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## **LOOKING BEYOND ECO: ALTERNATIVES TO EMPLOYER-BASED TRIP REDUCTION**

by  
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### **EXECUTIVE SUMMARY**

Even as the U.S. EPA distances itself from enforcement of the Employee Commute Options requirements of the Clean Air Act, Metropolitan Planning Organizations (MPOs) face an interesting challenge in designing and implementing transportation control measures that will not only clean the air and reduce traffic congestion, but will also satisfy the ambient air quality standards of the Clean Air Act.

To reduce the air pollution contribution of mobile sources, several metropolitan planning organizations are turning to employer-based trip reduction measures patterned after California's Regulation XV, partly because it is available "off-the-shelf," partly because of claims regarding its success made by some Southern California regulators, and partly because the EPA has only recently backed away from enforcement of Employee Commute Options requirements, and it was only one of a few historically acceptable methods of satisfying that requirement. The full story of Regulation XV's failings is still being written, however, and many metropolitan planning organizations with similar transportation control measures in the pipeline are unaware of the regulation's dysfunctionality, high cost, and unpopularity.

Fortunately, the path blazed by Regulation XV is not the only path available to metropolitan planning organizations trying to reduce commuter vehicle emissions. Thanks to recent EPA statements regarding Employee Commute Options, and the flexibility that EPA has promised to apply in consideration of Employee Commute Option satisfaction, metropolitan planning organizations can avoid the mistakes of the past and implement transportation control measures such as congestion pricing, parking cash-out, paratransit deregulation, and fleet cleanup, each of which carry far more promise than Regulation XV ever did.

In some cases, EPA's newly defined flexibility allows metropolitan planning organizations to implement regional measures that may minimize or alleviate the need for Employer Trip Reduction measures akin to Regulation XV altogether. In cases where such measures are still required, EPA's newly declared flexibility allows implementation in ways that can produce vastly superior performance while providing greater flexibility to both employers and employees with regard to commuting behavior.

## I. INTRODUCTION

In January of 1994, employer-based trip reduction (ETR) programs became mandatory in nine major urban areas that meet the Clean Air Act's definition of "severe ozone nonattainment areas." Such areas must implement employer trip reduction programs, pursuant to the Employee Commute Options (ECO) provisions of the 1990 Clean Air Act Amendments.<sup>1</sup>

The logic behind such measures is simple, and probably simplistic. The Employee Commute Options concept relies on the assumption that increasing the Average Vehicle Ridership (AVR)\* of the commuter fleet will result in fewer cars on the road and, consequently, less pollution in the air. As the most readily available point of control for commuter behavior, employers must produce these increases in Average Vehicle Ridership among their employees using a variety of incentives and disincentives to alter commute behavior. California's Regulation XV (Reg. XV) is, arguably, the most broadly implemented, best-known and most studied example of one such transportation control measure which satisfies the Employee Commute Options requirements.

Many Metropolitan Planning Organizations (MPOs) are turning to variants of Reg. XV, partly because it is available "off-the-shelf," partly because of claims regarding its implementation made by some Southern California regulators, and partly because the Environmental Protection Agency (EPA) has already accepted it in satisfaction of the Employee Commute Options requirements of the Clean Air Act. However, the full story of Reg. XV's failings is still being written, and many MPOs are unaware of the regulation's dysfunctionality, high cost, and unpopularity.

On the brighter side, recent EPA clarification presents the possibility of implementing measures on a region-wide basis that might allow an MPO to implement a minimalist approach to Employee Trip Reduction programs, thus minimizing the impacts of such programs upon their business communities, many of which are already straining under a considerable regulatory burden.<sup>2</sup> These newly acceptable programs have the potential for considerably greater pollution-reduction effectiveness as well as greater cost-effectiveness in producing the primary goal: **cleaner air**.

This paper offers public officials, especially those in MPOs, an informed guide to alternatives to the Reg. XV approach that are effective, efficient, and preserve individual choice, rather than relying on traditional mandate-driven solutions. Transportation/air pollution control measures such as congestion pricing, parking cash-out, deregulation of paratransit systems, and "gross polluter" identification and scrappage programs, have shown great potential for success in both theoretical and pilot studies, and have the potential to vastly out-perform Reg. XV style measures.

This paper also discusses several nontransportation measures that could reduce the need for some types of auto trips, thus bringing entire regions closer to reaching the AVR levels specified in the Clean Air Act. Reform of zoning laws to legalize home-based businesses and neighborhood retail stores, facilitation of telecommuting and remote work centers can all contribute to increasing a region's AVR levels, reducing the need for draconian trip reduction measures.

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<sup>1</sup> *Clean Air Act Amendments*, Public Law No. 101-549, 104 Stat. 2399, 1990.

\* The term Average Vehicle Occupancy (AVO) is often used to describe this ratio. AVR is chosen here for consistency, due to its use in Reg. XV.

<sup>2</sup> Browner, C., Letter to Senator Lautenberg (and attachments), *United States Environmental Protection Agency*, June 1994.

