principal's goals where "the superior . . . develop[s] a reputation for not intervening in matters that are relatively inconsequential to her and for intervening only in important matters").

188. In the private sector, when "agents fail [to put the interests of the principal first where there are real trade-offs between advancing the interests of the agent and advancing the interests of the principal], they won't be agents for very long." Susskind, *supra* note 146, at 1154. For political, constitutional, and other reasons, the federal government may not be able to "fire" a state under the Clean Air Act. Even if the federal government could do so, the state would continue to exist and to advance any of its interests different from or contrary to the federal government's interests. The federal government may legitimately decide that it can achieve its goals better by keeping a state as its nominal agent. The federal government may gather information or support from dissidents within the state, encourage those dissidents in hopes of realigning the state more consistently with the federal government's interest, and freeing the state from any political, fear of losing funding, or other constraint on the state's ability to act contrary to the federal government's interest.

189. *See* PERCIVAL ET AL., *supra* note 58, at 557 (noting that "states also have varied considerably in their progress toward attainment of the standards").

190. *Id.* at 581-82.

191. *Id.* at 576.

standards[192] that can be successfully imposed lead to more credibility over time than the initial approach under the Clean Air Act.

The conflicting roles of the EPA weaken both environmental protection and economic efficiency. In its role as principal, the EPA must support the states in their regulation of sources. If sources may successfully appeal to the EPA for relief from state decisions, then the EPA has undermined its agent's credibility and encouraged wasteful appeals. To ensure credibility of the state's threat in enforcement actions, the EPA must act more negatively toward sources in enforcement cases than the state would have done.[193] Historically, the EPA has generally done so.[194] Delay by the federal government—if followed by credible action—may serve to increase the cost of dealing with the EPA by increasing lost opportunity costs.[195] On the other hand, if the EPA does not act or, worse, compromises more than the state, the state's credibility will be greatly undermined with that source and probably with other savvy sources.[196]

In its role as principal overseeing the actions of its agents in achieving the NAAQS, the EPA may wink at some necessary compromises by the states. The stakes are much higher when the EPA brings its own action.[197] Failing to make reasonable compromises in litigation risks the EPA's credibility through losing or, even when it wins, appearing irrational and prompting resistance by states and sources.[198]

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192. *See* Dwyer, *supra* note 67, at 217.

193. *See* Steinzor, *supra* note 7, at 388. Professor Steinzor notes that the EPA has acted with "missionary zeal" in enforcement cases. *Id.* Sophisticated states and sources with powerful incentives for discovering inconsistencies eventually find them whether hidden or not and whether actual or fanciful.

194. *Id.*

195. EPA delay is, however, problematic. It is not only economically costly, but also politically costly because it seems irrational and drives sources and states together against the EPA.

196. *See* Steinzor, *supra* note 7, at 444.

197. *See* Harrison, *supra* note 18, at 55. The EPA may do so to directly regulate an area as principal, to support a state action, or to "correct" a state error.

198. Harrison asserts:

> Proponents of cooperative enforcement argue that although frequent resort to the stick may compel greater compliance among firms inclined to evade the law; it risks destroying the good will of a much larger number of law-abiding firms, who resent being treated like criminals. Such firms may respond with perfunctory compliance with the narrow letter of the law rather than public spirited efforts to comply with the intent of the law. At worst, a 'culture of resistance' may emerge, in which firms help each other identify and exploit loopholes in regulations.

Id.

The extremely large number of agents led to coordination failures of cooperative federalism.[199] The different constituencies of the fifty individual states, and the different political parties holding power in individual states and the federal government[200] make inconsistency and conflict inevitable in administering a complex program like the NSR Program.[201] Making consistent, credible discriminations among states is a monumental task in addition to the massive task of determining how to achieve the NAAQS.[202] Conflicts would gradually reduce trust and cooperation between all governments. The success of California in decreasing automobile air emissions suggests that fewer agents can be better.[203]

Efforts to increase trust and cooperation have only partially succeeded.[204] First, the EPA's piecemeal approach to increasing trust and cooperation in the NSR Program has created more complexity and more confusion.[205] Second, both the NAAQS and pollution control technology standards are biased toward increasing strictness.[206] The administrative and political costs of changing the NAAQS mean they are rarely changed.[207] Pollution control technology standards change more easily and often but the NSR Program requires more protective and usually more costly controls.[208] Slightly less protective but much less expensive pollution control technologies rarely—if ever—get selected.

