

Going Mobile: Emissions Trading Gets a Boost From Mobile Source Emission Reduction Credits

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"The 21st century is going to be about using markets to solve social and environmental problems."¹

INTRODUCTION

Over the last two decades, the Environmental Protection Agency (EPA) and state regulators have tested various emissions trading policies to supplement the command and control approach of the Clean Air Act (CAA).² Originally developed to allow continued economic growth in urban areas without compromising air quality goals, these policies have established markets in which polluters trade emissions reduction credits (ERCs) or allowances.³ The basic theory is that allowing polluters

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1. Jeffrey Taylor, *Smog Swapping — New Rules Harness Power of Free Markets to Curb Air Pollution*, WALL ST. J., April 14, 1992, at A1(E) (quoting Richard L. Sandor, economist and a director of the Chicago Board of Trade).

2. See T.H. TIETENBERG, EMISSIONS TRADING: AN EXERCISE IN REFORMING POLLUTION POLICY 9 (1985); Robert W. Hahn & Gordon L. Hester, *Where Did All the Markets Go? An Analysis of EPA's Emissions Trading Program*, 6 YALE J. ON REG. 109 (1989); Brennan Van Dyke, Note, *Emissions Trading to Reduce Acid Deposition*, 100 YALE L.J. 2707 (1991).

3. See TIETENBERG, *supra* note 2, at 9; cf. Daniel J. Dudek & John Palmisano, *Emissions Trading: Why is this Thoroughbred Hobbled?*, 13 COLUM. J. ENVTL. L. 217, 224 (1988). Allowances to emit pollution are either auctioned off, with the sources purchasing them from the control authority at the market-clearing price, or provided with a pollution permit. Cf. *Economic Incentive Program Rules*, 59 Fed. Reg. 16690, 16716 (1994) (to be codified at 40 C.F.R. pt. 51) [hereinafter *EIP Rules*]; T.H. Tietenberg, *Economic Instruments for Environmental Regulation*, ECONOMIC POLICY TOWARDS THE ENVIRONMENT, Dieter Helm, Ed. 94 (1991). ERCs, on the other hand, are created by sources as voluntary, additional reductions surplus to a predetermined set of emission standards. Cf. *EIP Rules*, *supra* at 16,716; Tietenberg, *supra* at 94. (Primarily due to some inconsistency in EPA definitions over time, Tietenberg and other commentators define allowances and emissions reduction credits with some differences). See also *supra* notes 17-21 and accompanying text.

greater flexibility in choosing how to control air pollution will reduce overall costs of pollution abatement.⁴

Estimates and studies indicate that emissions trading does result in significant cost savings to industry.⁵ Despite these savings, however, problems in existing trading systems have discouraged, and in some cases precluded polluters from using the available markets.⁶ Prompted primarily by the Clean Air Act Amendments of 1990 (CAAA), EPA and state and local agencies are working to solve these problems. If they are successful, a more efficient market and even greater costs savings will result, with potential for greater compliance and environmental benefits.⁷

Such efforts will be increasingly important to achieving CAA goals for three reasons. First, despite steady progress in improving air quality, the goal of meeting air quality standards in major urban areas remains stubbornly elusive.⁸ Second, air pollution regulation cost the public and private sectors more than \$30 billion annually prior to the 1990 CAAA.⁹ The average cost of pollution controls can be expected to increase due to the CAAA and because most of the inexpensive control measures have already been implemented.¹⁰ Finally, control costs are becoming more widely borne across society, as the measures required to solve remaining air pollution problems fall increasingly on decentralized sources and individuals, rather than on relatively few large industrial facilities.¹¹

Mobile source emission reduction credits (MERCs)¹² and other recent innovations aim to improve upon existing trading

4. See Tietenberg, *supra* note 3, at 88; Van Dyke, *supra* note 2, at 2707; Dudek & Palmisano, *supra* note 3, at 218.

5. See *infra* notes 36-46 and accompanying text.

6. See *infra* notes 51-82 and accompanying text.

7. See Van Dyke, *supra* note 2, at 2708; TIETENBERG, *supra* note 2, at 188-202.

8. See John P. Dwyer, *The Use of Market Incentives in Controlling Air Pollution: California's Marketable Permits Program*, 20 *ECOLOGY L.Q.* 103, 105 (1993).

9. *Id.* In 1987, for example, \$32.3 billion was spent on air pollution controls, including expenditures on pollution abatement, regulation and monitoring, and research and development. Xiannuan Lin, Karen R. Polenske and Kelly Robinson, *Economic Impact Analyses in U.S. State and Local Air Pollution Control Agencies: A Survey*, *AIR & WASTE*, Feb. 1994, at 134.

10. Lin, Polenske and Robinson, *supra* note 9, at 134.

11. *Id.*

12. The term "mobile sources" refers to sources of air pollution primarily from on-road vehicles (e.g., automobiles, trucks and motorcycles), but also from nonroad vehicles (e.g., trains, airplanes, agricultural and industrial equipment, construction vehicles, off-road motorcycles, and marine vessels). See *EIP Rules*, *supra* note 3, at 16711.

schemes. The EPA and the California Air Resources Board each provided comprehensive MERC guidance for the first time in early 1993.¹³ This new way of creating ERCs can improve emissions trading programs, providing potentially less expensive sources of credits, increased flexibility and trading, and beneficial new strategies and technologies.¹⁴ In turn, improved trading programs will provide greater cost savings and environmental benefits.

This Article reviews emissions trading generally and explains how the development of MERCs increases emissions trading activity and improves program results. Part I overviews traditional emissions trading activities and problems, providing the reader a base from which to evaluate MERCs.¹⁵ Part II closely examines the new phenomenon of mobile source emission reduction credits, provides examples of proposed MERCs and actual programs, and describes their potential impact on emissions trading.¹⁶

I.

EMISSIONS TRADING

A. *The Concept*

Emissions trading programs generally allow polluters to exchange "credits," or allowances to satisfy their pollution control obligations most economically.¹⁷ Allowances to emit pollution are either auctioned off, with the sources purchasing them from

13. See generally Interim Guidance on the Generation of Mobile Source Emission Reduction Credits, 58 Fed. Reg. 11134 (1993) [hereinafter EPA MERC Guidance]; CALIFORNIA ENVTL PROTECTION AGENCY, AIR RESOURCES BD., MOBILE SOURCE EMISSION REDUCTION CREDITS: GUIDELINES FOR THE GENERATION AND USE OF MOBILE SOURCE EMISSION REDUCTION CREDITS (1993) [hereinafter CARB MERC GUIDELINES I]. CARB produced a revised guidelines by the same name in 1994. See *infra* note 101.

14. See *infra* notes 216-223 and accompanying text.

15. See *infra* notes 17-84 and accompanying text.

16. See *infra* notes 85-223 and accompanying text.

17. In any type of program, sources can either meet their requirements by maintaining their own emissions within established limits, or by buying surplus allowances or ERCs from other sources. *EIP Rules*, *supra* note 3, at 16716. The Clean Air Act's title IV Federal Acid Rain Program is an example of an emission allowance trading program, while "bubbles" and "generic bubbles" created under the EPA's 1986 Emission Trading Policy Statement (ETPS) are examples of ERC trading. See *id.* Allowance trading programs can establish emission allocations to be effective at the start of a program, at some specific time in the future, or at varying levels over time. *Id.* An ERC trading program requires ERCs to be measured against a pre-established emission baseline. *Id.*

the control authority at the market-clearing price, or they are provided along with a pollution permit.¹⁸ Emission Reduction Credits, or ERCs, on the other hand, are voluntary, additional reductions surplus to a predetermined set of emission standards.¹⁹ These tools may be combined in a single program, and while the vast majority of rules and programs promulgated thus far have relied solely on ERCs,²⁰ combinations of the tools seem to be gaining popularity.²¹

ERCs allow polluters to reduce emissions at any discharge point more than required by its emission standard, then apply for certification of the excess control as credit.²² To qualify, the emission reduction must be: (1) surplus, (2) enforceable, (3) permanent, and (4) quantifiable.²³ ERCs are generally defined in terms of tons per year of specified pollutants.²⁴ Once credits issue, program participants may then bank them for future use or trade them depending on the particular rules to which they are subject.

Emissions trading can involve activities not typically thought of as "trades." Trading can be internal, as well as external.²⁵ Internal trades involve a facility using ERCs generated from one stack or vent to satisfy emissions requirements from another in the same facility.²⁶ External trades involve one facility generating ERCs for use at another facility.²⁷ External trades usually take place between different firms.²⁸

The EPA implemented its emissions trading program, prior to the CAAA, by four specific policies set forth in the EPA's Emis-

18. See *supra* notes 3 and 17.

19. See *id.*

20. Distributing allowances by auctioning them off has been unpopular with industry because it requires sources to pay for allowances to pollute as well as for pollution control. Van Dyke, *supra* note 2, at 2714.

21. RECLAIM, a comprehensive California emissions trading and permit program, and the Clean Air Act's title IV acid rain trading program use these tools in combination. See also *infra*, notes 174-75 and accompanying text.

22. See TIETENBERG, *supra* note 2, at 7.

23. See Emissions Trading Policy Statement, 51 Fed. Reg. 43814, 43832 (1986) [hereinafter ETPS]; TIETENBERG, *supra* note 2, at 7. See also *infra*, notes 131-145.

24. See TIETENBERG, *supra* note 2, at 7.

25. See Hahn & Hester, *supra* note 2, at 369. The distinction can also be characterized as intra-firm "trading," where a single firm uses ERCs it has generated from a particular stack or plant to satisfy emissions requirements from another stack or plant it owns, and inter-firm trading, where one firm generates and sells ERCs to another.

26. See *id.*

27. See *id.*

28. See *id.*

sions Trading Policy Statement (ETPS).²⁹ The offset, bubble, emissions banking, and netting policies³⁰ were linked by ERCs and governed how ERCs could be created and used or banked. The ERC remains the primary "common currency" used in trading and banking. The ETPS, while still valid, is now encompassed by broader rules promulgated by the EPA pursuant to title I of the CAAA.³¹ The ETPS primarily concerns the generation and use of ERCs from stationary sources, while the newer Economic Incentive Program (EIP) Rules encourage a vast universe of economic incentives from mobile, area, and stationary sources, and is not limited to emissions trading alone.³²

29. See *supra* note 23.

30. "EPA's offset program permits the construction of major new emission sources in nonattainment areas by allowing firms to offset emissions increases from these sources with decreases in the same type of emissions from other sources." Hahn & Hester, *supra* note 2, at 119. See ETPS, *supra* note 23, at 43,830-31. Offsets are a unique element of emissions trading because they are mandatory for major new sources in nonattainment areas. Hahn & Hester, *supra* note 2, at 119.

"Bubbles" provide a way for an *existing* firm to increase emissions at one or more emission sources in exchange for decreases at other emission sources so that the total emissions from the firm does not exceed the sum of all the its individual emission limits (as long as the total emissions within the "bubble" encompassing all of a firm's sources does not increase). See ETPS, *supra* note 23, at 43,830; Hahn & Hester, *supra* note 2, at 118-19, 123-29.

"Emissions credit banking encompasses the processes of creating, certifying and storing ERCs" for later use in trading transactions. Dudek & Palimissimo *supra* note 3, at 227. See ETPS, *supra* note 23, at 43,831; Hahn & Hester, *supra* note 2, at 119, 129-32.

