

POLLUTION TRADING AND ENVIRONMENTAL INJUSTICE: LOS ANGELES' FAILED EXPERIMENT IN AIR QUALITY POLICY

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*It is the nature of all greatness not to be exact, and great trade will always be attended with considerable abuses.*¹ Edmund Burke

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INTRODUCTION

Pollution trading² has been touted as a great innovation in environmental policy making³ and a key tool for sustainable development.⁴ Pollution trading allows a polluter to forego reductions in pollution (or increase pollution) at its own facility in exchange for reducing emissions elsewhere or by purchasing credits which represent someone else's pollution reduction.⁵ Pollution trading advocates argue that this approach saves money, promotes innovative technology, and continuously reduces pollution through market incentives. In contrast, they claim that technology-based regulations, commonly referred to as 'command and control', are economically inefficient and rigidly over-prescriptive.⁶

2. "Pollution trading" is used interchangeably with "emissions trading" to refer to one kind of market-based environmental policy tool that provides for the buying, selling, and use of emission reduction credits to more cost-effectively reduce pollution. These programs have also been called marketable permit programs or permit trading.

3. See Jeremy B. Hockenstein et al., *Crafting the Next Generation of Market-Based Environmental Tools*, ENVIRONMENT, May 1997, at 13-14. Pollution trading stands distinct from other market-based environmental policies, which include eliminating government subsidies, charging pollution fees, using a deposit refund system on products and reducing other market barriers.

4. See HERMAN E. DALY, BEYOND GROWTH: THE ECONOMICS OF SUSTAINABLE DEVELOPMENT 222-224 (1996) ("[T]he paradigm policy for solving the allocation, distribution, and scale problems seems . . . to be the tradable permit plan."). According to Daly, economic policy for sustainable development must solve three separate problems: efficient *allocation* of resources for production, fair and adequate *distribution* of resources to people, and setting an optimal *scale* of resource use at a point beyond which further growth costs more than it is worth. See *id.* at 222. Daly sees great virtue in the tradable permit scheme because it forces us to recognize and address these three problems separately through three independent policy instruments. See *id.* at 224. It requires the scale and distribution problems to be decided socially before relying on the competitive market to work out the allocation problem individualistically. See *id.* Daly calls the term *sustainable development* "dangerously vague" and something that "everyone likes, but nobody is sure of what it means." See *id.* at 1. The United Nations-sponsored Brundtland Commission report, *Our Common Future*, defined the term as development which meets the needs of the present without sacrificing the ability of the future to meet its needs. See *id.*

5. All the various forms of pollution trading incorporate this feature, including offsets and bubbles for new and existing sources of air pollution (see *infra* Part I.B), declining cap-and-trade programs, such as RECLAIM, see *infra* Part II.A, and open market trading programs, such as car scrapping Rule 1610, see *infra* Part II.A.

6. See David M. Driesen, *Is Emissions Trading an Economic Incentive Program? Replacing the Command and Control/Economic Incentive Dichotomy*, 55 WASH. & LEE L. REV. 289, 296-97, 306-7 (1998) [hereinafter Driesen, *Emissions Trading*] ("[Proponents of economic incentives hold] that command and control regulation generates unnecessarily high compliance costs because the regulator, instead of deciding only how much pollution reduction to demand, also specifies the technologies and methods firms must use to control pollution. This may prove inefficient because the polluter knows its facility better than the regulator and can determine how to deliver any given decrease in pollution more efficiently than the regulator.")

Pollution trading has received strong support from several quarters. Many in academia, industry, and some environmental organizations such as the Environmental Defense Fund, have endorsed pollution trading strategies. The United States government has also grown increasingly reliant on pollution trading to address domestic air pollution problems.⁷ Furthermore, the United States has successfully foisted pollution trading on the rest of world as a policy tool to combat climate change, despite strong opposition from developing countries and some environmentalists.⁸

Academics, in particular, have been fascinated with pollution trading for decades. A vast body of academic literature discusses the theory and virtues of pollution trading,⁹ especially its promise of identifying the most cost effective means to reduce pollution.¹⁰ Some articles approach this subject with an almost religious fervor, praising the ability of pollution trading to harness the forces of the free market for the good of the environment.¹¹ However, fewer studies have ex-

Furthermore, "because facilities have unequal compliance costs, uniform standards demand relatively expensive reductions from some facilities without securing greater reductions from facilities with lower compliance costs. Hence, uniform standards may use private sector resources that are devoted to pollution control inefficiently."); Hockenstein et al., *supra* note 3, at 14-15.

7. See discussion *infra* Part I.B on the growing U.S. reliance on pollution trading.

8. See David M. Driesen, *Free Lunch or Cheap Fix?: The Emissions Trading Idea and the Climate Change Convention*, 26 B.C. ENVTL. AFF. L. REV. 1, 18-35 (1998) [hereinafter Driesen, *Cheap Fix?*] (reviewing the evolution of trading, including joint implementation, in the Framework Convention on Climate Change); Jonathan Baert Wiener, *Global Environmental Regulation: Instrument Choice in Legal Context*, 108 YALE L.J. 677, 704-13, 735-83, 798-800 (summarizing the use of different regulatory instruments at the international level and arguing that global environmental protection should presumptively favor quantity-based tradeable allowances, due to the unique legal framework that exists at the international level). See *infra* Part IV.B. for the implications of pollution trading for climate change policy.

9. See Lisa Heinzerling, *Selling Pollution, Forcing Democracy*, 14 STAN. ENVTL. L.J. 300, 301, n.3 (1995) (describing support for market-based pollution regulations); Symposium, *Free Market Environmentalism: The Role of the Market in Environmental Protection*, 14 HARV. J.L. & PUB. POL'Y 297 (1992) (surveying market-based regulations).

10. See Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law*, 37 STAN. L. REV. 1333, 1346 (1985) [hereinafter Ackerman & Stewart, *Reforming Environmental Law (I)*] (arguing that market-based pollution trading programs will save billions of dollars annually).

11. See, e.g., Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law: The Democratic Case for Market Incentives*, 13 COLUM. J. ENVTL. L. 171, 179-88 (1988) [hereinafter Ackerman & Stewart, *Reforming Environmental Law (II)*]; Richard B. Stewart, *Controlling Environmental Risks Through Economic Incentives*, 13 COLUM. J. ENVTL. L. 153, 158-62 (1988); Cass Sunstein, *Democratizing America Through Law*, 25 SUFFOLK U. L. REV. 949, 964-66 (1991); Driesen, *Emissions Trading*, *supra* note 6, at 295 (noting "the quasi-religious faith in programs labeled economic incentives and [the] demonization of traditional regulation").

amined the empirical evidence of what occurs on the ground as a result of trading.¹²

This article analyzes two of the most developed pollution trading programs in the world—Mobile Source Credits (specifically, the Rule 1610 “car scrapping” program) and RECLAIM. Both programs benefit large industrial polluters in the Los Angeles area, and have been in place for more than five years. Although industry has saved money, these air pollution trading programs have otherwise failed to deliver.

The promises of pollution trading advocates have not come to pass. Pollution trading in Los Angeles has led to concentrated toxic air emission hot-spots that have shackled low-income and minority communities with the region’s air pollution. Pollution reductions have been far less than those promised by trading proponents. Furthermore, pollution trading has virtually eliminated public participation in the environmental decision-making process. The lessons learned from the Los Angeles pollution trading experiments should inform decision making in the development and reform of domestic and international emissions trading programs.

Part I of this article reviews the theoretical basis for emissions trading programs. This part also examines the trend, especially in the last decade, of increased regulatory reliance on such market incentive programs.

Part II describes how air emissions trading programs have evolved in the metropolitan Los Angeles area of the South Coast Air Basin. This part then describes the harsh reality of emissions trading based on the early results of the Los Angeles experiments and introduces the environmental justice concerns that have called attention to the programs’ shortcomings. The Los Angeles emissions trading programs have resulted in adverse public health impacts, fraud, and manipulation of the trading market to reward the worst polluters.

Part III criticizes emissions trading by drawing on the Los Angeles experience and examines the immorality, injustice, and ineffectiveness of pollution trading. Pollution trading undermines moral claims that pollution is wrong by creating a ‘right’ to pollute. It creates environmentally unjust outcomes by placing a disproportionate

12. For a few empirical surveys of emissions trading see Robert W. Hahn & Gordon L. Hester, *Marketable Permits: Lessons for Theory and Practice*, 16 *ECOLOGY*. L. Q. 361, 381-91 (1989) (trading lead credits to reduce lead in gasoline successfully reduced costs but delayed compliance); Driesen, *Emissions Trading*, *supra* note 6, at 311-18 (reviewing pollution trading’s mixed record of environmental performance).

burden of the region's air pollution on low-income communities, a majority of which are ethnic and racial minorities. Finally, as demonstrated in Los Angeles, pollution trading makes for ineffective air quality policy in at least four ways: 1) it does not significantly reduce air pollution; 2) it does not spur technological innovation; 3) it decreases public participation in environmental decision-making; and 4) it increases the difficulty of monitoring and enforcing emission reductions.

Part IV presents recommendations for reforming or altering emissions trading proposals. This part also examines the implications of pollution trading in a broader context than Los Angeles. A detailed proposal to reform urban air pollution trading programs is presented. Also, this part examines the policy implications of emissions trading for the global climate change debate. Finally, this part briefly outlines other market-based policy tools that may prevent the problems associated with pollution trading, while still realizing the goal of enhancing economic efficiency.

I. FROM THEORY TO PRACTICE: THE GROWING RELIANCE ON POLLUTION TRADING

The attraction of pollution trading lies in its promise to reduce pollution as effectively as mandatory regulations, but with less expense. Advocates argue that a trading strategy increases the range of options for industrial plants. They claim trading encourages some plants to reduce extra pollution now through innovation, while it allows others to wait until later to reduce pollution, when reductions are more cost effective. Thus, pollution trading provides regulatory flexibility, allowing industry to simultaneously increase profits and produce a healthier environment.

A. *Pollution Trading In Theory*

Traditionally, industrial air pollution has been reduced through government regulatory programs that set emissions standards achievable through available pollution control technology. Critics of technology-based regulations assert that this traditional "command and control" approach actually prescribes the pollution control technology that must be installed at each facility or every category of facility.¹³ While command and control regulation might achieve the de-

13. See Driesen, *Emissions Trading*, *supra* note 6, at 296; Perry S. Goldschein, *Going Mobile: Emissions Trading Gets a Boost from Mobile Source Emission Reduction Credits*, 13

sired outcome, industry and many economists contend that such regulation is highly inflexible, creating unnecessarily costly (economically inefficient) outcomes.

The following illustration shows the theoretical advantages of emissions trading programs in achieving economic efficiency. The government mandates that certain industrial air emissions be reduced by fifty percent, a level determined to be achievable through the use of the best available pollution control technology.¹⁴ Imagine three industrial plants, with equal amounts of air emissions, which can readily meet the pollution reduction goal, but which have different compliance costs. Plant A can easily switch fuels at a low cost. Plant B, if applying existing technology, has medium compliance costs. Plant C faces high costs due to the difficulty of retrofitting its old equipment and its inability to switch fuels. If each plant were required to meet the same pollution reduction goal simultaneously, some would face higher marginal costs of compliance. Thus, many economists hold that inflexible, technology-based regulation results in economic inefficiency by requiring costly compliance regardless of the availability of more cost-effective pollution reductions from other sources.¹⁵

Pollution trading supposedly solves this problem by allowing the three hypothetical facilities to buy and sell the right to pollute. The choice of a permissible level of pollution and the issuance of pollution reduction credits are central program elements. Under a market-based scheme, rather than prescribe mandatory reductions at each plant based on a particular technology fix, the government simply mandates the overall outcome desired—for example, a fifty percent reduction in emissions from all sources combined. To reach that

UCLA J. ENVTL. L. & POL'Y 225, 230 (1994/95). However, Driesen argues that critics are wrong; technology-based regulations set performance standards that can be met by any means chosen by the polluter. *See id.* at 297-304.

14. Often, traditional environmental regulation has required pollution to be reduced by amounts achievable through the use of control technology already proven to be effective, affordable, and already in use to some degree. For example, the Clean Air Act requires that Reasonably Available Control Technology (RACT) be used by existing sources to reduce air pollution, while new industrial plants must comply with the Lowest Achievable Emission Rate (LAER) through more state of the art controls. *See* ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 776-77 (2d ed. 1996).

15. *See* Hockenstein et al., *supra* note 3, at 14 (“[Command-and-control] regulations force all firms to shoulder identical shares of the mitigation burden, regardless of the relative costs of this burden to them. This is a significant drawback because experience has shown that some firms can lower pollution at much less cost than others. Thus, while the command-and-control approach can effectively limit emissions of pollutants, it typically exacts unduly high societal costs in the process.”).

goal, each facility is granted “emissions credits” allowing that facility to release exactly fifty percent of its current level of pollution. The facilities can then decide how they will reach that fifty percent goal. If a facility can reduce its emissions by more than fifty percent, then it can sell its surplus credits. Facilities have an economic incentive to reduce their pollution to the maximum extent possible, since any excess reductions generate credits that can be sold to other facilities.

Returning to the above example, Plant A reduces its emissions by seventy-five percent by switching to cleaner burning fuels. Plant B develops an innovative, inexpensive pollution control technology, enabling it to reduce emissions by seventy-five percent. Plant C, faced with a relatively high cost of control, decides that it is too expensive to reduce emissions at all. Instead, Plant C purchases emission reduction credits from Plant A and Plant B, both of which reduced emissions by an extra twenty-five percent beyond the required minimum. The overall result is an emissions reduction equal to what would have been achieved through the command and control model, but at a much lower cost to industry. Thus, by harnessing free market forces and by expanding industry’s compliance options, the emissions trading market has achieved the most economically efficient reduction in emissions—“more bang for the buck.”¹⁶ This model can be replicated beyond the three hypothetical utilities in the above example to include all facilities in a particular region, state, country, or even the entire international community.¹⁷

Although cost savings for industry have motivated further reliance on pollution trading, scholars have developed several other theoretical arguments favoring emissions trading. Foremost among these is the notion that pollution trading stimulates continuous technological innovation to reduce emissions.¹⁸ Over time, as credits become scarce and their prices rise, “emissions trading gives plant man-

16. See John J. Fialka, *Breathing Easy: Clear Skies are Goal as Pollution is Turned into a Commodity*, WALL ST. J., Oct. 3, 1997, at A1 (discussing how Wisconsin Electric Power Co. saved \$100 million by buying pollution credits from other industries that had reduced their sulfur dioxide emissions instead of installing scrubbers); Ackerman & Stewart, *Reforming Environmental Law (I)*, *supra* note 10, at 1348 (noting that “the Clean Air Act bubble policy alone, in limited use for only a few years, has achieved compliance cost savings of over \$700 million without and reduction (and in some cases an increase) in pollution control”).

17. Global trading in carbon dioxide credits was called for in the Kyoto Protocol to the United Nations Framework Convention on Climate Change. See generally Driesen, *Cheap Fix?*, *supra* note 8.

18. See Daniel J. Dudek & John Palmisano, *Emissions Trading: Why is this Thoroughbred Hobbled?*, 13 COLUM. J. ENVTL. L., 217, 219-23 (1988); Ackerman & Stewart, *Reforming Environmental Law (II)*, *supra* note 11, at 171-72.

agers the opportunity and incentive to use existing technologies, production, process, operations, and maintenance changes in new ways which invariably result in more emission control for less money!"¹⁹

Furthermore, some pollution trading programs are more democratic than traditional command and control regulations.²⁰ Sunstein, Ackerman and Stewart argue that market-based regulations will help to reclaim community control over decisions about the environment.²¹ They further argue that adoption of trading programs will encourage public participation and promote reasoned deliberation by elected officials about environmental goals.²² Sunstein suggests that a system based on economic incentives leaves "little room for interest-group maneuvering . . . [and] puts the power of deciding pollution levels back into the hands of the citizenry."²³

B. *A Growing Reliance on Pollution Trading*

Pollution trading has grown from its meager beginnings as an academic theory to become a major policy tool in both domestic and international strategies to reduce harmful pollution. This growing reliance demonstrates the political support for pollution trading, but belies the emerging evidence of its real problems.

The history of environmental policy making over the last thirty years reveals an ongoing political tension between advocates of government regulation and supporters of unchecked commercial enterprise.²⁴ Economists suggested that market incentives, like pollution trading, or disincentives, like pollution taxes, would be more efficient than regulation. Yet, this view was not reflected in the pioneering

19. Dudek & Palmisano, *supra* note 18, at 235. *But see infra* Parts III.B.2-III.B.3.

20. *See* Heinzerling, *supra* note 9, at 311-14; Ackerman & Stewart, *Reforming Environmental Law (I)*, *supra* note 10, at 1353-55; Stewart, *supra* note 11, at 160, 164; Sunstein, *supra* note 11, at 966-68.

21. *See* Heinzerling, *supra* note 9, at 302 (noting that Cass Sunstein, Bruce Ackerman, and Richard B. Stewart have suggested that pollution trading programs are superior to technology-based regulations from a democratic perspective because they begin with an explicit discussion about what level of pollution is acceptable); Stewart, *supra* note 11, at 160, 164; Sunstein, *supra* note 11, at 966-68. *But see* discussion *infra* Part III.C.3.

22. *See* Heinzerling, *supra* note 9, at 302.

23. Sunstein, *supra* note 11, at 967.

24. *See generally* PHILIP SHABECOFF, *A FIERCE GREEN FIRE: THE AMERICAN ENVIRONMENTAL MOVEMENT* (1993); MARK DOWIE, *LOSING GROUND: AMERICAN ENVIRONMENTALISM AT THE CLOSE OF THE TWENTIETH CENTURY* (1995); ROBERT GOTTLIEB, *FORCING THE SPRING: THE TRANSFORMATION OF THE AMERICAN ENVIRONMENTAL MOVEMENT* (1993).

environmental legislation of the early 1970s.²⁵ However, amidst a growing political backlash against environmental regulations in the late 1970s and 1980s,²⁶ early forms of pollution trading gradually developed.²⁷ In the 1990s, these programs have grown explosively, driven by strong industry opposition to regulatory mandates and by an alliance forged between business interests and some national environmental groups.²⁸

The first major emissions trading program, adopted in 1976 by EPA, allowed new stationary sources of air pollution (e.g. industrial plants) to be built in exchange for “offsets” that reduced air pollution by a greater amount from other sources in the same region.²⁹ A more controversial trading program soon followed called “netting,” which used surplus emission reductions at an existing plant to offset increased pollution from expanded operations at the same facility.³⁰ Then, in 1979, a “bubble policy” was adopted by EPA to allow existing industrial polluters to meet pollution reduction goals in the aggregate through any combination of on-site emissions reductions.³¹ In 1984, by upholding EPA’s broad definition of an air pollution source, the Supreme Court endorsed the use of netting and bubbles.³² EPA memorialized these limited trading practices in its Emissions Trading Policy Statement, which included guidance on the use and banking of emission reduction credits.³³

In the 1980s, academics actively advanced the ideal of cost-effectiveness in environmental policy; they attacked technology-based regulations and pushed for expanded market incentive programs.³⁴ Their influence could be seen in a 1988 report by a biparti-

25. See Hockenstein et al., *supra* note 3, at 14.

26. See SHABECOFF, *supra* note 24, at 203-30; GOTTLIEB, *supra* note 24, at 117-61.

27. See generally, Dudek & Palmisano, *supra* note 18.

28. See SHABECOFF, *supra* note 24 at 258-60; DOWIE, *supra* note 24, at 105-17; GOTTLIEB, *supra* note 24, at 160-61.

29. See Dudek & Palmisano, *supra* note 18, at 224-25.

30. This results in “no net increase” in emissions but allows avoidance of pollution control responsibilities. See *id.* at 225-26.

