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# REGULATING WITH A CARROT: EXPERIMENTING WITH INCENTIVES FOR CLEAN AIR\*

## INTRODUCTION

The Clean Air Act,<sup>1</sup> like most traditional regulatory schemes, was implemented by imposing specified standards, which require specific technology, on certain categories of polluters. Traditional regulatory systems which use penalties to induce compliance are often called "command and control" regulation.<sup>2</sup> Traditional regulation is often blamed for hindering economic growth.<sup>3</sup> However, in 1976 the Environmental Protection Agency (EPA) promulgated a policy to accommodate economic development and the Act's goal of eliminating health hazards posed by air pollution.<sup>4</sup> The policy, known as the "emission offset policy," was an attempt to use economic incentives to induce compliance with regulatory aims.<sup>5</sup> This policy, revised in 1979, was advocated as an innovative model mechanism for regulation.<sup>6</sup>

The provisions of the emission offset policy "embody the traditional 'carrot and stick' philosophy by creating incentives" for

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1. The Clean Air Act, 42 U.S.C. § 7409(b)(1) (Supp. IV 1980). Originally the 1967 Air Quality Act, Pub. L. No. 90-148, § 107(g), 81 Stat. 485 (1967) was referred to as the Clean Air Act after the 1970 amendments, Pub. L., No. 91-604, § 109(b)(1), 84 Stat. 1676 (1970). The Clean Air Act Amendments of 1977, Pub. L. No. 95-95, § 101-19, 91 Stat. 685 (1977), recodified the entire statute at 42 U.S.C. §§ 7401-42 (Supp. IV 1980) [hereinafter cited as the Act].

2. See, e.g., Drayton, *Smarter Regulation*, 6 EPA J. 6 (Feb. 1980); Schultze, *The Public Use of Private Interest*, 254 HARPER'S, May 1977, at 43; Tucker, *Marketing Pollution*, 262 HARPER'S, May 1981, at 31.

3. *Id.* at 33, 36.

4. For a statement of the accommodation goal, see the Emission Offset Interpretative Ruling, 41 Fed. Reg. 55,524 (1976).

5. Drayton, *Getting Smarter About Regulation*, HARV. BUS. REV. July-Aug. 1981, at 38, 46.

6. See, e.g., the former EPA Administrator in Costle, *Current Developments*, 9 ENV'T REP. (BNA) 1708-09 (Jan. 12, 1979). See also Drayton, *supra* note 5, at 38.

pollution reduction.<sup>7</sup> In effect, incentives are created by establishing a price on the right to pollute.<sup>8</sup> Theoretically, a relatively high price will be set on pollution rights by the trading of a limited amount of rights among polluters. Monetary incentives will motivate polluters to clean up efficiently and voluntarily rather than pay the higher cost of purchasing a right to pollute.<sup>9</sup> Polluters facing a high cost of abatement may, in effect, pay another polluter who can abate emissions at a lower cost. Some economists and advocates of incentive-based regulation argue that this approach is more effective,<sup>10</sup> efficient,<sup>11</sup> and equitable<sup>12</sup> than traditional governmental regulation.<sup>13</sup> An experiment with incentives, this policy could be expected to use voluntary, less costly compliance to accomplish the regulatory aims of reducing health hazards.

In practice the benefits of trading pollution rights have not reached these expectations. While on its face the policy permits economic development, the provisions are still an impediment to

7. *New England Legal Foundation v. Costle*, 475 F. Supp. 425, 437 (1979).

8. See Comment, *Who Owns the Air? The Emission Offset Concept and Its Implications*, 9 ENV'T L. 575, 593 (1979) [hereinafter cited as *Who Owns the Air?*]; Comment, *Increment Allocation Under Prevention of Significant Deterioration: How to Decide Who Is Allowed to Pollute*, 74 NW. U.L. REV. 936, 949 (1980) [hereinafter cited as *Increment Allocation*].

9. J. Hoffman, *How to Reduce the Costs of Achieving and Maintaining Air Quality Standards in Metropolitan Areas 5-7* (available from Office of Planning and Evaluation, Environmental Protection Agency). See also Comment, *The Tradeoff Policy: Solution to Dilemma of the Clean Air Act?*, 1 HARV. ENV'T L. REV. 352, 375 (1976).

10. In policy analysis use, "effectiveness" of a policy refers to its success in achieving its goal.

11. In policy analysis terms, "efficiency" refers to the cost of implementing a policy. "Efficiency," for the purpose of this Comment, is limited to the administrative cost of the emission offset policy. Economically efficient reduction is a goal of this policy. Thus it is addressed under "effectiveness."

12. In policy analysis use, "equity" is the fairness of the distribution of benefits and costs of a policy among the intended targets of regulation.

13. See, e.g., Calvo y Gonzalez, *Markets In Air: Problems and Prospects of Controlled Trading*, 5 HARV. ENV'T L. REV. 377 (1981); Costle, *supra* note 6; Drayton, *supra* note 5; Hoffman, *supra* note 9; *Increment Allocation*, *supra* note 8, at 948. Note that EPA has not termed the right to an offset as "property."

Calvo y Gonzalez examines several potential models of regulation and concludes that a mixed regulatory and proprietary system is desirable. He views the policy as a step in the progression from a "commons" ownership of the air to public ownership, and, with this policy, to private ownership. Whatever the nature of the rights created, the focus of this Comment is whether the experiment has demonstrated thus far that private market forces can be used to successfully supplement traditional regulation.

industrial expansion, especially in older, industrialized cities.<sup>14</sup> Further, few banking operations have been established. Without active trading, markets have not set prices high enough to stimulate pollution reduction.<sup>15</sup> Like the hierarchical structure of traditional regulation, the offset trading theory was developed on a federal level and implemented by state and local governments. As a result, differing priorities developed and remain unresolved, while the controls on trading have become loopholes.<sup>16</sup>

These failures are significant in evaluating the emission offset policy as an experiment with incentive-based regulation. The flaws in this experimental policy might be argued to be a result of inherent faults in incentive-based regulation. Alternatively, fine-tuning the provisions implementing this policy might be the solution. After examining the development of the policy in Sections I and II of this Comment, the policy's effectiveness, efficiency, and equity are critiqued in Section III. The conclusions drawn are: 1) The policy's failures result from implementation flaws which are not necessarily inherent in the concept of incentive-based regulation; and 2) Adjustments in the implementation of the policy could result in more effective incentives through active markets. Examining this model of incentive-based regulation provides important insights into the difficulties of creating market-based regulation. EPA is seeking to expand the applications of the concept.<sup>17</sup> While expanding the concept, EPA could also modify trading controls to promote the necessary markets in offset rights. Only active, controlled trading can realize the policy's theoretical potential of effective, efficient, and equitable attainment of the statutory goal of clean, healthful air.<sup>18</sup>

## I. EVOLUTION OF REGULATORY INCENTIVES FOR CLEAN AIR

The Clean Air Act established National Ambient Air Quality Standards (NAAQS) for major pollutants and divided the nation

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14. 44 Fed. Reg. 3274, 3282 (1979) codified at 40 C.F.R. § 51 app. S (1980) (the emissions offset policy). *See also infra* text accompanying notes 116-37.

15. *See infra* text accompanying notes 165-204.

16. *See infra* text accompanying notes 138-68.

17. Conversation with Michael Levin, Head of EPA's Regulatory Reform Staff (Sept. 1981) [hereinafter cited as Levin Conversation]. According to Mr. Levin, various expansions of controlled trading are being considered, from generic bubbles requiring only state approval to using offsets to "net out" of review. *See also* N.Y. Times, Apr. 3, 1982, at 7, col. 1.

18. 42 U.S.C. § 7401 (Supp. IV 1980).

into 247 Air Quality Control Regions (AQCRs) for monitoring and control.<sup>19</sup> Where air pollution in a region exceeded NAAQS, states were required to develop State Implementation Plans (SIPs) for attaining the required pollutant level (NAAQS).<sup>20</sup> Failure to meet these standards by an established deadline would result in a ban on construction of all new pollutant sources in the region.<sup>21</sup> Since the purpose of the Act was to protect the public from dangerous levels of pollution, NAAQS were based on air quality levels consistent with health requirements rather than levels technologically or economically feasible.<sup>22</sup> The intent was to "force" the state of the art of pollution abatement.<sup>23</sup>

By the mid-1970's it was apparent that the standards would not be attained by the statutory deadline in many of the industrially-developed AQCRs of the nation. The resulting regulatory ban on construction of new pollution sources would freeze economic growth in these regions. EPA recognized this was a politically unacceptable price for clean air.<sup>24</sup> Therefore, in December, 1976 EPA promulgated an interpretive ruling to accommodate economic de-

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19. *Id.* at 7409. NAAQS established an allowable level of pollution in ambient air for each criteria pollutant. Originally five, the list now includes ozone, carbon monoxide, sulfur dioxide, total suspended particulates, hydrocarbons, nitrogen dioxide, and lead. Each AQCR is a region within a state which must attain the NAAQS.

20. *Id.* at 7410.

21. See Clean Air Act Amendments of 1970, Pub. L. No. 91-604, § 110 (a) (2) (A) (i), 84 Stat. 1676 (1970) (codified at 42 U.S.C. § 7410 (a) (2) (A) (i) (Supp. IV 1980)); 40 C.F.R. § 51.18 (b) (1973)). "Source" refers to a smokestack or other point of pollution production. See *infra* note 33; S. REP. No. 1196, 91st Cong., 2d Sess. 2-3 (1970); *Union Electric Co. v. EPA*, 427 U.S. 246, 257 (1976). These regulations are prime examples of imposing regulation on the states through federal "conditions" on grants. The states "voluntarily" assume responsibility rather than give up federal funding and local control in other areas. See *infra* note 163.

22. 42 U.S.C. § 7401 (Supp. IV 1980). "Primary" NAAQS are health related. Secondary NAAQS were also established to protect public "welfare," which is generally taken to mean plants, animals, and aesthetics.

23. See Bonine, *The Evolution of Technology Forcing in the Clean Air Act*, [July] ENV'T REP. (BNA) No. 21 (July 25, 1975); Comment, *supra* note 9, at 357. "Technology forcing" refers to an intent to stimulate development of more effective pollution abatement equipment and processes. In theory, by requiring both attainment of standards below present technological possibility and the best available control technology, a market is guaranteed for improved equipment and processes. This standard is different than tort liability's traditional standards of "state of the art."

24. Raffle, *Prevention of Significant Deterioration and Nonattainment Under the Clean Air Act—A Comprehensive Review*, [May] ENV'T REP. (BNA) No. 27, at 3 (May 4, 1979).

velopment in non-attainment regions.<sup>25</sup> Referred to as the "emission offset policy," this ruling permitted construction of a new pollution source under limited conditions.<sup>26</sup>

In theory, the policy permitted new development in non-attainment areas by allowing new, but not greater, pollution. The policy required emissions to be "offset" by a reduction of emissions from an existing source. The new emissions were required to be less than the offsetting reduction, thereby resulting in a net benefit of reasonable further progress toward NAAQS.<sup>27</sup> To qualify as an offset under this early policy version, a reduction by an existing source had to be in response to a planned trade. The elimination of a source for other reasons could be used as an offset only if the new source was clearly a replacement for the eliminated operation.<sup>28</sup> Therefore, a company closing a plant for economic reasons was prevented from gaining "offset windfalls" for reductions unrelated to air quality.<sup>29</sup> Furthermore, EPA believed that the use of past reductions would be inconsistent with Clean Air Act policies.<sup>30</sup> According to EPA, saving ("banking") reductions for future use would create accounting problems, be of no environmental benefit, and tend to dilute the benefits of the emission offset policy.<sup>31</sup>

By 1977 Congress recognized the need to encourage economic development and modified its goal of abating pollution at all cost.<sup>32</sup> The 1977 Amendments to the Clean Air Act codified the emission offset ruling of 1976, "except as may be modified by rule of the Administrator."<sup>33</sup> In 1979 EPA revised the policy to allow the

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25. 41 Fed. Reg. 55,524 (1976) (codified at 40 C.F.R. § 51 app. S (1980)).