Using the states as agents failed to work as well as hoped because of choices and incentives that worked contrary to the goal of achieving the NAAQS with an acceptable level of economic efficiency,[209] but some

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199. *See* Steinzor, *supra* note 7, at 380-81.

200. Both the EPA and the states have dual roles protecting the environment and advancing other, more political, goals. *Cf.* Cutcher-Gershenfeld & Watkins, *supra* note 145, at 29.

201. *See* Steinzor, *supra* note 7, at 380-81. More formally, the "crucial assumption of heterogeneity" in a large group "seems a very weak assumption in real world settings." Haller & Holden, *supra* note 158, at 839.

202. *See* Steinzor, *supra* note 7, at 376-77.

203. *See* Esty, *supra* note 128, at 594.

204. Steinzor, *supra* note 7, at 375-82.

205. *See generally* Prevention, *supra* note 40 (discussing how the EPA gradually added exclusions and exceptions to the basic trigger). Others have argued that this "fine-tuning" is an advantage. *See, e.g.*, Wagner, *supra* note 22, at 106-09; *see also* Latin, *supra* note 29, at 1269. Limited fine-tuning of regulations may help despite the information gathering costs they create. The "fine-tuning" of the NSR Program seems to have passed that point.

206. *See* Prevention, *supra* note 40, at 38,252.

207. *See* PERCIVAL ET AL., *supra* note 58, at 552. The difficulty of changing an existing NAAQS means that an economically inefficient or unnecessarily protective NAAQS remains in place. Delay, less enforcement, and other indirect methods must be used to incorporate new information about cost and public health.

208. *See* Wagner, *supra* note 22, at 105-07.

209. *See* Dwyer, *supra* note 67, at 227-28.

tradeoffs are unavoidable in areas of delegation.[210] Clarification and perhaps elimination of some roles of the federal government by reducing the number of agents used by the federal government may help achieve the national goal, although the incentives for uncooperative behavior will always remain strong. However, reducing the effective number of agents may require setting the NAAQS less protectively and preempting all other standards.[211] Only a few, highly motivated states would have the opportunity and incentives to create new, better pollution control.[212]

IV. CAP-AND-TRADE PROGRAMS INCREASE ECONOMIC EFFICIENCY AND ENVIRONMENTAL PROTECTION BY ELIMINATING OR REDUCING COORDINATION FAILURES BUT REQUIRE VIGOROUS ENFORCEMENT TO SUCCEED

Cooperative federalism and the trigger for NSR create a system where multiple layers of government may review and possibly veto changes in how individual sources operate.[213] Complexity, uncertainty, delay, economic inefficiency, and less environmental protection result.[214] Cap-and-trade programs can simultaneously improve economic efficiency and increase environmental protection by giving sources incentives to make use of their private information to reduce emissions,[215] but cap-and-trade programs need vigorous enforcement in order to ensure credibility and environmental protection.[216]

Cap-and-trade programs make use of the unrevealed information of sources by giving incentives to sources to use the information privately.[217] This works if the sources are in the best position to determine how to reduce emissions and have proper incentives to do so.[218] The disincentives to reveal information inherent in the traditional command-

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210. *See* Aghion & Tirole, *supra* note 187, at 10-11 (noting that delegation involves a tradeoff between providing incentives for an agent and loss of control for the principal).

211. *See* Latin, *supra* note 29, at 1271.

212. Obviously, this would raise issues of justice.

213. *See* Dwyer, *supra* note 67, at 214.

214. *See* Steinzor, *supra* note 7, at 367-69.