## II. EMPLOYEE COMMUTE OPTIONS (ECO) REQUIREMENTS OF THE CLEAN AIR ACT AMENDMENTS OF 1990

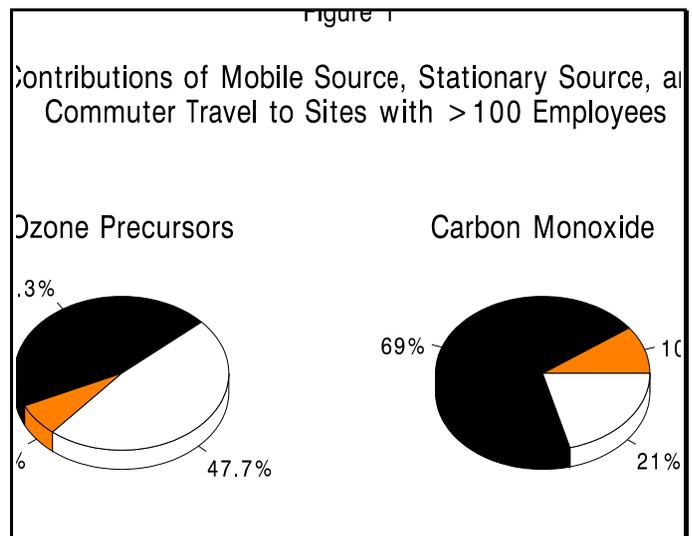
As part of the Clean Air Act's strategy for reducing emissions from mobile sources, provisions of the 1990 amendments to the Clean Air Act require the implementation of Employee Commute Options (ECO) programs in nine "severe" nonattainment regions across the United States, including areas in ten states: Texas, New York, New Jersey, Illinois, California, Maryland, Connecticut, Indiana, Wisconsin and Pennsylvania.<sup>3</sup> "Severe" non-attainment regions are characterized by levels of low-level Ozone in excess of 0.18 parts per million, usually measured over the course of at least one hour.<sup>4</sup>

The ECO requirement of the Clean Air Act requires companies with 100 or more employees to "reduce work related vehicle trips and miles traveled by employees," and stipulates that these employers must increase their "average passenger occupancy (same as AVR, as mentioned above) per vehicle in commuting trips between home and the work place... to a level not less than 25 percent above" the average for that region.<sup>5</sup> In past practice, this has meant the implementation of a transportation control measure (TCM) like Reg. XV, which requires employers to document and administer a complex program of incentives and disincentives designed to reduce the number of employees who drive to work alone.

These incentives/disincentives range from the trivial, such as distribution of local transit route maps, to the decidedly nontrivial, such as the construction and maintenance of shower and locker facilities for employees who might wish to bicycle to work. Trip reduction plans (TRPs), as they are called, usually include offering employees who rideshare a "guaranteed ride home" in case of emergency; carpool, vanpool, or mass-transit subsidies; regular drawings for cash and merchandise awards; installation of facilities for bicyclists and walkers; distribution of lists of potential rideshare partners ("matchlists"), and so on.<sup>6</sup>

Unfortunately, in the region where they have seen the greatest implementation—Southern California—such programs have not been reliably demonstrated to be effective in changing employee commute behavior significantly, either over the short term or the long term. Such programs have, however, been shown to be quite costly to the regulated community. (This will be discussed in greater depth later in this document.)

Supporters of ECO point to findings indicating that mobile source contributions to the air pollution problem have been considerably underestimated as justification for the imposition of stringent commuter transportation control measures. Recent studies have indeed indicated that mobile source contributions may amount to 80 percent of the ozone and carbon monoxide in metropolitan areas.<sup>7</sup> Commuters, however, represent only a



<sup>3</sup> Solomon, C., "Head-On Collision," *Wall Street Journal*, September 8, 1994.

<sup>4</sup> *Clean Air Act Amendments*, Public Law No. 101-549, 104 Stat. 2399, 1990.

<sup>5</sup> *Clean Air Act Amendments*, Public Law No. 101-549, 104 Stat. 2399, 1990.

<sup>6</sup> *Trip Reduction Ordinance Handbook (Draft Final)*, South Coast Air Quality Management District, May 1993.

<sup>7</sup> St. Denis, M.J., et al., "Effects of In-Use Driving Conditions and Vehicle/Engine Operating Parameters on Off-Cycle Events: Comparison with Federal Test Procedure Conditions," *Journal of the Air and Waste Management*

small fraction of total mobile source contributions.

Figure 1 shows the relative contribution of mobile and nonmobile pollution sources to the South Coast Air Basin in the 1990 base year as used in planning calculations by the South Coast Air Quality Management District. Contributions from work-trips that could be affected by ETR programs are shown in black. Even if mobile sources are confirmed to produce a greater percentage of the total volume of air pollution (and there is considerable evidence suggesting this), commuter trips, it is clear, will still be only a small component of a large problem.

While EPA has stated it will show some flexibility in evaluating ECO program acceptability, reduction of air pollution levels as required by the Clean Air Act is neither voluntary nor optional. Whether they rely on employer-based transportation control measures or not, metropolitan planning organizations are mandated to implement TCMs that are designed to satisfy those requirements, as judged acceptable by state and local environmental regulatory agencies entrusted with Clean Air Act enforcement by the EPA.