26. 44 Fed. Reg. 3274, 3284 (1979) (codified at 40 C.F.R. § 51 app. S (1980)). The conditions included limiting emissions to the lowest achievable rate and offsetting unpreventable emissions with reductions from existing sources. The "net benefit" requirement was left to reasonable determination on a trade by trade basis.

27. *Id.*

28. 41 Fed. Reg. 55,524, 55,529 (1976) (codified at 40 C.F.R. § 51 app. S (1980)).

29. Raffle, *supra* note 24, at 16.

30. 41 Fed. Reg. 55,524, 55,526 (1976) (preamble).

31. 44 Fed. Reg. 3274, 3280 (1979) (preamble).

32. Note, *Emission-Offset Banking: Accommodating Industrial Growth With Air Quality Standards*, 128 U. PA. L. REV. 937, 944 (1980).

33. 42 U.S.C. § 7502(n) (Supp. IV 1980). Congress changed the baseline for offset determinations. The offset policy applies only to "major" new or modified sources. Disputes have occurred as to the definitions of "modified" and "major." At present the only sources subject to the conditions of the offset policy are "major" sources—those with residual emissions of 100 tons (for most pollutants) after application of pollution control equipment. 45 Fed. Reg. 52,676, 688-89, 742 (1980) (to be codified in 40 C.F.R. § 51 app. S). For a brief review of

banking of reductions beyond those mandated by the applicable SIP.<sup>34</sup> In effect, any reduction which met the conditions could be used as an offset regardless of motivation for the emission curtailment.<sup>35</sup>

EPA's reversal on banking of reductions for future use was a result of arguments for an incentive-based policy.<sup>36</sup> Without banking, it was argued, industries would continue operation of marginal, poorly controlled sources until an offset was needed for a trade. Offset trading was believed to have been hindered by the expenses of locating potential reductions and negotiating the concurrent reduction and new construction.<sup>37</sup> A bank system would

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the evolution of the definition of "major" source, see Calvo y Gonzalez, *supra* note 13, at 399 n. 129. See *Alabama Power Co. v. Costle*, 636 F.2d 323, 352-55 (D.C. Cir. 1979); Note, *Alabama Power v. Costle*, 10 ENV'T L. 585 (1980) (for a detailed review).

Also, note that the emission offset policy applies to non-attainment areas, while related policies apply to attainment regions. The present analysis of incentive-based regulation focuses on the offset and banking provisions applicable to non-attainment. As the clean air policy has evolved, a variety of relevant changes have occurred. New sources in attainment areas may be subject to regulations designed to Prevent Significant Deterioration (PSD), as well as New Source Performance Standards (NSPS). The offset concept gave rise to a spinoff in the "bubble," a method of allowing companies to tradeoff reductions between sources within an existing plant. Emissions standards must be met by the net of emissions from the bubble. Specific sources to be controlled are determined by the company which, in theory, allows standards to be met at lower cost. The bubble does not require trades to result in "reasonable further progress," and, therefore, would not contribute to clean up in health hazard areas. See Note, *The EPA's Bubble Concept After Alabama Power*, 32 STAN. L. REV. 943, 971 (1980). See also Calvo y Gonzalez, *supra* note 13 (for a review of offsets, banking and bubbles, as well as their relation with PSD and NSPS); *Emission-Offset Banking*, *supra* note 32 (for a contemporary overview of the offset policy). The concerns of attainment and non-attainment areas are distinguishable, especially with regard to urgency of action and the accommodation of economic development. Many proposals for modification of EPA's controls of offset trading, bubble, and PSD increments would blur these distinctions. *Id.* at 408. To examine the policy experiment with a market-based incentives approach, it is most appropriate to focus on banking and offset trading envisioned as a "future" style market. The manifestations of a market approach include the viability of external trades and of banking and trading structures. See *infra* text accompanying notes 53-88.

34. 44 Fed. Reg. 3274, 3285 (1979) (codified at 40 C.F.R. § 51 app. S (1980)).

35. *Id.*

36. *Id.* at 3280; See also Raffle, *supra* note 24, at 16.

37. *Id.* at 17. Controversy over banking and use of past reductions reflects a basic difference between "command and control" and incentive advocates. EPA's careful terminology and explanation for its reversal resulted from arguments within and without EPA. "Command" strategists believe detailed supervision of polluters is necessary to eliminate pollution hazards. Incentive advocates would use monetary rewards to induce, rather than penalties to compel. EPA, under its new administrator, moved to supplement traditional regulation with a market concept. See *infra* note 41. In this experiment, EPA was careful not to acknowledge creation of rights to pollute, terming the rights "offsets" and "emission

provide incentives to close a marginal plant as soon as feasible because the offset could be preserved.<sup>38</sup> Banking of past reduction credit would ensure that offsets would be available when needed by a new source.

The 1979 revision was an innovative attempt to supplement traditional regulation with an incentive-based policy.<sup>39</sup> The objective of the initial policy statement in 1976 was to allow limited development in non-attainment regions where net reductions would result through offsets. The 1979 reversal on banking was an attempt to stimulate active trading and "markets" in offsets which would set a high price, in effect, on the right to pollute. The intent of the revised policy included the use of price incentives to promote voluntary pollution reduction. Another aim was a significant savings in pollution reduction costs as a result of monetary rewards for inexpensive reductions. Finally, the policy was designed to remove barriers to technological innovation.<sup>40</sup> Key EPA administrators favored market-based incentive approaches and believed "futures" style markets could be created for offset trading.<sup>41</sup> Frustrated with the failure of traditional "command and control" regulation which dictated specific reductions for each source,<sup>42</sup> EPA revised the emission offset policy and promoted market experimentation with a grant program.<sup>43</sup>

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reduction credits." A right to pollute was unacceptable both politically and to traditional EPA staffers. See *supra* notes 9 & 13.

38. See *infra* text accompanying notes 230-33.

39. See J. Hoffman, *Economic Advantages of Emissions Banking Systems* (May 1980) (available from Office of Planning and Evaluation, Environmental Protection Agency).

40. Liroff, *Foreward* to R. LIROFF, *AIR POLLUTION OFFSETS: TRADING, SELLING, AND BANKING* (1980) (prepared for the Conservation Foundation).

41. See, e.g., Costle, *Current Developments*, 9 ENV'T REP. (BNA) 1708-09 (Jan. 12, 1979). Costle, a former EPA Administrator, cites EPA's policies as "leading the way on rules reform," by establishing that a right to use the air has a direct economic value which will be set by buying and selling the rights on a "futures" market for air pollution rights. *Id.* See also Drayton, *supra* notes 2 & 5 (Drayton is a former Assistant Administrator, EPA); Environmental Protection Agency, *Emission Offset Banking and Trading Update* (Feb. 1980) [hereinafter cited as *Update*]. Hoffman, *supra* note 9 (Hoffman is a former Project Manager, Emissions Offsets Banking and Trading Project); Hoffman, *supra* note 39. Note the difference between a "storage" bank or information system listing potential offsets, and the active banking-brokerage system envisioned by these policy-makers. The intent was to create a market for offsets which would produce economic incentives by way of prices. This has not been successful. See Calvo y Gonzalez, *supra* note 13, at 401. The storage vault concept, however, has been moderately used to accommodate development.

42. See Drayton, *supra* note 2.

43. 44 Fed. Reg. 3274 (1979). The Air Quality Technical Assistance Demonstration



To justify this supplementation of the traditional regulatory framework, EPA cited the 1977 Amendments for authority for its reversal of policy on banking.<sup>44</sup> The concept of saving reductions for future use was said to be within the intent of the "growth margin" provision of the Amendments.<sup>45</sup> This provision allowed states to create "surplus" reductions below the NAAQS by requiring a more strict state standard. The amount between the state and federal standards could be allocated by the states to economic development. EPA interpreted this growth margin approach as allowing, in principle, the "saving" of reductions for future use. EPA based banking on this inferred intent to allow savings of reductions.<sup>46</sup>

Under the Clean Air Act, approved SIPs, which establish state regulations to ensure compliance with NAAQS, were to supersede federal policy by June 30, 1979.<sup>47</sup> On that date new construction would be banned in non-attainment areas which were not covered by a federally approved SIP. When it became clear that SIPs would not be developed and approved by the deadline, EPA again devised a means to avoid imposing a ban. EPA conditionally approved SIPs, continuing the effect of the federal regulation in the

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(AQTAD) project was funded by the EPA and four other federal agencies to test innovative regulation; a \$500,000, two-year grant to Erie County and Buffalo, New York, funded experimentation with offset trading and the establishment of a bank. See Air Quality Technical Assistance Demonstration Program, Grant Proposal of County of Erie and City of Buffalo (Dec. 1, 1978) (available from Erie County Department of Environment and Planning) [hereinafter cited as AQTAD Proposal]. Seven other urban areas received funding to test experimental air pollution regulation. One of three categories of problems to be addressed was the development of supplements to "traditional 'command and control' regulations." Kurtzweg & Griffin, *Economic Development and Air Quality: Complementary Goals for Local Governments*, 31 J. AIR POLLUTION CONTROL, Nov. 1981, at 1155-57. The grantees proposed to demonstrate methods that would achieve reductions beyond emissions limits. Economic efficiency of regulation was to be improved. Seven of the eight were to test offsets, and six were to test banking. *Id.* A key question in AQTAD was whether economic incentives could replace or supplement regulation. National League of Cities & National Association of Counties, *Parallel Goals: Clean Air and Economic Development* 10 (Mar. 1980) (available from the U.S. Environmental Protection Agency).

44. 44 Fed. Reg. 3274, 3280 (1979).

45. *Id.*

46. This rationale may stretch the congressional intention explicit in the growth margin provision. Congress appeared to have adopted two means of accommodating economic development, the EPA offset policy and the growth margin approach, while EPA sought to establish an incentive-based policy. See Note, *supra* note 32, at 944-46; 42 U.S.C. § 7503(1)(B) (Supp. IV 1980).

47. 42 U.S.C. § 7410 (a) (2) (I) (Supp. IV 1980); 44 Fed. Reg. 32,471 (1979); 42 U.S.C. § 7502 n. (Supp. III 1979).

gaps in partially completed state plans.<sup>48</sup> However, even as approved SIPs supersede federal policy, the offset policy will have continuing effect because regulations require SIPs to incorporate mechanisms to accommodate economic development. Many states have adopted the federal offset and banking policy in their SIPs to meet this requirement.<sup>49</sup> Also, EPA has developed extensive information for states on the operation of banks and offset markets.<sup>50</sup> Further, EPA is considering expansions of the offset concept by applying similar trade-off requirements to other programs.<sup>51</sup>

## II. ECONOMIC THEORY OF OFFSETS AND BANKING

### A. *Incentives.*

After 1979 the purposes of the emission offsets and banking policy were to accommodate economic development and to provide an incentive structure for emission reduction.<sup>52</sup> In 1976, the original policy was promulgated to allow economic development under the command and control implementation strategy of the Clean Air Act.<sup>53</sup> With the revision of the policy in 1979, EPA added an economic incentive approach to promote less costly reductions, technological innovations, voluntary reductions, and administrative efficiency.<sup>54</sup>

The key feature of the envisioned market in offsets would be to set a price on the right to pollute in non-attainment areas.<sup>55</sup> Economic growth would be allowed through marketing of *limited* pollution rights. With each trade, the net reduction requirement

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48. LIROFF, *supra* note 40, at 40-41.

49. 42 U.S.C. § 7503 (1) (Supp. IV 1980). States adopt the offset policy due to restrictions in the Act and because alternatives are limited. States may adopt the offset policy, the growth margin approach, or an original program meeting the Act's requirements. *Id.* at § 7503 (1) (B); LIROFF, *supra* note 40, at 36, 38. Twenty-eight states presently have offset provisions in their SIPs, and between twelve and seventeen have banking provisions. Levin Conversation, *supra* note 17.

50. See, e.g., Environmental Protection Agency, The Controlled Trader (July 1981) [hereinafter cited as Controlled Trader]; Update, *supra* note 41.