31. See *id.* at 227.

32. See *Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837, 866 (1984) (holding “that the EPA’s definition of the term ‘source’ is a permissible construction of the statute which seeks to accommodate progress in reducing air pollution with economic growth”).

33. Emissions Trading Policy Statement, 51 Fed. Reg. 43,814 (1986); see Dudek & Palmisano, *supra* note 18, at 228.

34. See, e.g., Ackerman & Stewart, *Reforming Environmental Law (I)*, *supra* note 10, at 1341-42 (“A system of tradeable rights will tend to bring about a least-cost allocation of control

san group called Project 88, which proposed economic incentives as a centerpiece of future environmental policy.³⁵ This report helped lead to the passage of the Clean Air Act Amendments of 1990. This legislation established a national pollution trading program for sulfur dioxide emissions from power plants to curb acid rain.³⁶ The 1990 Amendments also authorized states and regions to develop Economic Incentive Programs (EIPs), including emissions trading, as central policy strategies for reducing urban smog.³⁷

In the 1990s, support for emissions trading has grown. EPA and Congress have expanded significantly the use of emissions trading to combat urban smog.³⁸ The Clinton Administration has expressed strong support for market-based approaches, particularly pollution trading.³⁹ Many scholars and economists are aggressively calling for the expansion of market-based regulations.⁴⁰ Environmental regula-

burdens It will . . . reduce the incentives for litigation, simplify the issues in controversy, and facilitate more intelligent setting of priorities.”).

35. See Sherri Bittenberg & Robert Stavins, *Project 88: Harnessing Market Forces to Protect Our Environment*, HARVARD ENERGY AND ENVIRONMENTAL POLICY CENTER WORKING PAPER (1989); Thomas J. Graff, *Harnessing Market Forces to Protect Our Environment*, 20 EDF COLUMN 1, ¶ 3 (last modified Mar. 24, 1999) <http://www.edf.org/pubs/EDF-Letter/1989/Feb/j_market.html>; Harvard Environment and Natural Resources Program, *Outreach* (visited Apr. 1, 1999) <<http://ksgnotes1.harvard.edu/BCSIA/ENRP.nsf/web/Outreach>>.

36. Pub. L. No. 101-549, 104 Stat. 2399 (codified as amended at 42 U.S.C. §§ 7401-671 (1994)); *Bush Breaks Acid Rain Logjam, Commends EDF*, 20 EDF LETTER 1, ¶ 3 (last visited Apr. 11, 1999) <<http://www.edf.org/pubs/edf%2Dletter/1989/aug/a%5Facidrain.html>>.

37. See 42 U.S.C. § 7511a(g)(4) (1994).

38. The emissions trading strategy targets a severe and persistent public health problem. About 117 million U.S. residents breath unhealthy air during at least parts of the year, due to levels of ozone, a prime constituent of urban smog, in excess of the new federal health standard. See American Lung Association, *Outdoor Air Pollution* (last modified Dec. 9, 1998) <http://www.lungusa.org/air/outdoor_factsheet.html>; American Lung Association, *Ozone Air Pollution* (last modified Apr. 18, 1998) <<http://www.lungusa.org/air/envozone.html>>; U.S. Environmental Protection Agency, *Regulating Smog and Particulate Air Pollution: An Integrated Approach* (last modified Sep. 11, 1998) <<http://www.epa.gov/oar/oaqps/regusmog/infozone.html>> (“In 1995, approximately 70 million U.S. residents were living in counties with ozone levels that exceed EPA’s [old] ozone standard.”). See generally American Lung Association, *OUT OF BREATH: POPULATIONS-AT-RISK TO ALTERNATIVE OZONE LEVELS* (1995).

39. See REPORT OF THE NATIONAL PERFORMANCE REVIEW, *FROM RED TAPE TO RESULTS: CREATING A GOVERNMENT THAT WORKS BETTER AND COSTS LESS* 11 (1993) (recommending adoption of market-based approaches to reduce pollution); REPORT OF THE NATIONAL PERFORMANCE REVIEW, *FROM RED TAPE TO RESULTS: CREATING A GOVERNMENT THAT WORKS BETTER AND COSTS LESS* (visited Apr. 1, 1999) <<http://www.usgs.gov/npr/npr-2/npr-2-4.html>>; Heinzerling, *supra* note 9, at 301, n.2 (describing support for market-based pollution regulations).

40. See, e.g., Alexandra Teitz, *Assessing Point Source Discharge Permit Trading: Case Study in Controlling Selenium Discharges to the San Francisco Bay Estuary*, 21 *ECOLOGY L.Q.* 79 (1994); David Sohn & Madeline Cohen, *From Smokestacks to Species: Extending the Tradable Permit Approach From Air Pollution to Habitat Conservation*, 15 *STAN. ENVTL. L. J.* 405

tors and policy makers are developing pollution trading programs to address, among other concerns, water pollution⁴¹ and global climate change.⁴²

Thus, the dominant policy viewpoint sees emissions trading as *the* strategy for reducing pollution in the 21st century. Therefore, it is critical to find out whether the theoretical predictions and political promises bear out in practice. The Los Angeles experience sheds light on whether emissions trading is a 'win-win' cure for environmental ills or a band-aid approach that reduces short-term compliance costs for industry at the expense of public health, social justice and environmental quality.⁴³

II. LOS ANGELES: A TEST MARKET FOR AIR POLLUTION TRADING

The Los Angeles, California, region provides an ideal testing ground for environmental policies. Los Angeles' environmental problems are severe, its regulatory agencies are sophisticated, its resources are relatively ample, and the region's population is multi-racial and economically diverse. Los Angeles and the State of California continue to be national and international pacesetters for the development of new air pollution control policies and technologies. Thus, the effect of Los Angeles' pollution trading programs on air quality, public health, and environmental justice will help inform the future of this market-based approach.

The South Coast Air Basin,⁴⁴ which includes the metropolitan Los Angeles area, suffers the worst air quality in the nation.⁴⁵ For ex-

(1996); Fialka, *supra* note 16 (discussing President Clinton's plan to expand pollution trading world-wide and the Environmental Defense Fund's consulting with British Petroleum on a world wide carbon dioxide market).

41. See, e.g., U.S. ENVIRONMENTAL PROTECTION AGENCY, DRAFT FRAMEWORK FOR WATERSHED-BASED TRADING, EPA 800-R-96-001 (May 1996).

42. See, e.g., UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT, COMBATING GLOBAL WARMING: POSSIBLE RULES, REGULATIONS AND ADMINISTRATIVE ARRANGEMENTS FOR A GLOBAL MARKET IN CO₂ EMISSION ENTITLEMENTS (1994); UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT, GREENHOUSE GAS EMISSIONS TRADING: DEFINING THE PRINCIPLES, MODALITIES, RULES AND GUIDELINES FOR VERIFICATION, REPORTING AND ACCOUNTABILITY (1998).

43. See generally, Driesen, *Cheap Fix?*, *supra* note 8 (emissions trading is a cheap fix, not a free lunch or an enduring solution to pollution problems).

44. The South Coast Air Quality Management District (SCAQMD) was created to achieve and maintain healthful air quality in the South Coast Air Basin, a four-county region which includes Los Angeles and Orange counties and parts of Riverside and San Bernardino counties in California. This area of 12,000 square miles is home to more than 14 million people—almost half the population of the State of California. It is the second most populous urban

ample, nearly 6,000 premature deaths caused by particulate air pollution occur in the Los Angeles area each year, representing about a tenth of such fatalities nationwide.⁴⁶ Additionally, millions of residents of the region are exposed to unhealthy levels of ground level ozone, which causes aching lungs, wheezing, coughing, headache and permanent lung tissue scarring.⁴⁷ Levels of toxic chemicals in the air pose significant risks for causing cancer and other chronic diseases.⁴⁸

area in the United States. See South Coast Air Quality Management District, *Introducing AQMD* (last modified Jan. 27, 1999) <<http://www.aqmd.gov/aqmd/intraqmd.html>>.

45. See Matthew Polesetsky, *Will a Market in Air Pollution Clean the Nation's Dirtiest Air? A Study of the South Coast Air Quality Management District's Regional Clean Air Market*, 22 *ECOLOGY L.Q.* 359, 362, n.9 (1995) (noting that the South Coast Air Basin has the worst ozone and nitrogen oxide levels in the country); *The Alliance of Small Emitters/Metal Indus. v. South Coast Air Quality Management Dist.*, 70 Cal. Rptr. 54, 55 (Cal. App. 2d 1997) (According to the federal government the greater Los Angeles basin has the most polluted air in the entire nation, indeed the only area rated as experiencing 'extreme air pollution.');

Marla Cone, *9 AQMD Advisors Quit in Protest of New Smog Plan Health: Scientists, Economists Express Concern that Agency's Policies will not Ensure Healthful Air. They also Fault the District as Lax in Enforcing Penalties*, L.A. TIMES, Aug. 9, 1996, at A1 (noting that despite decades of progress, the South Coast Air Basin has the nation's "foulest air" and violates federal health standards for ozone on the average of every three days).

46. See DEBORAH S. SHPRENTZ, *BREATH-TAKING: PREMATURE MORTALITY DUE TO PARTICULATE AIR POLLUTION IN 239 AMERICAN CITIES* 58-73 (1996). Every year, some 64,000 people in the U.S. die prematurely from cardiopulmonary causes linked to particulate air pollution, their lives shortened by an average of one to two years. Los Angeles tops the list in premature deaths with 5,873 per year. In comparison, only 1,458 people died from car accidents in Los Angeles in a comparable year, making tailpipe emissions at least as deadly as the car itself. Los Angeles' air pollution early death rate is followed by New York (4,024), Chicago (3,479) Philadelphia (2,599) and Detroit (2,123). See Deborah S. Sphrentz, *Breath-Taking: Premature Mortality Due to Particulate Air Pollution in 239 American Cities* (last modified Mar. 10, 1999) <<http://www.nrdc.org/nrdcpro/bt/tableGu.html>>; Natural Resource Defense Council, *Danger in the Air* (last modified Dec. 16, 1998) <<http://www.nrdc.org/find/aibresum.html>>; Marla Cone, *Grit in L.A. Blamed in 6,000 L.A. Deaths Yearly*, L.A. TIMES, May 9, 1996, at A1.

47. See South Coast Air Quality Management District, *Smog and Health* (last modified Mar. 19, 1997) <<http://www.aqmd.gov/smog/inhealth.html>> [hereinafter SCAQMD, *Smog and Health*]. A 1989 study funded by AQMD and conducted by Dr. Jane Hall of Cal State Fullerton found that ninety-eight percent of the four-county basin's population of 13 million is exposed to unhealthful air, with children especially vulnerable. In addition, 1,600 people die prematurely each year as a result of exposure to air pollution, according to the study. Millions of residents of the South Coast Basin breathe dirty air some one-third the days of the year. Ozone levels here are often twice the federal health standard. See *id.*

In 1995, the standard was exceeded on 98 days at one or more Basin locations, most frequently in the east San Gabriel Valley. Lungs are ozone's primary target. Studies on animals show that ozone damages cells in the lung's airways, causing inflammation and swelling. It also reduces the respiratory system's ability to fight infection and remove foreign particles. Ozone may pose a particular health threat to the 1.4 million residents who already suffer from respiratory problems such as asthma, emphysema and chronic bronchitis. Ozone may also pose a health threat to the young, elderly and cardiovascular patients. See *id.*

48. Lisa Getter, *Cancer Risk From Air Pollution Still High, Study Says; Environment: Samples in L.A. Area Indicate Hazard is 426 Times More than Level Set by EPA in 1990. Report is the First to Measure Carcinogenic Dangers of Breathing*, L.A. TIMES, Mar. 1, 1999, at A1.

This dangerous mix of air pollutants, which are emitted by multitudes of factories, cars, and other sources, seriously threatens public health and well being.

A richly diverse, multi-racial and multi-ethnic population lives, works, and plays in the Los Angeles region,⁴⁹ raising the environmental justice⁵⁰ concern that people of color⁵¹ and poor people are unfairly exposed to more air pollution than others.⁵² Therefore, air pollution reduction strategies, including pollution trading programs, should be evaluated not only for their efficacy in reducing air pollution, but also for their effect on achieving environmental justice. Will such programs alleviate or worsen the environmental injustice of disproportionate exposures to air pollution already faced by the most powerless segments of society?⁵³ The answer to this question is al-

49. Of the more than 9.6 million people who live in Los Angeles County, nearly four million are Latino, about 3.5 million are White, 1.1 million are Asian/Pacific Islander and about one million are African-American. See Los Angeles County, *County of Los Angeles Statistical Data* (last modified May 12, 1998) <<http://www.co.la.ca.us/statistics.htm>>.

50. "Environmental justice" describes the goal of remedying the disproportionate burden of environmental pollution and resource degradation experienced by racial and ethnic minorities and poor people. A related term 'environmental racism' has been used to describe the disparate environmental risks borne by racial minorities. Another related but broader term, 'environmental equity', implies that environmental benefits and risks should be borne equally by all segments of society. See U.S. Environmental Protection Agency, *Environmental Justice* (last modified Dec. 3, 1998) <<http://www.epa.gov/swerosps/ej/index.html>> (EPA defines environmental justice as the "fair treatment for people of all races, cultures, and incomes, regarding the development of environmental laws, regulations, and policies"); Marianne Lavelle & Marcia Coyle, *Unequal Protection: The Racial Divide in Environmental Law, A Special Investigation*, NAT'L L.J., Sept. 21, 1992, at S1; Roberto Suro, *Pollution-Wearied Minorities Try Civil Rights Tack*, N.Y. TIMES, Jan. 11, 1993, at A1. See generally CONFRONTING ENVIRONMENTAL RACISM: VOICES FROM THE GRASSROOTS (Robert D. Bullard ed. 1993); U.S. ENVIRONMENTAL PROTECTION AGENCY, "ENVIRONMENTAL EQUITY" REDUCING RISK FOR ALL COMMUNITIES (1992).

51. The term "people of color" refers to racial and ethnic minorities (other than of European descent) in the aggregate, including Latinos, African-Americans, Asian-Pacific Islanders, Native Americans and other "non-Whites". The term "minority" has lost relevance, since in Los Angeles minorities taken together are in the majority. See Los Angeles County, *supra* note 49. The population of the entire State of California has recently become "majority minority", with the makeup of the U.S. population expected to follow the same trend.

52. See Kristina Lindgren, *Smog Affects Poor, Young, Nonwhite the Most; Research: Air pollution tends to be worst in low-income area of Southern California, economists claim. Youth suffer playing outdoors*, L.A. TIMES, May 21, 1992, at B8.

53. See discussion *infra* Part II.B.1 (on the experience in Los Angeles) and Part III.B (on the broader policy implications). The environmental justice question frames the central analysis in this article because until recently few claims had been made as to whether pollution trading programs affect environmental justice. As an unresolved concern, the environmental justice impacts of pollution trading demand close scrutiny. Also, since trading advocates assert that equivalent reductions in air pollution will be provided through pollution trading compared to technology-based regulations, we examine this claim in depth.

ready of pressing importance in Los Angeles and will become increasingly relevant throughout the rest of the country. The experience in Los Angeles provides a relevant model for evaluating the strengths and weaknesses of pollution trading as a strategy for reducing air pollution and achieving environmental justice, because of the confluence of severe pollution with a large multicultural population.

A. *Pollution Trading Comes of Age in Los Angeles: From Rule 1610 to RECLAIM and Beyond*

The development of pollution trading represents an important modern day chapter in the fifty-year-old political history of air pollution regulation and reaction in Los Angeles.⁵⁴ Industry and business interests in the Los Angeles area, which have generally opposed or resisted technology-based regulations, reacted strongly against the court-ordered 1989 Air Quality Management Plan (AQMP).⁵⁵ Under intense political pressure compounded by an economic recession, the South Coast Air Quality Management District (SCAQMD) openly embraced industry's call to replace existing and proposed air quality regulations with market incentive programs. The Clean Air Act Amendments of 1990⁵⁶ authorized states and local air districts to develop economic incentives programs, further paving the way for pol-

54. See South Coast Air Quality Management District, *The Southland's War on Smog: Fifty Years of Progress Toward Clean Air, Part 1* (last modified Mar. 4, 1997) <<http://www.aqmd.gov/monthly/marchcov.html>>. Oil companies and the Chamber of Commerce mounted stiff opposition to air quality regulations as early as 1947 when they opposed the repeal of a state law giving manufacturers the right to "necessary" discharge of smoke and fumes, and the creation of an air pollution permit system. See *id.*

55. See Steve Padilla, *Coalition Sees High Costs, Lost Jobs in AQMD Clean Air Plan*, L.A. TIMES, Feb. 7, 1990, at B1 (the air quality plan includes 120 rules which, among other things, restrict the use of certain chemicals or mandate extra pollution controls on manufacturing). See generally Daniel P. Selmi, *Transforming Economic Incentives From Theory to Reality: The Marketable Permit Program of the South Coast Air Quality Management District*, 24 ENVTL. L. RPTR. 10,695 (1994); SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT & SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS, AIR QUALITY MANAGEMENT PLAN: SOUTH COAST AIR BASIN (1989).

This visionary plan identified the need for a virtual phase-out in the use and combustion of petrochemical-based fuels and products in order to meet health standards for pollutants in smog. It divided proposed air pollution control measures into three tiers: Tier I were already available technologies, Tier II measures were technologies and management strategies expected to be ready for implementation in the next 10 to 15 years and Tier III measures were based on conceptual technologies not yet developed. See generally Selmi, *supra*; SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT & SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS, *supra*.