"Netting is the use of ERCs from within a facility to avoid New Source Review (NSR) when an expansion or other modification occurs." Dudek & Palmisano, *supra* note 3, at 225. See ETPS, *supra* note 23, at 43,830; Hahn and Hester, *supra* note 2, at 132-33. Netting allows a firm to increase emissions from one source if it decreases emissions from another source within the same facility so that the net increase does not equal a major source. Hahn & Hester, *supra* note 3, at 119, 132-33. In doing so, a firm that is modifying an existing emission source can avoid the most stringent emission limits and experience fewer complications in obtaining a permit. *Id.* From available data it appears that netting is the most commonly used emissions trading activity by a wide margin. *Id.* at 133. Netting may actually discourage the formation of markets because firms save emission reductions for their own use rather than sell them to other firms. *Id.* at 136.

31. See EIP Rules, *supra* note 3, at 16,708-709.

32. Until recently, the EPA allowed MERCs only after reviewing them on a case-by-case basis. See ETPS, *supra* note 23, at 43,834; EIP Rules, *supra* note 3, at 16,708-709.

The CAAA define the EIP as an incentive-based program which may include "State established emission fees or a system of marketable permits . . . or any combination of the foregoing or other similar measures." Clean Air Act, 42 U.S.C.A. § 7511a(g)(4), SELECTED ENVTL LAW STATUTES, 1994 Educational Edition 834 [hereinafter SELECTED STATUTES]. In addition, the Act expands this definition to include "incentives and requirements to reduce vehicle emissions and vehicle miles

The EPA's emissions trading program initially involved EPA rules which directly governed how trading took place. The EPA examined each proposed trade. Later, the EPA allowed "generic trading rules," which states or local governments could adopt as part of a state implementation plan (SIP).³³ These generic rules, essentially state trading programs, authorized states to approve certain types of individual transactions without case-by-case SIP revisions or associated federal review prior to approval.³⁴ The EIP rules continue this tradition, encouraging and in some cases requiring states to adopt their own economic incentive programs, including emissions trading.³⁵

B. *The Benefits*

In contrast to the traditional regulatory approach, which mandates particular forms of behavior or specific technologies, emissions trading allows sources more flexibility in reaching environmental goals. Emissions trading creates a "system which encourages those who know most about control opportunities, environmental managers for the industries, to use that knowl-

traveled." *Id.* The CAAA require the EPA to promulgate final EIP rules, which were published on April 7, 1994, for stationary, area, and mobile sources. *See EIP Rules, supra* note 3, at 16,690. *See also infra*, note 35.

33. *See* ETPS, *supra* note 23, at 43,831, 43,835-36. "While EPA has the responsibility for defining ambient [air] standards, the primary responsibility for ensuring that . . . [those] standards are met falls on the state air pollution control agencies." TIETENBERG, *supra* note 2, at 3-4. "They develop and execute an acceptable . . . SIP . . . which must be approved by the EPA. The SIP spells out, for each separate air quality control region, procedures and timetables for meeting ambient standards. *Id.* at 4-5.

34. *See* ETPS, *supra* note 23, at 43,831, 43,835-36.

35. The EIP rules provide guidance for States and local governments adopting EIPs pursuant to title I of the Act which governs state and federal plans to meet ozone standards. *See* EIP Rules, *supra* note 3, at 16,691. Under title I, EIPs are encouraged and, in certain cases, mandated. Clean Air Act, 42 U.S.C.A. § 7511a(g)(3)-(5), SELECTED STATUTES, *supra* note 32, at 799-800. The rules "establish as a goal for all EIPs that they be designed to benefit both the environment and the regulated entities." *EIP Rules, supra* note 3, at 16,694.

The EIP rules, being broadly applicable to any kind of EIP, generally cover emission trading programs which have historically been addressed by the EPA's previously released guidance on emission trading, primarily contained in the ETPS. *See generally* ETPS, *supra* note 23. Although based upon the same general principles, the EIP rules provide both greater flexibility and more comprehensive requirements for such programs. Under the EIP rules, stationary, area, and mobile sources may be allowed to participate in a common emissions trading market, including those stationary sources subject to the RACT requirement ("RACT sources"). *See EIP Rules, supra* note 3, at 16,696. However, states which prefer the familiarity of the ETPS may continue to implement emission trading under its guidance. *Id.* at 16,709.

edge to achieve environmental objectives at minimum cost."³⁶ Scarce public resources are thereby maximized by "thousands of self-interested micro-decisions."³⁷

As a result of this redirection of the private sector, emissions trading programs "can lower the overall cost of meeting a given total level of abatement."³⁸ Facilities with lower cost abatement alternatives can provide the necessary emissions reductions to sources with more expensive alternatives; and all sources eligible to trade, including those already in compliance, face continuing incentives to further reduce emissions.³⁹ Ideally, then, by changing industrial incentives, the best private choices can be made to coincide with the best social choices.⁴⁰

Unfortunately, comprehensive data on the effects of emissions trading do not exist because programs are now generally administered by local areas and no one collects information in a systematic way.⁴¹ Few studies have quantified actual performance of emissions trading. However, some of the general themes are clear. Trading programs have reduced costs, increased and sped compliance, and in some cases, have resulted in additional environmental benefits.⁴²

1. Cost-effectiveness

Costs associated with command and control regulation approaches can be so excessive that emissions trading can save money and resources even when it is heavily controlled and transactions are relatively few.⁴³ Indeed, most estimates through 1990 placed the accumulated capital savings for all emissions

36. See Tietenberg, *supra* note 3, at 93.

37. Dudek & Palmisano, *supra* note 3, at 223.

38. *EIP Rules*, *supra* note 3, at 16,716.

39. *Id.*

40. Tietenberg, *supra* note 3, at 93.

41. *Id.* at 89. "As a consequence of a division of responsibilities between EPA and the states, no single entity has taken the initiative to collect data on the performance of emissions trading activity. EPA has collected data on the 'bubbles' it has approved, but information on emissions trading activities that are controlled primarily at the state level is contained in thousands of individual permit files. This is significant because most emissions trading activity has occurred in programs over which the states have primary jurisdiction." Hahn & Hester, *supra* note 2, at 112 n.17.

42. See Tietenberg, *supra* note 3, at 89. See also Catherine L. Kling, *Emissions Trading vs. Rigid Regulations in the Control of Vehicle Emissions*, 70(2) LAND ECON. 174, 187 (1994).

43. TIETENBERG, *supra* note 2, at 52-53.

trading programs at more than \$10 billion.⁴⁴ Given that EPA estimated total air emissions control costs in the U.S. exceeded \$175 billion for stationary sources alone from 1981 to 1990, and that costs continue to increase, the future potential cost savings from emissions trading remains large.⁴⁵ In fact, some commentators believe it could save billions of dollars *annually*.⁴⁶

2. Environmental Benefits

Besides reducing compliance costs, emissions trading has also reduced total emissions — thereby improving air quality as well.⁴⁷ These emissions reductions will continue for two reasons. First, air districts grant credits for less than the amount of the reduction.⁴⁸ Because the resulting credits do not allow an equal amount of future pollution for an exchange in reduction, this regulatory tool reduces overall emissions. Second, compliance with the Clean Air Act has increased due to the extra flexibility emissions trading provides.⁴⁹

Finally, continued technological progress is more likely with emissions trading than with command and control policy because of improving incentives. Under the command and control approach, technological changes discovered by the control authority typically led to more stringent standards and higher costs.⁵⁰ Thus, sources have little incentive to innovate and a good deal of

44. See Tietenberg, *supra* note 3, at 89. As early as 1983, data revealed that the emissions trading program had significantly reduced the costs of complying with the requirements of the Clean Air Act. See TIETENBERG, *supra* note 2, at 55-56. For bubble trades alone, EPA estimated that total savings resulting from less than 150 total bubbles approved, proposed, or under development by September 1983 was over \$700 million. *Id.* Data on offsets and netting, which are both primarily state-level transactions, are much more difficult to collect. However, from 1976 to 1983 there had been at least 2,000 offset transactions, many of which were made available when plants closed down. *Id.*

45. See Hahn & Hester, *supra* note 2, at 111 n.11 (citing the ENVIRONMENTAL PROTECTION AGENCY, FINAL REPORT: THE COST OF CLEAN AIR AND WATER 12 (Report to Cong. 1984)).

46. See *id.* at 111.

47. See TIETENBERG, *supra* note 2, at 189. For instance, of the 43 bubbles approved or proposed by EPA prior to December 31, 1983, through the SIP revision process, 27 resulted in substantial air quality improvement. *Id.*

48. See Jonathan Marshall, *Selling Dirty Air Is Big Business*, S.F. CHRON., Mar. 21, 1994, at D2.

49. Tietenberg, *supra* note 3, at 90. By 1990, somewhere between 7,000 and 12,000 total transactions had occurred. Most of these transactions were voluntary and for the participants represented an improvement over the traditional regulatory approach. *Id.*

50. *Id.* at 102.

incentive to hide innovations from the control authority. With emissions trading, however, innovations that allow additional reductions create saleable ERCs.

C. *The Untapped Potential*

Despite the benefits emissions trading provides, a great deal of potential still remains untapped. Emissions trading has been slow in reaching its potential, as may be expected with any significant policy innovations. Costs associated with any change in policy make it difficult to overcome the inertia of the status quo.⁵¹ New grounds for legal challenge are exposed; bureaucratic staffs trained in one set of procedures must learn new ones; and both regulators and sources lose the comfort of familiarity.⁵²

A variety of other, more specific and mundane factors inhibit the development of emissions trading, including problems with banking and property rights, transaction costs, and difficulty in calculating ERCs.⁵³ Perhaps most important of all, however, is the distinction between intra-firm trading, where a single firm uses ERCs it has generated from a particular stack or plant to satisfy emissions requirements from another stack or plant it owns, and inter-firm trading, where one firm generates and sells ERCs to another.⁵⁴

While intra-firm trading has proven its worth in reducing the costs of complying with air pollution laws, inter-firm trading, which has been minimal,⁵⁵ would increase the cost-effectiveness

51. TIETENBERG, *supra* note 2, at 38.

52. *Id.*

53. One concern not discussed, but still important, is a concern over the nature of the regulated industries. "Despite early enthusiasm for Title IV, questions remain about its workability. Extensive attention has been given to the theoretical mechanics of supply and demand however, far less consideration has been given to those circumstances peculiar to the electric utility industry, which will affect the practical application of a market in emission allowances." Jeanne M. Dennis, *Smoke for Sale: Paradoxes and Problems of the Emissions Trading Program of the Clean Air Act Amendments of 1990*, 40 U.C.L.A. L. REV. 1101, 1102 (1993) (arguing that the monopolistic nature of the industry substantially reduces the possibility of active emissions trading).

54. See *supra* notes 25-28 and accompanying text.

55. See TIETENBERG, *supra* note 2, at 56-58; Dwyer, *supra* note 8, at 103 ("While there has been a significant number of intra-firm offsets, which itself is a significant victory for cost-effectiveness, there is no [active, inter-firm] market in pollution permits."); Taylor, *supra* note 1, at A12 ("A few interfirm trades have occurred in the Midwest and Northeast, but most — [only] about 100 in the past 10 years — have taken place in California."). But see Dudek & Palmisano, *supra* note 3, at 225 (In the late 80s . . . "Increasingly, firms are turning to other companies to buy or lease

of the program substantially.⁵⁶ However, insufficient inter-firm trading, which is linked to the other problems, serves as more of a barometer for emissions trading than an addressable barrier. Inter-firm trading will increase automatically with the fall of barriers and rise of innovative new trading ideas, such as MERCs.⁵⁷

1. Banking and Property Rights

Banking, the saving of ERCs or allowances for future use, has suffered from two main inhibitions. First, though successful banking programs exist, many states have chosen not to develop them.⁵⁸ Second, and more importantly, the security of banked credits in existing programs is almost always limited or in doubt. Potential for changes in emission control requirements raises the possibility of indirect confiscation or elimination of banked emission credits.⁵⁹ In addition, several banking programs specifically allow state regulators to discount or confiscate credits in certain circumstances (e.g. inability to comply with air quality standards).⁶⁰ These policies discourage firms from generating emis-

offsets. Several active markets are developing in California and elsewhere . . . [w]ell over 100 offset transactions have been arms-length transactions between firms.”)