51. Levin Conversation, *supra* note 17 (revolving funds, generic rules, and "netting-out"). See also N.Y. Times, Apr. 3, 1982, at 7, col. 1.

52. Costle, *supra* note 41; Drayton, *supra* note 4, at 39, 44-45; Hoffman, *supra* note 9, at 5; Update, *supra* note 41.

53. 41 Fed. Reg. 55,524 (1976).

54. 44 Fed. Reg. 3274 (1979); See also LIROFF, *supra* note 40; Hoffman, *supra* note 39; Update, *supra* note 41.

55. Costle, *supra* note 6.

would ensure cleaner air, even though new sources of pollution would be created. Market forces would stimulate clean-up activities and allocate the responsibility for reductions.<sup>56</sup> The market was envisioned as a controlled system based on certification of trades, a limited supply of offset rights, and forced demand.<sup>57</sup> Thus the objective of the policy was to establish controlled trading with a restricted supply of pollution rights to ensure the primary goal of clean, healthful ambient air.<sup>58</sup>

Under the policy, offset prices would be set by trading in a market. In theory the price would be based on the relative cost of the right to pollute the air and the equipment costs of avoiding such pollution.<sup>59</sup> By using a market function to set prices, the policy was not intended to force accountability for external costs. The costs of pollution borne by those outside the pollutant source were not to be determinative of the price of the right to pollute.<sup>60</sup> Rather, the advantages of using a market price to allocate the right

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56. Clean-up would be less expensive due to savings on information costs as well as use of least cost reducers (LCRs). The profit motive would provide incentive for voluntary reduction and technology innovation. See Calvo y Gonzalez, *supra* note 13, at 382; Drayton, *supra* note 5, at 39.

57. The policy's requirement that new sources obtain an offset would ensure the demand for pollution rights. Conditions on which reductions qualify as offsets would limit the supply of these offsets. 44 Fed. Reg. 3274, 3284 (1979).

58. The air quality problem has been referred to as a "problem of the commons." Tucker, *supra* note 2, at 31; *Who Owns the Air?*, *supra* note 8, at 589. Companies' costs of production do not consider the "external" costs of using resources which are owned in "common." Free use is inevitably abused. *Id.*

59. A polluter could either purchase a permit or install additional equipment. Theoretically, the aggregate of these decisions would result in an optimal level at which the price of all new reductions (*i.e.*, equipment cost) is the same. The price of any new offset, generally, would be the same as the cost of any new reduction. At that level, allocation is "efficient" because no benefit can be obtained by a trade without a greater loss to one of the parties. EPA intended the optimal price to be relatively high. EPA could influence price by controlling supply. Allowing offset credit only for reductions which are a result of equipment installation or process change would operate to limit the supply of offsets to only those with an abatement cost. See generally Coase, *The Problem of Social Cost*, 3 J. L. & ECON., 1 (1960); Comment, *supra* note 9, at 375 n.113.

60. An "external cost" is the value of the use of resources (or damage to resources) outside those which are incurred as production costs. Other incentive approaches have been suggested that would force polluters to pay the external costs of pollution. Generally, it is believed that if polluting companies are taxed an amount equivalent to the costs of the pollution to society, they will find methods to prevent most pollution. See, *e.g.*, W. BAUMEL & W. OATES, *ECONOMICS, ENVIRONMENTAL POLICY AND THE QUALITY OF LIFE*, 246-53 (1979); Tucker, *supra* note 2, at 32.

to pollute included more cost effective emission reductions.<sup>61</sup> Reductions would always be made at the least expense because polluters facing a high cost reduction would buy an offset from a lower cost reducer. This would result in efficient allocation of the nation's resources.<sup>62</sup>

The administration of pollution control was expected to be less costly under the emission offset policy because information on possible reductions would be less expensive. Unlike the command and control system, information would be gathered by those with the greatest access and control over the polluting processes. Industrial managers would be motivated by monetary reward to identify potential least cost reductions. The mechanism to provide these benefits was to be the price on air use.<sup>63</sup>

A basic assumption underlying the incentive approach of the policy is that all pollution cannot be eliminated because of unacceptable economic and political results.<sup>64</sup> However, rather than a ban on new pollution sources and specific control of tolerated polluters, EPA decided that limited rights to pollute would be allocated by the market system. The marketable supply of pollution rights (offsets) would be limited by policy conditions establishing which reductions could qualify for offset trades.<sup>65</sup> Limited supply (and forced demand) would result in prices high enough to be incentives and ensure a relatively healthy level of air quality (NAAQS). The initial allocation of rights would be limited to existing sources.<sup>66</sup> Demand would be forced by the Act's required at-

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61. See *infra* text accompanying notes 71-75. See also Calvo y Gonzalez *supra* note 13, at 386-87.

62. *Id.* See also *supra* note 59.

63. See *infra* text accompanying notes 225-32; *Who Owns the Air?*, *supra* note 8, at 575-76. The legal nature of the right is unresolved. One commentator suggested that it should be treated analogously to broadcast licenses. See Note, *supra* note 32, at 960. Another possible analogy is the transferable development rights concept. See, e.g. *Penn Central Transp. Co. v. City of New York*, 42 N.Y. 2d 324, 366 N.E. 2d 1271, 1277, 397 N.Y.S.2d 914 (1977).

64. See Tucker, *supra* note 2, at 32. Examples are relocation of industry from dirty air regions, price inflation due to the expense of absolute emission control costs, and industry failures as a result of inability to control emissions or inability to sell products at resulting costs. See *Who Owns the Air?*, *supra* note 9, at 593. See also *Increment Allocation*, *supra* note 8, at 955 (the right to pollute is of doubtful political popularity).

65. 44 Fed. Reg. 3274, 3284 (1979).

66. Under SIPs, regulated sources must make specified reductions to attain NAAQS. Additional reductions could be used or sold as trade-offs for new sources. The net reduction would be retired. Major new sources must reduce their emissions to the lowest achievable

tainment of NAAQS and the policy's required use of offsets for new pollution sources. Control of the market was intended to ensure that the marginal price of offsets would provide incentive for clean up activities.<sup>67</sup>

### B. *Market Mechanics.*

Under the market concept, potential polluters have a choice of reducing emissions or obtaining a right to pollute.<sup>68</sup> Reduction requires new processes or abatement equipment. Rights may be obtained from existing polluters, who have banked an emission reduction or plan a future reduction.<sup>69</sup> A source must permanently reduce its level of emissions to sell its right to a new source. The net reduction of emissions would be retired from the market.<sup>70</sup>

The offset price is set by the parties. In theory, the price range would be between the cost of the reducer's (seller's) abatement and the purchaser's potential cost of abatement equipment to prevent its emissions.<sup>71</sup> It is assumed each polluter will hold his rights until the offset price is greater than his costs of emission abatement.<sup>72</sup> If

rate and purchase offsets for new emissions. *Id.* See also *supra* note 221 and accompanying text. The Clean Air Act allowed an alternative approach to allocation. This "growth margin" provision allowed states to place a greater burden on existing sources to produce a margin between federal and state standards which could be allocated to new sources. 42 U.S.C. § 7503(1)(B) (Supp. IV 1980). See *Increment Allocation*, *supra* note 8, at 936 (for discussion of analogous allocation systems suggested by one commentator).

67. See *infra* text accompanying notes 85-89.

68. For new sources, the choice is limited under the policy because they must install equipment to attain the Lowest Achievable Emissions Reduction. They must obtain, in effect, a right for emissions beyond control of present technology. 44 Fed. Reg. 3274, 3284 (1979). In theory, this should force offset demand and stimulate technological innovation if the offset price becomes relatively high. See Drayton, *supra* note 2; Drayton, *supra* note 5.

The policy is a mixed system of "command and control" and incentive-based regulation. Recently a commentator reviewed three hypothetical systems: exclusively incentive, exclusively command and control, and a mixed system. The commentator concluded that EPA's current mixed system is the optimal mechanism. See Calvo y Gonzalez, *supra* note 13.

69. The policy conditions require the reduction to be verifiable as well as enforceable, and to set geographic limits. 44 Fed. Reg. 3274, 3283-84 (1979).

70. *Id.*

71. In theory, the seller would not reduce emissions for less than the cost of the necessary equipment, and the purchaser would not spend more on an offset than the cost of reducing its own emissions. See, e.g., F. ANDERSON, A. KNEESE, P. REED, R. STEVENSON & S. TAYLOR, ENVIRONMENTAL IMPROVEMENT THROUGH ECONOMIC INCENTIVE (1977); BAUMEL & OATES, *supra* note 60; Coase, *supra* note 59; R. STEWART & J. KRIER, ENVIRONMENTAL LAW AND POLICY 340 (2d ed. 1978).

72. *Id.* Note that the cost of equipment is assumed to include installation and maintenance costs. Of course, a polluter may decide to close down rather than purchase offsets or

the price of an offset is more than the cost of abatement, the rational profit-motivated decision would be to abate emissions and sell an offset.<sup>73</sup> Theoretically, trading would continue until each polluter's cost of an additional reduction would equal the cost of an additional offset right. Prices would reach this equilibrium because each polluter would reduce pollution by purchasing abatement equipment until the next (marginal) reduction would be equally as costly as purchasing the right to emit pollutants. Limiting the amount of offsets through control of the supply of pollution rights would ensure that the equilibrium price would be relatively high, stimulating voluntary reductions.<sup>74</sup> The allocation of rights would be economically efficient when no source could benefit from a trade without greater cost to another source.<sup>75</sup>

The results of this process would be beneficial to health, government administration, and the reducers. Under traditional regulation, each regulated source must reduce its emissions by a specified percentage regardless of cost.<sup>76</sup> The offset and banking policy would permit the actual reductions to be made by the sources that could reduce emissions at the lowest cost. Many sources would be able to reduce their costs by paying such a "least cost reducer" (LCR) to reduce emissions in their place.<sup>77</sup> Therefore, industry reduces expenses because EPA's requirements are met at the least possible cost. The least capital is thus spent for each reduction

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equipment.

73. Economic theory assumes that polluters are rational and will be motivated to reduce pollution by profit potential.

74. The use of the air generally has been free, so equipment has been more costly. To reduce pollution significantly, a high equilibrium price is necessary in order to stimulate equipment purchase rather than use of the air. *See supra* note 58.

75. Allocationally efficient. *See supra* notes 59 & 71.

76. The amount depends on the actual pollution in the ambient air and the SIP requirements specifying reductions at each controlled source. These requirements are called specification standards, because they specify the amount and method of reduction for each source.

77. A Least Cost Reducer (LCR) is a polluter that can reduce emissions less expensively than any other polluter. *See, e.g., Calvo y Gonzalez, supra* note 13, at 386. Traditional regulation could establish performance standards, *i.e.*, set a level of pollution reduction, and require sources to attain the standards. It is doubtful, however, that any reduction would occur without specification of the individual polluters responsible for the reductions. The government theoretically could name the polluters which are the LCRs and require reductions from them. The necessary information, however, would be expensive and the LCRs would be reluctant to produce this information. *See id.* at 388.

within a region.<sup>78</sup> Industry meets EPA's requirements at least cost per company, and society gets cleaner air with less capital cost.<sup>79</sup>

This regulatory structure would allow profit for LCRs, which would be incentive for voluntary reductions and technology innovation. In the long run, the incentive to improve abatement technology may result in greater pollution reduction at less cost.<sup>80</sup> In the short run, new technology which enables less costly reduction may result in both a profitable offset trade and a competitive advantage in the market place.<sup>81</sup> Under traditional regulations NAAQS were said to be technology "forcing" because improved abatement equipment was required to obtain specific pollution levels.<sup>82</sup> Under this policy, incentives for equipment innovation might be best termed technology "persuading" because development is induced by profit motivation.<sup>83</sup>

Achieving the goal of healthy air with this market approach would depend on a supply of offsets that is limited relative to the demand. This would result in an offset/equipment equilibrium price sufficiently high to stimulate emission reduction. LCRs would have incentive to provide offsets which would facilitate trading.<sup>84</sup> Technological innovation would be induced, with long-term results of greater reductions. To establish a high equilibrium price, the

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78. Note that this is a result of the change from specification to performance standards. *Id.* The Act, in a sense, assumes that the larger polluters are the LCRs and places the burden on them (possibly due to a "best cost spreader" or "deep pockets" assumption).