### III. WHAT DOES THE EPA REQUIRE AN MPO TO DO WITH REGARD TO ECO?

In recent months, EPA has steadily backed away from ECO enforcement. In a letter to Senator Frank Lautenberg, intended to clarify EPA's position on ECO and to reassure nervous lawmakers, EPA administrator Carol Browner reaffirms that the EPA interpretation of the Clean Air Act does require "large employers in the ten metropolitan areas with the worst ozone or carbon monoxide pollution to implement company-based programs to reduce solo driving by their employees."<sup>8</sup> Browner then goes on to describe the "flexibility" which EPA will use in evaluating a region's ECO measures to determine whether such measures satisfy the ECO requirements of the Clean Air Act. Browner emphasized three points of EPA interpretation of the ECO requirement:

- "There is nothing in the Clean Air Act that would force an employee to change commuting habits." In other words, ETR programs cannot justify implementing mandatory rideshare requirements upon employees based on the Clean Air Act, though employees may be given incentives to do so.
- "Employers who try but fail to meet trip reduction goals should not be penalized." In this section, while Browner states that EPA encourages the adoption of ECO programs that do not penalize employers for failing to meet trip reduction goals, she does not say that EPA will **disallow** programs that do so, as several "performance level" type regulations require.<sup>9</sup>
- "Failure to meet trip reduction goals would not trigger Clean Air Act sanctions against states. Sanctions... would **not** be levied based on the failure of an ECO program to reduce commuter trips or emissions as much as projected" [emphasis is Browner's]. Here, Browner is clearly trying to reassure MPOs and state governments that nonsatisfaction of the ECO requirements is not considered grounds for loss of highway funds, or mandated reductions in other sources at higher levels. This is very good news for MPOs in light of the minimal success shown in producing lasting increases in Average Vehicle Ridership (AVR) across nonattainment areas.

Toward the end of the letter, Browner makes a statement of considerable importance to MPOs:

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*Association*, January 1994.

<sup>8</sup> Browner, C., Letter to Senator Lautenberg, June 1994.

<sup>9</sup> Giuliano, G. and Wachs, M., "Managing Transportation Demand: Markets Versus Mandates, Congestion Pricing for Southern California: Using Market Pricing to Reduce Congestion and Emissions," Reason Foundation, September, 1992.

*It is important to note that state and local agencies will decide whether employers' ECO plans are adequate to meet statutory requirements, and later whether employers have made good-faith efforts to achieve trip reduction goals. EPA will give substantial deference to these state and local agency determinations. The Agency believes that state and local agencies will use proper judgment in determining whether an employer's plan demonstrates that the trip-reduction goal will be met, and whether an employer has made a good-faith effort.*

Recent statements by EPA representatives further distance EPA from ECO enforcement. With regard to State implementation of employer trip-reduction plans, EPA Assistant Administrator Mary Nichols has told legislators that “We're not going to double-check those plans, we're not going to verify them. We're not going to enforce them.”<sup>10</sup>

In summary, while the Clean Air Act requires MPOs to implement TCMs to reduce mobile source emissions, recent EPA statements imply that the federal government does not require them to waste their limited resources implementing draconian employer-based trip reduction measures. As we will discuss, there are far more effective alternatives available to MPOs trying to reduce mobile source emissions, both from commuter and noncommuter vehicles.

#### **IV. WHY NOT USE CALIFORNIA'S REG. XV AS MODEL LEGISLATION?**

Many of the metropolitan areas which have recently fallen under the ECO requirement (such as Houston and San Francisco)<sup>11</sup> are turning to variants of Southern California's Reg. XV as a model ETR measure, even while the South Coast Air Quality Management District's own review board has proposed to virtually scrap the concept in favor of a system based on the identification and scrapping of gross polluters.<sup>1213</sup> The Reg. XV approach is complex, costly, and only minimally effective. These characteristics argue strongly against the adoption of this regulation as a model TCM to satisfy the ECO requirements of the Clean Air Act.

##### **A. What Does Reg. XV-style ETR Require?**

Reg. XV is the oldest legislation of this kind in the United States, implemented in 1988 in the South Coast Air Basin of Southern California. The effects of Reg. XV implementation have been extensively scrutinized by planners, university researchers, consulting companies and research foundations.

Reg. XV requires employers with 100 or more employees to:

- Develop and implement a biennial trip reduction plan for those employees who report to work between 5:00 a.m. and 11:00 a.m. These plans, which may reach 100 pages in length, are evaluated and approved or disapproved by a specially designated cadre of plan evaluators at the South Coast Air Quality Management District who determine whether a plan is “likely” to produce the required increase in AVR called for by the regulation. Employers also must submit an “annual analysis” which is used by the agency in evaluating whether a plan needs revision prior to its biennial renewal date. Plan reviewers also have authority to make recommendations regarding rideshare program composition

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<sup>10</sup> Associated Press, *EPA Backs Off Commuter Plan*, Clarinet News Service, January 20, 1995.

<sup>11</sup> Lane, R., “The Commuter Police,” *Forbes*, December 20, 1993.

<sup>12</sup> Inside Cal/EPA, *South Coast Adopts Novel Rideshare Options Over EPA Objections*, Vol. 5, No. 47, November 1994.

<sup>13</sup> Mullen, Liz, “AQMD Eyes Fee for Motorists on Each Mile Driven,” *Los Angeles Business Journal*, Vol. 16, No. 43, October 31–November 6, 1994.

that would make the plan more acceptable to the agency. If a plan is not accepted, it must be revised and resubmitted to the agency within 30 days. Failure to submit an acceptably revised plan within 30 days of the initial notification of plan rejection is cause for penalty under the regulation, of \$25,000 per day, per site.

