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BREAKING THE LOGJAM: THE PEAK PRICING OF CONGESTED URBAN ROADWAYS UNDER THE CLEAN AIR ACT TO IMPROVE AIR QUALITY AND REDUCE VEHICLE MILES TRAVELED

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I. INTRODUCTION

A. *Choking in Traffic*

As a nation, we are increasingly stuck in traffic. Motor vehicles idling in rush-hour traffic contribute significantly to air pollution in metropolitan areas.[1] Traffic congestion has increased rapidly in urban areas where the growth in volume of motorists has risen faster

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1. *See* RANDALL GUENSLER & DANIEL SPERLING, *Congestion Pricing and Motor Vehicle Emissions*, *in* 2 CURBING GRIDLOCK 356, 368 (Transportation Research Bd. ed., 1994) (predicting that increases in average vehicle operating speeds are likely to yield significant reductions in carbon monoxide and hydrocarbon emission rates); FEDERAL HIGHWAY ADMIN., CONGESTION PRICING: GUIDELINES FOR PROJECT DEVELOPMENT i (1996) [hereinafter *Guidelines*]; METROPOLITAN TRANSP. COMM'N, CALIFORNIA'S TRANSP. FUTURE 8-9 (1995).

than the growth in roadway capacity.[2] Due to the expected growth in traffic and constraints in funding and space, there is a growing realization that we cannot "build out of this" mobility dilemma.[3] In fact, recent news reports concerning an alarming rise in aggressive motorist behavior, popularly called "road rage," lay the blame on motorists' frustration with traffic congestion.[4]

One proposed solution to reducing traffic congestion, the resultant air quality, and other negative impacts in already-distressed metropolitan regions is to adopt congestion pricing.[5] This would require roadway users to pay for the congestion costs they impose on other motorists during peak traffic hours.[6] In theory, congestion costs include lost time to other motorists, air quality impacts, added noise, and lost fuel as a result of idling.[7] In practice, congestion pricing may not reflect the full costs associated with congestion because the peak price is only set high enough to reduce peak-hour trips substantially.[8] Roadway space is an increasingly scarce resource. Imposing a charge at times when space is most scarce may divert some motorists from peak-hour use. Alternatively, they may: (1) use the roads at other times when the congestion price is not imposed; or

2. *See* DAVID J. OLSON, *Pricing Urban Roadways: Administrative and Institutional Issues, in* 2 CURBING GRIDLOCK 216, *supra* note 1, at 216 (stating that transportation planners generally define peak-hour congestion as the fraction of peak-period miles traveled on roadways with volume-to-capacity ratios higher than 80%). *See, e.g.*, U.S. DEPT. OF TRANSP., 1995 STATUS OF THE NATION'S SURFACE TRANSP. SYSTEM—CONDITION & PERFORMANCE 20 (1995). In the New York-Connecticut-New Jersey metropolitan region, the growth in regional road capacity has slowed from a rate of 62 miles per year in the 1950s to a mere 7 miles per year over the past decade. Under certain conditions, adding highway capacity may raise environmental concerns as new roadways respond to the latent demand for more capacity. *See* ROBERT D. YARO & TONY HISS, A REGION AT RISK 155 (1996).

3. *See Guidelines*, *supra* note 1, at i; Glenn Collins, *Economy Purrs in High Gear, But Traffic Idles in Gridlock*, N.Y. TIMES, Dec. 22, 1997, at A1.

4. "Road rage" is aggressive driving associated with congested road conditions which has been linked to an increase in traffic accidents. *See,* Robert Cohen, *"Road Rage" Hits the Gas and Here's Another Line: More Motorists Driven by Hostile Intentions*, NEWARK STAR-LEDGER, July 28, 1997, at 1 (describing increase in traffic accidents linked to angry motorists stuck in traffic).

5. The pricing of roadways to discourage peak usage is hardly a new concept. Urban planners like William Vickrey of Columbia were early proponents dating back to the 1950s. *Hearings on the Transportation Plan for the National Capitol Region Before the Joint Comm. on Washington Metro. Problems*, 86th Cong. 454 (1959) (statement of William Vickrey); Columbia University Colloquium, Pricing Transportation Right: William Vickrey's Legacy, (Apr. 28, 1997).

6. *See* OLSON, *supra* note 2.

7. *See id.*

8. *See* U.S. DEP'T OF TRANSP., REPORT ON THE CONGESTION PRICING PILOT PROGRAM 7 (1996).

(2) use available mass transit or car pool arrangements when the congestion price is in place.[9]

The timing for introducing congestion pricing is particularly ripe because of the introduction of electronic tolls. The new electronic system is revolutionizing the manner in which tolls are collected on major highways.[10] The new system facilitates the imposition of variable tolls to discourage road use during peak traffic periods by reading an electronic card placed on the vehicle.[11] Most importantly, the system allows toll collection to proceed without the traditional bottlenecks which resulted from manual collection.[12] In the New York-New Jersey region, as of October 1997, more than one million motorists had signed up for what is called the "E-Z Pass" system—ten times the number that was originally projected.[13] For the nearly 400,000 daily users, E-Z Pass has nearly eliminated rush-hour delays that had averaged twenty minutes.[14]

Despite these technological advances, the efforts made to date to adopt congestion pricing have run into substantial local opposition.[15] The failure to price roadways that experience congestion in many ways follows the paradigm of the tragedy of the commons, in which self-interested users ruin shared resources (e.g., roadways through over-use, air quality) because they do not suffer the full consequences of their actions.[16]

Part I of this article will address the policy justifications for adopting congestion pricing on our most trafficked urban roadways. The policy rationale for adopting congestion pricing can be found in the failure to achieve the goals of the Clean Air Act[17] through traditional command and control mechanisms. After nearly three

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9. *See id.*

10. *See* YARO & HISS, *supra* note 2, at 172.

11. *See* P.L. Wyckoff, *E-Z Pass Passes First GWB Test: 8,100 with Tags*, NEWARK STAR-LEDGER, July 29, 1997, at 15 (describing variable rates for frequent users of George Washington Bridge); Kirk Johnson, *A Flip Side to E-Z Pass: East River Tolls and Rush-Hour Prices*, N.Y. TIMES, Aug. 2, 1997, at B21.

12. *See* Johnson, *supra* note 11.

13. *See* James Rutenberg, *The Driving is E-Z as Pass Use Soars*, N.Y. DAILY NEWS, Oct. 15, 1997, at 4.

14. *See id.*

15. *See, e.g., Guidelines*, *supra* note 1, at 20 (describing San Francisco's failure to adopt pricing after completing extensive evaluation and focus groups).

16. *See* Geoffrey Wilcox, *New England and the Challenge of Interstate Ozone Pollution under the Clean Air Act of 1990*, 24 B.C. ENVTL. AFF. L. REV. 1, 12-13 (1996) (citing Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243, 1244-45 (1968)).

17. 42 U.S.C. §§ 7401-7671q (1994).

decades of regulation, the introduction of market incentives through pricing of roadways should be seriously considered. Moreover, the revenue generated by congestion pricing could alleviate the existing deficits in mass transit availability that force travelers to use the most polluting form of transportation—the motor vehicle. Further, in contrast to other measures, like penalizing the use of less fuel-efficient vehicles or imposing a gasoline tax, congestion pricing is likely to achieve wider acceptance because it is based on the neutral principle of rationing roadway use where other transportation alternatives to the roadway exist.

Part II will examine the obstacles to implementing congestion pricing. As we will see, these obstacles include: (1) the lack of criteria to determine what is an appropriate roadway for congestion pricing; (2) the lack of an appropriate price structure for a system of congestion pricing;[18] (3) the lack of popular support for pricing roads for which previously there were no charges; (4) equity concerns that those least able to afford to use the roadways will be those most impacted by higher peak charges;[19] and (5) the lack of sufficient incentives for local agencies to move forward with congestion pricing.[20]

B. *The Steady Increase in Vehicle Miles Traveled Degrades Air Quality, In Spite of Reduced Tailpipe Emissions*

Since 1968, Clean Air Act requirements have reduced automobile tailpipe emissions by an astonishing 96 percent per automobile.[21] However, that percentage is deceiving. First, the simultaneous increase in the absolute number of vehicle miles driven[22] and the cumulative effect of emissions predating tailpipe

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18. *See* CALIPER CORP., REGIONAL TRANSP. ECONS. STUDY: AUTO PRICING DEMAND SIMULATION MODEL 59-61 (1995).