215. Allowing sources to choose their own pollution control technology is the ultimate decentralization. *See* Latin, *supra* note 29, at 1271 (acknowledging the importance of decentralization where there is scarce information in an article otherwise generally supporting the NSR Program).

216. *See* Harrison, *supra* note 18, at 54 ("Cooperation is predicated on some measure of agreement or consent. However, when one is considering agreements between governmental and nongovernment interests, the nature of that consent requires closer examination. This is because government, unlike private actors, has legitimate authority to coerce others (subject of course to constitutional limitations).").

217. *See id.* at 57-58 (referring to the Netherlands).

218. *See* Strausz, *supra* note 89, at 337.

and-control NSR Program become less relevant in deciding how to control pollution.[219] To the extent trading technology or reducing pollution increases profit, technology transfers and emission reductions will occur.[220] Improvements in technology may occur more quickly because a source has an economic incentive to do so.[221] Even when noneconomic reasons justify emission reductions, they may occur more efficiently if sources have the proper incentives.[222]

Eliminating the complexity of the NSR Program should improve economic efficiency and perhaps environmental protection. Sources need only determine the tradable emission rights available from the government and can research the prices of tradable emission rights and pollution control themselves.[223] Absent readily available information about relevant pollution control technology, sources have the most expertise and, importantly, the most knowledge about building and operating their plants.[224] Using this information, sources choose the

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219. *See id.*

220. *See* Harrison, *supra* note 18, at 59.

221. *See id.* If the profit cannot induce any source or technology firm to enter the market, no improvements will occur. *Id.*

222. The same caveat as in the immediately above footnote applies here.

223. *See* Wagner, *supra* note 22, at 100-02. Professor Wagner argues that technology based standards are easier because "pollution sources have a head start in understanding their compliance requirements," result in clearer permits, and allow for better regulatory oversight because standards are based "on environmental conditions and cost/benefit analysis." *Id.* Parts II and III, *supra*, provide a full response to this argument, but a brief, direct response may highlight the differences between her analysis and mine. In response to the first point, sources may gather information on current pollution control technology that might be required, but this does not mean the regulatory agency will require it. Furthermore, the administrative agency must expend considerable resources in order to ascertain the permit conditions necessary to ensure the pollution control technology is working properly and to make those permit conditions enforceable in a situation where the source usually has better information than the agency. It also does not respond completely to the point that sources have the most expertise and private knowledge in making decisions about economic efficiency and therefore should have the freedom to choose how to comply. Second, comparing a single set of verified numbers seems very easy and certainly easier and clearer than describing how a source will be built and operated. Third, technology based standards differ based on whether the area meets the NAAQS and have always reflected some sort of cost/benefit analysis both through requiring different standards and, most explicitly, in determining BACT in attainment areas. However, I do not suggest that the proper test for individual sources is to weigh the social costs and benefits of its operation.

224. This means that arguments based on pollution control technology easing informational burdens apply in a limited subset of situations where the federal and state governments can and have helped provide information in the past. The government may lose knowledge because sources keep more information private, but still the government will likely have enough information to refer sources to similar sources who can then provide the information.

amount of pollution,[225] the pollution control technology, and the time to install the technology.[226]

Cap-and-trade programs may also allow better coordination between the individual states and the federal government by clarifying or limiting roles. Once the initial cap is set, states and the federal government will likely have less interaction because sources must do more. Conflicts should diminish by reducing federal oversight of SIPs and the NSR Program in delegated states. States and the federal government will disagree over whether to enforce against individual sources and, if so, the proper remedy,[227] but the issues become more focused: Has the source violated some aspect of the cap-and-trade program? If so, how should the government react? Governments will often find it easier to compare the amount of tradable emission rights against the actual emissions rather than determining whether the source installed and operated the proper pollution control technology under the NSR Program.[228] Enforcement raises fewer questions and disagreements over fundamental policy issues such as public health, economic growth, and autonomy than questions over the proper regulatory method and the setting of ambient air quality standards.[229] Enforcement emphasizes the governments' mutual interest in punishing scofflaws. The agglomeration of mutual interests and separation out of conflicting interests encourages states to give their better information about local sources and conditions to the federal government.[230] More cooperation between states and the federal government should result in improved enforcement and more environmental protection.