56. Pub. L. No. 101-549, 104 Stat. 2399 (codified in 42 U.S.C. §§ 7401-671).

lution trading in Los Angeles. Emboldened by national policy developments, an industry coalition called the Regulatory Flexibility Group successfully lobbied the SCAQMD to amend the Air Quality Management Plan to suspend industrial air quality regulations while the details of the market incentives program were developed.⁵⁷

Following a pattern shaped by the policy agenda of the largest industrial polluters, a group of market-based regulations centered on pollution trading have been adopted for the South Coast Air Basin. In 1993, SCAQMD approved the first old vehicle pollution trading program in the country, known as Rule 1610 or the "car scrapping program".⁵⁸ Rule 1610 allows stationary source polluters (such as factories and refineries) to avoid installing expensive pollution control equipment if they purchase pollution credits generated by destroying old, high-polluting cars. Ideally, an equal or greater amount of pollution can be reduced at a much lower cost by purchasing and destroying old cars than by forcing stationary sources to install expensive pollution control equipment.⁵⁹

57. See Judy Pasternak, *AQMD Approves Changes to Region's Clean Air Plan; Pollution: Revision is criticized by environmentalists and small businesses and praised by trade associations*, L.A. TIMES, July 13, 1991, at A1; Polesetsky, *supra* note 45, at 362-65 (noting that the RFG included at various times Chevron, Unocal, Shell, Mobil, Texaco, ARCO, and several of the other largest polluters); Marla Cone, *AQMD Plan for Blue Skies Turns Hazy*, L.A. TIMES, Aug. 21, 1993, at B1 (reporting that the largest polluters—oil refineries, power utilities, and major aerospace firms—stand to gain from RECLAIM because they can save millions of dollars a year but that smaller, less-polluting businesses would lose money under RECLAIM).

58. As SCAQMD Executive Officer James Lents wrote to the SCAQMD Board of Directors:

[Rule 1610] provides an alternative strategy for reducing emissions at a potentially lower cost . . . [and] adverse impacts on compliance costs for regulated industries will not occur. Businesses affected by District stationary source regulations have shown increasing interest in having the option of implementing mobile source emission control strategies to acquire emissions reduction credits. Proposed Rule 1610 addresses this interest.

Letter from James Lents, Executive Officer, SCAQMD, to SCAQMD Board of Directors to the SCAQMD Board (Dec. 28, 1992) (urging certification of the Environmental Assessment for Rule 1610 and adoption of Rule 1610) (on file with author); see also Maria L. La Ganga, *Firms Can Earn Pollution Credits by Buying Old Cars; Environment: AQMD approves groundbreaking plan to let companies delay costly smog-reduction efforts*, L.A. TIMES, Jan. 9, 1993, at A1.

59. See Goldschein, *supra* note 13, at 254-55. Though each individual vehicle represents a miniscule portion of the pollution problem, mobile sources collectively represent a significant portion. See *id.* at 239. Furthermore, a small number of vehicles account for a disproportionate amount of motor vehicle emissions. See *id.* at 241. The vast majority of these dirty vehicles are older vehicles. See *id.* Because of minimal or nonexistent emission control equipment, deterioration, and poor maintenance, older vehicles can generate very high emission levels. See *id.*

Under Rule 1610, “licensed car scrappers” can purchase and destroy old cars.⁶⁰ SCAQMD then grants the scrapper emissions credits based on the projected emissions of the car had it not been destroyed, which may then be sold to stationary source polluters (e.g. factories). The stationary sources use the pollution credits to avoid on-site emission reductions that would be required under the technology-based regulatory regime. Rule 1610 requires polluters to purchase credits representing twenty percent *more* emission reductions than would be achieved through compliance with technology-based regulations for their plant. Although industrial plants avoid emission reductions, the scrapping of older, high polluting cars should result in greater air quality improvements at a lower cost than regulatory mandates.

SCAQMD then adopted the centerpiece of its pollution trading strategy, the Regional Clean Air Incentives Market (RECLAIM), the world’s first urban smog trading program.⁶¹ RECLAIM replaced many of SCAQMD’s technology-based regulations aimed at reducing emissions of sulfur oxides (SO_x) and nitrogen oxides (NO_x). RECLAIM, a “declining cap and trade” program, mandates annual emission reductions for industry but provides them the flexibility to achieve that goal by either purchasing emission reduction credits or by reducing their own pollution. Under RECLAIM, SCAQMD allocates pollution credits to each major source facility⁶² in the region

60. South Coast Air Quality Management District, *Regulation XVI - Mobile Source Offset Programs*, Rule 1610(b)(6) (last modified Mar. 11, 1999) <<http://www.aqmd.gov/rules/html/tofc16.html>> [hereinafter SCAQMD, *Offset Programs*]. Rule 1610 represents a form of open market trading. It does not set an overall cap on emissions which declines each year. Nor does it mandate participation in trading from a tightly restricted universe of participants. Instead, any industry subject to a technology-based regulation listed in Rule 1610 can voluntarily choose to purchase car scrapping credits in lieu of compliance with the industry rules.

61. See Marla Cone, *Smog Market to Offer Pollution by the Pound; Environment: RECLAIM, the world’s first free-enterprise program to clean up urban air, will make its debut Jan. 1 with the participation of nearly 400 businesses*, L.A. TIMES, Dec. 28, 1993, at B1; Selmi, *supra* note 55, at 10,695-711 (1994) (detailing the development of the RECLAIM program leading up to its final adoption). Originally, RECLAIM was proposed to include trading in volatile organic compounds (VOCs), but that idea was dropped because of practical difficulties with VOC monitoring and enforcement and concern about localized increases in toxic VOC emissions. See discussion *infra* Part II.B.2 and Part III.C.4.

62. The RECLAIM market includes all facilities that emit more than four tons of NO_x or SO_x per year, except certain exempt public service facilities. See South Coast Air Quality Management District, *Regulation XX - Regional Clean Air Incentives Market (RECLAIM)*, Rule 2001(b) (last modified Apr. 15, 1998) <<http://www.aqmd.gov/rules/html/tofc20.html>> [hereinafter SCAQMD, *RECLAIM Rules*]. About 400 industrial facilities are included in the trading universe, representing about two-thirds of the NO_x, and eighty-five percent of the SO_x, emissions from permitted stationary source facilities in the Basin. See Selmi, *supra* note 55, at 10,698.

based on its historic level of emissions. Each facility has three options: 1) it can use all of its credits and pollute up to the level they allow; 2) it can reduce its pollution and sell the excess credits to other facilities; or 3) it can increase emissions relative to its initial endowment of credits by buying credits from other facilities. Each year SCAQMD decreases the number of credits allocated by the program, forcing facilities either to decrease their pollution or purchase credits from other facilities.⁶³ As the number of available credits decreases, their market price should rise, increasing the market incentive for companies to reduce pollution rather than purchase credits. According to its supporters, by 2003 RECLAIM should spur the lowest cost pollution reduction among individual industrial plants and slash aggregate emissions of NO_x by seventy-five percent and SO_x by sixty percent.⁶⁴

Toward fulfilling industry's goal of indefinitely avoiding emissions reductions at their own plants, SCAQMD aggressively expanded its emissions trading strategy.⁶⁵ In April 1997, the SCAQMD Governing Board voted to approve Rule 2506, Area Source Credits (ASCs), which provides for the issuance of marketable credits to entities that voluntarily reduce emissions NO_x and SO_x.⁶⁶ The resulting ASCs can then be converted to RECLAIM Trading Credits or used as an alternative method of compliance with other SCAQMD regulations.⁶⁷ The mobile source pollution trading has expanded beyond

63. See SCAQMD, *RECLAIM Rules*, *supra* note 62, at Rule 2002(e)(1).

64. See Cone, *supra* note 61, at B1.

65. For example, the SCAQMD Annual Report for 1996 states,

in 1996 [SCAQMD] continued its efforts to increase flexibility, streamline requirements and reduce fees for businesses under [its] Regulatory Reform Initiatives. For example, [SCAQMD] adopted a novel and widely heralded measure to allow businesses to help meet their air pollution reduction requirements by scrapping old lawn and gardening equipment, rather than employing costly new controls at their facilities.

South Coast Air Quality Management District, *South Coast Air Quality Management District 1996 Annual Report* (last modified March 10, 1997) <<http://www.aqmd.gov/pubinfo/96annual.html>>.

66. See South Coast Air Quality Management District, *Regulation XXV - Intercredit Trading*, Rule 2506 (last modified Dec. 23, 1997) <<http://www.aqmd.gov/rules/html/tofc25.html>> [hereinafter SCAQMD, *Intercredit Trading*]; South Coast Air Quality Management District, *Board Meeting Date: April 11, 1997 Agenda No. 37, Adopt Proposed Rule 2506—Area Source Credits* (last modified Apr. 10, 1997) <<http://www.aqmd.gov/hb/970437a.html>>.

Interestingly, Rule 2506 specifically states that “[u]se of ASC’s pursuant to any other District rule or regulation prior to approval by EPA into the SIP of such rule or regulation may be subject to enforcement action pursuant to the federal Clean Air Act.” SCAQMD, *Intercredit Trading*, at Rule 2506(k)(2).

67. See SCAQMD, *Intercredit Trading*, *supra* note 66, at Rule 2506(a), Rule 2506(k)(1).

Rule 1610 to provide for the issuance of Mobile Source Emission Reduction Credits (MSERCs) for voluntary emission reductions from:

- the repair of emissions-related components in high-emitting vehicles,⁶⁸
- the purchase of clean on-road vehicles, including new, low-emission buses, retrofitting vehicles to low-emission configurations, and purchasing zero-emission vehicles,⁶⁹
- the electrification of truck stops and tour bus stops to prevent engine idling,⁷⁰
- the purchase of low or zero emission off-road vehicles,⁷¹
- the purchase of clean lawn and garden equipment, such as battery-operated lawn mowers and leaf blowers, and the scrapping of old equipment.⁷²

Additionally, SCAQMD has proposed a broad Intercredit Trading Program that will radically expand the emissions trading market by linking all of SCAQMD's stationary, mobile, and area source credit markets.⁷³ To avoid reducing emissions from their employees' commutes, the Air Quality Investment Program allows large employers and other polluters to pay a fee to be used later to reduce other emissions.⁷⁴ Final adoption in 1999 of the Intercredit Trading rule, the lynchpin of the Intercredit Trading program, is expected to address the critical issues of credit conversion between markets, credit life, and banking.⁷⁵ With industry encouragement, SCAQMD

68. See SCAQMD, *Offset Programs*, *supra* note 60, at Rule 1605.

69. See *id.* at Rule 1612.

70. See *id.* at Rule 1613.

71. See *id.* at Rule 1620.

72. See *id.* at Rule 1623. See also Marla Cone, *Lawn Mower Buyback Plan Approved; Smog: Policy will let firms purchase and scrap homeowners' gas-powered equipment in exchange for pollution credits*, L.A. TIMES, May 11, 1996, at A20.

73. See Bill Kelly, *Intercredit Trading Market Proposed*, 3 AQMD ADVISOR 4, 4-5 (March 1996); Howard Fine, *AQMD Banking on Broader Smog Credit Plan*, ORANGE CO. BUS. J., Feb. 12, 1996, at 3 (noting that the intercredit trading program would not result in any additional emissions reductions, but rather make it easier for companies to reduce emissions under existing rules).

74. See SCAQMD, *Intercredit Trading*, *supra* note 66, at Rule 2501; South Coast Air Quality Management District, *AQMD News - AQMD Approves Air Quality Investment Program*, (last modified Feb. 23, 1999) <<http://www.aqmd.gov/news1/Archives/aqip1.html>> [hereinafter SCAQMD, *Air Quality Investment Program*].

75. See South Coast Air Quality Management District, *Board Meeting Date: March 14, 1997 Agenda No. 2, Set Public Hearing April 11, 1997 to Adopt Proposed Rule 2501—Air Quality Investment Program* (last modified Mar. 10, 1997) <<http://www.aqmd.gov/hb/97032a.html>>; South Coast Air Quality Management District, *Board Meeting Date: Febru-*

has demonstrated a firm commitment to the emissions trading strategy and has expanded its use in a variety of areas.

As SCAQMD has increased use of the trading approach, the Los Angeles experiments with pollution trading have become test cases for federal pollution trading policy concerning urban smog. EPA has looked to the model programs in Los Angeles to determine the advantages and drawbacks of emissions trading strategies. EPA's policy guidance on Economic Incentive Programs (EIPs)⁷⁶ establishes the rules for programs similar to RECLAIM to be developed around the country.⁷⁷ In 1995, EPA issued a model Open Market Trading Rule to enable states and regions to develop inter-credit trading programs similar to those now under development in Los Angeles.⁷⁸ Open market trading would allow credits earned from reducing emissions from mobile, stationary and area sources⁷⁹ to be used by industrial polluters to forego their existing emissions reduction obligations. However, concerns raised about toxic hot-spots and environmental justice,⁸⁰ and the efficacy of the Los Angeles trading programs⁸¹ have given pause to EPA's plans to grant the necessary approval for new emissions trading programs. Based on the Los Angeles experience, EPA hopes to develop safeguards and adopt amendments to its EIP program guidance and rules to mitigate or prevent environmental justice impacts.⁸²

The Los Angeles experiments are having a significant impact on the national policy debate on air pollution trading. Therefore, the re-

ary 12, 1999 Agenda No. 18, Rule and Control Measure Forecast (last modified Feb. 9, 1999) <<http://www.aqmd.gov/hb/990218a.html>>.

76. Recall that the 1990 Clean Air Act Amendments authorized states and regions to develop EIPs as central policy strategies for reducing urban smog. See discussion *supra* Part I.B.

77. See Economic Incentive Program Rules, 59 Fed. Reg. 16,609, 16,710 (1994).

78. See Open Market Trading Rule for Ozone Smog Precursors, 60 Fed. Reg. 39,668 (1995) (to be codified at 40 C.F.R. Ch. 1) (proposed Aug. 3, 1995); Open Market Trading Rule for Ozone Smog Precursors, 60 Fed. Reg. 44,290 (1995) (to be codified at 40 C.F.R. Ch. 1) (proposed Aug. 25, 1995). Due to concerns raised by environmentalists, the Open Market Trading Rule was never approved as a final federal regulation by EPA, but serves instead as guidance to the states and regional districts.

79. Air pollution sources fall into three categories. "Mobile sources" include autos, trucks and other transportation related activities. "Stationary sources" include factories, power plants and other discrete, fixed facilities. "Area sources" include all other air pollution emitted by many diverse small sources, such as from the use of consumer products like paints, barbecue grills, and from small stationary sources.

80. See discussion *infra* Part II.B.1 and Part III.B.

81. See discussion *infra* Part II.B.2-3 and Part III.C.

82. See Robert Perciaseppe, Address at Joint Meeting of the Enforcement Subcommittee and Air & Water Subcommittee of the National Environmental Justice Advisory Council (Dec. 9, 1998) (on file with authors).

sults of the car scrapping and RECLAIM trading programs must be carefully evaluated. In order for emissions trading to live up to its proponents' claims, it must clean the air at least as well as the technology-based approach without adverse side effects. However, the Los Angeles experiments in pollution trading have created additional adverse public health impacts, such as toxic hot-spots, and have resulted in environmental injustice. To make matters worse, the pollution trading programs in L.A produced even fewer emission reductions than technology-based regulations.

B. *The Harsh Reality: Problems with Pollution Trading in Los Angeles*

Evidence indicates that pollution trading programs in Los Angeles are plagued with problems. Although the programs have succeeded in saving money for industry, they have not effectively reduced emissions and have not promoted technology innovation or public participation. Instead, they have further concentrated the region's pollution in lower income communities and given industry a "free ride" from otherwise obligatory emissions reduction schedules.

1. Toxic Hot-spots and Environmental Injustice: The Mad Science of Pollution Trading

Pollution trading programs can unfairly concentrate pollution in communities where factories purchase emissions reduction credits rather than reduce actual emissions. These localized health risks from pollution sources, or "toxic hot-spots," tend to be overlooked by policy makers focused on regional air quality concerns. However, the disproportionate burden thrust on communities surrounding major pollution emitters takes its toll in the form of increased risks of toxic exposure and damage to human health. Furthermore, it is environmentally unjust when these communities enduring localized toxic hot-spots are overwhelmingly low income and populated by people of color.⁸³ Such hot-spots can be worsened when pollution trading programs ignore the differences in chemical hazards posed by the pollutants reduced to earn credits and the pollutants emitted through the purchase of credits. The problem of hot-spots is further complicated by the emission of co-pollutants and precursors, which may increase exposure to certain types of chemicals in downwind communities where pollution is concentrated.

83. See Exec. Order No. 12898, 59 Fed. Reg. 7629 (1994) (federal policy requires that environmental injustice be assessed and addressed). See discussion *infra* Part III.B.

SCAQMD's pollution trading programs have resulted in the creation of toxic hot-spots by concentrating pollution in communities surrounding major sources of pollution. Rule 1610 provides the clearest example. SCAQMD studies indicate that cars destroyed through the Rule 1610 program were registered throughout the air quality management district, a four-county region.⁸⁴ Air pollution from these automobiles would have also been distributed throughout this region. By contrast, stationary sources in Los Angeles are densely clustered in only a few communities in this four-county region.⁸⁵ As a result of these distribution patterns, Rule 1610 effectively takes pollution formerly distributed throughout the region by automobiles, and concentrates that pollution in the communities surrounding stationary sources.

Most of the emissions credits purchased to avoid stationary source controls have been purchased by four oil companies: Unocal, Chevron, Ultramar and GATX.⁸⁶ Of these four companies, three are located close together in the communities of Wilmington and San Pedro; the fourth facility, Chevron, is located nearby in El Segundo. These companies have used pollution credits to avoid installing pollution control equipment⁸⁷ that captures toxic gases released during oil tanker loading at their marine terminals.⁸⁸ When loading oil tankers, toxic gases are forced out of the tanker and into the air, exposing workers and nearby residents to toxic vapors, including benzene, a

84. See Declaration of Bruce Lohmann in Support of Complainants Opposition to Respondents' Response to Environmental Justice Complaint at 22, *Communities for a Better Environment v. South Coast Air Quality Management Dist.*, EPA File No.10 R-97-R9 (US EPA, Office of Civil Rights 1998) ("[T]he cars that were scrapped came from all over the South Coast Air Basin, a four-county area.") [hereinafter Lohmann Declaration]; *South Coast Air Quality Management District, Rule 1610/All Vehicles Scrapped* (undated map) (on file with authors).