- Offer a broad range of incentives to promote employee ridesharing, such as flexible work hours, guaranteed ride home programs, prize drawings, “start-up” incentives to promote first time ridesharers, carpool and vanpool subsidies, rideshare newsletters, orientations for newly hired employees, rideshare fairs, and so on.
- Designate “trained employee transportation coordinators” (ETCs) to prepare and implement the plan. Training requirements for ETCs are spelled out in considerable detail in the regulation and are not trivial, requiring an initial training program and annual update training administered by a certified trainer. Certified trainers must hold a current certificate as an ETC, a bachelors degree in transportation/urban planning, two years of professional training experience, and three years of managerial experience in transportation demand management.
- Design a plan which includes an inventory of current measures used by the employer to increase Average Vehicle Ridership (AVR), a verifiable estimate of the current AVR at the worksite, and a list of incentives that the employer would commit to undertake which could reasonably be expected to achieve the AVR target within 24 months of approval. The regulation contains extensive guidelines detailing the methodology to be used in performing annual employee commute mode surveys, calculation of AVR, employee notification, annual analysis of plan effectiveness, and other aspects of plan development, and implementation.

Given this level of compliance complexity, it is no wonder that ETCs have been described as a “new class of professionals” by experts in the transportation field!<sup>14</sup>

## **B. Problems with the Reg. XV Approach**

Numerous studies have shown the problems with the Regulation XV approach to be manifold. The major negative findings with regard to Reg. XV are that the regulation is:

### *1. Poorly Targeted*

Because of its focus on large employers, the Reg. XV approach affects a relatively small percentage of the commuter fleet. Based on experience in Los Angeles, studies show that work trips to major employment sites (of 100 or more employees) only account for about 40 percent of total work-related travel.<sup>15</sup> Work-related travel, in turn, only represents approximately 26 percent of all trips and 32 percent of vehicle miles traveled on an average annual basis. Thus, ETR programs can only affect about 10 percent of daily trips, and 13 percent of daily VMTs. Full attainment of a 25 percent increase in average vehicle ridership would produce only a 2–3 percent reduction in trips, and perhaps a 3–4 percent decrease in daily VMT.<sup>16</sup> Further, even as studies indicate that mobile sources contribute the majority of pollutants to urban air, other studies have documented that over 50 percent of the pollution coming from

<sup>14</sup> Wachs, M., and Giuliano, G., “Employee Transportation Coordinators: A New Profession in Southern California,” *Transportation Quarterly*, 46, No. 3., July 1992, pp. 411–427.

<sup>15</sup> Orski, K.C., “Evaluation of Employee Trip Reduction Programs Based on California’s Experience with Rule 1501, An Informal Report of the Institute of Transportation Engineers,” *Resource Papers for the 1994 ITE International Conference*, January 1994.

<sup>16</sup> Orski, K.C., “Evaluation of Employee Trip Reduction Programs Based on California’s Experience with Rule 1501, An Informal Report of the Institute of Transportation Engineers,” January 1994.

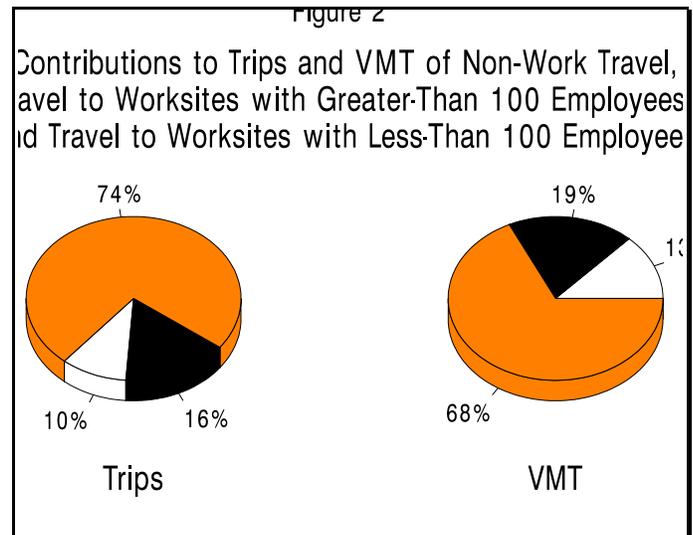
commuter vehicles is coming from less than 10 percent of the vehicles.<sup>17</sup> The Reg. XV approach does nothing to insure that these vehicles are identified, nor even that special emphasis is placed on getting these vehicles off the road. Given these limitations, then, it is not surprising that in three years of Reg. XV implementation, less than a 1 percent reduction in trips and VMT have been demonstrated, and likely even a lower reduction in vehicle emissions.<sup>18</sup>

Figure 2 graphically illustrates the small percentage of total trips and VMT which result from commuting to sites with 100 or more employees. As the figure shows, non-work trips, and trips to smaller employers constitute the vast bulk of trips and VMT in the South Coast Air Basin. While this is not, of course, absolutely representative of all the metropolitan areas which must implement ETR under ECO, it is reasonably likely to be a good approximation.