79. See Drayton, *supra* note 5; Tucker, *supra* note 2.

80. Drayton, *supra* note 2, at 7; Drayton, *supra* note 4, at 39; Hoffman, *supra* note 9.

81. The market theory rests on assumptions of a free market. Monopolies or oligopolies in the supply and demand for offsets may vary the effectiveness of the policy. See, e.g., Calvo y Gonzalez, *supra* note 13, at 396.

82. See *supra* note 23; 44 Fed. Reg. 3274, 3284 (1979).

83. See Drayton, *supra* note 4, at 39; Hoffman, *supra* note 9, at 5. Some commentators believe that the offset policy may dilute the motivation for technological innovation. While fewer sources must install new technology under the offset policy, the motivation to develop more effective and efficient methods is nevertheless stronger. Under the Clean Air Act, equipment that could reduce emissions was required regardless of cost and polluters had disincentives to develop new reduction methods. Thus, whether called technology forcing or persuading, the stimulus to innovate is more effective under the offset policy, because equipment may be used where it will reduce the polluter's cost of compliance. While reductions can also be made by process changes, the elimination of some of the disincentive (the policy still requires equipment that will provide the lowest achievable emission rate) and the addition of profit-motivated innovation by other sources appear to increase motivation for innovation. See Calvo y Gonzalez, *supra* note 13, at 421-24.

84. Hoffman, *supra* note 9, at 4. Readily available, publicized offsets at a known price will facilitate trading. See Hoffman, *supra* note 31.

availability of offsets must be limited in a controlled trading system.<sup>85</sup> Historically, the use of air by polluters was free and seemingly unlimited. Limiting and setting a high price on permitted use would induce development of alternatives to the use of the air.<sup>86</sup> Policy provisions which limit the reductions that qualify as offsets would shift the supply, resulting in a higher price. The relatively high price set by the resulting equilibrium of permit-equipment purchases would contribute to the goal of clean air.<sup>87</sup> The effectiveness of the controls on trading, especially the requirements specifying which reductions qualify as offsets, would be vital to the purpose of providing incentives for attainment of a health related standard.<sup>88</sup>

### III. ANALYSIS OF CONTROLLED TRADING<sup>89</sup>

#### A. Overview.

Commentators have anticipated problems with the uncertainty in the proposed market system, especially with the legal nature of the "right to pollute."<sup>90</sup> The failure to establish active markets has been recognized recently.<sup>91</sup> Proponents of the theory of incentive-based regulation have concluded that despite such failings, EPA should expand controlled trading. However, the policy's utility as an innovative model for incentive-based regulation has

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85. See Drayton, *supra* note 2, at 7; Drayton, *supra* note 4, at 46.

86. See Tucker, *supra* note 2.

87. A relatively unlimited supply may actually dilute the effect of the Act. This possibility, however, was foreseen by EPA. See 44 Fed. Reg. 3274, 3280 (1979).

88. Drayton, *supra* note 2, at 7; Hoffman, *supra* note 9, at 5-7. Calvo y Gonzalez seems to perceive the basic purpose of this policy. See Calvo y Gonzalez, *supra* note 13, at 423. The Gonzalez article is perplexing, however, in that it identifies the failures of the market approach experiment, but proposes various new applications without addressing corrective measures to stimulate trading. *Id.* at 380, 401, 418-30.

89. "Controlled trading" is a generic term applied for convenience to policies allowing trade-offs in emission reductions. See Drayton, *supra* note 5, at 38. While the term may include bubbles and PSD increment policies, the analysis of the incentive regulation experiment will focus on offset trading and banking in non-attainment areas. The emission offset ruling of 1979 was an attempt to establish viable markets in offsets. The analysis of some generally overlooked problems, such as the state of the economy, the government's role in effectuation of the policy, and uncontrolled supply of offsets, will consider controlled trading in its original context. See Costle, *supra* note 6; Drayton, *supra* note 2, at 7, 40. See also Calvo y Gonzalez, *supra* note 13 (for a more comprehensive overview of alternative applications).

90. See *supra* note 63.

91. See *supra* note 88.



not been examined in relation to EPA's loosening of offset conditions, the effects of regional economic conditions, and problems in intergovernmental relations. Even EPA, in first issuing the policy, expressed fears that allowing reductions to be credited as offsets regardless of motivation would dilute the effect of the emission offset policy.<sup>92</sup> Yet in 1979 EPA reversed its position on banking and now allows the use of offsets regardless of motivations.<sup>93</sup> Wide latitude in the definition of reductions qualifying as offsets may satisfy local priorities of economic growth, but dilute the effect of market incentives.<sup>94</sup> Experience with the policy has not proven that the benefits of market incentives are attainable.<sup>95</sup>

Currently twenty-eight states include an offset policy in their SIPs, and between twelve and seventeen provide authorization for banking. Active banks operate in only Seattle, San Francisco, and Louisville.<sup>96</sup> Recently a federal grant program testing innovative regulatory programs concluded that a market structure based on banking was impractical in an older, industrially declining Northeast city.<sup>97</sup> According to the findings, stagnating industrial areas could not generate sufficient demand for offsets to support an active bank and market structure.<sup>98</sup>

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92. 44 Fed. Reg. 3274, 3280 (1979).

93. *Id.* Critics have argued that the refusal to allow banking would result in polluters maintaining old, dirty plants until a trade could be arranged. See Note, *supra* note 32, at 943. This argument seems to inflate the significance of a potential offset credit to industrial planning, especially where a plant is otherwise producing below a marginal return. Further, it was argued that banking and a broad definition of reductions qualifying as offsets would facilitate trading. See Office of Planning and Management, U.S. Environmental Protection Agency, Offset Planning and Management, EPA, Emission Reduction Banking Manual 13 (Sept. 1980) [hereinafter cited as Banking Manual].

94. See *supra* text accompanying notes 84-88.

95. See, e.g., Calvo y Gonzalez, *supra* note 13, at 380, 401.

96. Levin Conversation, *supra* note 17.

97. Air Quality Technical Demonstration Assistance Project, Erie County, New York, Technical Progress Report, Fifth Quarter 14 (Sept. 1980) [hereinafter cited as Technical Progress Report]; A.D. Little, Inc., Report # 23 (1980) (available from the Erie County Department of Environment and Planning).

98. The project director of the Air Quality Technical Assistance Demonstration Project (AQTAD) for Buffalo and Erie County concluded that few major sources of pollution could be expected to seek, expand, or locate in the region. As a result, a general referral system was thought to be practical, while a brokerage bank was "relatively useless" because few local trades could be expected. *Id.* The directors believe that a boom area like Houston might support the banking concept. The trading concept was embraced by the local Industrial Development Agency and the outcomes of the grant have largely assisted local industry. These results reflect the local priority on development and the accommodation goal. Interview with Rosalind Parswell, former AQTAD Project Director (July 1981); Interview with

While there are varied estimates of trades occurring under the policy, only a small percentage have been trades between polluters (external trades).<sup>99</sup> Offsets within plants (internal trades) accounted for up to ninety-five percent of an estimated 700 trades in 1978-79.<sup>100</sup> Internal trades are not as effective in setting a publicly recognized offset price.<sup>101</sup> According to the economic theory behind the offset and banking policy, active trading between polluters is necessary to realize the benefits of the incentive approach.<sup>102</sup> Effective trading of offsets requires an active market to supply price information and stimulate offset availability.<sup>103</sup> The information is necessary to determine the least cost reducer.<sup>104</sup> Confidence in marketability of offsets is necessary to stimulate voluntary clean up and to provide technology persuading effect.<sup>105</sup> Banking was envisioned as a mechanism to supply information on price, availability, and marketing of offsets.<sup>106</sup>

Offset trading is actively used to accommodate development, but banking has not yet proven viable.<sup>107</sup> However, EPA is considering several expansions of the concept. For example, offsets could be used to satisfy reductions required of existing plants.<sup>108</sup> Also, a state revolving fund could be established to buy and retire reduc-

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Charles Rosenow, Erie County Industrial Development Agency (July 1981); Interview with Michael Raab, AQTAD Project Director (July 1981) [hereinafter cited as AQTAD Interviews]. See also *supra* note 41 (for the storage bank-brokerage distinction).

99. See Calvo y Gonzalez, *supra* note 13, at 401 n.147; Drayton, *supra* note 5, at 44. See also Update, *supra* note 41, at 4-8 (regions reporting external trades show none in N.Y. or New England, and only 15 nationally).

100. See Drayton, *supra* note 5, at 44, 46.

101. External trading is necessary to foster competitive bidding which will drive up the price of offsets. Further, internal trades offer no publicly known price which establishes the market value of potential offsets or inspires confidence that offsets are marketable. An internal trade may reflect a "price" choice between costs of abatement at two sources within a plant. The function of a market, however, is to publicly establish prices and stimulate least cost reductions across companies. See Drayton, *supra* note 2, at 40; Drayton, *supra* note 5, at 44, 46.

102. See *supra* text accompanying notes 71-75.

103. See *supra* text accompanying notes 71-83. See also Drayton, *supra* note 5, at 44, 46.

104. *Id.*

105. The key feature of the system is industry recognition of potential profit, or cost savings, from offset trading. *Id.*

106. See Costle, *supra* note 6.

107. See *supra* note 99.

108. Existing plants that are required by the SIP to reduce emissions could, in effect, substitute a reduction by another source for this requirement. Levin Conversation, *supra* note 17.

tions to offset emissions due to industrial expansion.<sup>109</sup> Expansion and modification of the policy may merely accommodate more economic growth. However, an adjustment of the controls on trading to activate the market may be required to secure the benefits of incentive-based regulation. In view of inactive trading and banking, an observation of a former assistant administrator of EPA is haunting: "If states or EPA allows these reforms to become loopholes, controlled trading will collapse instantly."<sup>110</sup> In considering policy modifications, the problem of banking's impracticality for the economically declining cities of the Northeast should be addressed.<sup>111</sup> To determine whether proposed changes will activate markets or aggravate the problems, analysis of the market failure is necessary. While some vital problems have been examined,<sup>112</sup> the effects of regional economic conditions and mixed governmental priorities have not been considered.<sup>113</sup>

### B. *Effectiveness: Factors Undercutting the Market*

The goal of the original emission offset policy was to accommodate economic development while achieving health related standards of air quality.<sup>114</sup> After the 1979 revision the policy was aimed at voluntary and efficient emission reduction through the use of

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109. This is a device proposed for use where a company seeking to construct a new source cannot locate an available offset. Rather than delay construction, the industry would pay an assumed price for an offset to the fund. The fund, in turn, would purchase and retire the first available offset. *Id.* Problems may arise regarding the local government's ability to act as effectively as private industry in locating and negotiating offset transactions. Further, an offset may be unavailable at the industry's *offered* price. In any case, information costs will be shifted to local government. Without active trading, the initial price paid to the fund will only be an estimate. Local government may not be effective in this role. *See infra* text accompanying notes 165-213.

110. Drayton, *supra* note 5, at 46.

111. *See supra* note 97. Note that established industrialized areas were the target of the original accommodation policy. *See* Davis, Kurtock, Leope & Magill, *Clean Air Act Amendments of 1977: Away from Technology Forcing?*, 2 HARV. ENVTL. L. REV. 1, 39 (1977).

112. Several commentators, for example, have analyzed the uncertainty of the nature and security of the "right to pollute." The problems are resolvable with federal controls of the definition of an offset. *See* Note, *supra* note 32, at 947. EPA appears to favor treating offsets as marketable permits. The expansions under consideration would generally allow trades with a permit change, rather than a SIP revision. Levin Conversation, *supra* note 17.

113. *See infra* text accompanying notes 123-37 (economic conditions may make a bank useless and local priorities may prevent banking operations).