85. See discussion *infra*, Part IV.A.

86. See generally Letter from Richard Toshiyuki Drury et al., *Communities for a Better Environment*, to Anne Goode, U.S. Environmental Protection Agency (Nov. 23, 1998) (Re: CBE et al. v. SCAQMD et al., No. 10R-97-R9; CBE's response to SCAQMD's June 26, 1998 Brief in the Title VI Civil Rights Act complaint filed against the SCAQMD over the car scrapping program) (on file with authors).

87. The equipment is similar to the vapor control nozzles common at gasoline stations in many states, only much larger.

88. Vapor recovery during marine loading was required by SCAQMD, Rule 1142, which EPA approved for inclusion in the State Implementation Plan, making the requirement enforceable under the federal Clean Air Act. See Approval and Promulgation of Implementation Plans; California State Implementation Plan Revision; San Diego County Air Pollution Control District; San Joaquin Valley Unified Air Pollution Control District; South Coast Air Quality Management District, 59 Fed. Reg. 64,132 (1994) (codified at 40 C.F.R. Part 52) (proposed Dec. 13, 1994).

known human carcinogen.⁸⁹ Thus, by using pollution credits, these companies are allowed to avoid reducing local emissions of hazardous chemicals in exchange for reducing regional auto emissions. As a result of Rule 1610, the four oil companies created a toxic chemical hot-spot around their marine terminals, exposing workers and nearby residents to elevated health risks.

Exposure to the emissions from loading marine vessels poses a cancer risk greater than 150 in 1 million for the maximum exposed individual.⁹⁰ By comparison, the typical significant risk threshold for cancer risk ranges from one to one hundred in 1 million.⁹¹ Neither of these risk estimates considers the cumulative impact of marine terminal emissions in combination with all the other sources of toxic air contaminants to which people in the region are exposed.⁹²

Rule 1610 allows automobile pollution, which was formerly distributed widely across the four-county South Coast Air Basin, to be *traded* for highly concentrated "volatile organic compounds" (VOCs) that are released into the communities surrounding these marine terminals. In theory, air pollution was reduced by a slight amount throughout the Los Angeles region to offset this pollution hot-spot. However, now a few communities surrounding stationary sources bear the brunt of pollution exposures that were formerly shared by the entire region's population.⁹³

89. See Shipra Bansal & Scott Kuhn, *Stopping an Unfair Trade: Environmental Justice, Pollution Trading, and Cumulative Impacts in Los Angeles*, ENVTL. L. NEWS, Spring 1998, at 16, 17-18. A marine vapor recovery system can reduce VOC emissions by at least ninety-five percent during any loading, lightering, ballasting or housekeeping events. See *id.* at 20.

90. See Los Angeles County Building and Construction Trades Council and the Steamfitters and Pipefitters Local 250, *Comments on the Draft Environmental Impact Report for the Renewal of Unocal's Lease for Berths 148-151*, in FINAL ENVIRONMENTAL IMPACT REPORT FOR BERTHS 148-151 PORT OF LOS ANGELES 17, 23 (1996). The Environmental Impact Report documented that workers at the marine terminal would be exposed to a total cancer risk of 162 in a million if that facility's lease was renewed to allow four additional ships per month to unload.

91. The Clean Air Act establishes that if technology-based standards do not reduce lifetime excess cancer risks to the individual most exposed to hazardous air emissions to less than one in one million, the EPA Administrator shall promulgate standards under this subsection for such source category, in order to protect human health and the environment. See 42 U.S.C. § 7412(f)(2)(A) (1994). The same risk level forms the basis for delisting hazardous air pollutants providing that the cancer risks from sources is less than one on a million. See 42 U.S.C. § 7412(c)(9)(b)(i) (1994).

92. The average "background" cancer risk from exposure to toxic chemicals in the air of Los Angeles is 426 in one million. See Getter, *supra* note 48, at A1.

93. Similar trading patterns have developed under RECLAIM. The region's largest polluters, particularly refineries, have been the most active purchasers of RECLAIM emission reduction credits. See Douglas Young, *Unocal Stocking up on Pollution Credit as Refinery Sell-*

To add insult to injury, the public health risks from the extra pollution concentrated in these neighborhoods constitutes a case of environmental injustice. The demographics of this hot-spot area starkly contrast with that of the metropolitan Los Angeles region. The residents living in San Pedro and Wilmington, which host a majority of the oil companies emitting hazardous toxic chemicals, are overwhelmingly Latino. Furthermore, the racial composition of communities living near three of the marine terminals ranges from 75 to 90 percent people of color, while the entire South Coast Air Basin has a population of only 36 percent people of color.⁹⁴

These communities are already overburdened with high levels of pollution.⁹⁵ People of color bear a disproportionate share of the impacts of air pollution and other environmental hazards within the Basin.⁹⁶ A 1993 SCAQMD study found that “those who are relatively

off Nears, L.A. Bus. J., Mar. 17, 1997, at 13 (noting that Unocal and Chevron were the top two purchasers of pollution credits in 1996. Three other refineries were among the top 10 purchasers: Mobil, Texaco, and Powerine Oil Company).

94. See Bansal & Kuhn, *supra* note 89, at 18. The South Coast Air Basin is home to 13,862,513 people. Of this number, 4,988,739 are people of color and 8,873,774 are white. See U.S. Census Bureau, *Census Bureau Population topics and Household Economic Topics* (visited Apr. 1, 1999) <<http://www.census.gov/population/www/index.html>>. Los Angeles County has a population of 8,863,164, and 43.1 percent are people of color. See Los Angeles County, *supra* note 49. The population demographics around the marine terminals were determined using EPA's Landview software program. See U.S. Environmental Protection Agency, *LandView III Mapping Tool* (last modified June 8, 1998) <<http://www.epa.gov/swerosps/bf/lvinfo.htm>> (LandView III uses U.S. census data to determine population demographics around selected facilities).

95. A review of the 1994 Toxic Release Inventory data reveals that 1,964,445 pounds of air pollution and 198,956 pounds of water pollution was released from facilities in the Wilmington-San Pedro area. See SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT/CALIFORNIA STATE UNIVERSITY FULLERTON FOUNDATION, *THE DISTRIBUTION OF CURRENT AND FUTURE EXPOSURE TO OZONE, FINE PARTICULATE MATTER, CARBON MONOXIDE, AND NITROGEN DIOXIDE AMONG DEMOGRAPHIC GROUPS IN THE SOUTH COAST AIR BASIN*, FINAL REPORT 5 (April 1993); ERIC MANN, *L.A.'S LETHAL AIR: NEW STRATEGIES FOR POLICY, ORGANIZING, AND ACTION 27-34* (1991) (noting that four of the country's top twenty air polluters are located in the Wilmington and San Pedro areas).

96. See SCAQMD, *Smog and Health*, *supra* note 47. In 1991, a study by Dr. Jane Hall of Cal State Fullerton showed that minorities as a whole were exposed more often to poor air quality since affordable housing is located where the air is more polluted. African-Americans and Hispanics generally breathe the worst air, partly because they tend to work in outdoor occupations. See MANN, *supra* note 95, at 31 (asserting that in Los Angeles, seventy-one percent of African Americans and fifty percent of Latinos live in the areas with the worst air quality); Susan Moffat, *Minorities Found More Likely to Live Near Toxic Sites*, L.A. Times, Aug. 30, 1995, at B1 (people of color in Los Angeles County are three times more likely than whites to live within half a mile of hazardous waste treatment or dumping centers); Eric Mann, *L.A.'s Smogbusters: Pollution in Los Angeles*, THE NATION, Sept. 17, 1990, at 257, 268 (1990) (noting that the Latino and Black communities in East Los Angeles, Huntington Park, and Watts are disproportionately impacted by industrial facilities and pollution). See also Lindgren, *supra* note 52, at B8.

poorer or younger, black or Latino, are exposed to more pollution than those who are better off, older, and white or Asian."⁹⁷ A 1993 study of the distribution of toxic chemical releases from manufacturing facilities in Los Angeles County⁹⁸ found that the majority of facilities emitting toxic pollutants were in "Hispanic-dominated" census tracts.⁹⁹ A 1996 study found that, given two neighborhoods of equal economic standing and with equal percentages of industrial activity, the community inhabited by a greater number of minorities will be more likely to have a hazardous waste treatment, storage, and disposal facility (TSDF) in their midst.¹⁰⁰ Overall, minorities are more than twice as likely as Caucasians to be living in a census tract located within a one-mile radius of at least one large capacity TSDF in Los Angeles County.¹⁰¹ Although environmental injustice seems to be one endemic feature of environmental programs in the Los Angeles area, pollution trading worsens the problem.

The hazards of trading extend beyond the shifting of pollution from a dispersed region to more concentrated localized areas; inter-pollutant trading can also create toxic hot-spots.¹⁰² Many trading programs allow facilities to trade pollution credits generated through reductions in a large variety of chemicals. For example, the Rule 1610 program allows pollution credits to be generated through reductions in VOCs.¹⁰³ VOCs are a family of over 600 chemical compounds,¹⁰⁴ some of which have high toxicity and some of which have low toxicity. VOC trading raises concerns about the difference in toxicity of

97. SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT/CALIFORNIA STATE UNIVERSITY FULLERTON FOUNDATION, *supra* note 95, at 5.

98. The study looked at manufacturing facilities required to report environmental releases of hazardous chemicals under the Toxic Release Inventory (TRI) program of the Emergency Planning and Community Right-to-Know Act (EPCRA). See 42 U.S.C. § 11001 (1994).

99. See generally LAURETTA M. BURKE, ENVIRONMENTAL EQUITY IN LOS ANGELES (1993) (National Center for Geographic Information and Analysis Technical Report 93-6).

100. See Joel Thomas Boer & Dr. James L. Sadd, *In Whose Back Yard? The Demography of Populations Proximate to Hazardous Waste Facilities in Los Angeles County*, ENVTL L. NEWS 10, 14 (1996).

101. See *id.*

102. The term "inter-pollutant trading" refers to the allowing of emissions of one pollutant to persist or increase in exchange for reducing emissions of a *different* pollutant somewhere else. In the discussion, *supra*, hot-spots resulted from allowing concentrated emissions in one location in exchange for widely dispersed emission reductions throughout the region. Through inter-pollutant trading, the continued (or increased) emissions of more hazardous pollutants could be justified by other reductions in less hazardous pollutants.

103. See SCAQMD, *Offset Programs*, *supra* note 60, at Rule 1610(a).

104. See Bansal & Kuhn, *supra* note 89, at 18; U.S. Environmental Protection Agency, Office of Air Quality Planning & Standards, Speciation Profiles for Volatile Organic Compounds, USEPA SPECIATE software.

VOC emissions from marine terminals compared to VOCs from automobiles. For example, benzene levels may be higher in VOC emissions from marine terminals than from cars,¹⁰⁵ which leads to greater exposure and risks concentrated in the communities around the marine terminals. Benzene exposure can cause leukemia, anemia, respiratory tract irritation, dermatitis, pulmonary edema, and hemorrhaging.¹⁰⁶ Therefore, the Rule 1610 program may allow continued release of highly toxic chemicals into certain communities in exchange for small area-wide reductions in much less toxic chemicals. Yet, no source testing has been required by SCAQMD to accurately characterize the differences in chemical composition and toxicity among VOC emissions subject to trading.

In addition to concerns about variable toxicity, VOCs also exhibit different degrees of reactivity related to their ability to form photochemical smog.¹⁰⁷ These differences in photochemical reactivity have long been recognized in air pollution regulation and have guided priority setting in the control of VOC sources for smog control.¹⁰⁸ In pollution trading programs, however, if highly reactive

105. Using USEPA software called SPECIATE, Communities for a Better Environment's staff scientist, Shipra Bansal downloaded the average chemical breakdowns for VOC emissions at petroleum product storage facilities (a surrogate for marine terminals) and for VOC emissions out of tailpipes. See Bansal & Kuhn, *supra* note 89, at 18. While benzene makes up to thirty-two percent of fugitive emissions at the marine terminals according to this model, it makes up less than two percent of tailpipe emissions. See *id.* at 19. Emissions from marine terminals have up to 16 times more benzene than automobile air emissions. See *id.* No source testing data are available to verify the content of benzene or other toxic chemicals in the marine terminal VOC emissions. The same VOC profiles showed that twenty-two percent of the emissions by weight from marine terminals consisted of chemicals not found at all in tailpipe emissions. See *id.*

106. Benzene is listed as a "hazardous air pollutant" in the 1990 Clean Air Act and is on the California Proposition 65 list of cancer-causing chemicals. See J. HARTE, ET AL., TOXICS A TO Z 233-35 (1991); Bansal & Kuhn, *supra* note 89, at 19; SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (PROPOSITION 65), CAL. HEALTH & SAFETY CODE § 25249.8 (West 1998).

107. Volatile organic compounds (VOCs) include reactive organic gases containing carbon that interact with nitrogen oxides (NO_x) in the presence of sunlight to form photochemical smog, including ground level ozone for which state and federal health standards have been established.

108. See Recommended Policy on Control of Volatile Organic Compounds, 42 Fed. Reg. 35,314 (1977); Requirements for Preparation, Adoption and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans, 57 Fed. Reg. 3941 (1992) (codified at 40 C.F.R. Parts 51 and 52) (proposed Feb. 3, 1992) (re-defining VOC). See Air Quality: Revision to Definition of Volatile Organic Compounds--Exclusion of Acetone, 60 Fed. Reg. 31,635 (1995) (codified at 40 C.F.R. Part 51) (proposed June 16, 1995) (citing William P. L. Carter, *Development of Ozone Reactivity Scales for Volatile Organic Compounds*, J. AIR & WAST MGT. ASSOC. (1994). Table III of Carter's paper gives a list of organic compounds

VOCs are emitted by purchasing credits earned for reducing low reactivity VOCs, then downwind ozone (smog) formation may be increased rather than reduced. This represents another inter-pollutant trading flaw in pollution trading programs that include VOCs.

The complex chemistry of air pollution leads to further problems with pollution trading. Emissions are composed of complex mixtures of chemicals, not the single pollutants often targeted for regulation or trading. We use the term "co-pollutants" to describe the secondary pollutants that inextricably accompany the emission of primary targeted pollutants. Further, air pollutants can later undergo chemical changes into more hazardous pollutants downwind. The initially emitted chemicals are commonly referred to as "precursors" to the hazardous pollutants formed later.¹⁰⁹ Since pollution trading enables polluters to avoid emission reductions, or even increase emissions, at one location by purchasing credits earned elsewhere, the co-pollutants associated with that emission source may also persist and concentrate around that polluter. Likewise, if emissions contain precursors, then greater exposure to the pollutants formed later may occur downwind when credits are purchased to maintain or increase emissions at a facility.

The results of the Rule 1610 car scrapping program demonstrate the co-pollutant problem. The VOCs emitted from the oil refinery marine terminals were targeted for regulation because they are precursors to ozone formation. In fact, many of the VOCs are also toxic co-pollutants. Unrestricted trading of VOCs inevitably results in localized toxic hot-spots, where toxic VOCs exist at higher levels at some locations than would be allowed under a technology-based regulatory regime.

The RECLAIM trading program presents a broader and less examined case of the co-pollutant and precursor problem. RECLAIM allows industrial sources to separately trade two combustion byproducts, NO_x and SO_x .¹¹⁰ The trading program and the technology-based

ranked by a maximum incremental reactivity (MIR) scale, with higher scores for VOCs that are more likely to react to form ground level ozone in smog.)

109. For example, ground level ozone forms as a result of precursor emissions of NO_x and VOCs from numerous sources in a broad geographic area. NO_x and SO_x are precursors to acid rain formation. Combustion gases can act as precursors to the formation of fine particles, or particulate matter, another serious air pollution problem.

110. NO_x and SO_x are emitted when fossil fuels are burned at a variety of industrial-commercial-institutional combustion sources and transportation-related sources. Hundreds of other co-pollutants are released during combustion of fossil fuels including fine particles, polycyclic aromatic hydrocarbons, mercury and other hazardous air pollutants and products of incomplete combustion. See U.S. ENVIRONMENTAL PROTECTION AGENCY, INDUSTRIAL

rules it replaced targeted NO_x as a precursor to ozone smog formation. SO_x was included because it is a precursor to the formation of fine particulate matter, which lodges deep in people's lungs contributing to premature mortality and breathing difficulties.¹¹¹

Does the trading of NO_x and SO_x, which allows some major sources to avoid emissions reductions, result in persistent or increased exposures in some areas to hazardous co-pollutants or precursors to hazardous pollutants, such as fine particles, ozone or formaldehyde? The answer is "maybe." There has been little analysis of whether concentrated hot-spots of ozone or other photochemical oxidants, e.g. formaldehyde, or increased exposure to fine particulates, have resulted from RECLAIM trading patterns.¹¹² More research needs to be performed in this area, because the co-pollutant and precursor problems may be exacerbating the already unfair concentration of the region's pollution in a few communities.

2. Market Incentives Run Amok: Fraud and Manipulation

Air pollution regulatory programs have been plagued with technical uncertainties in accurately accounting for the amount of emissions from different sources.¹¹³ Such concerns exist for both a technology-based approach and an emissions trading approach to regulation. However, for an emissions trading program, accuracy is more important than for technology-based regulations, because an accounting of pollution forms the basis for the number of emissions

COMBUSTION COORDINATED RULEMAKING: ORGANIZATIONAL STRUCTURE AND PROCESS 10 (1997).

111. See Selmi, *supra* note 55, at 10,697.

112. See SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, RECLAIM PROGRAM THREE-YEAR AUDIT AND PROGRESS REPORT 104-13 (1998) [hereinafter SCAQMD, RECLAIM PROGRAM AUDIT]; Scott L. Johnson & David M. Pekelney, *Economic assessment of the Regional Clean Air Incentives Market: a new emissions trading program for Los Angeles*, 72 LAND ECONOMICS 277, 292 (1996) (reporting the methodology used to assess the potential economic and environmental impacts of the RECLAIM emissions trading programs). Johnson and Pekelney report that RECLAIM will result in "changes in geographic distribution [which] include peak ozone concentrations that are lower in the western and central areas of the Basin and higher in some areas of southern Los Angeles County and northern Orange County, compared to CAC [command-and-control] regulations." See *id.*

113. See U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Clearinghouse for Inventories and Emissions Factors, *COMPILATION OF AIR POLLUTANT EMISSIONS FACTORS, AP-42, FIFTH EDITION, VOL. I: STATIONARY POINT AND AREA SOURCES* 3-4 (1995) (last modified July 3, 1997) <<http://www.epa.gov/ttnchie1/ap42pdf/c00s00.pdf>> [hereinafter U.S. EPA, AP-42]. A variety of techniques are available to estimate emissions. The reliability of these estimates increases with sophistication of method and cost of methods. In general, direct source testing and continuous emissions monitoring provide better representation of a tested source's emissions than using emission factors or engineering judgment.

reduction credits required by each facility. Furthermore, when an emissions trading approach is employed, the incidence of fraud may be greater. Pollution trading programs create stronger incentives to manipulate the numbers and cheat, because credits that are fraudulently created are still worth money. The Los Angeles pollution trading experience with car scrapping has been plagued by a history of under-reporting of *actual* emissions from industry and an over-reporting of *claimed* emission reductions from cars.