56. See TIETENBERG, *supra* note 2, at 56-58; Hahn & Hester, *supra* note 2, at 151 (“[T]he general failure of active markets in emission reduction credits to develop is the greatest disappointment of emissions trading. Until such markets exist, the full potential of emissions trading to reduce pollution control costs will go unrealized.”).

57. It would do little good to try to convince firms to trade between each other if they question the value of generating credits for their *own* use. Before inter-firm trading will increase, the barriers of insufficient property rights, transaction costs, and quantifiable credits must be resolved; and/or new sources of credits such as MERCs must become more prevalent.

58. Tietenberg, *supra* note 3, at 101. The paucity of emission banks inhibits trading activity. The EPA system allows states to establish emission banks, but does not require them to do so. Before the CAAA, only seven of the fifty states had established these banks. See also AIR QUALITY LABORATORY, GEORGIA INSTITUTE OF TECHNOLOGY, EMISSIONS BANKING AND TRADING: A SURVEY OF U.S. PROGRAMS, Appendices, Table 1 (April 1994) [hereinafter G.I.T. Report].

59. “[T]he potential for regulatory change can create uncertainty regarding the quantity of reductions that can be used for future emissions trades. New emissions control requirements that lower the amount of a firm’s allowable emissions may be imposed. Reductions that were once surplus would then be required, thereby effectively confiscating the property right held by the firm. Uncertainty about the durability of these property rights creates an additional disincentive for firms to engage in emissions trading. Hahn & Hester, *supra* note 2, at 117 (citations omitted). See also TIETENBERG, *supra* note 2, at 210.

60. Regulators “commonly confiscate a percentage of banked reductions to fund a community bank or to achieve air quality standards. Most dramatically, in June 1990, the [South Coast Air Quality Management District (California)] discounted most banked credits by eighty percent, thereby confirming industry’s fears about regulators’ confiscatory tendencies.” Dwyer, *supra* note 8, at 110.

sion credits for banking. Combined with tight restrictions on trades, the deficiencies of the banking program have caused trading to be less vigorous than expected.⁶¹

If emissions banking is to play its expected role in developing a healthy credit market, banked credits must be sufficiently protected to merit investment.⁶² For example, if a Fifth Amendment property interest attached to credits, subsequent regulatory changes could not jeopardize investments in those credits; the government would have to compensate firms for credits confiscated to achieve greater emission reductions.⁶³ However, regulators face a dilemma. The cost of achieving additional emission reductions by subsequent regulation could become prohibitively high.⁶⁴ Thus, credits have never enjoyed the level of protection afforded by the Fifth Amendment.⁶⁵

Political conflicts also impact the banking and property rights problems. To provide industry with flexibility, regulators have defined a set of property rights and placed minimum restrictions on their use. At the same time, they have been sensitive to the concerns of environmentalists regarding the definition of these rights.⁶⁶ Regulators are reluctant to define property rights in a way that resolves the uncertainty concerning their use in interfirm trades due to environmentalists' potential criticisms.⁶⁷ Moreover, they tend to give these rights an inferior status. Thus,

61. See TIETENBERG, *supra* note 2, at 202.

62. *Id.* at 210.

Currently this objective is seen by many state control authorities as conflicting with the need to reach attainment, but that need not be the case. . . . The sanctity of banked credits conflicts with reaching attainment only when banked credits appear to be the only easy source of reductions. Once credible plans for reaching attainment which integrate preserved credits are developed, the conflict disappears.

It was probably not a coincidence that the two interfirm transfers of emission reduction credits under the SIP revision bubble policy prior to the end of 1983 involved banked credits. Properly protected banked credits facilitate trades both by encouraging the creation of surplus reductions and by coordinating the availability of and the need for these credits over time.

Id.

63. Dennis, *supra* note 53, at 1,118 ("The takings clause of the Fifth Amendment protects property interests: '[N]or shall private property be taken for public use, without just compensation.'").

64. See *id.* at 1,118-19.

65. For example, the plain language of title IV of the CAAA, which epitomizes the position of legislators, as well as regulators, specifically denies such a property right to allowances in the acid rain program. See *id.* "Such allowance does not constitute a property right." Clean Air Act, 42 U.S.C.A. § 7651b(f), SELECTED STATUTES, *supra* note 32, at 906.

66. Hahn & Hester, *supra* note 2, at 143.

67. *Id.*

regulators have created continuing difficulties in determining what entitlements accompany these property rights, and have also created policies specifically designed to de-emphasize their nature.⁶⁸

2. Transaction Costs

Transaction costs also inhibit emissions trading. Such costs arise when acquiring information about credit prices, locating sellers or buyers,⁶⁹ undertaking appropriate engineering studies to quantify the emissions reductions, negotiating a trade, and securing approval.⁷⁰ This last factor deserves emphasis. A lot of uncertainty is associated with emission-reduction credit transactions since almost all trades must be approved by control authorities.⁷¹ If the authorities are not cooperative or consistent, the value of the created ERCs can be diminished or even destroyed.⁷² Thus, formal rules aside, agency practices and policies can reduce the security of ERCs and create strong disincentives to trade. This concern is acute when regulators are under continuous political and legal pressure to further reduce emissions such as in areas where the air quality does not meet federal and state standards.⁷³

Transaction costs can also affect a firm's decision about whether to trade internally or externally.⁷⁴ Transaction costs associated with an inter-firm trade primarily derive from the search for sellers and buyers of emission credits. Without banking pro-

68. *Id.*

69. Because most trades are one-time affairs, many firms, particularly smaller ones, are unfamiliar with the emissions trading program; they are not used to thinking of emission reductions as a commodity and must expend resources to understand the program. In the early stages of the emissions trading program, buyers also expended substantial resources to find and negotiate with numerous potential sellers. Today, however, there are some professionals who are familiar with the market and the District's rules and who can significantly reduce these search and negotiation costs.

Dwyer, *supra* note 8, at 109-10, n. 42.

70. See *EIP Rules*, *supra* note 3, at 16,716; Dwyer, *supra* note 8, at 109-10.

71. RECLAIM, a southern California permit and trading program, is unique in that it does not require preapproval. See SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, REGIONAL CLEAN AIR INCENTIVES MARKET: Final Volume I EX-12 - EX-13 (October 1993) [hereinafter RECLAIM Report].

72. See Tietenberg, *supra* note 3, at 101. For example, in the past, southern California "regulators have been accused of using unpublished policies [and] on-the-spot policy interpretations . . . [to place] unreasonably high hurdles . . . before emission credit creators, buyers and sellers. . . ." Dwyer, *supra* note 8, at 110.

73. Dwyer, *supra* note 8, at 109-10.

74. See Hahn & Hester, *supra* note 2, at 140-41.

grams to provide an efficient means to identify holders of emission credits, finding willing sellers of credits can be difficult.⁷⁵ Furthermore, buyers have no market information from which to predict future credit prices.⁷⁶

3. Calculating ERCs

Finally, credit valuation has also proven a common barrier to emissions trading. The ingredients of credit value, the emissions baseline and a firm's current level of emissions, are not always clear. Current emission levels are typically calculated rather than measured directly.⁷⁷ A firm is often unable to predict how the regulator who reviews its calculations will react.⁷⁸ The firm is, therefore, uncertain about the amount of ERCs to which it is entitled. This lack of clearly quantified property rights creates a disincentive for firms to generate ERCs, whether for banking or trading.⁷⁹

In making an inter-firm trade, firms face the even greater uncertainty associated with calculating ERCs for another firm. If credits are to be obtained by inter-firm trading, firms must know whether the potential seller is really going to be able to make the emission reductions necessary to create the credits.⁸⁰ "If so, the firm must know whether regulators will officially recognize the creation of the credits and the right of the seller to transfer them to the buyer."⁸¹ Firms cannot answer these questions with as much confidence as with intra-firm trades.⁸²

4. Tapping the Potential

Despite barriers to greater trading activity, emissions trading will become increasingly prevalent creating greater cost savings and potential environmental benefits. Industry and state regulators alike have increasingly supported emissions trading in recent years due primarily to the CAAA⁸³ Industry, in particular,

75. *See id.*

76. *Id.*

77. *Id.* at 116.

78. *See id.*

79. *See id.* at 116-17.

80. *Id.* at 140.

81. *Id.*

82. *Id.* "Because firms value certainty when considering major investments, they are likely to find internal trading advantageous, even if emission credits might be acquired at a lower cost through an external trade." *See id.*

83. To date, more than a dozen state and local trading programs have either been launched or proposed. *See* G.I.T. Report, *supra* note 58, at Appendices, Table I.

seems to realize that the U.S. Congress will not relax, and indeed has strengthened, its commitment to achieving clean air through these amendments.⁸⁴

Thus, the question is not whether emissions trading will continue to evolve, but in what ways it will evolve. Regulators, industry, and environmentalists have been scrambling to address this question, and the answers they provide are encouraging.

II.

MOBILE SOURCE EMISSION REDUCTION CREDITS

Traditionally, the emissions reductions necessary to produce ERCs, whether for offsets or otherwise, have been obtained from stationary sources through the application of emission control technology or changes in operations.⁸⁵ However, traditional sources of emission reduction credits have become more scarce and expensive as regulations on industry become more stringent and pervasive.⁸⁶ As a result, new interest has arisen in finding additional sources of emission reduction credits.⁸⁷

Mobile sources of air pollution — cars, trucks, buses, and other motor vehicles — are an obvious and significant additional source of ERCs.⁸⁸ While there are approximately 27,000 major

Eleven of the 18 existing or proposed programs developed after the CAAA, and more are expected as the CAAA's deadline for demonstrating Reasonable Further Progress (RFP) approaches — November 15, 1996. *See id.*; Clean Air Act, 42 U.S.C.A. § 7511a(g)(1)-(2), in *SELECTED STATUTES*, *supra* note 32 at 799; Paul Harris, *States Warm up to Emissions Trading*, *ENV'T TODAY*, June 1994, at 3. These new and proposed programs are a result of cooperation between state and local governments and industry.

84. *See Dwyer*, *supra* note 8, at 112. In addition, due to suits by citizens groups, the threat of EPA developing federal implementation plans (FIPs) for nonattainment areas is quite real; and the EIP rules mandate EIPs for certain nonattainment areas, further increasing the popularity of emissions trading. The FIPs are designed to replace all or part of SIPs that are deemed inadequate, and are generally feared to be more stringent.

85. CALIFORNIA AIR RESOURCES BOARD, *MOBILE SOURCE EMISSION REDUCTION CREDITS 1* (May 1994) [hereinafter *CARB MERCs*]. Such sources of ERCs include shutdown of unneeded equipment, selected facility shutdowns, selected curtailments, company specific "tweaks" to existing equipment, off-the-shelf hardware, innovative technologies and improved operations and maintenance. *See Dudek & Palmisano*, *supra* note 3, at 235-36.