19. *See* MARTINE MICOZZI, FEDERAL HIGHWAY ADMIN., AN IDEA GROWS IN BROOKLYN: CONGESTION PRICING PUBLIC OUTREACH WORKSHOPS IN NEW YORK CITY 4 (1996).

20. *See generally* Howard Latin, *Regulatory Failure, Administrative Incentives, and the New Clean Air Act*, 21 ENVTL. L. 1647, 1656 (1991); Olson, *supra* note 2, at 218.

21. *See* Ronald J. Gregario, *Success Obscured by Smog: The Regulation of Automobile Pollution*, 16 N.Y. ENVTL. LAW. 13 (May 1996).

22. For example, "In 1990, New Jerseyans drove a total of 59 billion miles, a figure that has grown by 10 billion miles in each of the two previous decades. That is a 50 percent increase in twenty years… . Between 1960 and 1990, the state's workforce grew 60 percent to well over 4 million jobs… . [V]ehicle registrations in the state soared 150 percent to about 5.2 million." Neal Thompson, *Roads to Ruin: Can We Afford to Close the Transportation Gap? And Can We Afford Not To?*, N.J. REP., Mar.-Apr. 1996, at 18. In 1994 alone, Californians drove 260

regulation have resulted in only marginal improvement in ambient air quality.[23] Second, emission-control devices require periodic inspection and maintenance, and EPA has estimated that only one-third of automobiles have properly working systems at any given time.[24] Third, sport utility vehicles and mini-vans, defined as light-duty vehicles under the Clean Air Act, represent a growing share of the market and are not subject to the strict emissions mandates that apply to automobiles.[25] Fourth, the heavy-duty engines in trucks are not as tightly regulated as the engines in automobiles.[26] These regulatory failures dramatize the need for a market-driven system of congestion pricing to reduce vehicle miles traveled where mass transit alternatives exist.

Despite the reductions in tailpipe emissions mandated by the Clean Air Act, the automobile remains the single most important source of air pollution in the United States.[27] Currently, motor vehicles are responsible for 75 percent of hydrocarbon emissions, 45 percent of nitrogen oxide emissions, and 34 percent of the volatile organic compound emissions in the United States.[28] The combination of oxygen, nitrogen oxides, volatile organic compounds, and sunlight leads to the formation of ground-level ozone.[29] Ground-level ozone

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billion miles, which is almost three times the number of miles they drove in 1974. *See* David Woodruff, *Electric Cars: Will They Work? And Who Will Buy Them?*, BUS. WK., May 30, 1994, at 104, 105.

23. *See* Wilcox, *supra* note 16, at 4. In the summer of 1997 in New Jersey, ground-level ozone exceeded Clean Air Act standards roughly twice as often as in the summer of 1996. The ozone level in New Jersey exceeded federal standards 211 times in 1997, compared with 130 times in 1996. *High Ozone Levels Occur More Often, Report Says*, N.Y. TIMES, Nov. 21, 1997, at B6.

24. *See* Gregario, *supra* note 21.

25. *See* Direct Final Rule Amending the Test Procedures for Heavy-Duty Engines and Light-Duty Vehicles and Trucks and the Amending of Emission Standard Provisions for Gaseous Fuel Vehicles and Engines, 62 Fed. Reg. 47114 (1997) (to be codified at 40 C.F.R. pt. 86).

26. *See id.*

27. *See* Henry Waxman et al., *Cars, Fuels, and Clean Air: A Review of Title II of the Clean Air Act Amendments of 1990*, 21 ENVTL. L. 1947, 1949 (1991); Arnold W. Reitze, Jr. & Barry Needlemen, *Control of Air Pollution from Mobile Sources Through Inspection and Maintenance Programs*, 30 HARV. J. ON LEGIS. 409, 411 (1993). By weight of pollutant, automobiles are the greatest source of air pollution in the country. *See* Michael T. Donnellan, Note, *Transportation Control Plans under the 1990 Clean Air Act as A Means for Reducing Carbon Dioxide Emissions*, 16 VT. L. REV. 711, 724 (1992).

28. They are also the largest source of these pollutants, and are responsible for nearly all the carbon monoxide and one-half of the ozone pollution in the cities. *See* Gregario, *supra* note 22.

29. *See* American Auto. Mfrs. Ass'n. v. Commissioner, Mass. Dep't of Envtl. Protection, 31 F.3d 18, 21 (1st Cir. 1994); *see* Wilcox, *supra* note 16, at 2.

is the most pervasive air pollution problem in the nation.[30] The sheer growth in volume of automobiles combined with the growth in other energy uses have kept ambient ozone levels high.[31] Automobiles are also a primary contributor to carbon monoxide emissions.[32] In addition, both in the U.S. and beyond our borders, motor vehicles contribute significantly to global warming since they burn fossil fuels which emit carbon dioxide.[33]

Motor vehicles present Americans with a conundrum.[34] In 1990, motor vehicles accounted for 88.2 percent of person miles traveled (excluding school bus travel).[35] On the one hand, they are central to economic activity as the primary means of transportation and to

30. *See* Wilcox, *supra* note 16, at 4. Ground-level ozone and stratospheric ozone pose two distinct environmental problems. Ozone in the upper atmosphere shields the planet from harmful ultraviolet rays of the sun. Depletion of stratospheric ozone by chlorofluorocarbons and other pollutants raises the risk of disrupting the Earth's protective atmospheric cover. Ground-level ozone, however, is the cause of human lung injury, agricultural damage, and other environmental problems. *See id.* at 1 n.1 (citing NATURAL RESEARCH COUNCIL, RETHINKING THE OZONE PROBLEM IN URBAN AND REGIONAL AIR POLLUTION (1991)).

31. Ozone levels are highest in summer due to the effect of sunlight. The ozone season of 1995 was the worst since 1988 for Clean Air Act violations. *See* Wilcox, *supra* note 16, at n. 26 (citing Gary Lee, *High Ozone Levels Prompt Warnings to Stay Indoors; Readings Far Exceed Federal Standards*, W. POST, July 28, 1995, at A3 (noting that 28 states had violations halfway through the season). In the New York-Connecticut-New Jersey metropolitan area, the number of vehicle miles traveled between 1970 and 1990 grew by an estimated 60%. This growth occurred in spite of the efforts of the Clean Air Act to discourage motor vehicle use in urban areas. *See generally*, Donnellan, *supra* note 27, at 729 (describing localities' inability to reduce motor vehicle use under the Clean Air Act).

32. *See* Motor Vehicle Mfrs. Ass'n v. New York State Dep't of Envtl. Conservation, 17 F.3d 521, 524 (2d Cir. 1994); National Ambient Air Quality Standards for Particulate Matter, 61 Fed. Reg. 65,638 (1996) (to be codified at 40 C.F.R. pt. 50) (proposed Dec. 13, 1996).

33. The greenhouse effect is caused by the build-up of carbon dioxide and water vapor in the atmosphere. Americans produce a disproportionate share of the world's greenhouse gas emissions. *See* Donnellan, *supra* note 27, at 720. President Clinton has pledged that the U.S. will play a leading role in reducing those emissions. Transportation sources, primarily motor vehicles, are responsible for about one-third of the nation's carbon dioxide emissions. *See id.* at 719.

34. *See Motor Vehicle Mfrs. Ass'n*, 17 F.3d at 524 ("The invention and proliferation of the automobile has been a mixed blessing: its advantages are obvious and need no chronicling; its disadvantages, most notably as a source of air pollution that threatens human health and well-being, have become more and more apparent").

35. *See* OFFICE OF HIGHWAY MANAGEMENT, FEDERAL HIGHWAY ADMINISTRATION, 1990 NATIONWIDE PERSONAL TRANSPORTATION STUDY, EARLY RESULTS, PERSON MILES OF TRAVEL BY MODE, 24 tbl. 6, *cited in* Charles Komanoff, *Pollution Taxes for Roadway Transportation*, 12 PACE ENVTL. L. REV. 121, 124 n.1 (1994). The emergence of the two-income household has also exacerbated the congestion problem. In 1960, most families had one car, and a mere 2.8% of households had more than two. By 1990, almost 16 percent had three or more cars. *See* Thompson, *supra* note 22, at 18.