## 2. Costly

Numerous studies have demonstrated the high cost of the Reg. XV approach to employee trip reduction.<sup>19</sup> Annual cost estimates for Reg. XV implementation have ranged widely, from a low of about \$12 per commuting employee per year to a high of \$750 per commuting employee per year. The most detailed studies, by Ernst and Young,<sup>20</sup> Giuliano and Wachs,<sup>21</sup> Keith Hwang,<sup>22</sup> and Green,<sup>23</sup> support Reg. XV cost estimates in the range of \$100 to \$400 per employee, per year. Interestingly, Green found that in practice at a large South Coast Air Basin aerospace company, nearly 70 percent of the spending to promote rideshare was used in program administration, rather than in program incentives. Ernst and Young estimated the full cost of compliance with Reg. XV in the South Coast Air Basin at \$136 million to \$197 million per year, and the EPA estimates the full cost of compliance with ECO in all of the severe nonattainment areas at \$1.2 billion to \$1.4 billion per year.

Table 1 extracted from Table 4 in a report by the National Association of Regional Councils illustrates the high cost of the Reg. XV approach compared to some of the alternatives discussed in this paper. Costs



<sup>17</sup> Bishop, G.A., et al., "A Cost-Effectiveness Study of Carbon Monoxide Emissions Reduction Utilizing Remote Sensing," *Journal of the Air and Waste Management Association*, 43:978-988, (July 1993).

<sup>18</sup> *Costs and Effectiveness of Transportation Control Measures (TCMs): A Review and Analysis of the Literature*, National Association of Regional Councils (NARC), January 1994.

<sup>19</sup> *Costs and Effectiveness of Transportation Control Measures (TCMs): A Review and Analysis of the Literature*, January 1994.

<sup>20</sup> Ernst and Young, "Rule 1501 Cost Survey," *South Coast Air Quality Management District*, August, 1992.

<sup>21</sup> Giuliano, G., Hwang, K. and Wachs, M., "Employee Trip Reduction in Southern California: First Year Results," *Transportation Research*, June 1992.

<sup>22</sup> Hwang, K., "Evaluating the Effectiveness of a Large-Scale Transportation Demand Management Program: A Case of Rule 1501 in Southern California," Doctoral Thesis *University of Southern California*, August 1992.

<sup>23</sup> Green, Kenneth P., "Costs of Compliance with Environmental Regulations: A Case-Study of Rule 1501 Compliance Efforts at Five Hughes Aircraft Company Business Units," Doctoral Dissertation, *University of California, Los Angeles*, May 1994.

are expressed as dollars per round trip avoided, where a round trip was defined as being a two-way work trip of 11 miles each way. Costs used in production of this table included “capital, operating and administrative costs” only. These costs, according to NARC, are the “costs of trying to get travelers to change their behavior or of enhancing efficiency of travel, incurred by governments or by employers responding to government regulations and pressure.” Notice that ETR measures are as expensive as major rail transit improvements, and bicycle/ pedestrian facility construction, both of which are among the least effective measures for decreasing vehicle trips or vehicle miles traveled.<sup>24</sup>

### 3. Unpopular

Opposition to Reg. XV has been vehement and highly vocal by members of the regulated community, leading to a characterization of the regulation by Henry Wedaa, chairman of the South Coast Air Quality Management District as their “most hated rule” and “least popular environmental program.”<sup>25</sup> As a result of the unpopularity, the regulation has been reviewed by two special committees, and is expected to be modified significantly as a result of these committee findings.

Table 1

Travel Cost-Effectiveness Estimates: Cost Per Vehicle Round-Trip Avoided in Dollars* Based on Literature Review**	
TCM	Cost-Effectiveness
Bicycle/pedestrian facilities	\$10.60
Employer trip reduction	10.30
Major rail transit improvements	10.00
HOV lanes	4.00
Congestion pricing	2.40
Parking pricing (work)	1.70

### 4. Distracts from More Viable Solutions

The focus on large, ambitious ETR programs often distracts MPOs as well as the regulated community from more viable solutions. Proposals for such measures as parking cash-out, telecommuting, credit for alternate fuel vehicles, and so on are all slowed down by the process of determining whether or not the proposal fits with the current ETR scheme and how it will be affected. Two-year debates with regulatory agencies over very minor points of ETR implementation are not uncommon, while proposals for more radical and potentially much more effective changes may be debated for three years or more before reaching even a pilot program. Also, it is clear that funds being spent on implementing and complying with minimally effective ETR regulations are not funds being used to conduct research and pilot test more promising solutions. Finally, the high cost, unpopularity, and lack of effectiveness so clearly visible in the Reg. XV approach may poison the waters when it comes to other environmental measures, causing a backlash which reaches considerably beyond the transportation control measure arena.

Notes:

\* Estimates are rounded to the nearest ten cents.

\*\* Cost-effectiveness estimates taken from NARC report. The NARC report concentrated on conservative estimates of both effectiveness and cost, which for the purposes of estimating overall TCM effect are superior to ranges which encompass both high and low values observed in literature.

## V. WHAT ALTERNATIVES DOES AN MPO HAVE TO THE REG. XV APPROACH?

### A. Promote Regional Measures

Numerous studies have shown that regional transportation measures such as congestion pricing and parking cash-out programs are both more equitable (putting the burden of higher cost on those who cause the most pollution) and more effective than the Reg. XV approach.<sup>26 27 28 29</sup> Trip reduction achievable

<sup>24</sup> *Costs and Effectiveness of Transportation Control Measures (TCMs): A Review and Analysis of the Literature*, January 1994.