86. *See CARB MERCs*, *supra* note 85, at 1.

87. Industry has long been interested in tapping the potential emission reductions available from mobile sources. *See id.*

88. As the major stationary sources come under control, increasing attention has to be paid to mobile and area sources. *See TIETENBERG*, *supra* note 2, at 212. Avoiding increased regulation of mobile sources is not possible in many locations if air quality standards are to be attained; collectively they comprise too large a pro-

stationary sources, well over 100 million motor vehicles travel on American roadways.⁸⁹ Though each individual vehicle represents a miniscule part of the problem, mobile sources collectively represent a significant proportion, particularly in urban areas, of three criteria pollutants — ozone, carbon monoxide, and nitrogen dioxide.⁹⁰

In 1992, The Wall Street Journal reported that, “[o]ne shortcoming of market-based regulation is that no one has yet devised a comprehensive way to apply it to the biggest polluter of all: automobiles.”⁹¹ While comprehensive guidance for developing ERCs from mobile sources had yet to be provided, both Congress and the EPA had considered this problem.⁹² It was only a matter of time before the problem would be addressed, and in February 1993, both EPA and the California Air Resources Board (CARB) put out comprehensive guidelines on the generation and use of mobile source emission reduction credits.⁹³

A. *The Concept*

Mobile source emission reduction credits are created when reductions in emissions from cars, buses, or other mobile sources

portion of total emissions. In other areas, even if attainment could be accomplished solely by controlling stationary sources, that would be an expensive way to meet the standards; it would be cheaper to achieve more of a balance between controlling stationary and mobile sources. Controlling mobile sources will not be an easy task. Not only are they numerous and diverse, ranging from compact cars to eighteen-wheel trucks, but in many cases the owners or operators have very little information about the available control options. *Id.*

89. T.H. TIETENBERG, ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS 450-451 (3d ed. 1992).

90. *Id.*

91. See Taylor, *supra* note 1, at A12.

92. The CAA definition of EIP (economic incentive program) includes “incentives and requirements to reduce vehicle emissions and vehicle miles traveled.” See Clean Air Act, 42 U.S.C.A. § 7511a(g)(4)(1984), SELECTED STATUTES, *supra* note 32, at 799-800; *EIP Rules*, *supra* note 3, at 16,692. EPA’s 1986 ETPS allowed MERCs, but without providing any guidance for their creation, and only on a case-by-case basis. See ETPS, *supra* note 23, at 43,834.

93. See *supra* note 13. EPA’s guidance addresses key issues involved in the generation of MERCs, including the calculation of emissions baselines for participating sources, the projection of future emissions levels, and the time-averaging of emission reduction credits that vary over time. See generally EPA MERC Guidance, *supra* note 13. The guidance represents EPA’s current position, though it is receiving public comment for establishing final guidance for MERCs. *Id.*

EPA’s and CARB’s MERC guidelines represented the first *comprehensive* mobile source ERC guidance — prior to these MERC guidelines, guidelines on accelerated vehicle scrappage had been produced by both EPA and CARB in 1992. See RECLAIM Report, *supra* note 71, at 3-24.

exceed those required by federal, state, and local district laws.⁹⁴ MERC programs are generally voluntary "because they are meant to be used as an additional means of flexibility for industry to meet emissions requirements."⁹⁵ Options include using MERCs as offsets to mitigate emissions from temporary sources; to delay compliance with emission regulations; to function in market-based permit programs; and to mitigate long-term projects.⁹⁶

A market for MERCs may develop if reductions can be made from mobile source credit programs at costs comparable to, or lower than, more traditional sources of emission reductions.⁹⁷ For example, in areas which face relatively high stationary source control costs relative to mobile source control costs, MERC programs that allow for the trading of ERCs from mobile sources to stationary sources may provide significant economic benefits.⁹⁸

In addition, simply including MERCs in a trading program produces further benefits. For instance, by increasing the total number of potentially available credits, as well as the potential number of players in the emissions market, MERCs may induce additional trading and create more efficiencies. Moreover, the development of MERC programs encourages the "advancement of technologies that increase the emission reductions possible from mobile sources, such as the advancement of electric vehicles and fuel cell technology."⁹⁹

This last point deserves emphasis because the beneficial technologies MERCs may encourage affect a much greater universe of polluters than stationary sources or vehicle fleets subject to clean air laws and regulations. Technologies such as cleaner, al-

94. CARB MERCs, *supra* note 85, at 1. MERC programs need to be carefully designed so that they do not exacerbate a district's air quality problem by allowing credit for emission reductions required by other programs, rules or laws. *Id.*

95. See CARB MERC Guidelines I, *supra* note 13, at 3.

96. "The life of MERCs varies based upon the manner in which emission reductions were created." *Id.* at 21-22. For instance a MERC generated by an accelerated retirement program may have a useful life of only three years, while one generated from the purchase and use of low-emission buses may be twelve years, as in California. *Id.* The MERCs with relatively short lives are more suited to temporary strategies for stationary sources, while the MERCs with longer lives can be used in a general emissions trading market. *Id.* In addition, air quality benefits can be generated by MERCs if governments and concerned environmental groups pooled their resources together to purchase MERCs and donated them to achieving cleaner air. *Id.*

97. See *id.* at 2.

98. See EPA MERC Guidance, *supra* note 13, at 11134.

99. CARB MERC GUIDELINES I, *supra* note 13, at 9.

ternative fuel vehicles, once implemented and improved by innovation from industry and commercial fleets seeking MERCs, will have a multiplicative effect on improving air quality — the technology will spread to the general public through individual use of these new motor vehicles. In contrast, the technologies derived only from stationary source ERCs do not offer such a multiplier effect. These technologies, while environmentally beneficial, continue to influence only the relatively few, large stationary sources subject to the Clean Air Act.

B. *Types of MERCs*

The EPA produced guidance on generating MERCs from accelerated retirement of older vehicles and from conversion to clean fuel fleets, vehicles, and urban buses.¹⁰⁰ CARB produced similar examples in its guidelines for California's various air districts as well.¹⁰¹ There are a variety of other ways that MERCs can be generated, and the EPA encourages states to use their creativity. The two most common approaches — accelerated retirement of older vehicles and conversion to clean fuel fleets — are discussed in depth in this section.

1. Accelerated Retirement of Older Vehicles

“Recent on-road testing and results from emission models indicate that a small number of vehicles account for a disproportionate amount of the motor vehicle emissions.”¹⁰² The vast majority of these very dirty vehicles are older vehicles. Because of minimal or nonexistent emission control equipment, deterioration, tampering, and poor maintenance, older vehicles can generate very high emission levels.¹⁰³

Strategies to accelerate the retirement of these older, higher-polluting vehicles constitute the most common type of MERC

100. U.S. ENVTL PROTECTION AGENCY, GUIDANCE FOR EMISSION REDUCTION CREDIT GENERATION BY CLEAN FUEL FLEETS & VEHICLES 2 (1993).

101. See generally CALIFORNIA AIR RESOURCES BOARD, MOBILE SOURCE EMISSION REDUCTION CREDITS: GUIDELINES FOR THE GENERATION AND USE OF MOBILE SOURCE EMISSION REDUCTION CREDITS (1994) [hereinafter CARB MERC GUIDELINES II].

102. CARB MERC GUIDELINES I, *supra* note 13, at 23.

103. Memorandum from Peter Okurowski, Technical Support Staff, U.S. Env'tl Protection Agency, to Phil Lorang, Chief Technical Support Staff, U.S. Env'tl Protection Agency 7 (Mar. 30, 1992); see also CARB MERC GUIDELINES I, *supra* note 13, at 23.

program.¹⁰⁴ By eliminating these vehicles from the fleet earlier than would otherwise be the case, greater emission reductions can be achieved at an earlier date.¹⁰⁵

An accelerated retirement program, also known as a scrappage program, basically operates in the following way. A state or local government, or a company, advertises for the purchase of certain older vehicles. Owners then voluntarily sell their vehicles to the sponsor of the program and the vehicles are removed from use and dismantled ("scrapped"). Thus, a sufficient price for these vehicles, creates an incentive for owners to "trade in" these high emitters for newer, lower emitting vehicles.¹⁰⁶ The sponsor then receives an emission credit for each car removed from operation equivalent to the difference between the emissions from the retired vehicle and the emissions from the replacement vehicle.¹⁰⁷

A 1990 pilot retirement program called SCRAP (South Coast Recycled Auto Project) operated by the UNOCAL Corp. in the Los Angeles area provided early evidence "that a well-run program could be cost effective and produce quantifiable emission reductions."¹⁰⁸ Other stationary sources like Unocal may be interested in funding such scrappage programs. "Because stationary-source emitters are tightly controlled, and old cars essentially have not been, it is possible that stationary-source emitters would find it cheaper to meet certain emission-reduction requirements by removing old cars than by purchasing some increment of increasingly expensive control technology" for their stationary sources.¹⁰⁹

104. There are over a dozen state programs involving this strategy as compared to only half a dozen for clean fuel vehicles. See generally G.I.T. Report, *supra* note 58. Other MERC strategies are widely scattered, with no considerable constituencies.

105. TIETENBERG, *supra* note 89, at 472.

106. Okurowski, *supra* note 103, at 7.

107. U.S. ENVIRONMENTAL PROTECTION AGENCY, OFFICE OF MOBILE SOURCES, GUIDANCE FOR THE IMPLEMENTATION OF ACCELERATED RETIREMENT OF VEHICLES PROGRAMS 3-4 (1993); see also Okurowski, *supra* note 103, at 7.

108. Okurowski, *supra* note 103, at 7. In SCRAP and other programs run in Southern California, vehicles have been purchased for between \$500 and \$700. See CARB MERCs, *supra* note 85, at 2. Maximum credit is generated by purchasing pre-1972 vehicles. *Id.* As an example, the purchase of a pre-1972 vehicle generates 110 pounds of reactive organic gases (ROG), 30 pounds of nitrogen oxides (NO_x), and 600 pounds of carbon monoxide (CO) credit per year. At a cost of \$700 per vehicle plus a \$100 administrative fee, the cost effectiveness of credits would be \$4,700/ton ROG and \$18,000/ton of NO_x. *Id.* See also *infra* note 120.