Pollution trading programs primarily rely on industry self-reporting of emission reductions and increases. Based on these self-reports, regulatory agencies must allocate air pollution credits. In Los Angeles, widespread under-reporting, inaccurate modeling, and potential financial windfalls for polluters plague the pollution trading program.¹¹⁴

In the Rule 1610 program, for example, oil companies purchase pollution credits from the scrapping of old cars to offset their VOC emissions. In order to determine the number of emission reduction credits that oil companies need to purchase from car scrappers, SCAQMD relies on industry self-reporting of emissions. The program creates an incentive to under-report actual emissions. By under-reporting their air pollution, the companies can reduce their purchase of emission reduction credits.

Rather than measure *actual* emissions released, companies estimate emissions using emission factors developed by the Western States Petroleum Association. Emissions factors are surrogate estimates of emissions based on activity level.¹¹⁵ For example, engineers may estimate that a small industrial boiler will release so many pounds of NO_x for every barrel of fuel oil burned. Emission factors are hotly argued among technical specialists from different fields and change as new information becomes available. Emissions factors are poor surrogates for actual measurements. With margins of error ranging from fifty percent to one hundred percent, emissions factors are highly uncertain, making claimed emission reduction difficult to

114. See discussion *infra* Part III.C.4. There are inherent problems with monitoring and enforcement associated with pollution trading. In Los Angeles, noncompliance rates by industry are high for the pollution monitoring requirements of the RECLAIM trading program.

115. See U.S. EPA, AP-42, *supra* note 113, at 2. "Because emission factors essentially represent an average of a range of emission rates, approximately half of the subject sources will have emission rates greater than the emission factor and the other half will have emission rates less than the factor. As such, a permit limit using an AP-42 emission factor would result in half of the sources being in noncompliance." *Id.*

verify.¹¹⁶ They can readily be adjusted to report emissions as being higher or lower, since at best they represent educated guesses of actual emissions.¹¹⁷ Source testing, which measures *actual* emissions, was required to ensure compliance with the technology-based emission limits set under Rule 1142 for marine terminals.¹¹⁸

Information recently obtained through the Freedom of Information Act reveals that the oil companies did, in fact, measure their emissions. When the actual measurements were compared to reported emissions based on industry emissions factors, striking differences were revealed. Oil companies under-reported their oil tanker emissions by factors between 10 and 1000.¹¹⁹ As a result, the oil companies purchased between 10 and 1000 times too few credits from scrapping old, high-polluting cars to offset their tanker pollution. This persistent problem was completely overlooked by SCAQMD and was only detected through a time-consuming investigation by Communities for a Better Environment.¹²⁰ However, despite this under-reporting, SCAQMD continues to allow the use of emissions factors to underestimate emissions.

Exacerbating the huge gap between actual emissions and credits purchased by polluters, credit generators—the car scrappers—have abused the system. Many of the cars allegedly destroyed through the

116. See Letter from Jim Jenal, Richard Toshiyuki Drury & Alan Ramo, Communities for a Better Environment (CBE), to James M. Lents, Ph.D., Executive Officer, SCAQMD 4 (June 25, 1993) (CBE'S COMMENTS ON DRAFT RECLAIM RULES AND ENVIRONMENTAL ASSESSMENT) (on file with authors). See also Selmi, *supra* note 55, at 10,705.

117. Cf. Letter from Jim Jenal, Richard Toshiyuki Drury & Alan Ramo to James M. Lents, *supra* note 116, at 4. In the South Coast Air Basin, approximately eighty percent of sources are in AP-42 categories E and F, meaning that their emissions factors have the lowest level of accuracy. See *id.* at 4 (citing to EPA's COMPILATION OF AIR POLLUTANT EMISSIONS FACTORS, AP-42, (4th ed.)).

118. See Letter from Wang, Mgr., Oper. & Evtl. Issues, Western States Petroleum Association, to Jim Lents, Exec. Officer, SCAQMD 3 (April 27, 1994) (source testing needed to ensure compliance with Rule 1142 limits) (on file with authors).

119. See Letter from Richard Toshiyuki Drury et al., to Anne Goode, *supra* note 86 (citing UNOCAL, VAPOR SOURCES: PERMIT APPLICATION SECTION 5 (Mar. 25, 1992) which contains data supporting a permit to install a vapor reduction system at the Wilmington Marine Terminal). The actual, measured emission rates in Unocal's Vapor Sources are significantly higher, from 12 to 1247 times higher, than what Unocal reported to SCAQMD on its Rule 1142/1610 compliance forms. Adding together all of Unocal's under-reported and unreported marine loading emissions from 245 loading events from January 12, 1995 through March 31, 1998, reveals that Unocal purchased 3 million fewer pounds worth of Mobile Source Emission Reduction Credits than required.

120. Communities for a Better Environment (CBE) is a non-governmental organization that works with people affected by industrial pollution to improve environmental health and achieve environmental justice. The authors are current and former employees of CBE.

Rule 1610 program were not, in fact, destroyed, according to Bruce Lohmann, SCAQMD's Chief Inspector for the Rule 1610 program.¹²¹ While the car bodies were crushed, many of the engines which produce the pollution were not. Instead, many of those engines were sold for re-use, despite the fact that pollution credits for destroying the car had been granted by SCAQMD.¹²² EPA has refused to approve the Rule 1610 program precisely because car engines are not always destroyed.¹²³

Several assumptions underlying the Rule 1610 program are also dubious. In order to quantify the credits generated by scrapping a vehicle, SCAQMD assumes that the old cars would have been driven approximately 4,000 to 5,000 miles annually for an additional three years and that the owner of the car would replace it with a "fleet average" automobile.¹²⁴ Although these assumptions were based on studies of old car driving patterns, they have not been borne out in reality.¹²⁵

According to Inspector Lohmann and an audit conducted by SCAQMD, many of the cars scrapped through the Rule 1610 program were at the end of their useful life, and would have been destroyed through natural attrition.¹²⁶ Each year, between 100,000 to 200,000 old vehicles are naturally scrapped or abandoned without the intervention of the Rule 1610 trading programs.¹²⁷ No "surplus"

121. See Lohmann Declaration, *supra* note 84, at 11-12.; Declaration of Bruce Lohmann in Support of Plaintiffs' Motion for Preliminary Injunction at 11-12, *Communities for a Better Environment v. Chevron Corp.* (1998) (on file with authors).

122. See Lohmann Declaration, *supra* note 84, at 11.

123. See Letters from David P. Howekamp, Director, Air Division, EPA Region 9, to Barry Wallerstein, Acting Executive Officer, SCAQMD (June 23, 1998) (Aug. 12, 1998) (on file with authors).

124. See Lohmann Declaration, *supra* note 84, at 2-3; SCAQMD, *Offset Programs*, *supra* note 60, at Rule 1610(i).

125. See Lohmann Declaration, *supra* note 84, at 2, 21.

126. See *id.* at 5-6, 10. See also South Coast Air Quality Management District, *Board Meeting Date: June 12, 1998 Agenda No. 4* (citing SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, ATTACHMENT C: RULE 1610 OLD VEHICLE SCRAPPING SURVEY REPORT (March 1998)) (last modified June 26, 1998) <<http://www.aqmd.gov/hb/98064a.html>> [hereinafter SCAQMD, *Board Meeting June 12, 1998*].

127. Each endpoint in the estimated range of the number of scrapped cars represents an estimate from a different source, rounded to the nearest 100,000. Lohman, based on interviews with licensed car scrappers, estimated that 60,000 to 120,000 cars were scrapped each year in the South Coast Air Basin, a range he then refined to 75,000 to 100,000 scrapped cars annually. See Lohmann Declaration, *supra* note 84, at 10. Other SCAQMD staff concluded that an annual average of 236,000 cars were scrapped from 1994 to 1997, based on statewide data received by the Department of Motor Vehicles on junked cars, adjusted to account for 'junked' vehicles that were revived. See South Coast Air Quality Management District, Presentation to

credits should be counted from scrapping one of those thousands of cars, since those reductions would have naturally occurred. Since less than 23,000 cars have been destroyed through the Rule 1610 program in its five-year life, most of these cars are probably among those that would have been destroyed even without the program.¹²⁸ However, market forces encourage people who were planning to scrap an old car for its \$50 value as scrap metal to obtain \$600 for it through the Rule 1610 program instead.¹²⁹ This practice is encouraged in Los Angeles because many licensed scrappers are operated jointly with junkyards, where people bring their old cars to be destroyed. While this is rational economic behavior for the car owner, it creates false emission credits.

According to Lohmann and SCAQMD, of the cars that were not at the end of their lives, many were not regularly driven and would not have been driven for another three years. The Rule 1610 formula, therefore, over-allocates emission credits generated by destroying these cars. Inspector Lohmann reported many cases in which inoperable cars were brought to the car scrapping facility and minor repairs were made solely for the purpose of obtaining the \$600 payment from the scrapping program.¹³⁰ Obviously, such inoperable cars were not generating any pollution at all, but were merely collecting dust in someone's garage. However, through Rule 1610, this non-existent automobile pollution has turned into real VOC pollution released from oil tankers or other sources.

At least one study concludes that car scrapping programs like Rule 1610 are incapable of generating any significant air pollution reductions.¹³¹ Yet, the elaborate credit trading mechanism has fooled the public into thinking that pollution is actually being reduced. Fur-

the Technology Committee Meeting (Apr. 24, 1998), *reprinted in* Lohmann Declaration, *supra* note 84, Exhibit D, at 5; SCAQMD, *Board Meeting June 12, 1998*, *supra* note 126, at Attachment D.

128. *See* Lohmann Declaration, *supra* note 84, at 10.

129. *See id.* at 7-9.

130. *Id.* at 7, 11-12.

131. *See generally* Carl B. Moyer et al., PERSPECTIVES ON VEHICLE SCRAPPING IN AIR QUALITY PROGRAMS, DRAFT FINAL REPORT (July 1995) (prepared for California Electric Transportation Coalition). As the report's abstract and summary states, "[I]t does not appear likely than scrapping can provide a major attainment strategy for a federal ozone nonattainment area classified as Extreme or Severe. . . . New assessments of scrapping are beginning to provide evidence that scrapping cannot become a major part of hydrocarbon and carbon monoxide attainment plans, even if the programs can successfully target high-emitting vehicles through remote-sensing or other measurement means. The supply of vehicles. . . appears too limited to yield much more than about one percent reductions in the inventories of these pollutants." *See* Bansal & Kuhn, *supra* note 89, at n.38.

thermore, this elaborate mechanism may also mask more sinister outcomes. Absent democratic accountability, a pollution trading market creates financial incentives for fraud.¹³² If a company is able to under-report its emissions, it can avoid purchasing costly pollution credits. If another company is able to falsely report a pollution reduction, it can then sell fraudulent pollution credits to other companies. To combat similar fraud, agencies like the Securities Exchange Commission were established to police various markets;¹³³ however, no such regulatory agency polices emissions trading markets. The evidence of massive fraud in Los Angeles, one of the most highly regulated areas on the planet, suggests it may be extremely difficult to avoid similar fraud in states or countries with much smaller, less sophisticated regulatory agencies.

3. Distortion of the Market: Hot Air and Phantom Reductions

In addition to fraud by market participants, “cap and trade” strategies, like Los Angeles’ RECLAIM program, are plagued by a broader form of institutional manipulation. This manipulation takes the form of ‘phantom reductions’ in air emissions — reductions that exist on paper only. Under RECLAIM, *allowable* emissions have declined each year as required by regulation.¹³⁴ However, because emissions reduction credits were initially allocated in an amount significantly inflated above *actual* emissions,¹³⁵ early ‘reductions’ in

132. See ROBERT KUTTNER, EVERYTHING FOR SALE: THE VIRTUES AND LIMITS OF MARKETS 49 (1997) (“Market values, ripped out of a broader context of socially shared norms, declare that opportunism, cutting corners, taking advantage are not only legitimate but virtuous, since squeezing out the maximum possible price that the market will bear maximizes efficiency.”).

133. See U.S. Securities and Exchange Commission, *The U.S. Securities and Exchange Commission: What It Is, and What It Does*, (last modified Dec. 23, 1996) <<http://www.sec.gov/asec/asecart.htm>>. “The SEC is an independent, nonpartisan, quasi-judicial regulatory agency with responsibility for administering the federal securities laws. The purpose of these laws is to protect investors in securities markets that operate fairly and to ensure that investors have access to disclosure of all material information concerning publicly traded securities Often referred to as the ‘truth in securities’ law, the Securities Act of 1933 requires that investors receive financial and other significant information concerning securities being offered for public sale. *This act also prohibits deceit, misrepresentations and other fraud in the sale of securities.* [The Securities Exchange Act of 1934] requires that investors have access to current financial and other information regarding securities, particularly those that trade publicly on exchanges or over-the-counter. *This Act also prohibits companies, securities brokerage firms and others from engaging in fraudulent and unfair behavior, for example sales practice abuses and insider trading.*” (emphasis added) See *id.*

134. See Selmi, *supra* note 55, at 10,701; SCAQMD, *RECLAIM Rules*, *supra* note 62, at Rule 2002(e)(1).

135. See Selmi, *supra* note 55, at 10,698-699; SCAQMD, RECLAIM PROGRAM AUDIT,

emissions were illusory. In the first three years of the RECLAIM program, actual industrial NO_x emissions have declined by at most three percent, while allowable emissions have been reduced on paper by about thirty percent.¹³⁶ In the global context, the term “hot air” has been used to describe the vesting of certain countries like Russia with excess credits.¹³⁷ Not only does the trading in hot air credits represent illusory environmental gains, the excess allocation drives down the price of credits, reducing the motivation to invest in actual emission reductions or technological innovation.

By inflating the initial allocation of credits, pollution trading programs like RECLAIM tend to reward the worst polluters. Rather than allocate emissions credits based on current *actual* emissions levels, SCAQMD allocated its initial round of credits based on *historic* emissions levels. SCAQMD allowed polluters to base their credit allocation on the highest year of emissions out of the last five years, because industry successfully argued that emissions should not be capped at current levels due to an economic recession that affected California before the RECLAIM program's adoption.¹³⁸

In response to industry pressure, SCAQMD issued over 40,000

supra note 112, at 42.

136. See SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 42. At the time of RECLAIM adoption, the aggregate rate of reduction of NO_x emissions between 1994 and 2000 was established at eleven percent per year. See Selmi, *supra* note 55, at 10,701.

137. See Driesen, *Cheap Fix?*, *supra* note 8, at 60, n.328 (citing CHRIS ROLFE, TURNING DOWN THE HEAT: EMISSIONS TRADING AND CANADIAN IMPLEMENTATION OF THE KYOTO PROTOCOL 311 (1998)). Another California smog trading program, named “SEED,” is also based on hot air emissions. Under SEED, the Sacramento Metropolitan Air Quality Management District (SMAQMD) issued pollution credits that were generated by the decommissioning of B-52 bombers that formerly flew out of the region. The SMAQMD issued five tons per year of VOC credits, representing the pollution that used to be released by the bombers. Those credits have been purchased by companies including Intel, Campbell's Soup, Aerojet, and others, which have used to credits to avoid installing pollution control equipment. However, the credits are pure “hot air.” Destruction of the bombers was required under the START treaty. Therefore, their pollution would have been eliminated in any case. As a result of the SEED program, the B-52 pollution continues despite the fact that the bombers are gone. In essence, they continue to pollute from the grave. See Letter from Richard Drury et al., *Communities for a Better Environment*, to Carol Browner, U.S. Environmental Protection Agency (June 12, 1998) (Re: Request that EPA Reject SMAQMD Rules 107, 204, and 205 (the SEED Program)) (citing Chris Bowman, *Mather's B-52 Loss May Help Clean Air*, SACRAMENTO BEE, Sep. 1, 1996, at B1) (on file with authors).

138. See Selmi, *supra* note 55, at 10,699. The baseline allocation of pollution credits was further inflated as a result of two other provisions of RECLAIM adopted at industry's insistence. One allows industry to add emission reduction credits previously earned under the limited program in effect before RECLAIM to be added to their baseline allocation. The other provision, in a give away to the oil industry, allowed oil refiners to increase their baseline emissions allocation to reflect the increased refinery pollution associated with reformulated fuels production.

tons of NO_x and SO_x credits more than it should have issued based on actual emissions.¹³⁹ This over-allocation of credits is a major reason for RECLAIM's poor performance in reducing pollution.¹⁴⁰ The RECLAIM trading program has achieved a slower rate of pollution reduction than would have been achieved by the former technology-based regulations. For example, the current RECLAIM allocations for NO_x are projected to be greater in most years of the program than the comparative allocations from the 1991 Air Quality Management Plan (AQMP) that RECLAIM replaced.¹⁴¹ The RECLAIM allocations for NO_x are also greater than the NO_x allocations in the 1994 AQMP, which is the approved State Implementation Plan¹⁴² for air pollution control in Los Angeles.¹⁴³

According to a SCAQMD audit, over the first three years, RECLAIM has produced barely discernible pollution reductions.¹⁴⁴ In fact, during the first two years of RECLAIM, 1994 and 1995, NO_x and SO_x emissions reportedly increased compared to 1993.¹⁴⁵ Only in 1996 were emissions reduced, and then by at most three percent from 1993 NO_x levels and by less than ten percent from 1993 SO_x levels.¹⁴⁶ This pattern contrasts sharply with the time period 1989-1993 when NO_x emissions from industrial facilities declined steeply, by approximately thirty-seven percent, as a result of technology-based control regulations.¹⁴⁷

Due to the over-allocation of RECLAIM trading credits, credit prices are far below the level projected upon adoption.¹⁴⁸ The logic of

139. See Letter from Jenal, Drury and Ramo to Lents, *supra* note 116 (citing an excess of 43,000 tons of NO_x and SO_x to be emitted over a ten-year period under RECLAIM compared to the emissions projected under the Air Quality Management Plan that it replaced).

140. See SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 247 (RECLAIM Advisory Committee members Gail Ruderman Feuer, Natural Resources Defense Council and Tim Carmichael, Coalition for Clean Air, in April 16, 1998 letter appended to RECLAIM program report and audit).