<sup>25</sup> Price, D.A., “Newest Mandate—Everyone Into the Carpool,” *Wall Street Journal*, November 8, 1993.

<sup>26</sup> Wachs, M., “Will Congestion Pricing Ever Be Adopted?” *Access*, No. 4., Spring 1994, pp. 15–19.

through paratransit legalization is also more significant than that achieved through the current approach, and offers numerous other economic and social benefits as well.<sup>30</sup>

New technologies may further facilitate pollution-reduction on a regional basis. Pilot tests of “gross polluter” identification and repair programs are being conducted in Los Angeles, using remote sensing systems at freeway on-ramps and at entrances to employee parking lots.<sup>31</sup>

Each of these measures and methodologies have been the subject of several studies, and a few of them, such as congestion pricing and parking cash-out, have been the subjects of more than a few books. The following short summaries of each of these measures will, it is hoped, convey both the substance of the measure and an indication of the promise that each measure holds for contributing to cleaner air as an adjunct to, or replacement of, Reg. XV-style legislation.

### 1. Congestion Pricing

*We know it [congestion pricing] works, and we readily accept it in other parts of our daily lives: the telephone company has long varied the price of a call by time-of-day and day-of-the-week; airline fares between the East and West Coasts can differ by as much as a thousand dollars depending upon the timing of the trip: many restaurants offer early bird specials and movies give matinee discounts...I am persuaded by the evidence that congestion pricing should be applied to our highway system.*<sup>32</sup>

This is how Martin Wachs, an expert on congestion pricing, frames the issue. Wachs, who has been involved with Reg. XV since its inception, recently chaired the “Committee for Study on Urban Transportation Congestion Pricing,” formed by the Transportation Research Board and the Commission on Behavioral and Social Sciences and Education of the National Research Council at the request of the Federal Highway Administration. The committee, composed of leading authorities on transportation issues from the United States and Japan, with nonvoting representation by industry and advocacy group liaisons, recently published a two-volume report in 1994 which unequivocally endorsed the implementation of congestion pricing at both state and federal levels.<sup>33</sup>

Congestion pricing is the practice of transmitting the true cost of transportation to the end-users as directly as possible, through such mechanisms as road tolls, Vehicle Miles Traveled (VMT) fees, parking cash-out (which will be discussed separately) and so on. Congestion pricing allows factors such as time-dependent or seasonal patterns of air pollution and congestion levels to be folded into the pricing of automobile use along with infrastructure costs, which are now paid for (or not paid for, depending on whose estimates one reads) through gasoline taxes and registration fees. Much like the time-and-traffic dependent pricing

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<sup>27</sup> *Market-Based Solutions to the Transportation Crisis*, Bay Area Economic Forum, May 1990.

<sup>28</sup> Kessler, J. and Schroeder, W., “Meeting Mobility and Air Quality Goals: Strategies that Work” (draft), *U.S. EPA Office of Policy Analysis*, April 1993.

<sup>29</sup> Shoup, D.C. and Willson, R.W., “Commuting, Congestion, and Pollution: The Employer-paid Parking Connection, Congestion Pricing for Southern California: Using Market Pricing to Reduce Congestion and Emissions,” Reason Foundation, September 1992.

<sup>30</sup> Kessler, J. and Schroeder, W., “Meeting Mobility and Air Quality Goals: Strategies that Work” (draft), April 1993.

<sup>31</sup> Simon, R. and Ingram, C., “Polluters Beware: Smog Sentries Will Soon Be Manning Their Posts,” *Los Angeles Times*, October 10, 1994, Street Smart section.

<sup>32</sup> Wachs, M., “Will Congestion Pricing Ever Be Adopted?” *Access*, No. 4., Spring 1994, pp. 15–19.

<sup>33</sup> Committee for Study on Urban Transportation Congestion Pricing, National Research Council, *TRB Special Report 242: Curbing Gridlock, Volume 1* [of 2], National Academy Press, Washington, D.C., 1994.

already in place on information highways such as Compuserve, congestion pricing mechanisms on automobile highways could, by accurately transmitting the true cost of facility use to the consumer, reduce utilization of the roadways at currently underpriced or overcrowded times.

It should be understood that congestion pricing, as it is currently being studied, has little resemblance to the turnpike and tollbooth systems which most people think of when they read the word "toll roads." On the contrary, most of the congestion pricing systems currently under discussion are far less intrusive and inconvenient, replacing old-fashioned toll booths with electronic sensors and prepaid, or monthly-paid debit accounts linked to stickers or sensors affixed to automobiles. Nor does congestion pricing have to be limited only to certain roads, or distances traveled. In "zone pricing," for example, users are charged for travel anywhere inside of an electronically 'cordoned' part of a city.<sup>34</sup>

In what many authorities consider to be the most thorough and rigorous implementation of congestion pricing, Singapore's congestion pricing system has produced dramatic reductions in automobile trips into the central city area. When the system was implemented, trip reductions of up to 44 percent were observed during higher-priced "restricted" hours. Even after 20 years of strong economic and population growth, automobile trips to the city center are still 25 percent below the 1974 level, when the program was implemented.<sup>35</sup>

Conservative models of congestion pricing effectiveness in Southern California, with its more diffuse transportation network, have projected a 4-percent reduction in vehicle trips and a 5-percent reduction in VMT, nearly five times the observed effectiveness of Reg. XV.<sup>36</sup>

Table 2 shows the modeled reductions in trips, VMT, fuel, reactive organic gases (ozone precursors), carbon monoxide, nitrogen oxides, and carbon dioxide (a "greenhouse" gas), as a result of the implementation of congestion pricing alone, and in conjunction with other market-based methods.<sup>37</sup>

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<sup>34</sup> Committee for Study on Urban Transportation Congestion Pricing, National Research Council, *TRB Special Report 242: Curbing Gridlock, Volume 1*, Chapter 2., 1994.