109. Okurowski, *supra* note 103, at 8. CARB has specifically concluded that a scrappage program is a cost-effective method of reducing ROG emissions. See CARB MERC GUIDELINES II, *supra* note 101, at 93. "The likely range of costs for reducing such emissions appears to be comparable with other emission reduction

2. Clean, Alternative Fuel Fleets & Vehicles

A newer but potentially more complex approach to generating MERCs involves the production and use of new and/or retrofit alternative fuel vehicles. Because of the great variety of ways alternative fuel vehicles can be used to generate MERCs, and because no one method seems to be better than another, a "typical" program does not exist yet. Therefore, this section briefly describes some of the programs currently being suggested in federal and California guidelines.

a. Federal Clean-Fuel MERC Program Guidance

Provisions of the CAAA require the establishment of a Clean Fuel Fleet Program. The program is designed to introduce lower-emitting vehicles into centrally fueled fleets in areas with ozone and carbon monoxide air quality problems.¹¹⁰ The provisions require that the affected states require some of the new vehicles purchased by certain fleet owners to meet clean-fuel fleet vehicle (CFFV) exhaust emission standards.¹¹¹ This program has a credit component that allows fleet owners to earn purchase credits by acquiring CFFVs ahead of schedule or above the mini-

strategies now in place. The amount of the emission reduction can vary considerably, and is a function of the age of the vehicle purchased, the replacement vehicle, the annual mileage of the retired vehicle, and the amount of money spent on the program." *Id.*

110. "By choosing to introduce clean fuel vehicles (CFVs) in centrally fueled fleets, Congress focused on vehicle operators that often have more control over their source of fuel than does the general public." Clean Fuel Fleet Credit Programs, 58 Fed. Reg. 11,888 (1993) [hereinafter CFF Programs]. "Additionally, the central control which operators maintain over their fleets simplifies the issues related to vehicle maintenance and refueling." *Id.* "Finally, because fleet vehicles typically travel more miles on an annual basis and are replaced more frequently than non-fleet vehicles, they offer a greater opportunity to improve air quality, on a per-vehicle basis and in a more timely manner, than potentially could be achieved by concentrating on a similar number of non-fleet vehicles." *Id.*

111. Affected states may "opt-out" of the program by submitting an adequate substitute plan by the November 15, 1992 deadline as did California and Texas. See Conditional Approval of California's Substitute Program for the Clean-Fuel Fleet Program, 58 Fed. Reg. 27,253 (1993). Likewise, states not covered by the program may opt-in to the program or develop similar programs voluntarily, as several states already have done. U.S. ENVIRONMENTAL PROTECTION AGENCY, GUIDANCE FOR EMISSION REDUCTION CREDIT GENERATION BY CLEAN FUEL FLEETS & VEHICLES 2 (1993) [hereinafter EPA CFFVs]. This is especially the case in those 70 areas which have some degree of ozone air quality problems and are covered under the fleet provisions of the National Energy Policy Act of 1992, but not under the CAAA. *Id.*

num requirement, or by acquiring vehicles which are certified to stricter emission standards than required.¹¹²

Covered fleets may use these purchase credits as substitutes for vehicle purchases to meet the purchase requirement. In accordance with CAA section 246(f)(2), credits may be held or banked for use at a later time with no depreciation.¹¹³ They may also be traded or sold to another covered fleet in the same nonattainment area so that another fleet may demonstrate compliance.¹¹⁴ In addition, states may allow non-covered fleets to generate credits.¹¹⁵

Most importantly, however, states may convert this fleet purchase credit program into a fleet emission reduction program.¹¹⁶ The EPA suggests various elements for converting clean fuel vehicle purchase credits to tradeable MERCs, leaving the states to integrate these elements into proposals for their own specific trading programs.¹¹⁷ The MERCs generated from a properly converted CFFV program may be traded against emis-

112. Clean Air Act, 42 U.S.C.A. § 7586(f)(1), *SELECTED STATUTES*, *supra* note 32, at 905. Exemption from transportation control measures (TCMs) are also a part of this program. Clean Air Act, 42 U.S.C.A. § 7586(h). *Id.* at 906. *See also* CFF Programs, *supra* note 110, at 11,888.

113. Clean Air Act, 42 U.S.C.A. § 7586(f)(2)(A), *SELECTED STATUTES* *supra* note 32, at 905; CFF Programs, *supra* note 110, at 11,891.

114. Clean Air Act, 42 U.S.C.A. § 7586(f)(2)(A), *SELECTED STATUTES* *supra* note 32, at 905. However, the program prohibits a fleet owner who owns a fleet distributed among more than one nonattainment area from using credits generated in one area to show compliance in another. *Id.*

115. Clean Air Act, 42 U.S.C.A. § 7586(f)(1), *SELECTED STATUTES*, *supra* note 32, at 905. The CFFV purchase requirements do not go into effect until the 1998 model year. 42 U.S.C.A. § 7586(b), *Selected Statutes*, *supra* note 32, at 904. However, states are required to grant purchase credits to CFFV purchases in the period after the SIP approval but before the 1998 model year. CFF Programs, *supra* note 110, at 11,890. "In addition, after SIP approval, states are permitted the discretion to grant retroactive credits to CFFVs purchased prior to SIP approval." *Id.*

116. *See* EPA CFFVs, *supra* note 111, at 4-5. The criteria used for creating a vehicle purchase credit program under the auspices of the fleet program are insufficient for defining a broader emission reduction credit program, where the focus is on emission reductions rather than the number of vehicles purchased. *Id.* Thus, for useable ERCs, the purchase credit program would have to be converted to an ERC program. *Id.*

117. *Id.* EPA's general elements include suggestions that: credit-generating vehicles must be in addition to those required to be purchased by statute or must be certified to cleaner standards; vehicles need not be dedicated (single) fuel vehicles to generate exhaust emission credits; vehicles can be new or converted; vehicles must pass an annual I/M test in areas that require testing and where I/M tests are available; and credits will be calculated yearly. *Id.* EPA also suggests methods of calculation. If a state does not follow this guidance, it must show that emission reductions are being achieved. *Id.* at 13.

sions from stationary sources within the guidelines provided by the Economic Incentive Program (EIP) rules — extra flexibility which represents a significant advantage.¹¹⁸

b. California Clean-Fuel MERC Program Guidance

The California Air Resources Board, which oversees 34 districts, has also developed guidelines for generating MERCs from clean, alternative fuel vehicles.¹¹⁹ These guidelines include specifics on generating MERCs from new zero-emission vehicles (ZEVs) and retrofit vehicles, among other strategies.¹²⁰

Generating MERCs via new ZEVs involves purchasing these vehicles to replace, or in place of, gasoline-powered vehicles. Emission reductions associated with the purchase of a ZEV, under California guidelines, are calculated based on the difference between the average emission rate of a new emitting vehicle and a ZEV.¹²¹ However, while this technology is very beneficial, barriers to using it for generating MERCs exist. Because new ZEVs would displace the newest, cleanest vehicles, the per-vehicle emission benefits are relatively low.¹²² In addition, the cost-effectiveness of a ZEV program cannot be calculated until the costs of ZEVs can be better quantified.¹²³ Conflicting regulations between California and other states pose further problems for generating MERCs from ZEVs.¹²⁴

118. CFF Programs, *supra* note 110, at 11,892.

119. CARB MERC GUIDELINES II, *supra* note 1019.

120. Zero-emission vehicles are those without any tailpipe emissions. CARB MERC GUIDELINES II, *supra* note 101, at 54. Currently electric vehicles are the only technology that satisfy this definition. "The general concept [of using ZEVs to generate MERCs] is to give people an extra incentive to buy a ZEV instead of an 'emitting' vehicle. Through such a program, an entity that is interested in generating [ERCs] could assist an individual or company that is interested in purchasing a ZEV by offsetting a portion of the purchase price." *Id.* CARB's guidelines ensure that ERCs generated from the purchase of a ZEV are surplus to the manufacturer credit system contained in CARB's LEV regulations. *See id.*

121. *Id.* at 55.

122. *Id.* at 59. "For example, in 1996, about 1,900 ZEV purchases are required to generate 25 tons/year of combined NMOG and NO_x emission credits in the [South Coast Air Basin of California] (although these credits last for 10 years)." *Id.*

123. *Id.* at 62.

124. The States of California, New York, and Massachusetts have regulations which currently govern the production and sale of ZEVs. *See* PERRY S. GOLDSCHNEIN & SANTOS V. GOMEZ, *ELECTRIC VEHICLES: POLICY, LAW & ECONOMICS* 26-30 (1993). The requirements of California's Low-Emission Vehicle (LEV) regulations, adopted by New York and Massachusetts, limit the opportunity to generate MERCs by purchasing ZEVs because they require large auto manufacturers to produce a minimum number of ZEVs, for improving state air quality, beginning in 1998.

Perhaps easier than a new ZEV purchase program, a program to retrofit vehicles to operate with lower emissions may also generate MERCs.¹²⁵ Gasoline vehicles can be retrofitted to use alternative fuels, or vehicles can be retrofitted with add-on devices to reduce emissions. If retrofitted vehicles emit less than with original equipment, an emission reduction benefit would accrue.¹²⁶

The amount of credit a retrofitted vehicle generates would be based on its emissions before and after being retrofitted, and on its remaining life, in miles.¹²⁷ Once the difference between the emissions levels before and after the vehicle is retrofitted has been determined, it is multiplied by the expected remaining mileage of the vehicle.¹²⁸ The cost-effectiveness of creating credits this way varies greatly depending on the technology and the vehicles being converted. For example, if older, higher-emitting vehicles are retrofitted to ZEV status (i.e., converting gasoline cars to electric vehicles), large amounts of MERCs could be produced in a potentially cost-effective manner.¹²⁹

Id. at 19. Consequently, to obtain MERCs by purchasing ZEVs from the large manufacturers, those manufacturers must first be willing to sell or transfer their rights to use those ZEVs to meet the LEV regulations — something they may be reluctant to do. See CARB MERC GUIDELINES I, *supra* note 13, at 3. Otherwise, the same emissions reductions would be relied on twice, or “double-counted,” due to using the same ZEV to reduce emissions in two air quality management strategies — one at the state, and another at local levels. This problem does not exist, though, where the ZEV is purchased from a smaller manufacturer not affected by the regulations, or where the ZEV has been retrofitted from a gasoline-powered vehicle.

125. See CARB MERC GUIDELINES II, *supra* note 101, at 63. Again, as with ZEVs, however, existing policy may conflict with the generation of MERCs from retrofitting vehicles. The National Energy Policy Act (NEPA) requires certain fleets “to purchase a certain number of alternative fuel vehicles each year.” *Id.* at 73. “The NEPA primarily applies to government fleets; however, in later years large fleets with central refueling capabilities may be required to purchase a certain number of alternative-fuel vehicles. If a fleet meets the NEPA requirements by retrofitting vehicles to credit-generating standards, credit could be granted for those vehicles only if the local district does not count the emission reductions associated with the vehicles in its air quality management plan. *Id.*

126. *Id.*

127. *Id.* at 67-68.

128. To calculate the remaining life of a retrofitted vehicle, the mileage on the odometer at the time the vehicle is retrofitted is subtracted from the useful life for that vehicle. *Id.* at 67.

129. Retrofitting *existing* vehicles to ZEV status does not conflict with any federal or state laws or regulations, and thus may validly generate MERCs under California’s retrofit program, or any other approved state program.

3. Other Potential Types of MERC Programs

In addition to existing MERC guidance, California is also considering the following strategies for generating MERCs: "voluntary use of remote sensing to identify high-emitting vehicles, then repairing those vehicles to lower emissions . . . voluntary inspection and maintenance programs that achieve greater emissions reductions than the mandated Smog Check program," and implementing transportation control measures (TCMs) "not otherwise required by regulations," such as an employee trip reduction program.¹³⁰ Other ideas have included creating MERCs from an automated toll-collection system, and car pooling and telecommuting programs (part of employee trip reduction).¹³¹

C. Federal Rules

While states have more freedom than ever before in developing their own emissions trading programs, they still must adhere to basic EPA rules. MERCs must meet the same four criteria that all ERCs must meet: (1) reductions must be surplus — not required by law, regulation, or otherwise assumed to occur as part of a regional air quality plan; (2) reductions must be real and quantified to an acceptable degree of certainty; (3) the actions that produce the credits must be enforceable and legally binding; and (4) the life of the reduction must be reasonably established and commensurate with the proposed use of the credit ("permanent").¹³² However, EPA also adds flexibility for MERCs by approving a method to generate them more consistently over time so that stationary sources will find them more appealing.¹³³

130. See CARB MERC GUIDELINES II, *supra* note 13, at 90. The idea of using employee trip reduction programs for generating MERCs comes with the caveat that the Clean Air Act mandates such programs in areas with *severe* and *extreme* nonattainment classifications. Thus, these areas may not use employee trip reduction to generate MERCs. See Clean Air Act, 42 U.S.C.A. § 7511a(d) and (e), SELECTED STATUTES *supra* note 32, at 796-97; G.I.T. Report, *supra* note 58, at 24 n. 39; see also *infra* note 148 and accompanying text. But see EPA MERC Guidance, *supra* note 13, at 11,135 (making no distinction between nonattainment classifications, but indicating that use of ETR programs are flat out prohibited from generating MERCs).