Besides improving economic efficiency by reducing the costs spent by states and the federal government in implementing the Clean Air Act, sources may also benefit from better cooperative federalism. It will reduce the uncertainty and costs that sources face when deciding what they must do to comply. Not only will this increase economic efficiency,

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225. The EPA recommends changing from the actual-to-potential methodology to an actual-to-future actual methodology for all. *See New Source Review*, *supra* note 126, at 3-4.

226. "The flexibility of voluntary approaches, particularly with respect to timing of introduction of environmental measures, also promises greater cost effectiveness for business than inflexible regulation." Harrison, *supra* note 18, at 58. Thus, a voluntary approach justifies eliminating long-term grandfathering.

227. The most visible and well-known examples are when the federal government "overfiles" to change or reverse a decision by a state with regard to an individual source. Steinzor, *supra* note 7, at 450.

228. *See* PERCIVAL ET AL., *supra* note 58, at 987 (noting that monitoring violations are easier to enforce).

229. *See* Harrison, *supra* note 18, at 53.

230. *See* Dwyer, *supra* note 67, at 228.

it may help the environment by encouraging wavering, reputable sources[231] to comply by eliminating any competitive advantage gained through noncompliance.[232] Consequently, increasing overall compliance with the Clean Air Act benefits the environment.[233]

This will not happen magically.[234] Asymmetrical information, uncertainty, historical distrust, and incentives for uncooperative behavior remain even in cap-and-trade programs.[235] It is unlikely that cap-and trade programs will work for every pollutant or everywhere due to either hazardous local effects or market failures. The continued existence of a traditional command-and-control NSR Program for some pollutants in some places will likely impede the development of trust and cooperation in cap-and-trade programs. Attempting to simplify and desensitize the trigger for NSR in the command-and-control program runs great risks for environmental protection,[236] but may, on balance, increase both economic efficiency and environmental protection through increased trust and cooperation in all programs.[237] The movement to give states and local governments more autonomy[238] can also conflict with cap-and-trade programs if the movement interferes with the internalization of social costs or the creation of competitive markets.[239] The same lack of information about the economic situation of sources hinders the government in providing effective and economically efficient financial incentives for sources to cooperate and benefit the environment.[240]

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231. Harrison, *supra* note 18, at 58 (stating that the free riders "may undermine the commitment of those firms initially inclined to participate"). Professor Harrison also examines how free riders and self-selection undermine the validity and reliability of the results in two voluntary compliance programs. *Id.* at 59-63.

232. *See* Steinzor, *supra* note 7, at 462-63.

233. Only empirical research can determine whether this actually happens.

234. Scholz & Gray, *supra* note 104, at 714 (noting the "need to develop a better understanding of the role government plays in facilitating cooperative agreements").

235. One great danger in evaluating all environmental programs is comparing a program to a utopian alternative. *E.g.*, Harrison, *supra* note 18, at 57 (referring to traditional command-and-control programs).

236. Source control of information and lack of governmental resources may lead to widespread noncompliance by sources.

237. The lack of reliable information about the effects of simplification and desensitization makes any benefit to the environment highly speculative. It requires trust and the recognition that reform might fail.

238. This is a well-known, legitimate goal of government that may justify both a reduction in economic efficiency and in environmental protection. Harrison, *supra* note 18, at 59.

239. "Governments routinely balance multiple policy objectives in choosing policy instruments." *Id.* at 53 (citation omitted).

240. *See id.* at 62 (discussing how the low rate of participation in a Canadian voluntary compliance program prompted calls for regulation on sources that did not voluntarily comply).