114. 41 Fed. Reg. 55,524 (1976).

markets in offset rights.<sup>115</sup> The incentive theory depends on complex control of a market where price is sufficient to motivate voluntary reductions by least cost reducers.<sup>116</sup> In practice, active trading among industrial polluters has been sluggish, especially in the Northeast.<sup>117</sup> Offset prices are rarely publicly set and are undercut by inexpensive reductions qualifying as offsets.<sup>118</sup>

1. *Economic stagnation.* The original offset policy was aimed particularly at accommodating development in urban, industrialized areas.<sup>119</sup> EPA's goal in promoting the offset and banking approach was to establish viable markets in offset trading.<sup>120</sup> Only an active market would establish the price of offsets at a cost-of-prevention, cost-of-permit balance. A relatively high price was desired to motivate voluntary reductions and persuade industry to develop innovative technology. These effects were unlikely where few buyers of offsets were believed to exist. Without a perceived demand for offsets, even least cost reducers would not likely generate a satisfactory return on investment in abatement technology.<sup>121</sup> Therefore, offset marketability would undercut the market system.<sup>122</sup>

In fact, participants in an EPA sponsored test of banking concluded that in most traditional industrial areas of the Northeast, banking was impractical because there was little demand for offsets.<sup>123</sup> Local officials concluded that a bank was undesirable because industrial development was stagnant. Even though banking costs would be paid by federal funds, local administrators of the project decided that an offsets market structure was not worth the effort.<sup>124</sup> Houston was the type of developing area which was cited as potentially able to support the concept.<sup>125</sup> Economic stagnation precludes a successful bank and therefore, undercuts the effective-

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115. See Drayton, *supra* note 5, at 39, 44, 46.

116. See *supra* text accompanying notes 84-88.

117. See Drayton, *supra* note 5, at 44, 48; Technical Progress Report, *supra* note 97; Update, *supra* note 41, at 4-8.

118. See *infra* text accompanying notes 147-65.

119. See Davis, *supra* note 111.

120. See Drayton, *supra* note 2, at 40; Drayton, *supra* note 5, at 39; Hoffman, *supra* note 9, at 5-7.

121. See Liroff, *supra* note 40, at 42-45.

122. See Hoffman, *supra* note 9, at 5.

123. See AQTAD Proposal, *supra* note 43; Technical Progress Report, *supra* note 97.

124. Little future demand is expected because industry is leaving the region and new economic development is projected to be of a low polluting nature. *Id.*

125. See Technical Progress Report, *supra* note 97.

ness of the emissions and offset policy.<sup>126</sup>

The effect of this finding is especially significant because without an active bank, local government may suffer a competitive disadvantage in economic development.<sup>127</sup> Areas with active banks may attract development because of reduced costs of identifying offsets, no delays in coordinating offsets and new construction, and less costly offsets provided by least cost reducers.<sup>128</sup> Even if an area without apparent demand successfully developed a functioning market, the administrative cost per trade would still be higher than in a more active market.<sup>129</sup> In theory, an area might induce a market to attract industry with low-priced offsets. In actively developing areas, offset prices would be expected to rise as demand exceeded supply. Industry might then seek to locate where readily available, lower priced offsets were banked. This hypothetical scenario relies on two faulty assumptions. First, it assumes a limited supply of offsets in developing areas, which is not the case under current policy. Second, it assumes local government has sufficient confidence in the practicality of the policy to attempt to induce a market. EPA's funded AQTAD experiment suggests that local government is unlikely either to perceive the likelihood of future benefit of the policy or to believe industry location decisions will be based on available offset prices.<sup>130</sup>

While AQTAD indicates that declining cities are unlikely to develop banks, a basic referral service is still valuable.<sup>131</sup> Even in industrially declining areas, identification of potential offsets is

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126. The advantages of incentive regulation, *i.e.*, least cost reductions, voluntary reductions, and technology persuading, are unlikely to be realized under current policy. Accommodation of industrial development is somewhat more successful. While new large industry is unlikely, existing industry may expand or modernize operations. Offsets may be needed for internal trades, but will not be sufficient to support a bank. *See LIROFF, supra* note 40, at 43; *See also supra* note 41 (for the distinction between storage and active banking).

127. Industry may be less likely to locate in areas where offsets are not readily available, because planning would be uncertain and delays likely. Alexander, *A Simpler Path to a Cleaner Environment*, 103 *FORTUNE*, May 4, 1981, at 234, 242-43; Drayton, *supra* note 5, at 44, 46.

128. LIROFF, *supra* note 40, at 43-44, 60-61.

129. *Id.*

130. AQTAD personnel saw the policy as highly complex, theoretical, and impractical. AQTAD Interviews, *supra* note 98. *See also* Kurtzweg, *supra* note 43, at 1156-57 (all participants decreased their funds allocated to offsets and shifted the monies to more valuable aspects of their projects).

131. AQTAD Interviews, *supra* note 98.

practical.<sup>132</sup> An industrial development agency may wish to identify offsets to reduce barriers to expansion of existing industry. Similarly, a major industry may occasionally consider locating in the region, and an industrial development agency may wish to have offset referrals available. Interest in accommodating such potential development supports the establishment of an offset referral mechanism.<sup>133</sup> Nevertheless, the policy of requiring offsets is viewed as an impediment to development.<sup>134</sup>

The effectiveness of the policy in economically stagnating areas is marginal. While offset referrals may assist the accommodation of development, little benefit is realized from the incentives approach. Even where the banking operation is "free," controlled trading excites little interest.<sup>135</sup>

2. *The offset supply: limited rights.*<sup>136</sup> The supply of offsets is limited under a controlled trading system by the criteria for reductions qualifying as offsets. Under controlled trading the function of a private market will provide monetary incentives through the price level of offsets. A limited supply of offsets will result in competitive bidding, which will raise the price to an optimal level of prevention/permission.<sup>137</sup> This price serves the goals of accommodating economic development while stimulating clean-up efforts through incentives.<sup>138</sup> However, a large supply of inexpensive offsets results in lower prices, which are less of an incentive for technology development and voluntary emission reduction. Further, the supply must be limited to ensure the desired level of abatement is achieved by the cumulative effect of the individual firms' actions. EPA recognized the necessity of controlling supply in its

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132. *Id.*

133. *Id.*

134. *Id.*

135. *Id.* See also Calvo y Gonzalez, *supra* note 13, at 401 n.147. However, the switch to flexible compliance with performance standards is significant. Internal trades do save costs over specified reductions for each stack. LCRs, at least in a plant, reduce costs and thus the incentive to litigate and delay. See Tucker, *supra* note 2, at 36. Internal trades, however, do not result in LCRs across industries or have a significant impact on the market function. The effect is like a "bubble," but with some net reduction after the offset.

136. The seemingly unlimited supply of free air use had caused the original market failure resulting in air pollution hazards. See, e.g., Tucker, *supra* note 2; *Who Owns the Air?*, *supra* note 8, at 589.

137. See *supra* text accompanying note 5.

138. See Drayton, *supra* note 2, at 7; Hoffman, *supra* note 9, at 5-7.

refusal to allow banking under the 1976 policy.<sup>139</sup> Defining the conditions for an offset credit too broadly not only reduces the incentives' effect, but could result in more polluted ambient air.<sup>140</sup>

If a source reduces emissions because it is going out of business, its reduction is eligible under current regulations for an offset trade.<sup>141</sup> For example, an offset based on a prior reduction, unrelated to the purposes of the policy, was upheld in federal court.<sup>142</sup> Permission to construct a refinery on the Virginia coast was granted based on offsetting hydrocarbon reductions by the state. The State of Virginia agreed to continue converting to cheaper emulsion-based asphalt rather than using petroleum-based asphalt. The court held that although the state would have decreased hydrocarbon emissions by switching its type of asphalt for economic reasons, a net enforceable reduction was the result of the trade. The decision was a technically correct application of the EPA regulations. However, those challenging the offset argued that the reduction would have occurred without the trade and it should not be certified as an offset.<sup>143</sup> The air would have been cleaner, and the trade did not stimulate any reduction or technological innovation. While development was accommodated, the trade did not provide cleaner air or incentives.<sup>144</sup> Enforceability of the reduction under the agreement added a distinguishing element, but the question remains whether such offsets are desirable in view of the goals of the Clean Air Act.<sup>145</sup>

While trading regulations only require an offset to be enforceable net emission reduction, allowing new emissions in place of this kind of reduction seems anomalous with the Act and its deadlines.<sup>146</sup> Greater reduction would have occurred voluntarily without

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139. 44 Fed. Reg. 3274, 3280 (1979).

140. See *infra* text accompanying notes 149-52.

141. 44 Fed. Reg. 3274, 3280 (1979) (if the reduction is verifiable, enforceable, and meets the other conditions for an offset).

142. *Citizens Against the Refinery's Effects, Inc. v. U.S. Env'tl. Protection Agency*, 643 F.2d 183 (4th Cir. 1981).

143. *Id.* at 187.

144. These effects occur because the air would have been cleaner anyway and no price which would motivate other reductions was publicly set. In fact, the offset was free to the new polluter.

145. See Drayton, *supra* note 2, at 7. Trading is a means to cleaner air while accommodating growth. The primary goal is the attainment of a healthful standard of air quality. See Hoffman, *supra* note 9, at 5-7.

146. See Drayton, *supra* note 2, at 7.

the trade. Further, the trade has a negative effect on incentives. Like a plant closing, this reduction provided disincentive for technological innovation. A disincentive results when offsets are allowed for plant closings and changes to less expensive processes because the offsets produced are likely to undercut the desired market price. The price is not based on equivalent technological prevention costs. There is little incentive for reduction at least cost because no actual reduction costs are represented in the price. A private supplier of such an offset would receive an "offset wind-fall," while undercutting the intended function of controlled trading.<sup>147</sup>

A related issue is the problem of "paper offsets" in which a reduction is certified on paper without an actual decrease in emissions.<sup>148</sup> Offsets are required by the policy to be verifiable and enforceable.<sup>149</sup> However, the basis for comparing emissions before and after the trade may not represent the trade's actual effect on ambient air. For example, a proposed offset for a refinery was to be obtained partly by reducing emissions of local dry cleaners to offset hydrocarbon emissions.<sup>150</sup> Monitoring large numbers of relatively small sources raises questions about whether the reductions are verifiable or enforceable.<sup>151</sup> Proposals for closing small plants for use as offsets pose another problem. While purchasing and closing a plant would be verifiable and enforceable, competitors of the plant might well expand their business in response to less competition. The resulting increase in their emissions would be uncounted

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147. See Raffle, *supra* note 24, at 16. The health related standards (NAAQS) are required to be attained by the Act. The offset policy is independent of the reductions required for NAAQS attainment. To qualify as an offset, reduction must not be necessary for NAAQS attainment. Accordingly, the reductions used as offsets are not necessary for attainment of NAAQS and other voluntary reductions are similarly "surplus." However, there is reason to doubt that the SIPs will result in attainment of NAAQS by the deadline. See Note, *The EPA's Bubble Concept After Alabama Power*, 32 STAN. L. REV. 943, 972 (1980). Even if the reductions under the SIPs successfully meet the deadlines, the potential use of nearly all other reductions as offsets results in clean-up of a health hazard that is slower than is practical. Further, the use of low priced reductions, regardless of motivation, dilutes the market function. Even if accommodation were the only goal of the offset policy, a rebalancing of the goals of economic development and clean-up is necessary.

148. See LIROFF, *supra* note 40, at 35, 45 (discussion of concept of offsets "on paper").

149. 44 Fed. Reg. 3274, 3284 (1979). See also *Citizens Against the Refinery's Effects, Inc. v. U.S. Envtl. Protection Agency*, 643 F.2d 183 (4th Cir. 1981).

150. See LIROFF, *supra* note 40, at 27.

151. In a similar case, a challenge to the enforceability of offsets was raised. [Current Developments] 10 ENV'T REP. (BNA) 245-46 (June 15, 1979).



in the trade because EPA does not regulate all minor polluters.<sup>152</sup> Ambient air would actually be more polluted as a result.