Americans' self-conception in a nation that spans a continent.[36] On the other hand, motor vehicles carry a distinct set of disutilities: air and noise pollution, accidents, and congestion on major roadways.[37]

In December 1996, after reviewing voluminous health data and in response to a lawsuit by the American Lung Association challenging the existing standards, EPA proposed a tightening of air quality standards for ozone and small particulates. EPA concluded that the existing ambient air quality standards under the Clean Air Act for ozone and small particulates were not sufficiently protective of public health.[38] The rules were issued in final form in July 1997.[39]

Over the course of the last decade, the effects of ground-level ozone on human health have been isolated in numerous studies which measure respiratory function under controlled conditions.[40] The effect of EPA's decision is to increase the number of regions in the United States that are in severe nonattainment for these pollutants.[41] Even before the new standards were promulgated, more than 50 million Americans lived in areas that failed to meet the ozone threshold.[42] In light of the tightening of standards for ozone and

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36. *See* Komanoff, *supra* note 35, at 123.

37. *See id*.

38. *See* National Ambient Air Quality Standards for Ozone, 61 Fed. Reg. 65,716 (1996) (to be codified at 40 C.F.R pt. 50) (proposed Dec. 13, 1996); National Ambient Air Quality Standards for Particulate Matter, 61 Fed. Reg. 65,638 (1996) (to be codified at 40 C.F.R. pt. 50) (proposed Dec. 13, 1996).

39. *See* National Ambient Air Quality Standards for Ozone, 62 Fed. Reg. 38,856 (1997) (to be codified at 40 C.F.R. pt. 50); National Ambient Air Quality Standards for Particulate Matter, 62 Fed. Reg. 38,652 (1997) (to be codified at 40 C.F.R. pt. 50).

40. *See, e.g.*, Robert B. Devlin et al., *Exposure of Humans to Ambient Levels of Ozone for 6.6 Hours Causes Cellular and Biochemical Changes in the Lung*, 4 AM. J. RESPIR. CELL MOL. BIOL. 72 (1991); Dalia M. Spektor et al., *Effects on Ambient Ozone on Respiratory Function in Active, Normal Children*, 137 AM. REV. RESPIR. DIS. 313 (1988); Committee on Environmental Health, *Ambient Air Pollution: Respiratory Hazards to Children*, 91 PEDIATRICS 1210, 1212 (1993)(criticizing existing ozone standard because it "contains little or no margin of safety for children engaged in active outdoor activity").

41. *See generally*, National Ambient Air Quality Standards for Particulate Matter, *supra* note 39 (describing projected reductions in excess mortality and morbidity as a result of stricter standards for particulates in major metropolitan nonattainment regions). As of 1993, some 94 urban areas were out of compliance with federal standards for ozone. Some 42 areas were in non-attainment for carbon monoxide. *See* TRANSPORTATION RESEARCH BOARD, 1 CURBING GRIDLOCK 49 (1994) (citing ENVIRONMENTAL PROTECTION AGENCY, NATIONAL AIR QUALITY EMISSIONS TRENDS REPORT (1992)).

42. *See* Wilcox, *supra* note 16, at 6 n.33. "Based on monitoring data from 1993-1995, EPA estimates that 280 counties in thirty-four states will not meet the new ozone standard, compared to 106 counties not meeting the current standard." EPA also estimates that "150 counties in thirty-one states will not meet the new PM [particulates] standard, compared to forty-one counties currently in violation under the old standard." *See* Julie R. Domike,

small particulates and the worsening problem of persistent nonattainment in major metropolitan areas, the resulting pressure to think creatively about ways to reduce motor vehicle use will be enormous.[43]

C. *ISTEA Contains a Rarely-Used Funding Mechanism to Test and Implement Congestion Pricing in Nonattainment Areas*

In 1991, Congress passed the Intermodal Surface Transportation Efficiency Act ("ISTEA")[44] which enables local transportation agencies to distribute federal funds among all modes of transportation, rather than exclusively for highway construction. Under ISTEA, the Congestion Mitigation and Air Quality Improvement Program ("CMAQ") was designed to expand the focus and purpose of Federal transportation funding assistance to include air quality improvement as a specific objective.[45] The state and local planning units, metropolitan planning organizations ("MPOs") set up to implement the statute, are authorized to use transportation funds for the kind of long-range planning and "demand management" that congestion pricing requires.[46] Use of transportation funds in a flexible manner to reduce motor vehicle usage is the explicit goal of ISTEA.[47] Pursuant to ISTEA, CMAQ provides funding for transportation projects or programs that will contribute to attainment of a national ambient air quality standard ("NAAQS"), primarily for ozone and carbon monoxide.[48]

To date under ISTEA, a total of $31 million has been spent on a series of congestion pricing pilot projects throughout the country.[49] Although these programs are in their early stages, preliminary results

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Changes to the Clean Air Act Program Affect State and Local Governments, ABA ST. & LOC. LAW NEWS, Fall 1997, at 1, 2.

43. *See, e.g.*, Tom Johnson, *U.S. Clearing the Air … Slowly: Asthmatics Fear New Pollution Rules Won't Help Too Soon*, NEWARK STAR-LEDGER, July 8, 1997, at 1; Gregario, *supra* note 21, at 13 n.22.

44. 23 U.S.C. §§ 100-501 (1994).

45. *See* The Congestion Mitigation and Air Quality Improvement (CMAQ) Program of the Intermodal Surface Transportation Efficiency Act—Guidance Update, 61 Fed. Reg. 50,890 (1996) [hereinafter *CMAQ Program*].

46. *See id.*

47. Telephone Interview with Michael Savonis, Team Leader for Air Quality Policy, Federal Highway Administration (July 18, 1997).

48. *See CMAQ Program*, *supra* note 45.

49. Telephone Interview with John Berg, Team Leader, Congestion Pricing Program under ISTEA, Federal Highway Administration (July 21, 1997); FEDERAL HIGHWAY ADMINISTRATION, OVERVIEW AND STATUS REPORT: CONGESTION PRICING PILOT PROGRAM (1997) [hereinafter *Overview*]; *See* discussion *infra* Part II (describing pilot programs).

are promising.[50] However, as we shall see, many of these pilot programs remain in the study and design phase due to local opposition to moving forward with implementation.[51]

II. DISCUSSION

Part I—With New Stricter Standards to Meet under the Clean Air Act, Policymakers Should Consider the Adoption of Congestion Pricing of Major Trafficked Roadways

A. *The Clean Air Act Has Failed to Reduce Overall Automobile Emissions, Because the Statute Has Not been Used to Address the Root Problem of Growing Vehicle Use In Peak Travel Times*

l. Background

With the passage of the Clean Air Act Amendments of 1970, Congress ushered in the modern era of air pollution regulation.[52] The Clean Air Act has been described as a "bold experiment" in cooperative federalism, in which EPA "identifies the ends to be achieved while the States choose the particular means for realizing that end."[53] Despite the incentives and threats of sanctions contained in the current statute, the end result at this juncture would appear to indicate the limits of cooperative federalism.[54] For the most part, federal standards have not changed local habits.[55]

The 1970 Amendments required the federal government, through the newly created EPA, to establish standards for specific pollutants in ambient air.[56] The amendments termed these standards

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50. *See Overview*, *supra* note 49*; see* discussion *infra* Part II p. 109.

51. *See Guidelines*, *supra* note 1, at 20-21 (describing local opposition to implementation of congestion pricing programs); Latin, *supra* note 20, at 1656; Interview with Janine Bauer, Executive Director, Tri-State Transportation Campaign, in New York, N.Y. (June 23, 1997).

52. *See* Marc Melnick & Elizabeth Willes, *Watching the Candy Store: EPA Overfiling of Local Air Pollution Variances*, 20 ECOLOGY L. Q. 211 (1994).

53. Air Pollution Control Dist. v. EPA, 739 F.2d 1071, 1075 (6th Cir. 1984).

54. *See generally* Richard B. Stewart, *Pyramids of Sacrifice? Problems of Federalism in Mandating State Implementation of National Environmental Policy*, 86 YALE L. J. 1196 (1977).

55. *See, e.g.*, YARO & HISS, *supra* note 2, at 155.