The government must assure itself that it knows how much of the pollutant the source emits, when the source emits the pollutant, how best to monitor the emissions,[241] and how the pollutant disperses in the atmosphere. The government also needs any information on health effects that the source may have, especially any health effects on local populations. Scientists tied to the source or the industry may have better, private information on all of this. As in the present system, however, revealing trade secrets, the existence of previously undetected pollutants, or the greater adverse health effects of a pollutant increase costs and serve as disincentives for sources to share relevant information with the government.[242]

The disincentives to reveal information place a limit on how much the government can reasonably expect a source to reveal voluntarily. New pollutants should not be traded absent an extraordinary situation. Pollutants that may have unknown health effects or have health effects about which there is great uncertainty should not be traded unless the cap protects the public health against these uncertainties by reducing pollutants more than current information suggests is economically efficient. Pollutants that cannot be adequately monitored by sources or verified by the government should not be traded. Finally, only the government has an incentive to capture health and other effects not easily priced in a market.

Knowledge of the geography of a pollutant's effects becomes very important. Trading emission rights for pollutants with severe local effects on a regional or national level will enable the source to benefit from externalities.[243] Setting caps on a local level will increase transaction costs and eventually, prohibitively so if it involves too many local governments.[244] If pollutants have effects in other states and countries, then regional or national programs make sense.[245] The benefits from a competitive market may also justify regional or national standards

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241. "Standard agency theory tells us that optimal incentive schemes make use of all available information related to the agent's [here the source monitoring its environmental performance on behalf of the government and public as well as itself] performance." Strausz, *supra* note 89, at 337. Another expert, Mr. Zinn, provides a thorough overview of cooperative versus coercive approaches to environmental violations. *See* Matthew D. Zinn, *Policing Environmental Regulatory Enforcement: Cooperation, Capture*, 21 STAN. ENVTL. L.J. 81, 83 (2002).

242. *See* Strausz, *supra* note 89, at 338.

243. *See* Esty, *supra* note 59, at 1503-04.

244. The EPA's recommended plantwide applicability limits (PALs) are essentially cap-and-trade programs limited to one source. *See New Source Review*, *supra* note 126, at 1.

245. Either state compacts or the federal government can address transboundary pollutants.

and programs.[246] The effects and characteristics of the pollutant in the atmosphere should determine the size of any market and not arbitrary political boundaries or theoretical ruminations about who can best balance social costs and benefits.

It is less important that the government knows the social benefits of the polluting activity in a cap-and-trade program. The market for the service provided or good produced by the polluting activity will likely capture most of the social benefits. A source can more easily capture the beneficial externalities it bestows through negotiation than an individual can recoup his or her lost health. Nonetheless, accurate knowledge of the social benefits of the polluting activity can prevent governments from paying too much for the polluting activity.

Most importantly, the EPA and the states must increase the certainty of enforcement for noncompliance. Sources must have few incentives to violate or avoid the cap-and-trade program.[247] The self-monitoring required under the Clean Air Act[248] makes this goal more difficult. Self-monitoring is another cooperation game because the government must induce sources to report possible violations.[249] Besides the obvious disincentives for sources to report themselves, the difficulty of accurately observing pollution makes cooperation more difficult.[250] The lack of governmental resources has always meant that sources must self-monitor.[251] Comparing a source's actual emissions to the source's available tradable emissions rights appears easier than it is. Behind this simple comparison are opportunities for sources to manipulate data; continuous monitoring is never absolutely continuous and monitors can be avoided. Machines can break down or be tampered with and numbers can be manipulated. Accounting practices can multiply rights and shift emissions. It remains easier to determine compliance in a cap-and-trade program than in a technology-based system,[252] but this does not

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246. These benefits raise issues, of course, about the justice of any hot spot.

247. *See* Scholz & Gray, *supra* note 104, at 697 ("What is critical is that the resultant solutions [from contentious rulemaking process] must ensure that all relevant parties who could undermine the agreement are better off abiding by the proposed rule than they would be by undermining it.").

248. *See* PERCIVAL ET AL., *supra* note 58, at 986-87.

249. *See* Scholz & Gray, *supra* note 104, at 697-98.

250. *See* Steinzor, *supra* note 7, at 391-95. Professor Steinzor demonstrates that even states have severe problems gathering enough information to know whether sources are violating the Clean Air Act. PERCIVAL ET AL., *supra* note 58, at 986-87.