Paper offsets can also occur where a source has been emitting less than its full permit amount.<sup>153</sup> For example, a plant may have reduced emissions without a change in permit. The ambient air may still be hazardous despite this uncounted reduction. A subsequent offset certification would verify an enforceable reduction from earlier permit levels. The net effect may be an increase in the hazard because actual emissions have increased. Relying on permit levels, or even modeling of major polluters, is dubious because of the uncertain causal link between major polluters and ambient air quality.<sup>154</sup>

The problems of measurement and causal effect associated with monitoring reductions at all the varying sources may not be easily resolved.<sup>155</sup> The result may be offset trades without actual reduction in emissions, which are contrary to the goals of the Act and the emission offset policy.<sup>156</sup> Of course, if paper offsets are an infrequent occurrence, the effect on health would not be significant. However, the long term effect of trade prices that are not related to equipment costs is to dilute price and technological incentives, undercutting the policy purpose. Low prices result from paper offsets and the fact that reductions qualify as offsets regardless of motivation, because these reductions increase the potential supply of offsets. Inexpensive, readily available offsets may assist the accommodation of economic development without meeting the prime goal of net benefit to air quality.

Certainly EPA was aware that accomodation of development

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152. See LIROFF, *supra* note 40, at 42 (a potential polluter could purchase and close existing companies). EPA is primarily concerned with major sources. See *supra* notes 21 & 33. The agency seems to combine a "deep pockets" theory with a concern for administrative efficiency.

153. See Liroff, *supra* note 40, at 45.

154. Monitoring may not establish the causal link. The ambient air is measured for attainment, but reductions are specified for only large sources. Enforcement authorities may not be concerned about trades of "reductions" already made within a permit, because the reduction is not required by the SIP. The net effect on the ambient air, however, may be an actual increase in emissions from actual, rather than permitted, levels of emissions prior to the trade. *Id.*

155. See Calvo y Gonzalez, *supra* note 13, at 389-91 (for a review of the monitoring problem under the offset policy).

156. See the Act, *supra* note 1; 44 Fed. Reg. 3274 (1979).

was a priority trade-off with clean air.<sup>157</sup> The use of reductions generated by factors unrelated to clean air was recognized as diluting the goal of rapid attainment of clean air.<sup>158</sup> Further, the 1979 revisions of the offset policy were foreseen as potential loopholes if there was not careful enforcement of the policy guidelines.<sup>159</sup> If broad offset definitions and uncertain measurement allow too much accommodation of economic development, attainment of the primary goal may be threatened.<sup>160</sup>

More certainly, these costless, specious reductions inhibit the development of the intended market incentives. Reductions which sell below the least costly actual reduction destroy the market pricing function.<sup>161</sup> Without an equilibrium between the price of marginal clean-up and marginal permit purchase, the effect will be the loss of the benefits of incentive-based regulation.<sup>162</sup> However, conditioning offset credit on the motivation for a reduction poses unacceptable problems in the determination of motive and the complexity of regulations. Strict controls on offset banking and trading may be the only alternative to failure of the incentive policy experiment. Banking could be restricted to reductions resulting from changes in abatement technology, or those that are monitored, or those that have an expiration date. The solution must allow clear and simple determination of eligibility of reductions for offset credit. Increased complexity of regulations of offsets would only discourage reductions by causing delays and greater uncertainty.

3. *Local enforcement, federal theory.* EPA formulated the theoretical policy of offsets and banking, and established standards and conditions. However, as is typical of the conditional grant sys-

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157. See 41 Fed. Reg. 53,661, 55,524 (1976). See also Drayton, *supra* note 5, at 44.

158. 44 Fed. Reg. 3274, 3280 (1979).

159. Drayton, *supra* note 5, at 46. As of the summer of 1982, there were indications that recent expansions of the policy concept were perceived as creating loopholes. While related policies were challenged in court as inconsistent with the Clean Air Act, the "give-away" of pollution rights was criticized by noted policy analysts who suggested that the initial rights should be auctioned by government. Ackerman & Elliot, *Air Pollution 'Rights'*, N.Y. Times, Sept. 11, 1982, at 23, cols. 2-5.

160. EPA relies on phased reductions through SIPs to attain NAAQS. Too much accommodation in allowing questionable reductions, however, threatens NAAQS attainment, because both monitoring accuracy and the causal link between the phased reductions by the major sources and the ambient air are uncertain. See *supra* notes 154-55.

161. See *supra* text accompanying notes 68-88.

162. Pareto optimality will be achieved at a price only insignificantly above the use of air—no purchase of equipment (prevention) will be stimulated. See *supra* note 59.

tem of federal regulation,<sup>163</sup> administration of the banks and envisioned markets in offsets is a local government responsibility.<sup>164</sup> Trades must be approved at both the state and federal levels.<sup>165</sup> EPA's policy statement is not specific as to how the banking mechanics might operate.<sup>166</sup> EPA hoped localities would experiment with a variety of models to test the concept.<sup>167</sup> In essence, EPA formulated controlled trading as an incentive regulatory approach and mandated experimental implementation by state and local government.<sup>168</sup>

State and local government may cooperatively monitor and approve trades as well as measure compliance with reduction mandates required to meet NAAQS. However, local government has particular interest in the policy's theoretical advantages for local economic development.<sup>169</sup> Local priorities differ from those of EPA. Economic development, especially in stagnant regions, is a more immediate priority of local government than the long range effort to meet federal air quality standards.<sup>170</sup> The national economic slowdown, especially in the Northeast, has made local employment and corporate tax base top political priorities of local government. The accommodation of development as an objective of the emission offset policy appears consistent with local concerns. The market concept, based on a brokerage-type banking system as envisioned with the 1979 revision of the offset policy, does not

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163. States can lose federal highway and sewage construction funds and be subjected to stringent environmental regulation if the deadline is not met. See 42 U.S.C. § 7413(a)(5) (Supp. IV 1980). See also *supra* note 21.

164. See, e.g., *infra* note 265. Under the Act, SIPs must incorporate a permissive provision allowing banking. See *supra* note 49. Each region may initiate a banking structure. See *infra* note 167.

165. 44 Fed. Reg. 3274, 3285 (1979) (SIP revision required). Both state and federal approval is necessary for a trade. EPA is considering allowing states to give final approval to routine trades under a "generic" rule, similar to the "generic" bubble policy being experimented with in New Jersey.

166. 44 Fed. Reg. 3274, 3280, 3285 (1979).

167. See Banking Manual, *supra* note 93; Kurtzweg, *supra* note 43.

168. Some commentators view mandatory state enforcement of federal programs as coercive use of state resources for federal priorities. See, e.g., Beam, *Washington's Regulation of States and Localities: Origins and Issues*, in INTERGOVERNMENTAL PERSPECTIVES (A.C.I.R. ed. 1981); Kaden, *Federalism in the Courts: Agenda for the 1980's*, 1981 A.C.I.R. CONF. ON THE FUTURE OF FEDERALISM IN AMERICA 89-108.

169. Local economic priorities will likely lead to local involvement in at least accommodating development with offsets.

See LIROFF, *supra* note 40, at 43-44.

170. AQTAD Interviews, *supra* note 98; Liroff, *supra* note 40, at 35.

match a local priority.

Local government officials may view the administration of controlled trading as an added cost, with only theoretical long-term benefit.<sup>171</sup> The policy is theoretical, complex, and an unfamiliar approach to regulation.<sup>172</sup> A banking operation requires a technical capacity to process complex data in developing and monitoring controlled trading.<sup>173</sup> Further, local government is unlikely to have officials with the expertise to develop and manage "futures" markets in offset trading.<sup>174</sup> EPA only broadly defined the legal requirements of banking.<sup>175</sup> A local bank is not likely to be large enough, or have sufficient priority, to justify new personnel to develop the necessary rules and procedures.<sup>176</sup> In addition, cooperation among various agencies and levels of local government may be necessary for banking, which compounds the problem of theoretical comprehension.<sup>177</sup> Conflicting priorities exist at each level, complicating intergovernmental relations.<sup>178</sup>

The scale of the pollution problem also detracts from effective local government regulation. Major polluters are likely to be large industries with plants in various AQCRs. EPA may negotiate directly with the polluter's home office regarding compliance with Clean Air Act requirements.<sup>179</sup> The size of the corporate polluter also affects local government's capacity to act freely. Industry may have a bargaining power superior to that of local government in air

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171. AQTAD Interviews, *supra* note 98. See also Alexander, *supra* note 127, at 250 (buyers and sellers find policy too complex).

172. The usual approach to regulation is command and control. This regulation is innovative and, thus, unfamiliar. See *id.* See also Drayton, *supra* note 2, at 6; Schultz, *supra* note 2, at 44.

173. AQTAD recognized this need by funding data processing capacity and a computer "librarian." See AQTAD Proposal, *supra* note 93.

174. Local officials are certainly competent. Few, however, would likely have training or experience related to offset banking, "future" market structures, or even incentive-based regulations.

175. 44 Fed. Reg. 3274, 3280, 3285 (1979).

176. AQTAD Interviews, *supra* note 98.

177. *E.g.*, AQTAD for Buffalo and Erie County, New York involved cooperation between various agencies of both the county and the city as well as the state environmental agency, the local industrial development agency, the regional planning board, and, of course, local industry. Data had to be shared and coordination developed in spite of differing priorities. AQTAD Interviews, *supra* note 98.

178. *Id.*

179. Until a challenge of EPA and SIP mandated reductions is resolved, a source may not qualify a reduction for offset credit. Reductions qualifying as offsets may not include reductions mandated by SIPs. *Id.*

quality matters.<sup>180</sup>

These mixed priorities and corporate influences may also result in difficulties of another sort. Under the policy, local government may be a source of reductions for offsets.<sup>181</sup> As administrator of a bank, local government may be both the monitor and a party to a trade. Local priorities may make local government a willing supplier. A potential new pollution source is also a new source of employment and an addition to the tax base. Further, existing sources seeking expansion or subject to a mandated reduction may seek offsets using governmental emission reductions.<sup>182</sup> Local government could be subject to pressure to supply or locate reductions to attract or hold local industry. Along with tax incentives, services, and development bonds, offset credits have become part of the competition to attract industry.<sup>183</sup>

As an offset supplier, local government could be giving away a significant resource without full awareness of its value. As a market develops, the offsets could be of increasing value.<sup>184</sup> Allocation of public reductions should be made with consideration of maximizing the return on government's limited potential reductions.<sup>185</sup> Government should also consider leasing or holding a reversionary right in the offset. For example, providing an offset for a marginal, existing industry could be of short run value. An unconditional offset grant would enable the recipient to sell the offset credit if the plant was later forced to close by decreasing profits.<sup>186</sup> Local government should allocate available offsets wisely and retain a legal interest when supplying reductions as offsets.

Offsets supplied by local government may undercut the development of the offset market which is desired as a means to cleaner air. As with reductions from plant closings, government supplied

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180. See Liroff, *supra* note 40, at 25-26, 43.

181. 44 Fed. Reg. 3274, 3285 (1979).

182. EPA would allow an existing source, subject to SIP mandated reductions, to meet the requirements by purchasing an offset. Levin conversation, *supra* note 17.

183. LIROFF, *supra* note 40, at 25-26, 31, 31 n. 61.

184. The value of offsets would rise as a market developed. See *supra* text accompanying notes 73-75.

185. Commentators have suggested allocation with criteria such as impact on tax base, additional employment, marginal productivity of the industry, new rather than existing industry, and long term viability. See, e.g., *Increment Allocation*, *supra* note 8, at 945. Another commentator suggested an auction rather than a "give-away." Ackerman & Elliot, *Air Pollution Rights*, N.Y. Times, Sept. 11, 1982, at 23, cols. 2-5.