56. 42 U.S.C. § 7409 (1994). A key event leading to increased study of air pollution impacts caused by the volume of automobile emissions dates back to the connection made between traffic jams to a football game in Berkeley, California, in November, 1949 and the experiencing of severe eye irritation by fans and surrounding residents. A local committee that studied the air quality at the time ruled out the possibility of increased industrial activity in the Bay Area that might have contributed to the problem. *See* Gregario, *supra* note 21.

the primary and secondary NAAQS.[57] EPA has since adopted NAAQS for six pollutants: sulfur oxides, lead, ozone, nitrogen oxides, carbon monoxide, and particulates.[58] Motor vehicles emit four of the primary pollutants for which NAAQS have been issued: volatile organic compounds (which react with nitrogen oxides to form ground-level ozone); carbon monoxide; sulfur dioxide; and particulates.[59]

The original deadlines set in the 1970 statute were ambitious but ultimately unrealistic, and for the most part were not attained by the States.[60] The central lesson of the statute is that good implementation, rather than good legislative intentions, is the key to effective environmental protection.[61] In fact, some areas' air quality actually declined after the statute's passage.[62]

The current deadlines for attainment vary depending on the air pollutant and the degree of nonattainment. Regions in severe nonattainment for ground-level ozone, like the New York tri-state metropolitan area, Los Angeles, Chicago, Boston, and Philadelphia, must reduce their emissions of volatile organic compounds by 3 percent per year.[63] Local resistance remains strong to the kinds of stringent measures which would achieve such reductions, e.g., no new stationery sources which would emit VOCs, massive carpooling, and shifts in working hours.[64] Attainment of the new stricter NAAQS within the statutory deadline of 2007 for areas in "severe" nonattainment is therefore considered highly unlikely.[65]

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57. 42 U.S.C. § 7409.

58. *See* 40 C.F.R. pt. 50 (1990), cited in Latin, *supra* note 20, at 1669 n.60.

59. *See* Kenneth Small & Camilla Kazimi, On the Cost of Air Pollution from Motor Vehicles 2 (Sept. 1994) (unpublished paper, on file with author).

60. *See* Latin, *supra* note 20, at 1657, n.19.

61. *See id*.

62. *See generally* Wilcox, *supra* note 16, at 8 (describing how the Clean Air Act has been "an unwieldy tool to address a complex problem").

63. *See* STATE OF NEW JERSEY, STATE IMPLEMENTATION PLAN REVISION FOR THE ATTAINMENT AND MAINTENANCE OF THE OZONE NATIONAL AMBIENT AIR QUALITY STANDARDS 11 (1993); *see also* Approval and Promulgation of Air Quality Implementation Plans; Virginia; 15 percent Rate of Progress Plan for the Metropolitan Washington, D.C. Area, 62 Fed. Reg. 11,395 (1997) (to be codified at 40 C.F.R. pt. 52) (requiring additional documentation to demonstrate affirmatively that the 15% emission reduction target will be realized).

64. *See* Latin, *supra* note 20, at 1685 (noting that in some areas ambient ozone levels are so high that states would need to adopt every feasible control measure to meet the attainment deadline).

65. *See generally* Leslie Harrison Reed, Jr., *California Low-Emission Vehicle Program: Forcing Technology and Dealing Effectively with the Uncertainties*, 24 B.C. ENVTL. AFF. L.

2. The States Have Not Succeeded in Reducing Automobile Use

To achieve the NAAQS within the established time limits, the Clean Air Act requires each state to adopt and submit for EPA approval a State Implementation Plan ("SIP").[66] Each SIP must specify the state and local procedures and regulations that will enable all areas within the state to achieve and maintain the primary and secondary NAAQS.[67] The SIP must also include emission limitations, a program for enforcement, and provisions prohibiting emissions that prevent attainment of the NAAQS.[68] For nonattainment areas, the SIP must require the sources to use "reasonably available control measures" and must provide for "reasonable further progress" toward attainment.[69] Further, the SIP must comply with extensive provisions applicable only to ozone nonattainment areas.[70]

The SIP has proven to be an ineffective tool to improve air quality as highway construction and other local projects that may increase total emissions go forward and are incorporated in the SIP.[71] In July 1996, EPA issued warnings to ten industrialized states with serious air quality problems that their SIPs failed to achieve sufficient progress in improving air quality under the statute.[72] In a recent letter dated April 1997, EPA Assistant Administrator Mary Nichols informed twenty-seven states that they needed to achieve additional air emission reductions.[73] This illustrates the systemic failure of the Clean Air Act to achieve its stated goals of emission reductions.[74]

REV. 695, 695-97 (1997).

66. 42 U.S.C. § 7410(a) (1994). The Clean Air Act's treatment of each state as a separate unit is paradoxical since air pollutants, like ozone, are transported across state boundaries by wind and other weather conditions. *See* Wilcox, *supra* note 16, at 2,4,8. In fact, transport from the Midwest of airborne nitrogen oxides, a precursor chemical for ozone, may be the largest source of nitrogen pollution in the Chesapeake Bay. *See id.* at 2 n.7 (citing Todd Shields, *Scientist Tracks Bay Pollution Back to States in the Midwest*, WASHINGTON POST, Apr. 30, 1996, at B1).

67. *See* 42 U.S.C. § 7410(a).

68. *See id.*

69. 42 U.S.C. § 7502(c) (1994).

70. *See* 42 U.S.C. § 7511 (1994).

71. *See* NEW JERSEY TRANSPORTATION PLANNING AUTHORITY, AIR QUALITY CONFORMITY 44 (1995) (incorporating highway extensions and roadway widenings as part of submitted plan).

72. *See* Final Rule Making Findings of Failure To Submit Required State Implementation Plans for Nonattainment Areas for Ozone, 61 Fed. Reg. 36,292 (1996) (to be codified at 40 C.F.R. pt. 52).

73. The states were Alabama, Connecticut, Delaware, the District of Columbia, Georgia, Indiana, Illinois, Kentucky, Maine, Maryland, Massachusetts, Michigan, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin. *See* Dave Ryan,

3. The Transportation Control Plan Places an Unrealistic Burden on the States to Reduce Motor Vehicle Use

The States may place limits on automobile emissions through the use of transportation control plans to reduce motor vehicle use. With the 1990 Clean Air Act Amendments, Congress has again attempted to restore the transportation control plan to its earlier prominence as a means for reducing vehicle miles traveled.[75] However, as with earlier efforts in the 1970 statute, the transportation control plan in the 1990 Amendments has not resulted in significant motor vehicle emission reductions.[76]

The most significant change in the 1990 Amendments links the withholding of federal highway grants to improvement in air quality.[77] The 1990 Amendments also contain a detailed array of transportation control measures that states may adopt. These include: (1) programs for improved public transit; (2) restriction of certain roads or lanes to passenger buses or high occupancy vehicles; (3) employer-based transportation management plans; (4) trip reduction ordinances; (5) traffic flow improvement programs that achieve emissions reductions; and (6) trip-reduction incentives.[78] But experience to date with the transportation control plan suggests that state and local planners have not used it effectively to reduce vehicle miles traveled.[79] In addition, EPA has had little appetite for imposing sanctions on local government entities, the very partners on whom it relies for implementation of the statute.[80]

Although the transportation control plan could include congestion pricing, as described in Part II of this article, such pricing has been adopted in only three localities across the country. Those transportation control plans which have been adopted have not

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EPA Cites States That May Need to Reduce Air Emissions to Protect Regional Health-Protection Systems, EPA PRESS ADVISORY, APRIL 18, 1997, *available in* 1997 WL 188144.

74. *See* Small & Kazimi, *supra* note 59, at 21.

75. *See* 42 U.S.C. §§ 7511-7515 (1994).

76. *See* Reed, *supra* note 65, at 695-96.

77. *See* Latin, *supra* note 20, at 1707.

78. 42 U.S.C. § 7408(f)(1)(A) (1994).

79. *See, e.g.*, NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY, REGIONAL TRANSPORTATION PLAN 5 (1995) (describing Federally funded projects that "contribute" to emissions reductions).