131. See G.I.T. Report, *supra* note 58, at 27; MICHAEL J. BRADLEY, NORTHEAST STATES FOR COORDINATED AIR USE MANAGEMENT, FINAL REPORT FOR THE EMISSION REDUCTION CREDIT DEMONSTRATION PROJECT, SUMMER 1993 i (1993)[hereinafter NESCAUM Report]. See also Harris, *supra* note 83, at 16.

132. See CARB MERC GUIDELINES I, *supra* note 13, at 14-15; EPA MERC Guidance, *supra* note 13, at 11,135; RECLAIM Report, *supra* note 71, at 3-24.

133. See *infra* notes 150-53 and accompanying text.

1. Surplus Reductions

The scope of any emissions trading program must be defined so as not to credit emissions reductions, or their equivalent, already required by other laws or regulations.¹³⁴ For example, meeting clean-fueled fleet requirements under the Clean Air Act and alternative-fueled fleet requirements under the National Energy Policy Act cannot generate credits.¹³⁵ In general, sources subject to these statutory requirements may participate in emissions trades as long as, apart from their participation in such trades, they continue to meet the statutory requirements.¹³⁶ Thus, if these sources reduce their emissions below the applicable statutory requirements, these additional reductions may furnish credits.¹³⁷

2. Quantifiable Reductions

Under EPA's current guidelines, MERCs are quantified for each year of a proposed program by calculating the annual difference between an "emissions baseline" and a "projected emissions level."¹³⁸ The emissions baseline represents the existing mobile source emissions and the projected emissions level represents the emissions expected after implementation of the MERC strategy. Projecting credits in a typical MERC program requires information on the number of miles driven and the emission rates for both baseline and replacement vehicles.¹³⁹

Developing procedures for mobile source evaluation can present significant challenges, because quantifying actual emission reductions is more difficult than for most industrial sources.¹⁴⁰ Considerations must include the level of participation in a transportation program, as well as how much and where vehicles are driven.¹⁴¹

134. See *EIP Rules*, *supra* note 3, at 16,695. This prevents "double-counting" of emissions reductions. See *supra* note 124.

135. See *supra*, notes 110 and 125.

136. See *EIP Rules*, *supra* note 3, at 16,695.

137. *Id.*

138. See *CARB MERC GUIDELINES I*, *supra* note 13, at 15; see also *EPA MERC Guidance*, *supra* note 13, at 11,136.

139. See *CARB MERC GUIDELINES I*, *supra* note 13, at 15; see also *EPA MERC Guidance*, *supra* note 13, at 11,136.

140. See *EIP Rules*, *supra* note 3, at 16,699; *CARB MERC GUIDELINES I*, *supra* note 13, at 15. See also *infra* notes 199-200 and accompanying text.

141. *EIP Rules*, *supra* note 3, at 16,699.

3. Legally Enforceable Credits

To meet Clean Air Act requirements, emissions trading rules must be approved by the state and be federally enforceable.¹⁴² Programs or rules that are part of a SIP revision, or that EPA has otherwise approved, are federally enforceable.¹⁴³ In addition, trading programs and rules should be incorporated in an enforceable instrument which requires record keeping to monitor and ensure compliance.¹⁴⁴

4. Credit Life and Use

Once generated, quantified and certified to program standards, MERCs may then be used. Because of the relatively short life span of many types of MERCs, their most likely uses in trades with stationary sources are in situations involving delayed compliance or noncompliance penalties.¹⁴⁵ In addition, in accordance with EPA guidelines for ERCs generally, MERCs can also be used (1) to satisfy emission reduction requirements beyond the reasonably available control technology (RACT) requirements, (2) to satisfy RACT requirements for existing sources and (3) to meet new source emissions offsets requirements at the offset ratios specified in the Clean Air Act.¹⁴⁶

Conversely, MERCs may not be used to satisfy the requirements of BACT, LAER, NSPS, and Federal I/M.¹⁴⁷ Nor may they be used to satisfy the requirements of Employer Trip Reduction (ETR) programs in severe or extreme nonattainment areas.¹⁴⁸ However, MERCs can be generated if they are surplus to any of these required controls.¹⁴⁹

142. See ETPS, *supra* note 23, at 43,832.

143. See *id.*

144. See *id.*

145. EPA MERC Guidance, *supra* note 13, at 11,134-35.

146. *Id.*

147. *Id.* at 11,135. "BACT" stands for Best Available Control Technology; "LAER" for Lowest Achievable Emissions Rate Technology; "NSPS" for New Source Performance Standards; and "I/M" for Inspection and Maintenance.

148. See *supra* note 130. The Texas Natural Resources Conservation Commission apparently ran into trouble obtaining EPA approval for their MERC programs as a result of its proposed use of employer trip reduction rules. Telephone Interview with Phil Stafford, Sacramento Metropolitan Air Quality Management District (July 21, 1994). See also *infra* note 185 and accompanying text.

149. EPA MERC Guidance, *supra* note 13, at 11,135.

5. MERC Averaging

In addition to minimum requirements for MERC generation and use, the EPA has created a unique concept to make MERCs more tradeable. Most emissions trades involve a regulated stationary source seeking a constant stream, over time, of ERCs to fulfill, or delay enforced reductions in its emissions.¹⁵⁰ However, because of the rapid turnover of mobile sources, relative to stationary sources, the annual level of MERCs created by a mobile source control program will seldom remain steady over time. For some types of control programs, the level of MERCs generated may decline with time, as would be typical with a scrappage program with a limited number of vehicles available for scrapping. Other programs, however, could create increasing levels of MERCs, as could be expected of an alternative fuels program with an expanding market.¹⁵¹

To make MERCs more desirable in the emissions trading context, therefore, it is important to identify possible techniques for turning the rising and falling of credits into a constant stream. For this reason, EPA allows an averaging scheme in limited situations, over the period in which a mobile source control program remains in effect.¹⁵² This averaging scheme essentially allows the same annual number of MERCs over a period even though the actual emissions reduced in any given year may be above or below the level represented by the MERCs.¹⁵³

150. See *id.* at 11,137.

151. See *id.*

152. See *id.* EPA approves the use of the following averaging algorithm in the calculation of a constant stream of MERCs: $MERC = \text{Sigma}R_i(i = 1 \dots N)/N$, where R_i = emissions baseline in year "i" minus projected emissions level in year "i"; "i" equals 1 in the first year of the mobile source control program; N = the number of years the program will be in effect; and MERC = constant level of annual emission reduction credits. *Id.*

The use of EPA's averaging scheme for generating a constant stream of MERCs raises policy issues primarily concerning the "saving" and "borrowing" of ERCs. *Id.* When emissions reduction credits are used in the same year they are created, the emissions "increases" and "decreases" created by the trade contemporaneously offset each other. However, MERCs may often be used in trades involving emission reductions and increases which occur in different years. For this reason, EPA allows the "averaging" (or saving and borrowing) of MERCs as described in its averaging scheme in certain situations. *Id.*

153. See EPA MERC Guidance, *supra* note 13, at 11,137. For instance, if a MERC program results in increasing surplus emissions over time, as with an alternative fuels program with an expanding market, the averaging technique could be used to create a constant stream of credits. *Id.* Averaging in this instance would allow credits to be taken or "borrowed" before there were equivalent reductions of air pollutants. Because of the obvious potential to initially worsen air quality, the aver-

D. State MERC Programs

Under the new MERC guidelines, several state regulatory agencies have already developed, or are developing creative MERC rules and programs. These rules and programs are the precursors of what may be the future of emissions trading.

1. California Programs

Since the adoption of the state's Clean Air Act of 1988 and the federal CAAA, interest in emissions trading has grown substantially in California. With mobile sources accounting for a disproportionate amount of the state's air pollution, MERC guidance was developed by CARB and rules adopted by three urban air districts.¹⁵⁴

a. Sacramento Metropolitan Air Quality Management District

The Sacramento Metropolitan Air Quality Management District (SMAQMD) is one of the three California districts with MERC rules.¹⁵⁵ While its Rule 206, adopted in December 1992, provides general MERC rules for trading between mobile and stationary sources, the District approved additional, innovative MERC rules in July 1994.¹⁵⁶ The new rules, together called the "fleet rules," actually involve alternative fuel vehicle rules working in tandem with MERC rules to allow mobile-to-mobile source emissions trading for the first time.

aging scheme is limited to MERCs intended for use in trades not involving new source offsets' and, among other things, to programs offering significant future environmental benefits because of the innovative control measures or technologies they sponsor (e.g. electric and alternative fuel powered fleets). *Id.*

154. Although new cars pollute much less, people in California, as elsewhere, are driving much more. "Since 1970 the state's population has grown by 50 percent, while the number of miles motorists travel has increased by 125 percent." CALIFORNIA AIR RESOURCES BOARD, CALIFORNIA'S PLAN TO REDUCE MOTOR VEHICLE POLLUTION 1 (1992). Air pollution from this increased driving "has greatly slowed the trend toward cleaner air." *Id.*

155. The other two are the South Coast Air Quality Management District and the San Joaquin Valley Unified Air Quality Management District. *See* CARB MERCs, *supra* note 85, at 2.

156. Telephone Interview with Stafford, *supra* note 148. One beneficial MERC trade, under Rule 206, was the MERCs generated by 95 natural gas buses used by Sacramento's Regional Transit sold to the Sacramento Municipal Utility District (SMUD) to offset new SMUD power generation plants. The 95 natural gas buses replaced 95 older diesel powered buses. *See* KENNETH SMITH, SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT, MOBILE EMISSION REDUCTION CREDITS 4 (1994) (on file with author).

Rule 1003 (Reduced-Emission Fleet Vehicles/Alternative Fuels) will require operators of fleets within the District to introduce and use reduced-emission vehicles (REVs) prior to, and in greater numbers than, the statewide average requirements of the California Air Resources Board.¹⁵⁷ Fleet operators purchasing more reduced-emission vehicles than the rule requires will be able to earn MERCs or "certificates of advanced placement" (CAP).¹⁵⁸ Such credits or certificates may be banked to offset the increasingly stringent requirement to purchase REVs in subsequent years.¹⁵⁹ MERCs may also be used or traded in any emissions trading market. CAP, on the other hand, may only be used or traded among the emission sources regulated by the District's mobile and indirect source rules.¹⁶⁰

Emission sources eligible to purchase MERCs from fleet operators include other fleets, indirect sources in need of emissions credits, congestion management programs, and stationary sources, as approved by the District.¹⁶¹ Affected fleets may also meet their obligations to reduce motor vehicle emissions by purchasing CAP (in place of using REVs).¹⁶²

157. CARB requires that vehicle manufacturers offer reduced-emission vehicles for sale. See CARB MERC GUIDELINES II, *supra* note 101, at 54. CARB's requirements for reduced-emission vehicles for passenger cars and light-duty trucks begin in 1994, and for medium-duty vehicles in 1998. *Id.*

158. The Sacramento Metropolitan Air Quality Management District (SMAQMD) Rules introduce the concept of a Certificate of Advanced Placement (CAP). CAP is the acknowledgment of *potentially* surplus emissions reductions for exceeding the obligation established by Rule 1003 for light- and medium-duty vehicles. SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT, Rule 1003 - Reduced Emission Fleet Vehicles/Alternative Fuels (June 1994) [hereinafter SMAQMD Report I]. CAP will indicate compliance or noncompliance with the obligation imposed by this rule. They may also be sold or traded within the fleet rules and indirect source rules. They will *not* be treated as real MERC, except under the special escrow provisions of Rule 1005 - MERC/Banking. See *id.* at 10-13.