141. *Id.* at 29, 245-246.

142. A State Implementation Plan (SIP) details how compliance with the National Ambient Air Quality Standards will be achieved in each air quality control region (AQCR). To develop a SIP, each state first has to determine existing and projected levels of the criteria air pollutant in each AQCR within the state's boundaries. See PERCIVAL ET AL., *supra* note 14, at 792-93.

143. See SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 29, 245-46.

144. See Steven Church, *Report Gives Smog-Trading Program an F Grade*, SAN BERNADINO COUNTY SUN, May 8, 1998, at B1; SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at *id.* at 42, 247, 252.

145. See SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 38.

146. See *id.*

147. See *id.* at 42, 247.

148. See *id.* at 53, 63. For example, in 1997, average prices for NO_x credits ranged from

supply and demand explains these low credit prices. By flooding the market with tens of thousands of surplus credits, SCAQMD made the commodity nearly worthless. In an ideal world with perfect information, economists' predictions concerning pollution reduction and technology innovation¹⁴⁹ under a trading regime might bear fruit. However, because credit prices are so low due to this institutional defect in the market, industry has more motivation to purchase cheap credits than to invest in actual emission reductions or to develop innovative pollution control technologies.

With the supply of RECLAIM credits so far in excess of demand, more than eighty-five percent of the NO_x credits traded (in tons) were sold for \$0.¹⁵⁰ Therefore, no rational company would reduce emissions when other facilities are giving credits away for free. In fact, a company would be at a competitive disadvantage if it did invest in pollution control in such a market. SCAQMD ignored basic economic relationships between supply and demand and prices¹⁵¹ in the face of industry's threats to abandon support for the proposed RECLAIM program.¹⁵² Industry lobbyists claim that a slow-down in pollution clean-up, resulting from an initial over-allocation of credits, is the necessary price to obtain industry acceptance of emission limits on their factories.¹⁵³ This is a weak justification for RECLAIM's poor performance in reducing air pollution thus far. Unfortunately, the

\$227 per ton for current year credits to \$1,880 per ton for year 2010 credits. *See id.* at 53. However, a 1993 analysis, on the eve of RECLAIM adoption, projected that 1997 NO_x credits would sell for \$9,151 per ton while year 1999 NO_x credits would command \$11,257 per ton. *See id.* at 63.

149. *See infra* Part III.C.

150. *See* SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 55-57. A lot of these transactions involved transfers from facilities to third-party brokers and then transfers back again to the facilities when the brokers were unable to sell the credits for a price. More than 400 trades have been recorded in which RECLAIM Trading Credits were actually sold for a real price in the first three years of the RECLAIM program.

151. *See* Ackerman & Stewart, *Reforming Environmental Law (I)*, *supra* note 10, at 1349.

152. *See* Marla Cone, *Anti-Smog Plan Praised, Jeered as Hearings Begin; Environment: Hours of Testimony Reveal Bitter Divisions over Pollution-Trading Concept. Stakes are High for Air Quality and the State's Economy*, L. A. Times, Sept. 10, 1993, at A3.

153. C.W. Aarni, Chevron Products Company, justifies RECLAIM's poor environmental performance by stating that:

In order to implement RECLAIM, the emphasis of the District's enforcement programs needed to shift from focusing on the concentration of NO_x and SO_x emitted to focusing on the total pounds of air contaminants emitted. For the first time, under RECLAIM, the mass of air contaminant emissions from industrial facilities is limited. This is good for air quality because it creates a level of certainty regarding future emissions. It was, however, a major adjustment for the business community. This "shift in consciousness" needed to occur during the first few years of RECLAIM. The slight over-allocations in the first few years were necessary to allow the shift to occur.

SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 242.

international community is seemingly poised to make this same mistake.

Originally, SCAQMD pledged that credit supply would exceed demand for less than three years and that credit prices would rise steadily, motivating significant investments in pollution control. Now the air district says that the crossover point, where supply begins to fall below demand level, won't be reached for NO_x until at least 1999 and for SO_x until at least 2001, six and eight years, respectively, after the program was started.¹⁵⁴ If this currently closed market becomes open to credits earned from mobile and area source reductions, as proposed,¹⁵⁵ RECLAIM credit prices will remain depressed for many more years to come.

Not only were the RECLAIM trading credits over-allocated, they were given away, or grandfathered.¹⁵⁶ In contrast, to internalize the costs of air pollution and to create proper price signals, many economists have called for an auctioning off of pollution credits to the highest bidder.¹⁵⁷ The fees paid for emission credits would function like pollution taxes to encourage further emission reductions thereby saving money.¹⁵⁸ Revenues could be used to fund monitoring and enforcement of market trading rules and to compensate workers and consumers who are adversely effected by the pass-through costs of pollution permits.¹⁵⁹ By giving away a public resource, pollution-free air, for free rather than charging the highest price the market

154. *See id.* at 36, 247.

155. *See supra* Part II.A. on the Intercredit Trading proposal.

156. *See Selmi, supra* note 55, at 10,698.

157. *See Ackerman & Stewart, Reforming Environmental Law (I), supra* note 10, at 1343-46 (objecting to two features of technology-based regulation, that existing permits are free, and they are non-transferable). In calling for marketable permits to be auctioned by the government, Ackerman and Stewart note that their "market reform will be opposed by businesses who (despite their promarket rhetoric) will predictably resist the prospects of buying pollution rights after all these years of polluting for free. . . . *See id.* at 1344, n.27. "While it is possible to design efficient auction systems that ameliorate, or eliminate entirely, the financial burdens imposed upon polluters", Ackerman and Stewart would "oppose these schemes on principle." *See id.* They "believe that just as firms are obliged to pay for other raw materials they require for their production process, they should be obliged to pay for the air and water degrade." *See id.*

158. *See M. JEFF HAMOND ET AL., TAX WASTE, NOT WORK 68 (1997)* (holding that auctioning pollution permits and using the revenue to offset existing tax distortions would be preferable to other approaches).

159. *See J. ANDREW HOERNER, ALTERNATIVE APPROACHES TO OFFSETTING THE COMPETITIVE BURDEN OF A CARBON/ENERGY TAX 28-29 (1997)* (A grandfathered permit system would place U.S. competitiveness at greater hazard than an auctioned permit system or equivalent pollution tax because no new revenues would be generated to offset adverse economic impacts on workers, consumers and businesses) (on file with authors).

will bear, SCAQMD has subsidized industrial pollution and missed an important opportunity to harness market forces for environmental improvement.¹⁶⁰

Since its inception, the Los Angeles emissions trading experiment has been wracked by fraud, manipulation, and subsidization of the worst polluters. Polluters have consistently under-reported their actual emissions by the use of emissions factors. Car-scrappers have re-used the engines from 'scrapped' vehicles and have issued credits for destroying inoperable cars, leading to a systematic over-reporting of pollution reduction in the Rule 1610 program. Finally, SCAQMD's program has flooded the market with emissions credits by allocating pollution 'rights' based on a polluter's highest historic emissions level, depressing the market price of credits and removing the incentive for innovation. Instead of listening to market theorists, RECLAIM trading credits were given away rather than auctioned. RECLAIM has every indication of amounting to at least a ten-year free ride of avoided emission reductions for the four hundred largest polluters in the Los Angeles area.¹⁶¹

III. THE TROUBLE WITH TRADING

Some advocates and academics advance several arguments as they push to expand reliance on pollution trading and supplant technology-based controls. According to trading proponents, emissions trading will provide equal or greater emissions reductions than a technology-based regulatory regime at a much lower cost to industry. They argue that emissions trading stimulates continuous technological innovation to reduce emissions. Furthermore, some contend that

160. SCAQMD does impose small fees on emissions to help fund its regulatory program, but they are not set at high enough levels to change price signals to promote significant pollution reductions. SCAQMD has adopted a fee schedule for the issuance of air quality permits to stationary sources. RECLAIM facilities are required to file Annual Emissions Reports and pay annual fees based on their emission of air contaminants. The fees help cover costs to evaluate, plan, inspect, and monitor air quality efforts. See South Coast Air Quality Management District, *Regulation III - Fees*, Rule 301(o) (last modified July 1, 1998) <<http://www.aqmd.gov/rules/html/tofc3.html>>; CAL. HEALTH & SAFETY CODE § 40510 (West 1998).

161. Industry's ten year "free ride" includes the two years that proposed industrial regulations were shelved pending development of RECLAIM, and the six to eight years after RECLAIM adoption that it will take for allocated emission credits to drop below actual emission levels. Assuming that proposals to open up the closed RECLAIM market to interchangeable credits prevail, the free ride for industrial stationary sources will continue. See SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 41-42.

the emissions trading approach will inspire meaningful public participation and promote democratic control of environmental policies.

Criticisms of pollution trading, some empirical and some theoretical, challenge the growing support for emissions trading as a universal policy cure for environmental ills. Pollution trading, as practiced in Los Angeles, has produced immoral, unjust, and ineffective outcomes. These are inherent characteristics that flow from emissions trading theory and practice. In an ideal world, one that has perfect information and is free from market distortions, pollution trading might succeed. However, the necessary conditions for pollution trading's success appear to be politically unacceptable to the large industrial polluters who seem to embrace trading as indefinite regulatory relief.¹⁶²

What once was a wrong—polluting—is now a 'right'. The immorality of pollution trading lies in its treatment of a public resource, pollution-free air, as a private commodity. Instead of people having the right to breathe free, businesses have the right to pollute as much as they can afford. Furthermore, pollution trading unfairly harms minority and low income people by unfairly concentrating emissions in toxic hot-spots. Therefore, pollution trading conflicts with environmental justice. Should this call for *moral* and *just* pollution policy remain unheeded, then, at least the ineffectiveness of pollution trading policies must receive close attention. In Los Angeles, the emissions trading strategy has weakened meaningful commitments to reduce air pollution; it has delivered more promises than environmental progress.

The reality of pollution trading on the ground has not been as rosy as the academics and economists predicted. The experience in Los Angeles shows that, in economic terms, the emissions trading market has been plagued by market failures like any other market. These market failures have created pollution hot-spots and have allowed trading fraud and anti-democratic outcomes. These results occurred in a region with vast human and financial capital, including

162. In 1996, industry actively opposed expansion of RECLAIM to 1,000 more industrial facilities that emit VOCs because of concerns that significant industrial emissions reductions would be required, which would limit economic growth in the region. The South Coast Air Quality Management District abandoned its proposal for RECLAIM VOC trading, instead opting to expand open market trading of mobile and area source credits, which allow industry to avoid reducing its own emissions. See South Coast Air Quality Management District, *AQMD News - New Trading System Eyed: Air Board Shelves Expansion of Smog Trading Market* (last modified Feb. 23, 1999) < <http://www.aqmd.gov/news1/Archives/vocr.html>>; Marla Cone, *Anti-Smog Plan Appears Likely to Be Shelved*, L.A. TIMES, Jan. 12, 1996, at A1.

perhaps the largest and most sophisticated air pollution regulatory institution in the world. These difficulties came from the oldest trading programs ever developed for urban air pollution, but they are not unique to pollution trading in Los Angeles. Rather, similar concerns and variations on the problems encountered in Los Angeles are likely to be experienced in any market incentives program that relies on trading in emission reduction credits.

A. *Morality and the 'Right' to Pollute*

Although it appears to have become socially unacceptable to discuss the morality of public policy, this poses an important obstacle for pollution trading. Pollution trading removes the social stigma associated with pollution. Rather than treating pollution as a social ill that we should attempt to eliminate to the extent feasible, trading programs turn pollution into another commodity, to be traded when economic efficiency dictates. What is wrong with polluting, when only money for the required pollution credits stands between socially acceptable behavior and socially aberrant activity? As Sandel points out, in a trading scheme, pollution becomes a right rather than a wrong:

If a company . . . is fined for spewing excessive pollutants into the air, the community conveys its judgment that the polluter has done something wrong. A fee, on the other hand, makes pollution just another cost of doing business, like wages, benefits, and rent The distinction between a fine and a fee for despoiling the environment is not one we should give up too easily. Suppose there were a \$100 fine for throwing a beer can in to the Grand Canyon, and a wealthy hiker decided to pay \$100 for the convenience. Would there be nothing wrong in his treating the fine as if it were simply an expensive dumping charge?¹⁶³

A more elegant, if not romantic, sentiment about pollution trading can be found in the words inspired by Chief Seattle nearly 150 years ago:

What is it that the white man wishes to buy, my people ask me? The idea is strange to us. How can you buy or sell the sky, the warmth of the land, the swiftness of antelope? How can we sell these things to you and how can you buy them? . . . If we do not

163. See Michael Sandel, *It's Immoral to Buy the Right to Pollute*, N.Y. TIMES, Dec. 15, 1997, at A2.

own the freshness of the air and the sparkle of the water, how can you buy them from us?¹⁶⁴

Ultimately, no regulatory program can survive if it does not generate morally acceptable outcomes. Economic efficiency alone does not create a sound basis for public policy if it results in immoral results such as toxic hot-spots in disempowered communities, fraudulent emission reductions, or actual increases in pollution. As domestic environmental agencies and the international community consider expanding pollution trading to combat regional pollution and global climate change, the social and moral costs should be fully weighed, not just the economic benefits.

B. *Environmental Injustice*

Regardless of one's views on pollution rights and wrongs, distributional fairness, which lies at the heart of environmental justice concerns, cannot easily be ignored.¹⁶⁵ As opposed to a technology-based regulatory strategy, pollution trading has higher public health risks because it concentrates pollution in neighborhoods surrounding polluters. These neighborhoods tend to be low-income communities of color. Environmental injustice results when regional pollution trading leads to disproportionate localized toxic exposures and risks to low income communities, a majority of which are ethnic and racial minorities.¹⁶⁶

Although the movement for environmental justice and against environmental racism was self-named as recently as the 1980s, relatively powerless groups—immigrants, workers, women, poor people—have had a long tradition of organizing to redress hazardous living and working conditions in search of a cleaner, safer environment.¹⁶⁷ The modern day environmental justice movement challenges environmental policy makers and practitioners by emphasizing the public health and human rights dimensions of environmental prob-

164. FRED PARRY, HOW CAN ONE SELL THE AIR? CHIEF SEATTLE'S VISION 48 (1992) (inspired by Chief Seattle's speech in December 1854 to Isaac I. Stevens, the new Governor and Commissioner of Indian Affairs for the Washington Territories who was on a preliminary field trip to the various tribes he was planning to force onto reservations).

165. See generally Richard J. Lazarus, *Fairness in Environmental Law*, 27 ENVTL. L. 705, 711 (1997) (fairness should be the basis used in assessing proposed reforms affecting existing environmental law).

166. See Exec. Order No. 12898, *supra* note 83.

167. See GOTTLIEB, *supra* note 24, at 235 (by the early 1900's ethnicity has emerged as a significant though understated factor in how serious community and workplace environmental hazards were experienced).

lems and by demanding solutions which honor principles of social and economic justice.¹⁶⁸ The organized linkage of environmental protection with civil rights led to formal recognition by the Clinton administration and EPA that addressing environmental justice was a political imperative.¹⁶⁹ The contested policy terrain of environmental justice features tools that advance environmental justice, such as enforcement of Title VI of the Civil Rights Act against discriminatory environmental decisions,¹⁷⁰ and tools that weaken environmental justice protections, such as pollution trading.

The Los Angeles experiment shows that emissions trading programs can exchange small reductions in widespread pollution for increased exposure to concentrated, and often more toxic, pollution in the neighborhoods surrounding large industrial facilities.¹⁷¹ The resulting exposures to low-income communities of color make this a matter of environmental injustice.

The Los Angeles experience demonstrates how two Clinton Administration priorities are in direct conflict—the promotion of environmental justice and the promotion of pollution trading. The concerns documented in Los Angeles test the Administration's commitment to environmental justice and its willingness to curb the excesses of unrestricted pollution trading. Over the last three years, the National Environmental Justice Advisory Council (NEJAC),¹⁷² appointed by Administrator Carol Browner to advise EPA on environmental justice matters, has adopted a series of resolutions raising concerns related to pollution trading.¹⁷³ An administrative complaint

168. At a seminal meeting of more than 600 environmental justice leaders, seventeen "Principles of Environmental Justice" were adopted at the First National People of Color Environmental Leadership Summit, held in Washington, D.C., in October 1991. See generally Karl Grossman, *The People of Color Environmental Summit*, in UNEQUAL PROTECTION: ENVIRONMENTAL JUSTICE & COMMUNITIES OF COLOR 272, 272-97 (Robert D. Bullard ed., 1994).

169. See Exec. Order No. 12898, *supra* note 83; National Environmental Justice Advisory Council, *Welcome to the National Environmental Justice Advisory Council!* (last modified Nov. 18, 1998) <<http://www.epa.gov/oeca/oej/nejac>>.

170. See generally Michael Fisher, *Environmental Racism Claims Brought under Title VI of the Civil Rights Act*, 25 ENVTL. L. 285 (1995) (Title VI of the Civil Rights Act of 1964 provides a useful basis for litigation over environmental racism).

171. See discussion *supra* Part II.B.1.

172. The National Environmental Justice Advisory Council was established as a federal advisory committee in September 1993 to advise the EPA Administrator on environmental justice. See National Environmental Justice Advisory Council, *Welcome to the National Environmental Justice Advisory Council!* (last modified Feb. 1, 1999) <<http://es.epa.gov/oeca/oej/nejac/mainpage.html>>.

173. See Letter from Haywood Turrentine, Chair, National Environmental Justice Advisory Council, to Carol Browner, Administrator, U.S. Environmental Protection Agency, Attach-

has been filed with EPA under Title VI of the Civil Rights Act against SCAQMD for allowing discriminatory impacts under its Rule 1610 car scrapping program.¹⁷⁴ The alleged violation of the civil rights of people exposed to excess pollution as a result of pollution trading has highlighted the seriousness of the environmental justice issues for the NEJAC and EPA.

Only recently has EPA acknowledged the legitimacy of the environmental justice impacts associated with pollution trading. They concede that no proposed or existing pollution trading program contains appropriate safeguards against concentrating pollution in low-income communities of color.¹⁷⁵ The concerns raised about hot-spots, environmental justice, and the efficacy of the Los Angeles trading programs have given pause to EPA's plans to grant the necessary approval for new emissions trading programs. Based on the Los Angeles experience, EPA has pledged to revise its guidance for Economic Incentive Programs to ensure that the environmental justice impacts of pollution trading are assessed in advance and prevented or mitigated.¹⁷⁶

Whether this can be achieved remains to be seen. Environmental injustice may be an institutional feature of emissions trading programs, because economic models do not have adequate means to quantify values such as justice and fairness.¹⁷⁷

ment (Mar. 11, 1998) (citing, for example, a resolution entitled *Enforcement Resolution on [sic] Concerning Study of Disproportionate Impacts of Pollution Trading Programs*, which was adopted by the National Environmental Justice Advisory Council (NEJAC) on Dec. 12, 1996) (on file with authors).