80. *See* Latin, *supra* note 20, at 1707; Stephen L. Kass & Michael B. Gerrard, *Clean Air, ISTEA, and New York Transportation*, N.Y. LAW JOURNAL, June 29, 1992, at 3, 4 (predicting that "(u)nfortunately, the signs are not good that full compliance with the (Clean Air Act) will be achieved"); Telephone Interview with Michael Savonis, Team Leader for Air Quality Policy, Federal Highway Administration (July 11, 1997) (describing two isolated instances in counties in Montana and Missouri, where sanctions were imposed).

reduced motor vehicle use because incentives like high-occupancy lanes and restricted parking rules have not been sufficient to deter peak use of major roadways.[81]

4. The Clean Air Act's Regulation of Motor Vehicle Emissions Has Not Resulted in Improvements in Air Quality, and EPA has been Rebuffed in its Attempt to Force More Stringent Emissions Reductions on the States

The mandating of cleaner cars and cleaner fuel has gone forward in fits and starts because of resistance from the automobile industry and litigation challenging EPA's attempts to impose stricter standards.[82] In contrast to stationary sources, state power to limit emissions from mobile sources is restricted, even though mobile sources contribute significantly to ambient air quality violations.[83]

Automobile tailpipe emissions are regulated under a separate provision of the Clean Air Act.[84] Unlike the process for setting NAAQS,[85] regulators setting mobile source standards may consider such factors as cost, technological feasibility, and the availability of a sufficient number of automobiles to satisfy consumer demand.[86]

Despite resistance from the automobile industry, EPA has promulgated standards requiring automobiles to use cleaner fuel.[87] With one exception, the Clean Air Act prohibits states from further regulating tailpipe emissions by an explicit preemption clause.[88] The one exception is California, for which there is a specific waiver provision because of the unique severity of its air pollution problems and its history of aggressive state regulation predating the passage of the Clean Air Act in 1970.[89] Consequently, there can be only two types of cars "created" under emissions regulations in this country:

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81. *See Increased Flexibility Proposed for States on Conformity in Transportation Projects*, ENV'T REP. (BNA) 558 (July 12, 1996) (describing EPA proposal to give states additional flexibility in implementing Clean Air Act requirements).

82. *See, e.g.*, Virginia v. EPA, 108 F.3d 1397, 1401 (D.C. Cir. 1997).

83. *See* 42 U.S.C. § 7543(a) (1994).

84. *See* 42 U.S.C. §§ 7521-7574 (1994).

85. The NAAQS are health-based thresholds set by EPA for six "criteria" pollutants: ozone, carbon monoxide, particulate matter, sulfur dioxide, nitrogen dioxide, and lead. 40 C.F.R. pt. 50 (1990), *cited in* Latin, *supra* note 20, at 1669 n.60.

86. *See* Donnellan, *supra* note 27, at 724.

87. *See* 42 U.S.C. § 7521(b).

88. *See* 42 U.S.C. § 7543(a).

89. *See id*.

"California" cars and "Federal" i.e., EPA-regulated cars.[90] Other states cannot force manufacturers to create a "third vehicle."[91]

Recently, EPA issued a rule which sought to compel twelve Northeastern states to adopt California's Low-Emission Vehicle Program[92] on the grounds that their SIPs contained inadequate controls to reduce motor vehicle emissions.[93] In a clear blow to EPA, the D.C. Circuit found that the federal agency lacked the statutory authority to compel the states to adopt the California Low-Emission Vehicle Program.[94] In so holding, the Court reasoned that the Clean Air Act did not enable EPA to force particular control measures on states to ensure compliance with the statute, even if the SIPs were found to be lacking.[95] This decision is likely to further slow the introduction of low-emission vehicles outside California.

5. The Zero Emission Vehicle, Under Development in California, is Unlikely to Achieve Market Penetration in the Near Future

In California, mobile sources cause nearly 60 percent of hydrocarbons and nitrogen oxides, which react with sunlight to form harmful ozone, and 90 percent of the carbon monoxide emissions.[96] Consistent with the trends in the rest of the nation, and in spite of increasingly stringent emissions controls, this huge share of total emissions occurs because of the increasing number of motor vehicles and vehicle miles traveled.[97]

California's current "Clean Fuel/Low-Emission Vehicle" program requires the use of Zero Emission Vehicles ("ZEVs").[98] For the foreseeable future, the only vehicles able to meet the zero emission requirement are those powered by electric motors. The program remains an important model for future motor vehicle emission reductions. By this year, manufacturers in California are

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90. *See* 42 U.S.C. § 7507 (1994); American Auto. Mfrs. Ass'n v. Commissioner, Mass. Dep't of Envtl. Protection, 31 F.3d 18, 21 (1st Cir. 1994).

91. *See* 42 U.S.C. § 7507; *American Auto. Mfrs. Ass'n*, 31 F.3d at 21.

92. The California Low-Emission Vehicle Program ("LEV") is the most stringent regulatory program for new motor vehicles. It requires the staged reductions in nitrogen oxides and volatile organic compounds, the two precursors which form ozone, in new vehicles. *See* Virginia v. EPA, 108 F.3d 1397, 1404 (D.C. Cir. 1997).

93. *See id*. (citing 60 Fed. Reg. 4712, 4713 (1995)).

94. *See id.* at 1410.

95. *See id.*

96. *See* Reed, *supra* note 65, at 695.

97. *See id.* at 695-96.

98. *See* Gregario, *supra* note 21, at 14 (citing Cal. Regulatory Notice Reg. 90, No. 32-Z).

required to market ZEVs in amounts that represent 2 percent of their sales.[99] By 2001, the percentage is to climb to 5 percent of total sales; by 2003, it is to rise to 10 percent of sales.[100] However, in light of manufacturers' resistance and ongoing litigation concerning whether other states may adopt this program, progress in implementation beyond the State of California is expected to take many years and be halting at best.[101]

6. Congestion Pricing as a Mechanism for Reducing Road Usage and Motor Vehicle Emissions

In contrast to the regulatory roadblocks we have examined, congestion pricing does not require the heavy hand of regulatory commands but rather relies on pricing to alter pollution-creating behavior.[102] Air travel, train travel, and other modes of transportation are priced based on peak usage.[103] Only roads, carrying millions of pollutant-emitting motor vehicles, have by tradition been "free." ISTEA specifically authorizes the piloting and funding of congestion pricing projects, although, with a few exceptions discussed herein, localities to date have not gone forward with them.[104]

In 1993, the number of vehicle miles traveled on highways reached 2.3 trillion, an increase of 3.4 percent per year since 1983.[105] From 1975 to 1987, the percentage of peak-period miles traveled on interstate highways with volume-to-capacity ratios higher than 80 percent jumped from 42 to 63 percent; in the space of two years, from 1985 to 1987, the rush hour traffic classified as congested by the Department of Transportation rose from 61 to 63 percent.[106]

Discouraging the peak usage of automobiles on major urban roadways, particularly where mass transit alternatives are available, would reduce motor vehicle use at those times of day when pollution

99. *See id*. at 15.

100. *See id*.

101. Telephone Interview with Michael Savonis, *supra* note 74.

102. *See* Olson, *supra* note 2, at 216.

103. *See* DAVID GILLEN, *Peak Pricing Strategies in Transportation, Utilities, and Telecommunications*, *in* 2 CURBING GRIDLOCK 115, *supra* note 1, at 115-34 (1994).

104. *See generally Overview*, *supra* note 49.

105. *See* U.S. DEPARTMENT OF TRANSPORTATION, 1995 STATUS OF THE NATION'S SURFACE TRANSPORTATION SYSTEM: CONDITION & PERFORMANCE 5 (1995).

106. *See* ANTHONY DOWNS, STUCK IN TRAFFIC: COPING WITH PEAK-HOUR TRAFFIC CONGESTION 1 (1992).

impacts and lost traffic time are most problematic.[107] The number of trips undertaken is important from an emission modeling standpoint because the emission levels of all pollutants are elevated during the first few minutes of operation.[108] Cold-start and hot-start emissions (from idling vehicles) are also important contributors to the on-road emissions inventory.[109] In 1987, cold and hot-start operations from the automobile fleet in the Los Angeles basin were estimated to contribute about 27 percent of hydrocarbon emissions, 35 percent of carbon monoxide emissions, and 19 percent of nitrogen oxide emissions.[110]

It is only recently that the concept became administratively feasible with the introduction of electronic tolls and computerized toll cards.[111] The pricing of roadways on an incentive basis has long been the province of academics and urban planners.[112] Congestion is a classic negative externality. As additional road users occupy the road, the quality of service provided to all users declines.[113] When drivers use a highway, they do not pay the costs they are imposing on other drivers by adding to their delay.[114] The only "costs" incurred by the single driver are running costs and her own time delay.[115] Traffic should flow smoothly at the speed limit.[116] As traffic increases, however, the eventual addition of one more vehicle will slow the flow and increase the travel time of other vehicles.[117] At this point, congestion begins.[118] The Port Authority of New York & New Jersey, the bi-state transportation agency that runs the three bi-state crossings, the George Washington Bridge and the Holland and Lincoln Tunnels, has estimated that at those three crossings drivers collectively experience a total of about 8,000 hours of toll plaza delay.[119]

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107. *See* GUENSLER & SPERLING, *supra* note 1, at 356-57.