186. See Liroff, *supra* note 40, at 46-47.

offsets are not given a price by the functioning of market equilibrium.<sup>187</sup> An offset supplied by government likely will have no publicly recognized price.<sup>188</sup> Government supplied offsets contribute to the oversupply of offsets, undercut prices, and reduce incentives for innovative technology. Government is also unlikely to be the least cost reducer.<sup>189</sup> Government supplied or induced offsets dilute the incentive-based policy's effectiveness.<sup>190</sup>

A further concern is raised by the requirement that a reduction must be enforceable.<sup>191</sup> Local or state government can agree to verifiably reduce emissions by changing technology, decreasing polluting processes, or eliminating pollution sources.<sup>192</sup> For example, Virginia promised to reduce the use of pollution-emitting asphalt to offset a refinery's emissions.<sup>193</sup> However, doctrine implies that legislative prerogative cannot be contracted away.<sup>194</sup> Some agreements between government supplier and EPA may arguably bind future legislative power.<sup>195</sup> Therefore, the enforceability of such reductions is uncertain.

A basic policy question is raised by government's role as a supplier of offsets. In non-attainment regions, the Act's goal is to remedy a health hazard.<sup>196</sup> The offset policy is an accommodation of priorities for continued economic development.<sup>197</sup> Incentive-based policy is a means to promote clean-up while allowing economic development.<sup>198</sup> Government supplied offsets promote development, but also allow an industry to substitute its emissions for those of

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187. *Id.* at 25-26.

188. Government could be seen as "purchasing employment," but no recognized price is present. The offset, in effect, is free and even undercuts the LCR's costs.

189. *See supra* text accompanying notes 76-79.

190. Local or state government may not supply a reduction. Government units, however, may induce another source to provide a "free" offset. *See LIROFF, supra* note 40, at 30-31.

191. 44 Fed. Reg. 3274, 3284 (1979).

192. *See Citizens Against the Refinery's Effects, Inc. v. U.S. Env'tl. Protection Agency*, 643 F. 2d 183 (4th Cir. 1981).

193. *Id.*

194. 10 E. McQUILLIN, *THE LAW OF MUNICIPAL CORPORATIONS* § 29.07 (3d ed. 1981).

195. In Pennsylvania, a reduction of petroleum-based asphalt, occurring because emulsion-based asphalt was less expensive, was used by a state agency to provide Volkswagen with an offset for its U.S. plant. A state agency thereby effectively bound counties and the state to use a particular paving process. *LIROFF, supra* note 40, at 20.

196. *See the Act, supra* note 1.

197. *See Drayton, supra* note 5, at 44. *See also Raffle, supra* note 24.

198. *See Drayton, supra* note 5, at 38, 44.

government. Government supplied offsets seem anomalous to its duty of protecting the public. Government makes a priority trade-off of the public's health for development when it acts as an offset supplier. If government can change its practices to reduce a health hazard, perhaps it should do so without allowing another source to pollute in its place.<sup>199</sup>

Under the Act, an expansion of the role of state and local government is possible. The 1977 amendments included a provision allowing states to implement a growth margin device.<sup>200</sup> EPA is considering another device termed a "revolving fund."<sup>201</sup> These devices further involve local and state government—politically more responsive to economic development—in allocation and decisions of eligibility of offsets. The responsiveness of local government to economic development may lead to a conflict in priorities between competing for new industry and managing air quality policy.<sup>202</sup>

A more fundamental difficulty is that the federally developed theory may be too complex to be practically administered on a local level.<sup>203</sup> Local and state government are now expected to implement the policy with their own resources.<sup>204</sup> Initiation of a federal regulatory program is painless when enforcement costs are paid by others. Similarly, a new federal approach may be easier to theorize when implementation is by local government.<sup>205</sup> EPA has recog-

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199. Government-supplied offsets also undermine the incentive system and their supply is, to some extent, affected by industry pressure on government. See LIROFF, *supra* note 40, at 25-35.

200. See *supra* note 46.

201. See *supra* text accompanying note 109.

202. See LIROFF, *supra* note 40, at 25-26, 30-31, 31 n.61, 43. State and local governments generally compete for industrial development. Air quality should not become part of the competition, with each locality trying to give away greater rights to pollute. National standards and administration are the best method to prevent this practice.

203. AQTAD personnel spent months analyzing the policy, only to conclude that a market was too theoretical to be practical. AQTAD Interviews, *supra* note 98. See also Alexander, *supra* note 129, at 250 (too theoretical); Tucker, *Current Developments*, 11 ENV'T REP. (BNA) 2041 (Feb. 22, 1980) (no one uses it). AQTAD, however, has found merit in the case-by-case trading of offsets. Government and industrial development agency cooperation provides a helpful referral service for potential traders. AQTAD Interviews, *supra* note 98.

204. Although, even when federal funds were provided through AQTAD, the policy was still rejected as impractical. *Id.*

205. See Beam, *supra* note 68; Kaden, *supra* note 68.

Advocates of local autonomy argue that mandated state and local enforcement of federal priorities harms local government's integrity and our federal system. Local enforcement may also hinder the federal program due to reliance on local administrations which have differ-

nized the difficulty of implementation and is developing more specific guidelines and assistance in setting up banks.<sup>206</sup> However, local government may not be unable to afford or be interested in expensive administration of federal programs.<sup>207</sup> Already accommodating mixed priorities on the federal level, the policy is subject to further dilution by the addition of local priorities in the enforcement process.<sup>208</sup>

Economies of scale may also suggest the impracticality of bank operations in 247 AQCRs. Bank and market operations could be federally administered on regional levels.<sup>209</sup> Local government could then assist industrial development agencies, utilizing their expertise in facilitating industrial relocation without a potential conflict of interest. The policy of emission offsets and banking is based on an unfamiliar and complex theory.<sup>210</sup> Reliance on local and state government implementation may preclude effectiveness of the benefits of incentive regulation.

In summary, effectiveness of the offset and banking policy has been hampered by regional economic conditions, insufficient control of offset supply, and problems of intergovernmental relations. The policy has been successful in accommodating development in case by case trading. The use of performance standards rather than compliance specification has been an attractive feature, but does not require a banking system. Markets may evolve as trading experience increases the value of offsets. However, adjustments in the implementation of the policy are necessary to avoid accommodating economic and political priorities to the detriment of the

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ent priorities than the federal government.

206. See *Controlled Trader*, *supra* note 50; *Update*, *supra* note 41.

207. Banking operations are optional, so local government may decide not to implement the policy. 44 Fed. Reg. 3274, 3280 (1979).

208. The policy already was an accommodation of economic development and pollution control on the federal level. Intergovernmental relations problems include differing priorities, mistrust, varying levels of expertise, and political responsiveness to different populations. See National Commission on Air Quality, *To Breathe Clean Air* (Mar. 1981) See also M. LIPSKY, *STREET-LEVEL BUREAUCRACY* (1980) (for a discussion of the inherent complications in enforcement "on the street level").

209. Polluters, under such a program, could still trade offsets within each region, but would have the advantages of national comparison pricing along with publicity of trades and price. Also, economies of scale should result in lower administrative cost per trade.

210. Confusing jargon like "offsets," "laer," "ACQRs," "NAAQS," and "paper offsets" further complicates the complex economic theory behind emission offsets and offset banking.



goals of regulation.<sup>211</sup>

### C. *Efficiency: Administrative Cost-Effectiveness*<sup>212</sup>

Advocates of the emission offset policy argue that the administration of an incentive-based policy is more efficient than traditional regulation.<sup>213</sup> The traditional regulatory structure is criticized for specifying the means of compliance and requirements for each source.<sup>214</sup> The emission offset policy gives local managers flexibility in reduction decisions. Under the policy, managers in industry may identify the least costly means of reducing pollution and trade off higher cost reductions for less expensive curtailments.<sup>215</sup> This process may reduce administrative costs by eliminating some information costs and decreasing industry's tendency to legally challenge reduction requirements. Information regarding feasibility and cost of reductions at various sources is costly to gather.<sup>216</sup> Administrative costs can be reduced by utilizing the most cost-effective sources of information.<sup>217</sup> By giving local managers incentives

211. See Drayton, *supra* note 5, at 46 (controls would be loopholes).

212. "Efficiency," as a policy analysis term, includes the costs of administration of a policy. A cost effectiveness measure might best serve to measure the net benefit of each regulatory method. Comparative benefits, however, are nearly impossible to measure accurately. See Calvo y Gonzalez, *supra* note 13, at 392. It is possible, however, to compare the theoretical advantages of the offset policy with the actual practice. Advocates claim that incentive-based regulation should be more efficient. The LCR concept is an *economic* efficiency argument. LCR refers to the cost to a polluter of the reduction, not to governmental administration. Identifying and monitoring LCRs are administrative efficiency concerns. Accordingly, economic efficiency, a policy goal and the concept behind LCR, is examined in the section on "effectiveness." See *supra* text accompanying notes 114-35.

213. Information costs and the costs of determining which source should reduce emissions are shifted to polluters, reducing costs directly as well as indirectly through reducing the incentive for litigation. See, e.g., Drayton, *supra* note 5, at 38; Schultze, *supra* note 2, at 56.

214. SIPs set specified reductions for each source in non-attainment areas. See Drayton, *supra* note 5, at 38. See also Schultze, *supra* note 2, at 56; Tucker, *supra* note 2, at 34.

215. In addition to offsetting new sources, trades might also serve to show attainment of SIP-required reductions and to "net out" the review requirements for new sources by offsetting emissions until the new source is below the review threshold. The reductions, in theory, will come from LCRs due to monetary incentives.

216. See, e.g., Calvo y Gonzalez, *supra* note 13, at 388.

217. Under traditional regulation, decisions as to where and how to reduce have been made by regulatory authorities. Industry has had little incentive to provide data on emissions and especially potential reductions, because possible reductions often become required regardless of cost. Under the emission offset policy, industry is motivated to determine how LCRs can be made and to demonstrate these reductions to the regulatory authority. See Drayton, *supra* note 5, at 38; Schultze, *supra* note 2, at 56.

to determine the LCR, the market in offsets motivates information gathering by those with the best access to information and control of the polluting processes.<sup>218</sup> Shifting the burden of identifying LCRs to industry should in theory result in less litigation of reduction requirements.<sup>219</sup> The costs of litigating compared to reducing will not be favorable, even where a polluter previously would litigate only for delay. The polluter is in the position of proving what can be done.<sup>220</sup> Command and control strategies could possibly be modified to identify and require reductions by the LCR. However, industry control over processes, proximity, and availability of comparative information on alternatives should enable information gathering to be less costly for industry than government.<sup>221</sup> Also, the belief that government is inherently less efficient than profit-motivated companies supports the argument that the policy has an efficiency advantage over command and control regulation.

Savings in the initial determination of potential reductions could be outweighed by monitoring and verification costs. If the LCRs are previously unmonitored sources, or use technology necessitating new monitoring practices, government costs will increase.<sup>222</sup> Determinations of the effectiveness of new technology and monitoring numerous small sources for compliance may be expensive for state and local government.<sup>223</sup> Industry incentives to produce data may decrease information costs of monitoring. Decreased litigation and less negotiation delay, also as a result of incentives, may produce savings outweighing some increased moni-

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218. Providing incentives shifts the burden of gathering data and demonstrating possible reductions to industry. Also, under the traditional regulation, any new technology that produced a reduction often became required for all applications. Accordingly, industry had no incentive to develop new equipment. *Id.*; Drayton, *supra* note 5, at 38.

219. Schultze, *supra* note 2, at 56.

220. Litigation over required reductions may be intended to delay reductions. Industry may also resent interference and be willing to litigate mandated reductions. Flexible requirements are less costly and less fault-based. Industry has less reason to delay. LCRs, in fact, may have incentive to rapidly certify voluntary reductions. *Id.*

221. Command and control might require reductions at the least costly source. Industry could expect cost savings, but administrative costs to the government would be prohibitive. See BAUMEL & OATES, *supra* note 60, at 240-42. Allowing states to give final approval may further reduce EPA's costs. See Levin conversation, *supra* note 17. A one-step approval process is less expensive under both this policy and traditional regulation.

222. External trades have not become numerous enough to reliably judge the effect. Internal trades are usually already monitored so cost does not increase as greatly as is expected for external trades. See Calvo y Gonzalez, *supra* note 13, at 389-91.