Upon approval of an application by the SMAQMD, businesses which receive CAP may place them in an escrow account maintained by the District until they are matched with real, surplus, quantifiable, enforceable, and permanent MERC, or otherwise assured to meet these criteria. SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT, Rule 1005 - Mobile Source Emissions Reduction Credits/Banking, at 5 [hereinafter SMAQMD Report II]. CAP generated that are not used within the mobile or indirect source rules, may be placed in the escrow account. CAP in the escrow account shall convert to MERC when matched with equivalent actual emissions reductions that accrue due to the registering ratio or to other actual emission reductions. *Id.*

159. SMAQMD Report I, *supra* note 158, at 3.

160. *Id.*

161. *Id.* at 4.

162. *Id.* at 3.

Under Rule 1005 (MERC/Banking) sources may generate MERCs by several alternative methods.¹⁶³ These methods include: (a) exceeding the basic requirements of a rule which regulates one's business (as described in the fleet rules above); (b) voluntarily committing to meet some of the requirements of a rule which does not regulate one's business ("opting-in" to a rule); and (c) voluntarily implementing emissions reductions programs that are not regulatory requirements, as approved by the District.¹⁶⁴

Sources of MERCs may include introducing clean, alternative fuel vehicles into a fleet when not required by any rule to do so; retrofitting existing vehicles with clean alternative fuel conversions; and purchasing older vehicles and/or "gross emitter" vehicles and scrapping them.¹⁶⁵ The District determines the number of MERCs attributable to any option on a case-by-case basis, and is relating it directly to the quantified estimates of the emissions the option reduces.¹⁶⁶

To simplify the trading process and reduce transaction costs, the SMAQMD has set up and maintained a computer database and menu-driven software for use by affected fleet managers.¹⁶⁷ When connected by modem with this database, and using the software, fleet managers and other emissions trading participants can apply on line for MERCs, as well as receive approval from the District, advertise the availability of excess MERCs for trading, and shop for MERCs.

b. South Coast Air Quality Management District

Over the past twenty years, the South Coast Air Quality Management District (SCAQMD), responsible for cleaning up the

163. See SMAQMD Report II, *supra* note 158, at 3. The rule establishes an offset ratio of 1.3:1, with 10/13 credit going to the person generating the credit, 2/13 credit being banked by the District for clean air, and 1/13 credit being used for the escrow account. *Id.* at 4.

164. *Id.* at 3.

165. See *id.* at 3-4.

166. See *id.* Here lies the uncertainty a potential creator of MERCs must face. The uncertainty of a determination of the "currency earned" by an emissions reduction strategy on a case-by-case basis tends to deter trading. See *supra* text accompanying notes 77-79. For example, what incentives would an individual have to work hard at a job without knowing how much compensation she'll receive? Regulators are better advised to adopt formulas for determining the amount of MERCs generated by specific strategies.

167. See SACRAMENTO ENVIRONMENTAL COMMISSION, MINUTES 6 (Nov. 22, 1993)(on file with author).

nation's dirtiest air basin, has attacked the air pollution problem with some success. However, in recent years improvements have been slow.¹⁶⁸

The District has stepped up its efforts and experimented more with emissions trading programs.¹⁶⁹ For mobile sources, the District developed the nation's first widespread old-vehicle scrapping program in early 1993 — Rule 1610.¹⁷⁰ This rule targets the estimated 1.9 million old cars and trucks (pre 1982) in the four-county SCAQMD.¹⁷¹ It is designed to reduce motor vehicle exhaust emissions by issuing MERCs in exchange for the scrapping of older, higher-emitting vehicles.¹⁷² Crediting requires that vehicles have at least three years of useful life remaining when scrapped.¹⁷³

In addition to this rule, the SCAQMD has begun an emissions trading program of much greater scope — easily the most ambitious such program to date. More than three years in the making, the Regional Clean Air Incentives Market (RECLAIM) now allows a broad range of polluters to meet a cap placed on their emissions, either by reducing their emissions or by buying ERCs from other polluters.¹⁷⁴ Begun in January 1994, the program currently encompasses SO₂ and NO₂ emissions, and is soon to include VOCs.¹⁷⁵

SCAQMD's old-vehicle scrapping rule, 1610, is the first of other planned MERC rules that, while independent of RECLAIM, may also work within this comprehensive program.¹⁷⁶ RECLAIM facilities (stationary sources) will be able to use emission reduction credits from mobile sources created pursuant

168. See Dwyer, *supra* note 8, at 104.

169. See *id.*

170. See Maria La Ganga, *Firms Can Earn Pollution Credits by Buying Old Cars*, L.A. TIMES, Jan. 9, 1993, at A1.

171. *Id.* at A22. Only 1981 and earlier model-year passenger cars and light-duty trucks are eligible for MERCs through this program. Old Vehicle Scrapping, South Coast Air Quality Management District, Rule 1610 (Jan. 8, 1993).

172. *Id.* The companies that buy the vehicles for credit must take them to a licensed dismantler, have them crushed, and document the destruction. La Ganga, *supra* note 170, at A22.

173. Rule 1610, *supra* note 171. Although participating companies will set the price they pay for the cars, the agency estimates an average price of \$700 per vehicle and \$100 to cover paperwork and the costs of scrapping. La Ganga, *supra* note 170, at A22.

174. See generally RECLAIM Report, *supra* note 71; see also Dwyer, *supra* note 8, at 104.

175. See generally RECLAIM Report, *supra* note 70.

176. See *id.* at 3-26.

to these MERC rules.¹⁷⁷ Facilities, as well as individuals, will be allowed to generate such credits as RECLAIM trading credits (RTCs).¹⁷⁸ In addition, anyone may generate credits through these MERC rules, regardless of their participation in the RECLAIM program.¹⁷⁹

2. Texas

Texas, like California, has its fair share of nonattainment areas.¹⁸⁰ To address its urban air pollution problems, the Texas Natural Resource Conservation Commission (TNRCC) began to work in 1992 toward establishing an emission credit trading system to help reduce ozone while minimizing adverse economic impacts.¹⁸¹ The TNRCC opted-out of the Federal Clean Fuel Fleets program to develop a plan based on existing state legislation.¹⁸² The opt-out plan, known as the Texas Alternative Fuel Fleet (TAFF) program, provides the structure for the Alternative Fuels Credit Program, which is a MERC program for alternative fuel vehicles.¹⁸³ This program offers compliance flexibility for those fleets affected by TAFF regulations. These credits will also

177. *See id.*

178. *See id.* at EX-13. The mobile source RTC calculation methodology is equivalent to the methodology presented in Rule 1610. *Id.* at 3-26. The SCAQMD encourages polluters to use mobile source emission reductions generated by Rule 1610 and future 1600 series rules as RTCs. This would provide the opportunity for RECLAIM facilities to pursue the most cost-effective approach to reduce facility emissions. *Id.*

179. *See id.* at 3-26.

180. "Texas has four ozone nonattainment areas: Dallas-Fort Worth, which is in moderate ozone nonattainment; Beaumont-Port Arthur and El Paso, which are in serious ozone nonattainment; and Houston-Galveston, which is in severe ozone nonattainment." G.I.T. Report, *supra* note 58, at 26.

181. Marketable Permits Section, Texas Natural Resource Conservation Commission, Marketable Permits Final Report - Grant Period 1993-94, 1 (June 1994) [hereinafter Texas Report].

182. *See id.* at 53.

183. *Id.* There are three major components in the TAFF that contribute to the foundation of this credit program. *Id.* One, the compliance schedule for the affected fleets produces a demand for alternative fuel vehicles. This demand increases the probability that MERCs will be a part of the general TNRCC emissions banking and trading system. Two, emissions goals are required under TAFF. This element reaffirms that any credits from TAFF vehicles will come from real reductions. Further, these goals provide a means of quantifying emission reductions. Three, permanency of emissions reductions is verified through the emissions certification protocols adopted by the TAFF. The certification of alternative fuel technology will insure the vehicles meet the claimed emissions standards for the life of the vehicle.

reward those fleet owners that go beyond the mandates to improve air quality.¹⁸⁴

The proposed TNRCC Emission Bank will certify MERCs for any emission reduction which has been registered in accordance with an Accelerated Vehicle Retirement Program, as well as with the Alternative Fuels Credit Program.¹⁸⁵ Under the banking rule, MERCs may be used to comply with state fleet requirements; extend a compliance deadline; provide offsets for short-term emission increases that require a permit amendment; provide offsets for modifications to an existing source; or provide offsets for a new source at an existing facility.¹⁸⁶

As with Sacramento's program, regulated fleet operators or fleet operators that voluntarily participate may generate MERCs by (1) purchasing or converting to clean-fuel vehicles earlier than the TAFF requires; (2) purchasing or converting to more clean-fuel vehicles than required; or (3) purchasing or converting to vehicles that are cleaner than required standards.¹⁸⁷ Resulting MERCs may reduce the actual number of vehicles that are necessary to meet the TAFF schedule in a given year.¹⁸⁸ The fleet owner may also trade these MERCs to stationary and area sources.¹⁸⁹ Credits are valid only within the same nonattainment area, but unlike Sacramento, they are not discounted (there is no offset ratio).¹⁹⁰ Thus, the fleet owner receives full credit for the total emissions reduced.

3. Other State MERC Programs

Massachusetts also established an emissions banking and trading program, effective January 1994, which allows for the generation of MERCs from a range of methods, including accelerated vehicle retirement, employee trip reduction, and fleet conver-

184. *Id.*

185. *Id.* at 17. TNRCC is also working to expand the uses of MERCs to include compliance with the Employer Trip Reduction program. EPA, however, specifically prohibits use of MERCs to satisfy Employer Trip Reduction requirements in severe and extreme nonattainment areas. See *supra* notes 130, 148 and accompanying text.