108. *See id.*

109. *See id.*

110. *See id.*

111. *See Overview*, *supra* note 49, at 8; David S. Dahl, *Primer on Congestion Pricing*, FEDGAZETTE, April 1996, at 3.

112. *See* DOWNS, *supra* note 106, at 60.

113. *See* Dahl, *supra* note 111 at 1.

114. *See* Olson, *supra* note 2, at 216.

115. *See Guidelines*, *supra* note 1, at i.

116. *See* Dahl, *supra* note 111, at 1.

117. *See id.*

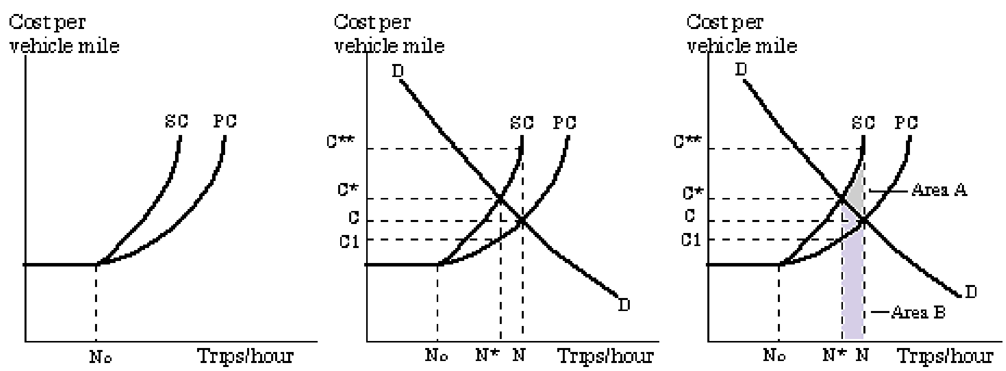
118. *See id.*

119. *See* CALIPER CORP., *supra* note 18, at 1.

David Dahl has used cost curves to illustrate the congestion phenomenon and the social costs which result (see Chart 1):

> The vertical axis measures the costs per vehicle mile, and the horizontal axis measures trips per hour. The curve, labeled private costs PC, includes the costs drivers impose on themselves such as gasoline and oil usage, and wear and tear on automobiles. The other curve, labeled social costs SC, includes PC plus costs that each driver imposes on all others.
>
> On the horizontal axis to the left of N_0 the curves coincide, and cars travel at the speed limit. But to the right of N_0, congestion sets in, and the two curves separate and slope upward. PC shows how a driver's costs increase as speeds drop below the limit and travel times increase. SC rises at a faster rate than PC because the additional drivers increase the gasoline, oil, time and other costs to all other drivers . . . .

Chart 1 Chart 2 Chart 3



> Highway usage is where the supply curve bisects the demand curve, labeled D (see Chart 2). From the demand curve's viewpoint, the costs per vehicle mile, C, indicate the prices motorists would pay for a given number of trips on a highway. D is downward sloping, indicating the higher the price the fewer trips taken. Prices also reflect the benefits a driver receives from a trip.
>
> If usage of the highway is free to drivers, then N number of trips will be taken, the point where D bisects PC. Up to that point, drivers' willingness to pay for trips exceeds their private costs, and beyond it they do not. At N, however, travel is underpriced because drivers pay C for trips instead of C**, the price which includes the congestion costs imposed on other drivers . . . .

> If drivers are required to pay for the congestion they impose on other drivers, N* becomes the optimal number of trips. This is where D intersects SC. Travel times decrease as N-N* fewer trips are taken.[120]

This assumes that drivers are sensitive to price and that demand is elastic. If the price is raised to sufficient levels to affect roadway use at peak hours, the limited studies and data available, discussed in Part II, suggest that this is a sound assumption.[121]

Part II—Obstacles to Implementing a System of Congestion Pricing Are Surmountable

A. *Under what circumstances is congestion pricing appropriate?*

Congestion pricing may take a number of forms. Single facility pricing might involve a bridge, tunnel, highway, street or intersection. Multiple facility pricing may take place in a corridor, or involve core areas or regionwide applications. Corridor pricing might include a major highway and parallel arterials. In all of these approaches, price levels and differentials should be set high enough to have a significant effect on congestion.[122]

How does one define a heavily trafficked roadway? A plausible definition would cover major arteries in all urbanized areas with populations over 200,000, where the ratio of use to capacity exceeds a certain percentage at peak travel times. This is an appropriate threshold because ISTEA, which provides funding for congestion pricing pilot programs, defines urbanized areas as those with populations over 200,000.[123]

There is limited data indicating whether roadway users are price-sensitive and thus likely to reduce their use of roadways when tolls reflect the true costs of using the roadway. However, the available data suggests that congestion pricing with moderate toll increases during peak usage would have substantial impacts on reducing congestion.[124]

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120. Dahl, *supra* note 111, at 1-2. Graph and text reproduced with permission of the author.

121. *See generally* Gillen, *supra* note 96, at 117 (describing "broadly based agreement among the academic community" that road pricing would ease congestion on U.S. streets, highways and urban expressways).

122. *See Guidelines*, *supra* note 1, at i.

123. *See* 23 U.S.C. § 134(i)(1) (1994).

124. *See* CALIPER CORP., *supra* note 18, at 59.

The most effective way to test such a system would be through pilot testing. To date, pilot programs have been initiated on roadways identified as heavily trafficked, where public acceptance of congestion pricing is likely to be higher than if the roadway were not perceived as a problem by peak-hour users.[125] Short of pilot testing, in 1994, the Port Authority of New York & New Jersey, conducted an in-depth survey of users of the George Washington Bridge, the Holland Tunnel, and the Lincoln Tunnel. For these crossings, the cash automobile toll is $4.00 at all facilities.[126] The toll is paid in one direction only and is effectively a round-trip toll.[127] According to a survey of roughly 4,700 bridge and tunnel users, a peak price of $6.00 at the Lincoln and Holland Tunnels between the peak hours of 6:00 a.m. and 9:00 a.m. would reduce morning peak delays by roughly 30 percent.[128] This is a significant reduction in travel delays, with a price increase of 50 percent. The survey did not quantify the projected air quality improvements, but they would be expected to be significant in light of the disproportionate impact that idling vehicles have on air quality, compared to vehicles moving at the speed limit.[129]

Under ISTEA, congestion pricing pilot programs are currently underway in San Diego, Orange and Sonoma Counties, California, Houston, Texas, Minneapolis, Minnesota, Fort Myers, Florida, Portland, Oregon, Boulder, Colorado, and Westchester County, New York. With the exception of the Orange County, San Diego, and Westchester County programs, the remaining programs are in the study/design phase and have yet to be implemented.[130] What follows is a brief description of the leading programs.

1. Orange County, California - State Road 91

The congestion pricing program on State Road ("SR") 91 is of particular interest. This project, which is the first of its kind, is the product of a private sector consortium and thus did not suffer the fate

125. *See Overview*, *supra* note 49, at 8 (describing public acceptance of congestion pricing on congested roadway into Los Angeles).

126. *See* CALIPER CORP., *supra* note 18, at 1.

127. *See id.*

128. *See id.*

129. *See id.* at 57; *see also id.* at 5 n.1.