174. See Bansal & Kuhn, *supra* note 89, at 18. Communities for a Better Environment, working with NAACP Legal Defense Fund and the Center on Race, Poverty and the Environment, filed the administrative complaint. EPA's Title VI implementing regulations forbid it or its delegated agencies from taking actions that have "the effect of subjecting individuals to discrimination because of their race, color, national origin, or sex, or have the effect of defeating or substantially impairing accomplishment of the objectives of the program with respect to individuals of a particular race, color, national origin, or sex." 40 C.F.R. § 7.35(b) (1998) (emphasis added).

175. See Perciaseppe, *supra* note 82.

176. See *id.*

177. See Eileen Gauna, *Federal Environmental Citizen Provisions: Obstacles and Incentives on the Road to Environmental Justice*, 22 *ECOLOGY L.Q.* 1, 27 (1995) ("The environmental justice movement adheres to a social justice perspective of environmentalism, while EPA and many national environmental organizations adhere to a science and technology oriented perspective of environmentalism. A scientific framework of risk analysis . . . is ill suited to address social justice issues.").

C. *Pollution Trading: Many Promises, Poor Results*

Although trading advocates have made few, if any, direct claims related to environmental justice,¹⁷⁸ they loudly assert emissions trading will reduce pollution, even perhaps better than dreaded command and control regulations, and certainly at lower cost.¹⁷⁹ Emissions trading has not effectively reduced pollution and has stifled innovation in new pollution control technology. Some critics argue that emissions trading does not ensure meaningful citizen participation or democratic decision making.¹⁸⁰ Furthermore, others have defended the technology-based control strategy for its success in preventing pollution¹⁸¹ and for its superiority to unproven regulatory reforms advanced in the name of efficiency.¹⁸² The technology-based approach also tends to avoid monitoring troubles that plague the emissions trading approach.

1. Pollution Trading Does Not Reduce Pollution Effectively

Pollution trading programs are not effective policy tools for reducing air pollution, as seen in the results from the Los Angeles experiment.¹⁸³ Neither RECLAIM nor the car scrapping trading markets have significantly reduced air pollution, despite claims made to the contrary upon their adoption.

Before RECLAIM was adopted, emissions of NO_x from industrial polluters dropped by about thirty-seven percent from 1989 to

178. See Ackerman & Stewart, *Reforming Environmental Law (I)*, *supra* note 10, at 1350-51 (conceding that their proposed marketable permits system could allow the creation of relatively high concentrations of particular pollutants in small areas within the larger pollution control regions, i.e. "hot-spots"). While silent on the environmental justice implications of toxic hot-spots, Ackerman and Stewart contend that tolerating hot-spots is also a defect of best available technology regulations. See *id.* Nonetheless, the blindness of both systems to intraregional variation is a serious concern, according to Ackerman and Stewart, "deserving of the highest priority on the reform agenda." See *id.* at 1350-51, n.43.

179. See generally Ackerman & Stewart, *Reforming Environmental Law (II)*, *supra* note 11; Dudek and Palmisano, *supra* note 18.

180. See Heinzerling, *supra* note 9, at 343.

181. See Barry Commoner, *A Reporter at Large: The Environment*, THE NEW YORKER, June 15, 1987, at 46, 46-52 (reporting major progress when environmental regulations have required prevention of pollution at its source, as opposed to control of pollution after its generation).

182. See Howard Latin, *Ideal Versus Real Regulatory Efficiency: Implementation of Uniform Standards and "Fine-Tuning" Regulatory Reforms*, 37 STAN. L. REV. 1267, 1270-71 (1985) (questioning whether other regulatory approaches would really perform better in practice than uniform standards).

183. See discussion *infra* Part II.B.2.-3.

1993 as a result of technology-based regulations.¹⁸⁴ However, from 1994 to 1996, the first three years of pollution trading, RECLAIM facilities had reported no more than a three percent reduction in NO_x emissions in aggregate from 1993 levels,¹⁸⁵ compared to an initially projected thirty percent aggregate reduction over the same time period.¹⁸⁶ It may be several years more before industrial emissions are reduced further under RECLAIM.¹⁸⁷ Foreshadowing the future of VOC trading and inter-source trading, the car scrapping program has reduced far fewer emissions than claimed, if any at all.¹⁸⁸

Other pollution trading programs are likely to be plagued by similar poor environmental performance. Allocating emission credits so that they exceed actual air pollution levels makes the inflated baseline an attractive design criterion for policymakers under pressure from industry to cut environmental costs.¹⁸⁹ Therefore, low credit prices and phantom reductions are certain. The increased incentive to manipulate the numbers and engage in outright fraud will further dampen environmental performance.

2. Innovation Suffers Under a Pollution Trading Regime

Understanding whether pollution trading has a positive or negative effect on technology innovation remains a critical point of contention.¹⁹⁰ Solving chronic threats to environmental health and climate stability requires the development of innovative technologies.¹⁹¹

184. See SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 42, 247.

185. See *id.* at 38, 42. (reported NO_x emissions from 1989 to 1996).

186. See Selmi, *supra* note 55, at 10,701 (the aggregate rate of NO_x reduction for all RECLAIM sources will be about eleven percent per year).

187. See *supra* text accompanying note 161.

188. See Lohmann Declaration, *supra* note 121, at 26; SCAQMD, *Board Meeting June 12, 1998*, *supra* note 126, at Attachment D.

189. See *supra* text accompanying note 153; SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 242 (the overallocations in RECLAIM in the first few years were necessary to allow industry to adjust to and accept the concept of mass emission caps); Driesen, *Cheap Fix?*, *supra* note 8, at 64-66 (government officials eager to avoid accountability may treat emissions trading as an opportunity to avoid making specific decisions about where reductions will come from); Dudek & Palmisano, *supra* note 18, at 239-40 (paper trading, which refers to trading emission credits that never existed or that reflect reductions that would have happened anyway, has occurred but reforms can fix this abuse).

190. See, e.g., Ackerman & Stewart, *Reforming Environmental Law (I)*, *supra* note 10, at 1346 (trading promises to reward innovative improvements in existing cleanup technologies); Driesen, *Emissions Trading*, *supra* note 6, at 334 (emissions trading discourages up front investment in innovation necessary to develop new technologies with some initial costs).

191. See Lester R. Brown & Jennifer Mitchell, *Building a New Economy*, in STATE OF THE WORLD 1998, at 168-87 (1998); BARRY COMMONER, MAKING PEACE WITH THE PLANET 79-102 (1990).

Continuous improvement in clean production methods can significantly reduce pollution from industry, consumers, transportation, and the energy sector.¹⁹²

Some academics argue that pollution trading encourages companies to reduce pollution beyond the minimum required in order to earn emissions reduction credits which can be sold at a profit.¹⁹³ This will encourage some companies to innovate for self-gain. Furthermore, since pollution trading programs give companies the flexibility to meet reduction goals by any means, creative forces will be unleashed to develop innovative and cost-effective ways to comply.¹⁹⁴ Together, the combined attributes of profit motive and regulatory flexibility inherent in emissions trading programs will promote the development of new pollution reduction technologies more quickly than rigid mandates.¹⁹⁵

In contrast, others have defended technology-forcing regulations, which set a performance standard achievable by the best available control technology, citing its history of success in reducing pollution.¹⁹⁶ In response to such firm command and control mandates, industry has often innovated to meet and exceed the required emission reductions.¹⁹⁷

Driesen argues that pollution trading will actually stifle innovation by encouraging pursuit of cheap fixes rather than innovative and

192. The United Nations Environment Program has defined cleaner production as:

Cleaner production is the continuous application of an integrated preventive environmental strategy applied to processes, products, and services to increase eco-efficiency and reduce risks to humans and the environment. . . . Cleaner production requires changing attitudes, responsible environmental management and evaluating technology options. . . . The goal of cleaner production is to avoid generating pollution in the first place—which frequently cuts costs, reduces risks and identifies new opportunities.

United Nations Environment Programme, Industry and Environment Office, *A Definition For Cleaner Production* (last modified Apr. 3, 1998) <http://www.unepie.org/cp/cp_ginf.html>.

193. See, e.g., Ackerman & Stewart, *Reforming Environmental Law* (1), *supra* note 10, at 1341 (pollution trading creates a powerful financial incentive for those who can clean up most cheaply to sell their permits to those whose treatment costs are highest).

194. See Dudek & Palmisano, *supra* note 18, at 234-36 (emissions trading creates incentives to use existing technologies, production, process, operations and maintenance changes in new ways that result in more emission control for less money).

195. See Robert N. Stavins, *Harnessing The Marketplace: We Have to Do More with Less*, EPA J., May-June 1992, at 22; Hockenstein et al., *supra* note 3, at 15.

196. See Driesen, *Emissions Trading*, *supra* note 6, at 304 (“[M]ore demanding traditional regulation often provides significant incentives to innovate.”).

197. See Nicholas A. Ashford et al., *Using Regulation to Change the Market for Innovation*, 9 HARV. ENVTL. L. REV. 419, 420 (1985); Driesen, *Emissions Trading*, *supra* note 6, at 294, 298-99; see generally Commoner, *supra* note 181.

enduring solutions.¹⁹⁸ Under technology-based regulations, companies who face high marginal compliance costs are forced to innovate to stay competitive.¹⁹⁹ However, under pollution trading, these companies instead are motivated to purchase emission reduction credits to avoid reducing pollution.²⁰⁰ Through pollution trading, firms with low marginal costs of compliance, rather than invest in innovative technology, have a greater incentive to use *existing* pollution control technologies or to pursue cheaper improvements in efficiency.²⁰¹ Thus, pollution trading actually creates perverse incentives to *avoid* innovation.

The RECLAIM program in Los Angeles provides a good example. The average cost of best available control technology for NO_x was about \$12,500 per ton at the time RECLAIM was adopted.²⁰² That is more than fifty times the average price of current 1997 NO_x credits under RECLAIM's emissions trading program.²⁰³ Rather than innovate, many large and some small firms have chosen to purchase cheap credits.

The Rule 1610 car scrapping program has taken less than 23,000 old cars off the road.²⁰⁴ However, this has allowed industrial firms that claimed car scrapping credits to avoid using existing or innovative technology to reduce their emissions. Also, scrapping old cars has not enhanced the market for new automotive technology. Many of these cars were at or near the end of their normal life span anyway, and the \$600 payment for each scrapped car does not provide a serious incentive for a consumer to purchase an electric vehicle or even a new, cleaner burning car.²⁰⁵ Therefore, in Los Angeles, pollution trading programs have stifled new technology development by al-

198. See generally Driesen, *Cheap Fix?*, *supra* note 8 (trading discourages capital investment in technology innovation).

199. See *id.* at 42-43 (industry operators, who might have innovated to escape expensive pollution control regulations, will tend to purchase emission credits instead).

200. See Ackerman & Stewart, *Reforming Environmental Law (I)*, *supra* note 10, at 1341 (Pollution trading creates a powerful financial incentive for those who can clean up most cheaply to sell their permits to those whose treatment costs are highest).

201. See Driesen, *Cheap Fix?*, *supra* note 8 at 42-43.

202. See Selmi, *supra* note 55, at 10,703.

203. See SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 53.

204. See Lohmann Declaration, *supra* note 121, at 10.

205. See *id.* at 23; see generally SCAQMD, *Board Meeting June 12, 1998*, *supra* note 126.

lowing industry to choose cheap fixes while little pollution reduction has actually occurred.²⁰⁶

Additionally, some individual companies that reported actual emission reductions relied on process changes that could have resulted anyway under the previous technology-based regulatory regime. In a survey of those companies who reportedly installed pollution control equipment in order to comply with RECLAIM, 1,305 tons per year of NO_x emissions were reduced. By comparison, more than 9,000 tons per year of NO_x reductions took place in the same time frame as a result of discretionary implementation of control equipment initiated under the rules *prior* to RECLAIM.²⁰⁷ This illustrates how emissions trading has muted the incentive to innovate.

Contrary to the view of many academics, there are theoretical reasons to doubt that significant innovation will take place under a pollution trading regime. Empirical evidence from Los Angeles demonstrates that the incentive to innovate appeared to be much stronger under a technology-based regulatory regime. In short, emissions trading has allowed industry to choose a cheaper option at the expense of technological innovation and emissions reduction.

3. Public Participation Suffers Under a Pollution Trading Regime

Public participation is a tenet of democratic government and environmental policy making. Some academics argue that pollution trading enhances meaningful public participation. Yet, existing pollution trading programs effectively exclude the public (and to a large extent, government agencies) from the decision making process about industrial pollution.

Most states have permitting procedures through which affected community members can advocate for pollution control requirements on facilities. However, pollution trading allows facilities to avoid those permit requirements—usually without the knowledge or involvement of the affected community. Pollution trades made pursuant to Rule 1610 and RECLAIM are not subject to public review or comment. In fact, the public faces numerous difficulties finding out what companies are trading to avoid compliance with pollution con-

206. See Marla Cone, *AQMD Tightens Rules of Car Scrapping, Environment: Vehicles must be roadworthy. Panel adds 100 compounds to list of restricted toxic chemicals*, L.A. TIMES, July 11, 1998, at B3.

207. See SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 44-45.

trol standards.²⁰⁸ For instance, RECLAIM credits can be purchased from independent brokers, without any environmental agency or public oversight.²⁰⁹ A company wishing to increase or continue its pollution need only purchase the required credits on the open market, without any public review or comment. In this way, the democratic will, as represented in permit and regulatory requirements imposed after full public review and comment, can be reversed by a simple economic transaction.

Sunstein, Ackerman, and Stewart hold that pollution trading promotes democracy and public participation. However, under Rule 1610 and RECLAIM, company management decides whether to reduce emissions or to use pollution credits.²¹⁰ Profit, not public health, becomes the deciding factor.²¹¹ Thus, as Heinzerling notes, "in deciding whether to adopt a trading program or some other regulatory strategy, 'democracy' cannot be counted on the side of pollution trading."²¹² As Rule 1610 demonstrates, when "pollution trading programs do not assure meaningful citizen participation in decisions about the environment, then the distributional objection goes unmet: some non-consenting citizens must endure greater pollution, in the service of reducing the overall costs of environmental compliance."²¹³

4. Monitoring and Enforcement are More Difficult Under a Pollution Trading Regime

Pollution trading creates new difficulties concerning monitoring and enforcement. Accurate accounting of actual emissions facilitates an honest market in which emissions reduction claims are verifiable and enforceable. Pollution trading relies more on accurate emissions accounting than does a technology-based strategy. Yet, accurate

208. Public participation has proven very successful as a tactic to prevent and reduce pollution. For example, the Toxic Release Inventory data which is required by the Emergency Planning and Community Right to Know Act has proven very successful in mobilizing public opposition that has led to pollution prevention and reduction. *See generally* Luke W. Cole, *Empowerment as the Key to Environmental Protection: The Need for Environmental Poverty Law*, 19 *ECOLOGICAL* L.Q. 619 (1992); Gauna, *supra* note 177.

209. *See* SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 55.

210. *See* SCAQMD, *Offset Programs*, *supra* note 60, at Rule 1610; SCAQMD, *RECLAIM Rules*, *supra* note 62, at Rule 2000-2015.

211. *Cf.* Heinzerling, *supra* note 9, at 318 (noting that the history of the 1990 Clean Air Act Amendments challenges the view that "establishing a system of marketable permits will promote democratic values, such as deliberation, decentralization, and freedom from faction. . . . In reality, Congress paid little attention to [debating the overall pollution limits]. . . [and] the 1990 Amendments owes much of its content to the influence of special interest groups.")

212. *Id.* at 343.

213. *Id.*

monitoring requires costly investments in technology and intrusive public accounting of chemical use data, measures traditionally opposed by industry. And, of course, market theorists decry such administrative requirements or other restrictions because they raise transaction costs, thus interfering with the free hand of the marketplace.²¹⁴ The RECLAIM program recognized the need to verify that trading credits represented real emission reductions, not just progress on paper.²¹⁵ RECLAIM requires that major sources use continuous emissions monitors (CEMs) to measure NO_x and SO_x releases from industrial facilities.²¹⁶ Despite the availability of this proven technology for constantly measuring pollutants in industrial stacks, these RECLAIM provisions were criticized by industry lobbyists because of the additional costs associated with data reporting and the installation and operation of CEMs. However, CEMs were required despite industry opposition, underscoring the program's intent to produce the data that enables creditable tracking of emissions.²¹⁷ To verify industry's claimed reductions, the RECLAIM program requires CEMs to monitor actual emissions from industrial stacks at major sources.²¹⁸

However, an audit of the RECLAIM program found that industry has been slow to comply with the CEM requirements.²¹⁹ After the first year, thirty percent of the RECLAIM facilities had still not installed properly operating CEMs.²²⁰ Although most CEMs are now certified, electronic data reporting requirements were still being violated forty percent of the time by major sources, and eighty percent

214. See KUTTNER, *supra* note 132, at 6.

215. See Selmi, *supra* note 55, at 10,703-704; SCAQMD, *RECLAIM Rules*, *supra* note 62, at Rule 2004(b).

216. See Selmi, *supra* note 55, at 10,704-705; SCAQMD, *RECLAIM Rules*, *supra* note 62, at Rule 2012(c)(2)(A).

217. See Selmi, *supra* note 55, at 10,704-705; see also SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 75; Southern California Gas Company, Position Paper: Regional Clean Air Incentives Market (RECLAIM) 2 (1993) (on file with authors). In the car scrapping program, in contrast, it's impractical to monitor emission reductions because the program is based on projections of emissions avoided in the future. As discussed above, these projections have been grossly over inflated.

218. RECLAIM exempted smaller NO_x and SO_x sources from using continuous emissions monitoring. See SCAQMD, *RECLAIM Rules*, *supra* note 62, at Rule 2012. Instead, SCAQMD relies on emissions factors for these smaller sources. Such emission factors may be inaccurate according to U.S. EPA, because some emissions factors are derived from tests that may vary by an order of magnitude or more. Even when the major process variables are accounted for, emission factors developed may be the result of averaging source tests that differ by factors of five or more. See U.S. EPA, AP-42, *supra* note 113, at 3.

219. See SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 76-77.

220. See *id.* at 77.

of the time by small sources.²²¹ As a result of poor compliance with emissions reporting requirements and continued industry opposition to comprehensive monitoring, SCAQMD's ability to verify claimed emission reductions from large sources of NO_x and SO_x remains in doubt.