251. "There are approximately 20,000 sources that would be classified as major under the Clean Air Act, and many more stationary sources that are not large enough to be called major." NSR 90-DAY, *supra* note 34, at 7.

252. *See supra* text accompanying note 188.

completely eliminate the opportunities or incentives to free-ride.[253] Sources can help themselves by volunteering credible information about its pollution and pollution control technology.

By explicitly including economic efficiency in determining pollution control technology, cap-and-trade programs may legitimize noncompliance in ways that technology-based pollution control programs do not. In both programs a source may decide to violate the law because the expected value of noncompliance exceeds the expected value of compliance. In a cap-and-trade program, however, the source makes exactly the same type of decision in determining how best to comply as when it determines whether to comply: What is the most economically efficient way to operate the source? Not only sources will argue that a source should choose to violate the law when expected benefits to society as reflected in the market outweigh all the expected social cost of its pollution.[254] In other words, the penalty becomes a tax where the failure to pay the tax is the wrong rather than the emission of a pollutant.[255]

Placing any philosophical differences about human use of the environment to one side, both the sources' and governments' lack of information about the social cost of pollution makes it difficult to set a penalty equal to the social cost of any violation.[256] As previously discussed, sources lack nonmarket information about the social cost of pollution and have limited incentive to discover or reduce it.[257] Governments have greater incentive and theoretically greater ability to discover and reduce social cost.[258] The social cost of pollution varies, however, not only with the amount emitted by a particular source but with the amount emitted by all sources.[259] The emissions from any one violation may have little social cost.[260] In contrast, the social cost of the emissions of many violations may impose great costs on society.[261] The one extra cow grazing plunges the commons towards exhaustion.[262]

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253. *See* Harrison, *supra* note 18, at 58; *see also* Scholz & Gray, *supra* note 104, at 698.
254. *See* Ronald H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 44 (1960).
255. *See id.*
256. *See id.*
257. *See* Strausz, *supra* note 89, at 338.
258. *See* Coase, *supra* note 254, at 44.
259. *See id.*
260. *See id.*
261. *See* ROBERT GIBBONS, GAME THEORY FOR APPLIED ECONOMISTS 27 (1992).
262. *See id.*

The government can and should increase inspections to discover violations.[263] Inspections provide important information to the government about emissions.[264] Even without penalties inspections may increase compliance through disclosure of violations to the public, education, and persuasion.[265]

The role and amount of penalties in assuring compliance proves more difficult to analyze. Penalties of some amount may increase the credibility of cap-and-trade programs to the public.[266] The Clear Skies Initiative has proposed an "automatic" penalty to increase the certainty of punishment, but this will not always deter violation.[267] Some sources will free ride and violate because they expect the government to fail to catch them every time and accordingly decrease the expected value of any penalty.[268] Where violations allow increased production of highly profitable goods, sources will have great incentives to violate.[269] The profits could run into the hundreds of millions. Criminal penalties may deter some violators but the balancing of economic costs and environmental regulation may make criminal enforcement difficult. Lax enforcement may discourage reputable sources.[270]

It may seem that the most effective way to prevent sources from treating penalties as part of the cost of operation is to remove all incentive for sources to violate by collecting the full economic benefit, including any profit or reductions in losses,[271] made by the company from violating the Clean Air Act and not just the cost of purchasing emission

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263. *See* Peter J. May & Soren Winter, *Regulatory Enforcement and Compliance: Examining Danish Agro-Environmental Policy* 20-21 (Aug. 10, 2002), *available at* http://depts.washington.edu/ampol/Danish.shtml (noting that frequent inspections with established priorities help ensure compliance in the study).

264. *See* Scholz & Gray, *supra* note 104, at 697 (noting that inspections decreased workplace injuries in certain circumstances).

265. *See id.* at 713 (referring to OSHA).

266. *See id.* at 703 (referring to OSHA).

267. Automatic penalties may exceed the social cost as well by decreasing economic efficiency for that source, but they will protect the environment.