130. The projects in Houston, Texas and Minneapolis, Minnesota are expected to commence in late 1997. The Fort Myers, Florida project is approved for implementation in the spring of 1998. Telephone Interview with John Berg, Team Leader, Federal Highway Administration (Sept. 29, 1997).

of other projects which died for lack of approval by local officials.[131] SR 91 provides a major commuter link between residential and employment centers in Orange, Riverside, and San Bernardino Counties. From 1980 to 1994, the existing eight-lane highway experienced an annual compound traffic growth rate of 6 percent to reach 255,000 daily vehicles.[132] Beginning in December 1995, the State contracted with a private operator to construct, finance, and operate a project which would add four new lanes of capacity, termed "ExpressLanes," along 16 kilometers in the median of the highway.[133]

To encourage ridesharing, vehicles with three or more passengers are exempt from the ExpressLanes tolls. All others pay for using the ExpressLanes. The costs vary by time of travel, ranging from $.50 to $2.75 per trip.[134] In addition, frequent users were allowed to pay a $15.00 monthly fee and receive a $.50 discount per trip, independent of time of day.[135] All fares are automatically deducted from each customer's pre-paid account using electronic "read-write" transponders mounted on the car windshield. Currently, over 86,000 motorists have established an ExpressLanes account and are equipped with transponders.[136]

In its first year of operation, the ExpressLanes concept has been well-received by the community. A recent poll conducted by the California Polytechnic Institute at San Luis Obispo indicates that the project is given favorable ratings by 65 percent of the ExpressLanes customers, 62 percent of the free ExpressLanes users, and 53 percent of the drivers in the adjacent freeway lanes.[137] ExpressLanes users reportedly can save up to twenty minutes in commute time.[138] The movement of single-occupant vehicles into priced lanes has made a measurable improvement in traffic flow in the "free" lanes. The facility's operator, the California Private Transportation Company, indicates that over 5.7 million vehicles were carried on the facility

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131. *See Guidelines*, *supra* note 1, at 20. Since SR 91 is a private consortium, it is not an official "pilot project" receiving federal funding under the ISTEA program, but its progress is being monitored by ISTEA staff. Telephone Interview with John Berg, *supra* note 130.

132. *See Overview*, *supra* note 49, at 8.

133. *See id.*

134. *See id.*

135. *See id.*

136. *See id.*

137. *See id.*

138. *See Overview*, *supra* note 49, at 8.

during 1996, with just under 1 million trips during the first quarter of the year, to nearly 2 million trips during the year's fourth quarter.[139]

2. San Diego - Interstate 15

On December 2, 1996, an existing 13 kilometer HOV facility in North San Diego was opened to a limited number of paying single motorists during morning and evening peak hours.[140] Prior to December 1996, usage of the HOV facility was limited to carpools of two or more passengers, which resulted in underuse of the facility. With the start of this project, carpools ride at no charge, and single motorists use the HOV lane at a *monthly* rate.[141] This rate began at $50 and was raised in March 1997 to $70.[142]

A recent report by the San Diego local planning unit indicates a steady increase in permit sales for the use of the HOV lane[143] in spite of increases in the price of the monthly permit. Ninety-four percent of those surveyed used I-15 to get to and from work, indicating that steady users valued the time savings involved in using the HOV service.[144]

3. Westchester County, New York

The Tappan Zee Bridge is a major east-west link into lower Westchester County and New York City. Peak-hour congestion is a persistent problem on the bridge, with volumes in the range of 7000 vehicles per hour during the morning peak period.[145] In July 1997, peak-period fees were introduced for trucks using the Tappan Zee Bridge.[146] Under the new pricing arrangement, truck tolls were essentially doubled, with the average tolls (on a per-axle basis) going from $10 per vehicle to $20 during the peak morning hours.[147] New York State, working with local transportation planners, recently began a study of congestion pricing among all vehicle users on the Tappan Zee and at a key Thruway crossing at Spring Valley, north of

139. *See id.*

140. *See id.* at 6.

141. *See id.* at 7.

142. Telephone Interview with Karen Schmidt, Program Administrator, Federal Highway Administration (Aug. 26, 1997).

143. *See* SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG), I-15 CONGESTION PRICING PROJECT 5 (1997).

144. *See id.* at 7.

145. Telephone Interview with Will Ristau, Transportation Analyst, New York State Thruway Authority (Aug. 5, 1997).

146. *See id.*

147. *See Overview*, *supra* note 49, at 16.

Westchester County.[148] The study is slated for completion in mid-1998.[149]

4. Houston,Texas

Beginning in late 1997, 21 kilometers of Interstate 10's Katy Freeway's HOV facility in Houston, Texas will be opened during peak hours to carpools of two passengers (HOV-2) for a fee of $2.00 per trip.[150] The implementation of this project is a result of a two-year feasibility study funded by the Federal Highway Administration Congestion Pricing Pilot Program.[151] The project, to be marketed as "QuickRide," will be fully automated using windshield-mounted transponders to deduct the $2.00 charge from qualified, two-person carpools.[152] The project will include a monitoring and evaluation effort to compare data collected before and after implementation of the project.[153]

5. San Francisco Bay Bridge

The San Francisco-Oakland Bay Bridge was the first congestion pricing project approved under the ISTEA Congestion Pricing Pilot Program in 1993.[154] It has yet to be implemented. The local Metropolitan Transportation Commission and the California Department of Transportation evaluated peak period tolls, off-peak toll discounts, and expanded transit on the Bay Bridge.

The current toll is a flat price of $1.00 for all westbound automobiles.[155] After extensive evaluation, the project proposed a peak period toll of $3.00 for westbound traffic during morning and evening peak periods while keeping the off-peak toll at the current level.[156] Although the Metropolitan Transportation Commission approved the proposal at the end of 1994, the California Legislature, which also must approve it, has not acted so far.[157] The Department of Transportation should have completed installation of electronic

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148. *See id*.

149. *See id.* at 15-16.

150. *See id.* at 9.

151. Telephone Interview with Mike Leary, Program Administrator, Federal Highway Administration (Aug. 5, 1997).

152. *See Overview*, *supra* note 49, at 9.

153. *See id.*

154. *See Guidelines*, *supra* note 1, at 20.

155. *See id*.

156. *See id*.

157. *See Overview, supra* note 49, at 12.

tolling in 1997, but congestion pricing has yet to go into effect because of state legislative opposition.[158]

B. *What is an appropriate price structure for congestion pricing?*

A pilot program with data showing road use during peak and off-peak hours would be the best way to "test" an appropriate pricing structure. To what extent does a change in price affect roadway use?[159] The data collected to date suggest that moderate price increases per mile driven on congested roadways, on the order of 27 cents per mile (in the case of SR 91), can substantially reduce congestion.[160] This is consistent with the impact of peak pricing on the use of other goods, like telephones, electricity and airplane landings, which have been in place for many years.[161]

The data on congestion pricing pilot programs are consistent with data on employer-provided parking subsidies.[162] The data indicate that the ending of employer-provided parking subsidies of employee parking affects the behavior of single-occupancy users.[163] If the average parking subsidy is a modest $3.87 per trip, the ending of that subsidy shifts single-occupancy users into carpool arrangements at a rate of 23 percent.[164] This is similar to congestion pricing data which suggests that peak prices that exceed off-peak prices by $2.00 per trip shift a substantial number of roadway users out of peak use.[165]

C. *How do communities build pubic support for congestion pricing?*

The lack of widespread implementation to date can ultimately be traced to lack of public support for the concept. Sharply conflicting values often accompany environmental policy making.[166] Congestion pricing is a good illustration. It is a bitter pill for individual peak users, but as a policy, it may improve driving conditions and air quality for the community as a whole.

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158. *See id.*

159. *See* JOHN KAIN, *Impacts of Congestion Pricing on Transit and Carpool Demand and Supply*, *in* 2 CURBING GRIDLOCK 502, *supra* note 1. Kain suggests that the costs and benefits of implementing congestion pricing may differ greatly from one metropolitan area to another.

160. *See Overview*, *supra* note 49, at 8. *See also* CALIPER CORP., *supra* note 18, at 59-60.

161. *See* GILLEN, *supra* note 103, at 147-48.

162. *See* DONALD C. SHOUP, *Cashing Out Employer-Paid Parking in* 2 CURBING GRIDLOCK, *supra* note 1 at 152, 152-99.

163. *See id.* at 157.

164. *See id.* at 155-59.

165. *See Overview*, *supra* note 49, at 9-10.

166. *See* Latin, *supra* note 20, at 1648.