<sup>35</sup> Hau, Timothy D., "Congestion Charging Mechanisms: An Evaluation of Current Practice."

<sup>36</sup> Harvey, Greig W., "Transportation Pricing and Travel Behavior," *TRB Special Report 242: Curbing Gridlock, Volume 2* [of 2], pp. 89–114, National Academy Press, Washington, D.C., 1994.

<sup>37</sup> Harvey, Greig W., "Transportation Pricing and Travel Behavior," *TRB Special Report 242...* National Academy Press, Washington, D.C., 1994.

Table 2

Overview of the South Coast Air Basin Pricing Study								
Strategy	Description	Percent Change from 2010 Mobile Source Baseline						
		VMT	Trips	Fuel	ROG	CO	NO <sub>2</sub>	CO <sub>2</sub>
Regionwide congestion pricing (level-of-service D/E), average \$0.15/mi.	An automatic vehicle identification (AVI) scheme would be used to price the regional freeway and arterial system to maintain level-of-service (LOS) D/E	-5.0 [± .7]	-3.8 [± .4]	-9.2 [± .9]	-8.2 [± .8]	-12.1 [± 1.0]	-8.4 [± 1.0]	-9.2 [± .9]
Regionwide employee parking charge, \$3.00/day	All workers in the region would experience a minimum \$3.00 (1991)/day charge for parking an automobile, pickup or van at the work place.	-1.5 [± .2]	-1.8 [± .3]	-1.7 [± .3]	-1.7 [± .3]	-2.1 [± .3]	-1.6 [± .3]	-1.7 [± .3]
Regionwide nonemployee parking charge, \$0.01/minute	All nonresidential parking lots and on-street spaces in commercial districts would be metered or gated for \$0.60/hr operation (\$3.00/day maximum) or converted to an equivalent pay-for-time scheme.	-3.5 [± .2]	-4.3 [± .4]	-3.5 [± .5]	-4.0 [± .5]	-4.2 [± .4]	-3.8 [± .5]	-3.5 [± .5]
Mileage- and smog-based registration fee (average \$110/vehicle)	Fees would be paid annually at the time of registration, based strictly on the calculated annual emissions for each vehicle (derived from the odometer reading and a representative measurement of tailpipe emissions)	-0.4 [± .2]	-0.7 [± .2]	-2.7 [± .4]	-4.1 [± .4]	-4.5 [± .4]	-5.0 [± .5]	-2.7 [± .4]
Deregulated private transit	Regulatory changes would remove legal restrictions on private shared-van transportation services. Private operations would emerge to provide access to the largest employment centers in the region, and in other heavily used corridors.	-1.8 [± .3]	-2.0 [± .3]	-1.9 [± .3]	-2.2 [± .3]	-2.2 [± .3]	-2.1 [± .4]	-1.9 [± .3]
Net for market-based strategies		-11.4 [±1.4]	-12.0 [±1.2]	-17.8 [±1.8]	-18.8 [±1.7]	-23.0 [±1.9]	-18.9 [±1.8]	-17.8 [±1.8]

## Notes:

VMT = automobile and private transit vehicle-miles traveled;  
 Trips = automobile vehicle Trips;  
 Fuel = gallons of fuel consumed;  
 ROG = emissions of reactive organics;

CO = emissions of carbon monoxide;  
 NO<sub>x</sub> = emissions of oxides of nitrogen;  
 CO<sub>2</sub> = emissions of carbon dioxide.

Each value represents the midpoint of the estimated range of effect. Numbers in brackets indicate variation above and below the midpoint, based on sensitivity tests of key parameters related to pricing (such as the travel cost coefficients). Accuracy of the estimates will depend as well on other uncertainties that are inherent in any travel forecasting exercise, such as in regional and subregional growth projections and in assumptions about future infrastructure investments.

Source: Cameron, M., "Transportation Efficiency: Tackling Southern California's Air Pollution and Congestion," Environmental Defense Fund & Regional Institute of Southern California, March 1991.

But congestion pricing is not an all-or-nothing, now-or-never option—it can be phased in gradually, as is currently planned for a five-mile stretch of State Route 520 in Puget Sound, Washington. Under a program administered by the Washington Department of Transportation, five miles of High Occupancy Vehicle lanes are slated to become High Occupancy/Toll (HOT) lanes.<sup>38</sup> The HOT lanes, which are currently under utilized, will remain free for buses and car pools of three or more but will also be available for use by those willing to pay a toll which will vary according to traffic congestion, and time-of-day. Tolls will be collected via electronic transponders purchased by those wishing access to the HOT lanes, which will be priced as appropriate to optimize travel speed and utilization. Revenues from the HOT lane tolls will be used to expand the HOT lane system, which could, over time, expand into adjacent free lanes according to demand.