186. Texas Report, *supra* note 181, at 5-6.

187. G.I.T. Report, *supra* note 58, at 25-26; see also Texas Report, *supra* note 181, at 55.

188. Texas Report, *supra* note 181, at 56.

189. *Id.* However, due to the amount of emissions reduced per vehicle and the vehicle's relatively short life, TNRCC expects the credits from alternative fuel vehicles to be used primarily for compliance with the fleet mandates. *Id.*

190. See G.I.T. Report, *supra* note 58, at 27.

sions.¹⁹¹ For vehicle retirement, the sponsors must determine the procedures and have them approved by the Massachusetts Department of Environmental Quality on a case-by-case basis.¹⁹² Generally, first-time initiatives will serve as the protocol for future initiatives, and compliance, recordkeeping, and monitoring standards will be established as the program progresses.¹⁹³

New Hampshire, as well, is developing an emissions banking and trading program with a MERC component that may include fleet conversions, early vehicle retirement and employee trip reduction programs.¹⁹⁴ In addition, several other states, including Illinois, New Jersey, and Colorado,¹⁹⁵ are pursuing scrappage programs and some states are doing pilot studies or working with their legislatures to establish the authority for regulators to develop scrappage programs.¹⁹⁶

Finally, the universe of MERC candidates is broader than polluters in nonattainment areas. For example, Tulsa, Oklahoma launched a trading program in 1993 because it reached attainment and wants to maintain its status.¹⁹⁷ Called MERIT (Maximizing Emissions Reductions by Intersource Trading), this program allows companies that need to temporarily boost emissions above permitted levels to do so by generating MERCs.¹⁹⁸

E. *Concerns of MERC Programs*

As with the early emissions trading programs, a variety of concerns surround the development of MERC programs. These concerns include the uncertainty of mobile source emissions reduction estimates, regulatory officials' concerns over lack of public support, administrative and transactional costs, and ensuring emissions reductions occur in the proper geographic areas.

191. *See id.*

192. Texas Report, *supra* note 181, at 39.

193. *See* G.I.T. Report, *supra* note 58, at 27. "The entire state of Massachusetts is in ozone nonattainment." *Id.*

194. *See id.*

195. Texas Report, *supra* note 181, at 39.

196. *Id.* at 39.

197. *See* Harris, *supra* note 83, at 16; *see also* G.I.T. Report, *supra* note 58, at 27. Tulsa "is classified as borderline ozone attainment." *Id.*

198. Harris, *supra* note 82, at 16; *see also* G.I.T. Report, *supra* note 58, at 27. A variety of methods qualify, from car pooling and telecommuting programs to company-reimbursed tuneups for employees. Credit value and life are determined on a case-by-case basis. No MERCs have been generated by the program to date, however. *Id.*

1. Uncertainty of Estimates

Mobile source emissions reduction estimates are inherently more uncertain than those for large stationary sources because of the decentralized and disparate use and maintenance of mobile sources.¹⁹⁹ Emission reduction credit valuation requires data on the number of miles driven, vehicle usage patterns, the emission rates for both the baseline and replacement vehicles, and expected life of the baseline vehicle.²⁰⁰

To help ensure that the surplus emissions reductions credited to the control program actually occur, EPA requires an approvable MERC program to (1) employ appropriate measurement, monitoring and enforcement measures, and program auditing, and (2) use adjusted calculation factors, such as offset ratios, to account for any remaining uncertainty or biases.²⁰¹ Emission reduction credit programs, in general, will "be required to discount quantified emissions reductions to reflect uncertainties (or biases) inherent in both the extent to which sources will comply with program requirements and the overall program design."²⁰²

2. Lack of Popular Support

Some local officials have been reluctant to create broad trading programs because of a lack of public support.²⁰³ The lack of support comes from unfamiliarity with emissions trading. Thus, reluctance may be even greater where the program involves trading of mobile source emissions reductions.²⁰⁴

Several organizations, including the Environmental Defense Fund and General Motors, have suggested that States consider discounting trades involving MERCs by 10 percent, in order to provide an "environmental bonus" from each trade.²⁰⁵ If MERC trades were discounted in this way, the bonus could help states move more rapidly to attainment of their clean air goals. "[B]y enlisting more public support for mobile-stationary source trading, such a bonus would encourage more trades and reduce the

199. EPA MERC Guidance, *supra* note 13 at 11,141; *see also* CARB MERC GUIDELINES I, *supra* note 13, at 15.

200. *See* CARB MERC GUIDELINES I, *supra* note 13, at 15.

201. These factors are discussed in more detail in the EIP rules.

202. EPA MERC Guidance, *supra* note 13, at 11,141.

203. *Id.* at 11,141-42.

204. *See id.* at 11,142.

205. *See id.* It is unclear whether this bonus is intended to apply in addition to offset ratio requirements, where applicable.

overall cost of clean air compliance."²⁰⁶ EPA is considering this policy in finalizing its MERC guidance.²⁰⁷

3. Transaction Costs

Emissions trading programs can entail substantial transaction costs, especially where every transaction is different. Programs requiring significant consideration of the differences in the chemical properties or geographic location of the emissions can result in higher transaction costs than programs with a standardized trading commodity and well-defined rules for acceptable trades.²⁰⁸ Transaction costs also are affected by the relative difficulty in obtaining information about the availability and price of allowances or credits.²⁰⁹ Such factors also increase regulators' administrative costs.

While not a panacea for addressing high transaction costs, personal computer and telecommunications technologies are combining to reduce these costs. In addition to the on-line database and software being developed for the Sacramento MERC program,²¹⁰ other programs are benefiting from similar ideas, such as the RECLAIM program's computer bulletin board system. These information systems allow participants to better understand emissions trading, gather information about the market, communicate their desire to buy or sell credits, reduce paperwork and approval through numerous bureaucratic channels, and exchange beneficial ideas with regulators and each other.

4. Geographic Area

The CARB recommends that in designing a MERC program, districts ensure that their credits are used within the air basin where they originated.²¹¹ Without such safeguards, there may be a "detrimental effect on air quality from the source using the

206. *Id.*

207. *Id.*

208. *See* EIP Rules, *supra* note 3, at 16,716.

209. *Id.*

210. *See supra* note 167 and accompanying text.

211. CARB MERC GUIDELINES I, *supra* note 13, at 18. For example, for scrap-page programs, "registration within the air basin for at least one year would provide some assurance that the retired vehicle would have had emissions in the local area." *Id.* at 19. For longer term emission reductions, such as the use of low-emission buses, transit agencies should be required to track the location and use of the buses. *Id.*

credits."²¹² Mobile sources, unlike stationary sources, are capable of moving out of the air basin; thus, if MERCs are to be used to offset permanent emissions which remain in the air basin, the district must ensure that mobile source emission reductions also occur within the air basin.²¹³

However, EPA has indicated that it will accept interstate and even regional trading, at least where the northeast states of the Ozone Transport Region are concerned, provided certain conditions are met.²¹⁴ Generally, these provisions aim to efficiently improve overall air quality in a particular region while preventing nonattainment areas from deteriorating due to emissions trades.²¹⁵ Such regional trading would reduce the regulatory burdens of ensuring that emissions are actually being reduced in specific areas.

F. *MERC Benefits and Synergies*

Despite the traditional barriers to emissions trading and the concerns over MERCs, there are many reasons why this relatively new phenomenon is likely to succeed. For one, emissions trading programs, as a whole, appear increasingly important for many states to meet Clean Air Act deadlines;²¹⁶ and as mentioned earlier, MERCs appear necessary as new sources of ERCs to continue these trading programs.²¹⁷

212. *Id.* at 18-19.

213. *Id.* at 19.

214. See Letter from John S. Seitz, Director Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, to Bruce Carhart, Executive Director, *Ozone Transport Commission 2-3* (Mar. 31, 1993). For the twelve northeast states and the District of Columbia in the Ozone Transport Region (OTR), EPA adheres to the policy of the CAA, sections 173(c)(1)(A)-(B), to prevent offsets generated in less polluted areas from being used for new growth in more polluted areas. *Id.* However, offsets may be obtained from any location within the same nonattainment area, and from sources in *another* nonattainment area of equal or higher nonattainment classification, within the OTR, provided the emissions obtained from that area contribute to a violation of the NAAQS. See *id.* (emphasis added). Also, as a general policy, EPA permits unlimited trading between attainment areas, and allows any attainment area to obtain emissions offsets from any nonattainment area in the OTR. *Id.* at 5.

In a landmark deal in March 1994, a New Jersey utility, which was cleaning up its exhaust, sold credits to emit nitrogen oxides to another, expanding utility in Connecticut. See Marshall, *supra* note 47, at D1. The two companies share the same air basin, but are the first to trade permits across state lines. *Id.*

215. See *supra* note 212.

216. Many state governments consider emissions trading the least painful way to meet RFP and future CAA deadlines. See Harris, *supra* note 83, at 3.

217. See *supra* notes 85-87 and accompanying text.

Besides this potential “necessity” for MERCs, these new credits should also earn their keep by stimulating increased emissions trading activity and creating more efficiencies. They will increase the number and types of available credits as well as the number of participants in the emissions credit market. The overall effect will be to increase flexibility by enlarging the arsenal of emissions reducing strategies from which participants may choose. These benefits are sure to accrue where mobile source emissions reduction strategies are cheaper than stationary source or other strategies, thereby creating less expensive credits.²¹⁸

Perhaps just as important to MERC success, however, are the powerful synergies behind recent MERC development. Because mobile sources account for a disproportionate part of air pollution in many nonattainment areas, strategies and technologies to reduce mobile source emissions have become increasingly important.²¹⁹ Thus, an abundance of such strategies and technologies have developed, which provides a ripe framework around which MERC programs may be designed.

Moreover, one such mobile source strategy/technology — encouraging, and in some cases, requiring production and use of alternative fuel vehicles — involves more than just air quality concerns. The benefits derived from alternative fuels and vehicles also significantly affect energy and economic policies.²²⁰ As a result, alternative-fuel vehicle technologies and strategies enjoy tremendous combined support at the federal level from several departments and agencies apart from the EPA.²²¹ With such strong and varied support, and additional benefits, designing a

218. The early Unocal program in the Los Angeles area already demonstrated these benefits. See *supra* notes 108-09 and accompanying text.

219. See G.I.T. Report, *supra* note 58, at 23-27; see generally CARB MERCs, *supra* note 85; CARB MERC GUIDELINES I, *supra* note 13; CARB MERC GUIDELINES II, *supra* note 101.

220. In addition to reducing air pollution, alternative-fuel vehicles are also expected to promote energy diversity and security, and global economic opportunity. See Goldschein & Gomez, *supra* note 124, at 3. In recent years, major pieces of legislation have been passed supporting alternative-fuel vehicle development and use. These include the Energy Policy Act of 1992 and the Intermodal Surface Transportation Efficiency Act of 1991. See *id.* at 12-15. As a result, the U.S. Departments of Energy and Transportation have become very active in supporting this technology, providing technical and financial assistance to states, local governments and private entities seeking to develop alternative fuels and vehicles, and promote their use. *Id.* Even the Department of Defense has become involved, largely due to defense conversion efforts. See *id.* at 15-16.

221. See *Id.*

MERC program around alternative fuel vehicles would seem advantageous for many states.

The EPA, recognizing the importance of such synergies, encourages emissions trading and other economic incentive programs that take advantage of them:

An important consideration in designing effective [economic incentive programs] is the extent to which different strategies, or programs targeted at different types of sources, can complement one another when implemented together as [a] 'package.' EPA encourages States to consider packaging different measures together when such a strategy is likely to increase the overall benefits from the program as a whole.²²²

As discussed earlier, this "packaging" is just what California, Texas, and Massachusetts have done with their alternative fuel vehicle and MERC rules.²²³ It seems likely that other states and local governments will follow.

CONCLUSION

Environmental regulation is not for the impatient. The implementation of new regulatory programs is a dynamic but lengthy process, involving organizational learning for those affected by the program.²²⁴ It often takes years for EPA to act, years for states to act, and then some time for industry to act. As two commentators have put it, "[t]he results we see today are fruit from seeds planted years ago."²²⁵

222. EIP Rules, *supra* note 3, at 16,715.

223. *See supra*, notes 154-67, 180-90 and accompanying text.

224. *See* Dudek & Palmisano, *supra* note 3, at 236.

225. *Id.*