Public resistance to congestion pricing is understandable for the following reasons. First, the automobile is considered central to the American dream and represents the quintessence of personal freedom.[167] Attempts to price roadways strike at the heart of what was previously considered free as a matter of right. Second, the pricing of roadways, either through uniform tolls or congestion tolls, is seen as another form of taxation, a price that users have to pay even if they have little choice in their use of the road.[168] Third, there is a popular misconception that the setting of variable prices will not affect drivers' behavior.[169] Fourth, the required registration of vehicles and the monitoring of vehicle movements is seen as an invasion of privacy.[170]

At the same time, congestion pricing is likely to receive greater acceptance in regions where tolling and electronic toll collection already exist. For example, in the Houston area, where the Katy Freeway is about to introduce congestion pricing, tolling is already in place in other nearby county highways, Beltway 8 and the Hardy Toll Road.[171] This is also the case in Westchester County where peak pricing for trucks is underway. In addition, the concerns about privacy should no longer be connected solely to congestion pricing because the system of electronic tolls will require individual motorist accounts whether or not congestion pricing is implemented.[172]

D. *The imposition of congestion pricing raises equity concerns.*

Proposals to adopt peak pricing raise equity concerns for those road users who cannot afford to pay peak prices.[173] Opponents argue that congestion pricing will permit users with high incomes to travel at the most convenient (peak) times whereas users with less resources will be forced to travel at less convenient times at off-peak rates.[174] In the case of projects like I-15 in San Diego, it may well be that single-driver, higher-income users are choosing to pay the premium to drive on the HOV lane, which was previously available only to car pools.

167. *See* Komanoff, *supra* note 35, at 123.

168. *See* Gillen, *supra* note 103, at 118.

169. *See id.* at 117-18.

170. *See id.* at 118.

171. Telephone Interview with Mike Leary, *supra* note 151.

172. *See, e.g.*, Neal Thompson, *E-Z Pass Hits New Jersey*, RECORD (Bergen County, N.J.), June 10, 1997, at A3.

173. *See* DOWNS, *supra* note 106, at 51.

174. *See id.*

There is little doubt that lower-income roadway users will be more sensitive to higher peak prices than higher-income users. This is true for a wide variety of goods that are priced on a peak-usage basis, e.g., telephones, air travel, and electricity.[175] The distinctive concern with roadways is that lower-income users may have little choice in setting their traveling hours. If one assumes that lower-income users are more sensitive to price increases than higher-income users, the concern would be that lower-income users would bear the brunt of higher peak prices and "only Lexus owners" would be cruising through a peak-priced roadway.[176]

The limited data on pilot programs does not appear to address this important issue. Initial data on the SR 91 project seems to indicate that the demographic characteristics of the ExpressLanes users who pay to use it are no different than those who use the non-toll lanes.[177] However, more information on possible shifts in travel behavior for lower-income motorists is sorely needed. Impacts would be harshest for households with the least flexibility, e.g., multiple-worker households or households with young children.[178] Working women are more likely to have significant schedule constraints than men, and thus may be disproportionately affected by such policies.[179]

A methodical assessment of the equity impacts of congestion pricing is a difficult task. An assessment is appropriate only if it can be compared with the impact of existing transportation policy. As set forth in the Transportation Research Board study, no such analysis of the distributional impacts of transportation policy has been completed since the mid-1980s.[180] However, other aspects of transportation policy, e.g., the price of fuel and the imposition of a gasoline tax, would fall more heavily on lower-income persons.

Establishing a baseline is only the first step in evaluating the equity effects of congestion pricing.[181] The second challenge is to

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175. *See generally* Gillen, *supra* note 103.

176. *See* DOWNS, *supra* note 106, at 51; Telephone Interview with Mike Leary, *supra* note 151 (describing focus groups' objections to imposition of congestion pricing).

177. Telephone Interview with John Berg, *supra* note 130 (describing observation that working mother in a rush to pick up a child at day care will willingly pay the $2.75 trip fee rather than the day care penalty for being late).

178. *See* GENEVIEVE GIULIANO, *Equity and Fairness Considerations of Congestion Pricing*, *in* 2 CURBING GRIDLOCK, *supra* note 1, at 275.

179. *See id.* at 252.

180. *See id.*

181. *See id.*

estimate the response to a specific pricing proposal.[182] With projects underway affecting private motorists in San Diego and Orange County, California, data on distributional impacts should be collected and methodically analyzed.

Assuming a distributional impact is found among lower-income motorists, the electronic toll system with individual user accounts does permit for income-based rebates. Accordingly, motorists who earn below a certain income level could be eligible for rebates based on their annual usage. This is an important technological breakthrough which allows communities that implement congestion pricing to correct for the impact on lower-income users.[183]

E. *Stronger incentives are required for localities to move forward with congestion pricing.*

As we have seen, much study but little implementation has characterized congestion pricing, fully six years after ISTEA provided federal funding for up to 80 percent of programming.[184] Clearly, stronger incentives are required to turn public opinion and build public support for congestion pricing. One of the most important incentives is continued federal funding of congestion pricing programs.

From 1992 to 1997, ISTEA provided funding of up to $25 million annually to support Federal participation in congestion pricing projects.[185] However, in 1995 Congress rescinded the unused balance of pilot program funds for Fiscal Year 1995, and transferred authorizations for FY 1996 and FY 1997 to other purposes. This loss of funds means that pilot program funds are not currently available for new project starts or to support additional implementation efforts after completion of current "pre-project" studies.[186] Continued federal support is obviously critical to maintain at least the current level of pilot pricing activity.[187]

A second incentive for successful implementation of congestion pricing would be a rebate program for individuals who shift their

182. *See id.*

183. *See Overview, supra* note 49, at 10.

184. *See generally id.* at 7-16.

185. *See id.* at 1.

186. *See id.* at 2. Congress is currently considering additional funding for Fiscal Year 1998 in the current Transportation Reauthorization Bill. Telephone Interview with John Berg, Team Leader, Federal Highway Administration (Sept. 16, 1997).

187. *See* discussion *infra* pp. 117-21.

motor vehicle use from peak to off-peak hours. This would directly reward the behavior of users who refrain from driving in peak hours. Such a rebate is administratively feasible because of the electronic toll system which requires individual motorist accounts.[188] It may also serve in the long run to encourage employers to adopt more flexible work schedules so that their employees are not uniformly on the road during peak hours.

Third, the introduction of congestion pricing on one class of vehicles only as a test of the program will probably lead to greater acceptance. For example, trucks contribute disproportionately to air pollution, infrastructure wear and tear, and congestion. Federal tailpipe emissions for trucks lag behind those for cars.[189]

The public is more likely to be accepting of a program that impacts trucks because of the general perception that trucks contribute disproportionately to roadway congestion. In addition, because congestion adds to travel time, efforts to shift traffic from peak to off-peak hours would reduce the cost of moving goods.[190] Congestion pricing targeting trucks would encourage the scheduling of trips more efficiently, and thus could result in overall productivity increases.[191] Thus, a program which begins with the congestion pricing of trucks is more likely to be a successful "test" of the system and gain public acceptance.[192]

CONCLUSION

Despite some of the uncertainties associated with implementing congestion pricing, the benefits of implementation are likely to outweigh its costs. The failure of our major metropolitan areas to attain the air quality goals of the Clean Air Act is well-documented. The preliminary results for the programs that are just underway in California and Westchester, New York are consistent with the economic theory that when users are required to pay for the congestion they impose in peak hours, the number of peak-hour trips is reduced.[193]

Reducing congestion would improve air quality because reductions in vehicle miles traveled would reduce running emissions.

188. *See, e.g., Overview*, *supra* note 49, at 9.
189. Telephone Interview with Will Ristau, *supra* note 145.
190. *See* Giuliano, *supra* note 159, at 268.
191. *See id.*
192. Telephone Interview with Will Ristau, *supra* note 145.
193. *See generally Overview*, *supra* note 49, at 8-16.

Further, if the average speed of travel on a freeway were increased from 30 to 50 mph, emission models predict a decrease in gram/mile emission rates for carbon monoxide and hydrocarbons, although emissions of nitrogen oxide may increase.[194] Congestion pricing would be likely to improve traffic flow and reduce overall emissions.[195] The significant acceleration and deceleration associated with "stop and go" traffic appear to contribute to dramatic increases in emission rates during peak travel times.[196]

Aside from air quality impacts, the time and cost savings to roadway users, in this era of growing road rage, are also compelling reasons to move forward with congestion pricing. Congestion pricing by itself will not bring the vast areas of this country that are in nonattainment magically into attainment.[197] However, in combination with other tools, including the introduction of zero-emission vehicles, improved mass transit, and stronger enforcement, attainment over time can be achieved.

194. *See* GUENSLER & SPERLING, *supra* note 1, at 371. Since emissions of oxides of nitrogen contribute to ozone formation, evaluating the impact on emissions is especially critical in areas in non-attainment for ozone. *See id.* at 372.

195. *See id.*

196. *See id.*

197. *See generally* Latin, *supra* note 20, at 1685-86 (describing obstacles to attaining goals of Clean Air Act).