Emissions of VOCs are difficult to monitor accurately because millions of sources release VOCs from everyday activities, and VOCs evaporate into the air instead of being emitted from a stack. VOC trading was dropped from the original RECLAIM proposal because the monitoring and enforcement challenges were so severe.²²² CEMs are impractical for pollutants with many individual sources, and VOCs have multiple sources. For example, most VOC emissions are from leaks from thousands of pieces of equipment (so-called fugitive emissions) or evaporation from direct use of thousands of VOC-containing products (e.g. spray paints).²²³

Claimed VOC emission reductions can best be verified through source testing or a materials balance that accounts for all use of the polluting material and all the releases of the same pollutant from all sources.²²⁴ Tracking chemical use data provides the means of measuring the major inputs of a polluting material.²²⁵ Industry, however, has strongly opposed proposed policies to publicly report chemical use data. Air pollution agencies have traditionally sought to maintain as confidential the amount of chemicals used by individual industrial plants, making independent verification impossible.

These monitoring concerns become more significant to public health protection when the primary regulatory strategy is switched from technology-based regulations to emissions trading. Any approach needs to ensure that emission reductions are real and verifiable. Enforcement action cannot be taken in the absence of a strong verification mechanism.

221. See *id.*, at 84-85.

222. See Selmi, *supra* note 55, at 10,697.

223. According to the U.S. EPA, "there are hundreds of thousands of sources of VOC emissions including automobile emissions, gasoline vapors, chemical solvents, and consumer products like paint." See U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, *Regional Approaches to Improving Air Quality: Ground Level Ozone* (last modified Aug. 27, 1997) <<http://www.epa.gov/oar/oaqps/airtrans/groundoz.html>>.

224. See U.S. EPA, AP-42, *supra* note 113, at 2-3.

225. See Ken Geiser, *Rediscovering Materials Policy*, in *RETHINKING THE MATERIALS WE USE: A NEW FOCUS FOR POLLUTION POLICY* 13, 18-19 (Ken Geiser & Francis H. Irwin eds., 1993). In one state where chemical use data reporting is required by law, better materials tracking has resulted in pollution prevention and cost savings. See generally KEN GEISER, *TRACKING POLLUTION PREVENTION PROGRESS IN MASSACHUSETTS: PART TWO* (1996).

Under the command and control technology-based approach, emissions uncertainties are less relevant. The important question is whether the pollution control action was taken or not. Regardless of the pollution control strategy employed, it is a simple matter to verify whether equipment was installed and is properly operating, or a process changed or a raw material substituted. Although uncertainty remains over actual emissions, verification of compliance with technology-based pollution control requirements ensures that emissions have declined, usually by significant amounts.

To avoid impeding the trading market, the RECLAIM program verifies transactions after the fact and does not examine the underlying actions to ensure that claimed emission reductions are real.²²⁶ SCAQMD simply verifies that all the paperwork is in order after the trade has already taken place.²²⁷ At the end of the allotted time period, the agency ensures that enough emission reductions credits are in hand at each facility to match the requirement to reduce emissions by a certain percentage.²²⁸ Credits are based on claimed emission reductions, which are subject to great uncertainty.²²⁹ In the trading program, industry makes many diverse emission reduction claims.²³⁰ Even if significant agency resources were available, it is impractical to verify that all emission reduction claims are real and accurate. This diffusion of accountability for reducing emissions renders pollution trading programs inherently less enforceable than technology-based regulations.²³¹

Monitoring and enforcement issues are further complicated when inter-source trading is allowed. For now, RECLAIM is a closed trading program where only stationary sources (larger industrial plants) may participate. However, pollution trading advocates want to open the market so that industrial polluters can avoid reducing pollution further by using credits earned from emissions reductions from area sources (small, diverse sources, such as dry cleaners, and spray can usage) and mobile sources (e.g. cars, trucks, and buses).²³² The Rule 1610 car scrapping program shows that stationary

226. See SCAQMD, *RECLAIM Rules*, *supra* note 62, at Rule 2004(b); see also Selmi, *supra* note 55, at 10,702.

227. See Selmi, *supra* note 55, at 10,704.

228. See *id.* at 10,704; SCAQMD, *RECLAIM Rules*, *supra* note 62, at Rule 2004.

229. See discussion *supra* Part II (about emissions factors).

230. See SCAQMD, RECLAIM PROGRAM AUDIT, *supra* note 112, at 29.

231. See Driesen, *Emissions Trading*, *supra* note 6, at 303-04.

232. See SCAQMD, *Air Quality Investment Program*, *supra* note 74.

to mobile source trading multiplies the potential for false claims of reductions.²³³

Industrial polluters (i.e. stationary sources) want to continue to avoid making investments in reducing their own emissions by taking advantage of inter-source credits which represent grossly inflated emission reduction claims or emissions that would have been reduced anyway through actions that would be taken without trading. In fact, in order to meet environmental and public health goals, significant reductions are needed from all sources.

IV. RECOMMENDATIONS AND IMPLICATIONS

Having determined that pollution trading has serious empirical and theoretical difficulties, we recommend a proposal for domestic, urban pollution trading programs. These recommendations are an attempt to avoid the pit-falls associated with the Los Angeles pollution trading experiments. However, pollution trading has increasingly been recommended at the international level to combat global climate change.²³⁴ The Los Angeles experience with trading has important implications for the international arena as well. Finally, alternatives to trading are discussed that may avoid some of the inherent difficulties associated with pollution trading

A. *Proposals for Urban Air Pollution Trading Programs*

We propose a series of reforms for EPA to adopt in revising its guidance on Economic Incentives Programs (EIPs), based on the documented experience with pollution trading in Los Angeles. These measures would avoid or mitigate the problems reviewed in this article.

1. Prohibit Toxic Trading

The EIP should forbid the trading of toxic substances.²³⁵ This is the most straightforward way to reduce the risk of creating toxic hot-spots from pollution trading programs. Such a rule would allow continued trading of other air pollutants not classified as toxic, such as NO_x and SO_x, through programs such as the national acid rain trading

233. See discussion *supra* Part II.B.1-B.2.

234. See JONATHAN BAERT WIENER, DESIGNING GLOBAL CLIMATE POLICY: EFFICIENT MARKETS VERSUS POLITICAL MARKETS 5 (Center for the Study of American Business Policy Study No. 143, 1997).

235. As defined in the Emergency Planning and Community Right-To-Know Act. See 42 U.S.C. § 11001 (1998).

program or limited closed market programs such as the current RECLAIM program.

2. Prohibit Trading into Overburdened Communities

EPA should prohibit trading into overburdened communities. Because industrial polluters tend to cluster in low income neighborhoods and communities of color, allowing those sources to increase pollution seriously threatens to further overburden such communities. The burden on these communities should be measured by a cumulative risk threshold that accounts for reproductive harm, cancer risk, acute health risks, and risks to the most sensitive individuals, such as children. Such measurements should include the cumulative risk from all facilities affecting a particular community.

3. Assess and Prevent Toxic Hot-spots and Discriminatory Impacts

EIPs should require a demographic analysis of affected communities before the approval of any trading program and should prohibit trading programs that are projected to have a disproportionately adverse impact on low-income communities of color. Economic models exist that allow agencies to accurately predict which facilities are likely to purchase pollution credits, thereby increasing or continuing their pollution, by comparing control costs across regulated source categories.²³⁶ Facilities with low costs of control are likely to comply with control requirements and generate pollution credits, while facilities with high costs of control are likely to purchase pollution credits and avoid installing pollution control equipment. The model results can be mapped to determine where pollution is likely to increase if a revised trading program is approved, and whether low income people of color are impacted.

4. Prohibit Trading Out of Reasonably Available Control Technology (RACT) Requirements

In order to ensure reasonable further progress, the EIP should not allow industry to use trading programs in lieu of compliance with pollution controls that constitute Reasonably Available Control Technology (RACT).²³⁷ The Clean Air Act states that a fundamental

236. A model prepared by Regional Economic Modeling Inc. (REMI) has been used by California's South Coast Air Quality Management District for socio-economic impact assessment as part of the development of Air Quality Management Plans, and could be adapted for this purpose. See generally Johnson & Pekelney, *supra* note 112.

237. See 42 U.S.C. § 7502(c)(1) (1998).

goal is to ensure pollution reduction at the source whenever feasible, while one of the stated goals of the EIP is to foster technological advancements. Allowing companies to trade out of compliance with RACT rules undermines both of these goals. Ensuring that all companies install feasible technology (RACT) establishes a technology-based floor to safeguard public health in all communities.

5. Prohibit Cross-Pollutant Trading

No facility should be allowed to increase or continue its emissions of air pollutants by purchasing pollution credits generated through reduced emissions of less hazardous pollutants. This would require a comparison of the chemical composition of the emissions reduced for credit with the chemical composition of emissions maintained by purchase of credits to ensure that they represent equivalent environmental impacts; this requires consideration of toxicity, co-pollutants, and precursors. Such cross-pollutant trading presents substantial risks of creating toxic hot-spots and increasing the overall toxicity of pollutants released.

6. Allow Affected Communities to Review and Comment on Proposed Trade

Any proposed pollution trade that will result in an increase or continuation of toxic chemical emissions in a given community should first be subjected to a public comment and review period, including notification to the affected communities. This should be conducted in accordance with the Model Plan for Public Participation developed by EPA's National Environmental Justice Advisory Council (NEJAC).²³⁸ The agency administering the trading program must retain discretion to reject or amend the proposed trade based on community comments.

7. Ban Inter-Source Trading (between Mobile, Stationary and Area Sources)

The only way to eliminate the environmental justice impact caused by inter-source trading is to eliminate this form of trading. Mobile to stationary source trading presents particular risks of toxic hot-spot creation in communities of color and undercounting of emissions. Similar concerns would be presented by trading area source

238. See NATIONAL ENVIRONMENTAL JUSTICE ADVISORY COUNCIL, PUBLIC PARTICIPATION AND ACCOUNTABILITY SUBCOMMITTEE, THE MODEL PLAN FOR PUBLIC PARTICIPATION 1-9 (1996).

credits with stationary sources. Since these risks are inherent due to the nature of the trading program, they must be eliminated. Stationary to stationary source trading as well as mobile to mobile source trading would still be allowed.

8. Prohibit Hot Air Credits that Result from Over-Allocating the Baseline

The initial allocation of credits for any emissions trading program should be based on actual emissions, not historically higher levels. If trading proponents are truly committed to environmental improvement and economic efficiency, then they ought to rigorously insist that the supply of credits not exceed the demand. A glut in issued credits depresses prices, stifles investments in pollution controls, and misleads the public by making them think that emissions have actually been reduced.

B. *Implications for the Climate Change Policy Debate*

Many of the same problems documented in Los Angeles are likely to be replicated internationally should pollution trading remain the central strategy advanced for reducing greenhouse gases, like carbon dioxide, to slow global climate change. Under global climate change, the justice concerns take on a larger dimension and the stifling effect of pollution trading on technological innovation has more profound consequences.²³⁹

The hot air credits problem has already taken shape. Since the collapse of the Russian economy, that country's carbon dioxide emissions have dropped by more than thirty percent below 1990 levels.²⁴⁰ Under the Kyoto Accords, Russia will be granted emission credits as if the economic collapse had never occurred. This will allow Russia to either increase its production levels, or to sell its thirty percent excess emission credits to other countries. As a result, cash-rich, high-polluting countries like the United States will be able to avoid politically painful decisions to reduce pollution domestically by purchasing "hot air" credits from Russia. The vast over-allocation of hot air credits will even allow developed countries to increase emissions for

239. See Michael Belliveau, *Smoke and Mirrors: Will Global Pollution Trading Save the Climate or Promote Injustice and Fraud?* CORPORATE WATCH (October 1998) (last modified Mar. 1, 1999) <<http://www.corpwatch.org/trac/feature/climate/pollution/belliveau.html>>; see generally Driesen, *Cheap Fix?*, *supra* note 8.

240. See generally CHRIS ROLFE, *TURNING DOWN THE HEAT: EMISSIONS TRADING AND CANADIAN IMPLEMENTATION OF THE KYOTO PROTOCOL* (1998).

years to come, without offsetting those increases by decreasing emissions elsewhere. Kyoto, therefore, provides a mechanism to allow the United States, representing about five percent of the world's population, to continue generating the largest percent of the world's greenhouse gases, around 20%—a number that is increasing daily as American consumers continue to buy ever larger cars and sport utility vehicles.²⁴¹

Environmental justice concerns will arise both domestically and globally under global pollution trading. Carbon dioxide sources release hazardous co-pollutants, e.g., fine particles and toxic products of incomplete combustion. As U.S. firms buy bogus Russian credits or cheap reduction credits from developing countries, where energy inefficiencies are high, air pollution in urban U.S. communities will be maintained or at least not reduced as fast as it otherwise would have been had domestic reductions in greenhouse gases been mandated.²⁴²

Developing countries lose twice in a pollution trading framework. Instead of receiving the capital investments necessary to develop state-of-the-art clean energy technology, developing countries will experience entrepreneurial "hit and run" projects aimed at bleeding off the cheapest emission reduction credits possible. Later, during the next phase of global action when developing countries which are locked in a fossil fuel-based development strategy must reduce their own greenhouse gases for the first time, they may be left with few easy greenhouse gas reduction opportunities and with few means to meet those reduction obligations.²⁴³

The World Bank, a heavy promoter of carbon intensive development projects in the Third World, has positioned itself to profit as a broker in the newly emerging market in greenhouse gas reduction credits.²⁴⁴ More than three-fourths of the World Bank's energy portfolio is devoted to fossil fuels.²⁴⁵ Under a recently leaked proposal, the bank plans to skim five percent from each trade it brokers in the

241. See G. TYLER MILLER, JR., *LIVING IN THE ENVIRONMENT: PRINCIPLES, CONNECTIONS, AND SOLUTIONS* 56, 292 (8th ed. 1994).

242. See Belliveau, *supra* note 239.

243. See *id.*; see generally Driesen, *Cheap Fix?*, *supra* note 8.

244. See Daphne Wysham, *Profiting from Pollution*, SAN JOSE MERCURY NEWS, Nov. 22, 1998, at 1P; See generally Driesen, *Cheap Fix?*, *supra* note 8; THE SUSTAINABLE ENERGY AND ECONOMY NETWORK (INSTITUTE FOR POLICY STUDIES, USA) AND THE INTERNATIONAL TRADE INFORMATION SERVICE (USA), *THE WORLD BANK AND THE G-7: STILL CHANGING THE EARTH'S CLIMATE FOR BUSINESS* (1998).

245. See Wysham, *supra* note 244, at 1P.

global pollution credit market, which is projected to reach \$150 billion in trading by 2020.²⁴⁶ This dual role will enable the World Bank, along with its partner corporations, to “double dip”, profiting from the expansion of inefficient fossil fuel technology in the developing world, then again when easy efficiency improvements generate credits that relieve responsibility for reducing emissions from industrialized countries.²⁴⁷

U.S. interests are pushing hard for rapid creation of a global pollution trading program, including proposed legislation in Congress that would guarantee U.S. companies early credit greenhouse gas reduction projects while the details of the international pollution trading regime are being worked out.²⁴⁸

C. *Alternative Market-Based Policy Approaches*

Unfortunately, little consideration has been given to alternative market-based policies, which suffer from few of the inherent limitations of pollution trading. If technology-based regulations were retained as the floor, then supplementary market oriented programs would accelerate the transition away from polluting technologies. By reforming subsidy programs to eliminate huge government investments in fossil fuels and other polluting technologies, and by redirecting investments toward clean technology, like solar electric and hydrogen power, market forces would be reoriented to reduce pollution.²⁴⁹

Pollution taxes have been proposed as another market-based approach to reduce pollution.²⁵⁰ Taxes could be increased on carbon intensive fuels and other toxic products. The more pollution a facility generated the higher its tax on emissions. A variation on pollution taxes, called tax shifting, would move taxes away from activities to be encouraged, like wages and savings, and instead increase taxes on polluting products and emissions to discourage environmental

246. *See id.*

247. *See id.*

248. *See Industries Push for Emissions Credits: Firms Want to Ensure Credit for Reductions of a Global Warming Treaty is Passed*, SAN JOSE MERCURY NEWS, Jan. 3, 1999, at 6A.

249. *See generally* David Malin Roodman, *THE NATURAL WEALTH OF NATIONS: HARNESSING THE MARKET FOR THE ENVIRONMENT* 29-110 (1998); LESTER R. BROWN ET AL., *SAVING THE PLANET: HOW TO SHAPE AND ENVIRONMENTALLY SUSTAINABLE GLOBAL ECONOMY* 48-63 (1991).

250. *See generally* Frank Muller & J. Andrew Hoerner, *Greening State Energy Taxes: Carbon Taxes for Revenue and the Environment*, 12 PACE ENVTL. L. REV. 5 (1994); HAMOND, *supra* note 158.

harm.²⁵¹ By maintaining a progressive tax structure and using some of the tax funds generated to compensate displaced workers and communities impacted by the shift to clean technology, pollution taxes could avoid any economic injustice in their implementation.²⁵²

Free market ideologues fervently embrace market incentive programs, like pollution trading, but tend to fall silent or oppose market disincentives, like pollution taxes or the elimination of harmful subsidies. Given the results of pollution trading in Los Angeles, the debate appears to be less about how to harness market forces to fairly reduce pollution, and more about how to protect and enhance profits for powerful economic interests.

CONCLUSION

An evaluation of the world's oldest and largest pollution trading programs for urban air quality reveals immorality, injustice, and ineffectiveness in their outcomes. As demonstrated in Los Angeles, the more unrestricted an emissions trading program, the more likely that unjust hot-spot impacts, over allocations, and fraudulent transactions will result. Yet reforms needed to improve the environmental performance and mitigate the adverse impacts of pollution trading erase the cost savings and regulatory flexibility touted by its advocates. These reforms should be aggressively pursued, especially for current and proposed smog trading programs.²⁵³ Serious restrictions are needed on the proposed global pollution trading system to prevent the worst abuses of an inherently flawed environmental policy tool. However, protecting public health, civil rights, and economic security would be better realized by halting further reliance on pollution trading. Instead, an effective floor of clean technology-forcing regulations, enhanced by other market-based strategies such as subsidy reform and progressive pollution taxes, provide the best means of ensuring a just, participatory, and environmentally sustainable future.

251. See David Malin Roodman, *Building a Sustainable Society*, in STATE OF THE WORLD 1999, at 169, 171-74 (1999). See generally HAMOND ET AL., *supra* note 158.

252. See generally HOERNER, *supra* note 159; Roodman, *supra* note 251.

253. See discussion *supra* Part IV.A.