268. *See* Brehm & Hamilton, *supra* note 53, at 446 (noting that firms compare the marginal cost of compliance with the marginal benefits of compliance).

269. Harrison, *supra* note 18, at 59 (citation omitted).

270. *See* Steinzor, *supra* note 7, at 352-53.

271. "The prospective benefits of participation in a voluntary program from industry's perspective will differ depending on whether or not the industry has financial incentives to pursue environmental objectives." Harrison, *supra* note 18, at 59. The government should not design an "[e]nforcement program designed solely to maximize expected penalties imposed by government inspectors" if the program causes the government to "overlook many effective compliance-inducing techniques based on facilitation." Scholz & Gray, *supra* note 104, at 714; *see also* Zinn, *supra* note 241, at 83, 86 (discussing that the government has and should employ a variety of cooperative and coercive environmental enforcement mechanisms).

rights or installing pollution control technology. This is especially true in nonattainment areas where the public health is not protected with an adequate margin of safety. The penalty does not become Draconian simply because it may be very large. Noncompliance can bring huge profits when it affects production of a good.

More effective penalties increase the confidence of the government and the public that sources will not violate the Clean Air Act or impose unexpected social costs because of uncertainty and lack of information. The more confidence the government and the public have that sources will comply, the more likely the government will adopt cap-and-trade programs that benefit sources.[272] The violations of unethical sources will reduce the number of governmental confidence in all. Less confidence means more command-and-control regulation.

The question should not be how to punish the individual source, but how to best reduce violations. The governmental cost in bringing an action to recover large penalties or lost profit will be substantial and may result in more violations and emissions than a smaller, automatic penalty. Collecting lost profits may discourage employees[273] from reporting their employers' violations and otherwise cooperating with their employer from fear of retaliation or plant shutdown.[274] It will be legally risky without legislation that expressly addresses this issue.[275] More so, it will be intrusive. It will be divisive because the benefit of noncompliance can legitimately be argued as equal to the costs avoided rather than the profits made. It will probably bring conflict between different political entities. Finally, the government must gather the private information necessary to prove that amount of profits. Whether the social benefit exceeds the cost from selectively imposing high penalties or collecting lost profits is an uncertain, political question.[276]

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272. The history of the traditional command-and-control NSR Program can be viewed as an effort to gain enough credibility with sources so that they would act in more socially desirable ways.

273. See discussion *infra* Part II about reducing or removing penalties for voluntarily reporting and resolving violations.

274 *See* Scholz & Gray, *supra* note 104, at 702-03. This argument assumes, of course, that workers and other individuals associated with the source have or could have an important role in enforcing the CAA. There is some evidence they do. *See* PERCIVAL ET AL., *supra* note 58, at 987. In any event, the main point is that regarding the source as a unified entity ignores the principal-agent issues within the source and the possibility of exploiting them for improving the environment or at least not making it worse.

275. The CAA presently states that "the economic benefit of noncompliance" is one of several criteria in setting penalties. CAA § 113(e)(1), 42 U.S.C. § 7413(e)(1) (2000).

276. If society decides that the costs outweigh the benefits then it provides a good counterargument to those who seek to keep the automatic penalties low for any reason.

Cap-and-trade programs may increase economic efficiency and environmental protection in practice by eliminating some coordination failures and promoting cooperative behavior. Governments must work cooperatively, however, to vigorously enforce cap-and-trade programs to avoid the benefits of such programs from flowing only to sources.

V. CONCLUSION

Cap-and-trade programs like the Clear Skies Initiative have great promise to benefit both the environment and the economy[277] because they avoid or reduce some of the coordination failures in the traditional command-and-control NSR Program. Limits on governmental knowledge and on confidence in whether sources will comply require vigorous enforcement to assure that cap-and-trade programs work to protect the public health in an economically efficient manner. Otherwise, the cost of violating the Clean Air Act becomes simply another factor of production.

277. The EPA's recommendations to use PALs and to change the NSR trigger should also help so long as sources have adequate reasons to comply.