223. State and local governments perform the monitoring under the SIPs.

toring costs. If the numbers or types of potential reductions which qualify for offsets are strictly limited, costs of monitoring may be reasonable.<sup>224</sup> In any case, the political advantage of using LCRs will be significant because businesses can reduce emissions at lower cost.<sup>225</sup> A fundamental fact emerges: all of the savings depend on incentives which result from an active market.

The willingness of industry to assume the burden of determining LCRs is a function of price incentives.<sup>226</sup> Price level will be set by active trading of limited offsets. Where demand for offsets is weak, a bank is not viable and active trading is unlikely.<sup>227</sup> Industry would have greater costs in locating and coordinating an offset trade in regions without a bank.<sup>228</sup> Of course, local government is likely to take on some of the costs in order to promote development.<sup>229</sup> In a region operating a case-by-case trading system, the cost of locating, recording and publicizing offsets will be high.<sup>230</sup> Active banks motivate industry to assume these costs, and the cost per trade of bank administration will be lower.<sup>231</sup>

The development of a bank may be costly. Expertise in offset banking may be expensive, whether new personnel are added or current staff re-trained.<sup>232</sup> Additional data processing capability will be necessary to record, monitor, and model offsets.<sup>233</sup> Additional monitoring equipment and personnel will likely be needed to verify and enforce reductions.<sup>234</sup> Cooperation among various government agencies and industry personnel must be established.<sup>235</sup> Yet EPA's desire for experimentation provided local governments

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224. See Calvo y Gonzalez, *supra* note 13, at 389-91.

225. See Tucker, *supra* note 2, at 34-37 ("wasteful" regulation has antagonized industry; new flexible compliance is advocated by polluters). See also Alexander, *supra* note 127, at 235.

226. Hoffman, *supra* note 9, at 4.

227. See *supra* text accompanying notes 169-78.

228. Information costs, delay, and the uncertainties of offset availability are all factors affecting the willingness of an industry to locate in such a region. See Hoffman, *supra* note 9, at 4-7.

229. E.g., AQTAD Interviews, *supra* note 98 (a referral system was maintained).

230. A greater portion of the cost falls on government. Moreover, government is less efficient than industry in gathering the necessary information.

231. See *supra* text accompanying notes 55 & 209.

232. See AQTAD Proposal, *supra* note 43.

233. *Id.*

234. See Calvo y Gonzalez, *supra* note 13.

235. E.g., meetings, report sharing, training and personal contact.

little guidance on how a bank should be structured.<sup>236</sup> The policy and even the "banking manual" provide theoretical explanation and administrative discretion.<sup>237</sup> Experimentation is expensive for local government,<sup>238</sup> and even the costs of maintaining a bank may be prohibitive where demand is low.<sup>239</sup>

The regulations allow banks to be administered by quasi-public or private agencies.<sup>240</sup> For example, a local industrial development agency could operate a bank mechanism. However, a "privately" operated bank would not be able to certify reductions. Therefore, local government would still bear certification (verification) costs, and industrial development would be delayed.<sup>241</sup> Local government would need to cooperate with private banking agencies on monitoring and referral, thus bearing many of the same costs of a government operated banking system.

In summary, efficiency considerations could influence EPA's modifications of the policy. The switch from specification to performance standards will probably increase monitoring costs,<sup>242</sup> but may decrease costs of identifying potential reductions and industry resistance. Banking administration may be costly to the point of becoming prohibitive in low demand areas. The benefits of incentives may justify the costs by accommodating economic development and promoting LCRs, technology persuading, and voluntary reductions. However, EPA's expansion of the concept of a private market in offsets may be costly if attempted without active banking.<sup>243</sup> Various proposals to expand the concept<sup>244</sup> may be impractical unless designed to activate the banking and marketing of offsets. Administrative efficiency is difficult to measure, but the

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236. 44 Fed. Reg. 3274, 3280 (1979). The EPA now provides more information. See *supra* note 206.

237. 44 Fed. Reg. 3274 (1979). See also Banking Manual, *supra* note 93.

238. See *supra* text accompanying notes 171-77.

239. AQTAD Interviews, *supra* note 98.

240. See Banking Manual, *supra* note 93.

241. A government-operated bank certifies reductions upon "deposits." Private banks cannot certify offsets. The offset would be certified as part of the trade approval at the time of the trade.

242. See Calvo y Gonzalez, *supra* note 13.

243. Revolving funds, "netting out" of review, and generic policies may expand monitoring which raises costs. *Id.* The benefits of these expansions may not be significant in regions without active banking and trading.

244. See *supra* note 243. Allocation systems for government supplied offsets were also proposed.

emission offset policy may raise costs, especially to local government, without the expected benefits. Active, controlled markets are necessary for benefits to be realized; greater federal control of offset supply and federal administration of banking may be the solution.

#### D. *Equity Distribution of Costs and Benefits*<sup>245</sup>

As a policy to accommodate economic development, the emissions offset policy is equitable on its face. Under the policy, new source construction is allowed in all non-attainment AQCRs.<sup>246</sup> However, variations in each region's economy, availability of offsets, and local governmental administration costs may result in disparity in actual effect.<sup>247</sup> For example, under the policy new industry is allowed in the urban Northeast, but regional economic conditions preclude the policy's accommodation effect. The policy requirements, especially where a functioning bank is unlikely, may be viewed as a major impediment to development.<sup>248</sup> The original policy was aimed at accommodating development in traditional industrialized areas, but may now contribute to greater attractiveness of other regions.<sup>249</sup>

The effect of the offset policy is disadvantageous to economically stagnant areas, as compared to its effect on prosperous regions. These areas have little offset demand and a viable bank within the region is therefore impractical.<sup>250</sup> Of course, without a bank, the costs of locating and coordinating an offset are higher relative to areas with active banking.<sup>251</sup> Higher costs and uncertainty of trades may deter industries from locating in regions without active banking. These costs result from administrative expenses of locating and negotiating reductions, not the cost of the offset itself. Cities without banks may need to induce banks to re-

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245. "Equity," as a policy analysis term, refers to the fairness of the distribution of the costs and benefits among the target populations.

246. 44 Fed. Reg. 3274, 3284 (1979).

247. See *supra* text accompanying note 211.

248. Where banking is not viable, industry must locate offsets, coordinate reduction with construction, and cover the costs of the offset and the delay. See LIROFF, *supra* note 40, at 43-44, 60-61.

249. See Davis, *supra* note 111 (accommodation in urban industrialized areas); Drayton *supra* note 5, at 34-36; Liroff, *supra* note 40, at 43, 60-61.

250. See *supra* note 98.

251. See *supra* note 248.

main competitive in the contest for new development.<sup>252</sup> A bank induced in a region with weak demand for offsets, even if successful, will be more costly for local government. These costs are especially inequitable because the greater burden falls on the local governments which can least afford them—in economically stagnant areas.<sup>253</sup> Under these conditions, the policy adds new disincentives for locating in the Northeast. A federally administered bank system would be more cost effective, spread the cost burden more widely, and equalize the impact of administrative costs on location decisions.<sup>254</sup>

On the other hand, an equity problem is raised by disparate costs and benefits resulting from trades. The trade of hydrocarbon emissions in Virginia illustrates an example of cost incurred by one area for the benefit of another.<sup>255</sup> The asphalt process was converted in the southern and western parts of the state in a trade for new construction on the east coast.<sup>256</sup> In effect, some regions paid the conversion cost in higher taxes and lost a potential offset for future economic development in their region.<sup>257</sup> Another example is the exposure of a particular plant's "neighbors" to new or continued pollution while a plant across town reduces significantly more than is required by the SIP.<sup>258</sup>

Other equity issues involve disparate impacts on private firms. In a practical sense, large firms bear the burden of emission reduction in AQCRs, and the offset policy adds to the burden.<sup>259</sup> Firms readily able to reduce emissions, even for reasons unrelated to the Act, may reap "offset windfalls."<sup>260</sup> Offsets supplied to private

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252. See Liroff *supra* note 40, at 43-44, 60-61.

253. A disincentive to growth in the urban industrialized areas adds to an already high unemployment rate among the poor. See H.R. REP. NO. 1175, 94th Cong., 2d Sess. 178 (1976). Governments in stagnating areas generally must meet high welfare, unemployment, and other service costs, while suffering from an eroding tax base.

254. See *supra* text accompanying notes 208-10.

255. See *Citizens Against the Refinery's Effects, Inc. v. U.S. Evtl. Protection Agency*, 643 F.2d 183 (4th Cir.1981).

256. *Id.*

257. Local benefits of the refinery include jobs, increased tax base, and stimulation to related industries.

258. See Alexander, *supra* note 127, at 250.

259. The Act regulates large sources and the policy applies only to major new sources. See *supra* note 33.

260. In other words, an unexpected return from a plant closing or other action that reduces emissions is qualification for an offset credit. See Raffle, *supra* note 24, at 16.

firms by government may raise questions about special treatment, especially where government has no systematic allocation plan.<sup>261</sup> The purchasing and closing of small firms by large firms seeking to use the resulting emission reductions seems inequitable and undesirable in view of the goal to accommodate needed economic development.<sup>262</sup> The result may be an equivalent level of production or employment at added cost.

A variety of inequities exist in the distribution of the costs and benefits of the emission offset policy. These disparities result from overly broad eligibility of reductions, impracticality of local government administration of banking, and regional economic conditions. The problems are not necessarily inherent in an incentive policy. Narrowed eligibility requirements for offsets and federal or regional banking could resolve the difficulties.

#### E. *Summary*

The policy's effectiveness depends on the development of active markets by local government.<sup>263</sup> However, bank administration is too costly for the few trades expected in economically declining regions. Another problem is that local officials are more responsive to the political benefits of promoting economic development than to federal priorities. As a result, emission reductions of questionable benefit to market operations may be credited as offsets. The administrative efficiency of the policy is also questionable because enforcement costs may increase. Further, shifting the determinations of least cost reducer to local industry has not resulted in the expected savings. The equitable distribution of benefits and costs of the policy depends on adjusting it to regional conditions and modifying the trading controls. Generally, varying economic conditions and reliance on local government for implementation of federal policy appear to severely undercut the current policy.

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261. See *Increment Allocation*, *supra* note 8, at 945; *Liroff*, *supra* note 40, at 20.

262. See *id.* at 42. The Act arguably recognized that some marginal firms would close as a result of control requirements. However, the goal of economic development may not be best served by substituting a large firm for many small ones.

263. Local governments are expected to operate the banks. See *AQTAD Proposal*, *supra* note 43; *Banking Manual*, *supra* note 93.

## CONCLUSION

EPA's emission offset and banking policy is accomplishing many of its goals. However, as a model of incentive-based regulation, the policy has not proven its effectiveness, efficiency, and equity. Where the effects of the policy have not equaled expectations, the causes of the failures may be resolvable by changes in implementation. Local government is very effective in promoting local development and should play a role in accommodating economic growth. However, local government can act most effectively as an advocate of growth, not as a party to trades and administrator of the trading rules. The administration of the offset requirements and banking operations are most effective, efficient, and equitable on a federal or regional level. Federal priorities are diluted by "street level" enforcement decisions of local and state governments.<sup>264</sup> Further, the policy is too theoretically complex for practical delegation to local government. Federal priorities cannot be realized through an hierarchical structure of regulation when concrete programs and consensus on priorities are lacking.<sup>265</sup>

The conditions which qualify a reduction to be used as an offset are too broad. These conditions may be loopholes which enable an over-supply of reductions to undercut the price incentive mechanism. It is important to consider that the underlying goal is to contribute to eliminating a health hazard. Development is to be accommodated while contributing to clean-up. This accommodation process may be utilized to provide monetary incentives for effective and efficient emission reduction. The means of providing accommodation and incentives is *controlled* trading. If implemented with appropriate controls, the incentive regulation scheme may still accomplish its objectives of accommodating development and stimulating technological innovation, cost-effective emission control, and voluntary emission control.

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264. See Lipsky, *supra* note 208.

265. See Beam, *supra* note 168, at 7-10, 12.