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United Infrastructure Washington, Inc., "The Congestion Busters: Tacoma Narrows," *PW Financing*, September 1994, pp. 24–28.

One cannot do justice to a discussion of congestion pricing, however, without discussing the product of such systems: revenue. One can imagine many uses for such congestion pricing revenues, some of which have been proposed, and others which no doubt will be, such as rebuilding distressed areas of the city, subsidization of low-income workers, expansion and subsidization of mass transit systems, or replacement of dwindling general funds in federal, state, and local coffers. Kessler and Schroeer, in EPA's own Office of Policy Analysis, however, wisely stress the importance of using congestion pricing revenues for "reduced taxes and improved public services," in order to gain and preserve public acceptance of the concept.<sup>39</sup> This idea is given a hearty second in "Curbing Gridlock."<sup>40</sup>

## 2. *Parking Cash-out*

*Nine out of ten Americans who drive to work in major metropolitan areas park for free.*<sup>41</sup>

That is how Kessler and Schroeer summarize a panoply of studies which all show that the vast majority of automobile users across the United States are offered free parking as a benefit of traveling to work-sites. In the South Coast Air Basin, a study of Reg. XV plans from the first year of implementation in 1991 showed that 97 percent of the firms offered free parking to employees.<sup>42</sup>

Parking cash-out brings the cost of parking out of the shadows of corporate and business tax accounting, making it clearly visible to employees. Under current law, employers can offer free parking to employees as a job benefit, writing off the cost of supplying that parking against the companies' taxes. Parking cash-out offers an incentive to commuters to find alternatives to solo commuting, by offering them the cash-value of the parking spot which they are currently using in lieu of using that parking spot. In other words, the money that an employer would normally spend either in leasing of parking space, or in depreciation of the value of the parking space (which the employer can write off against taxes) is given directly to the employee, while the employer gets to recoup the lost income by using the space for other purposes (or, in conjunction with revised zoning requirements, eliminate the parking space altogether). It should be noted that in some cases, such as where a company already owns or holds long-term leases upon land currently used for parking which would not realistically be convertible to other uses, the company would, in effect, be forced to maintain and pay taxes on land which it could no longer use. Model parking cash-out ordinances exempt such businesses from a requirement of offering the cash-out option to employees.

Pilot studies of parking cash-out implementation have produced impressive results: one study demonstrated up to a one-third reduction in single occupancy vehicle usage to a major worksite as a result of parking cash-out alone,<sup>43</sup> while other case studies of the effectiveness of parking cash-out in reducing drive-alone rates have produced drive-alone reductions ranging from 7 percent to 44 percent.<sup>44</sup>

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<sup>39</sup> Kessler, J. and Schroeer, W., "Meeting Mobility and Air Quality Goals: Strategies that Work" (draft), April 1993.

<sup>40</sup> Committee for Study on Urban Transportation Congestion Pricing, National Research Council, *TRB Special Report 242: Curbing Gridlock, Volume 1*, Chapter 4, 1994.

<sup>41</sup> Kessler, J. and Schroeer, W., "Meeting Mobility and Air Quality Goals: Strategies that Work" (draft), April 1993.

<sup>42</sup> Shoup, D.C. and Willson, R.W., "Commuting, Congestion, and Pollution: The Employer-paid Parking Connection..." Reason Foundation, September 1992.

<sup>43</sup> Shoup, D.C. and Willson, R.W., "Commuting, Congestion, and Pollution: The Employer-paid Parking Connection..." Reason Foundation, September 1992.

<sup>44</sup> Husick, T., "The Effects of Parking Pricing and a Transportation Allowance on Commute Behavior and Employee Attitudes, A Case Study: The Los Angeles County Civic Center Parking Plan," *Commuter Transportation Services, Inc.*, December 1992.

Table 3, adapted from a paper by Shoup and Willson, pioneers of the parking cash-out concept, shows the reductions in solo commuting observed in five case studies, four in Los Angeles, and one in Ottawa, Canada. The third column of the table shows the difference in solo share as a result of implementation of driver-paid parking. Observed reductions in solo commuting in the five studies ranged from 7 percent to 44 percent, with an average reduction of 27 percent.

Table 3

How Employer-Paid Parking Stimulates Solo Driving							
Case Study and Type (before/after)	Solo Driver Mode Share			Autos Driven per 100 Employees			
	Driver Pays for Parking	Employer Pays for Parking	Difference in Solo Share	Driver Pays for Parking	Employer Pays for Parking	Difference in Auto Trips	Price Elasticity of Demand
Mid-Wilshire, Los Angeles	8%	42%	+34%	30	48	+18	-0.23
Warner Center, Los Angeles	46%	90%	+44%	64	92	+28	-0.18
Century City, Los Angeles	75%	92%	+17%	80	94	+14	-0.08
Civic Center, Los Angeles	40%	72%	+32%	50	78	+28	-0.22
Downtown Ottawa, Canada	28%	35%	+7%	32	39	+7	-0.10
Average of Case Studies	39%	66%	+27%	51	70	+19	-0.16

Source: Adapted from Shoup and Willson, 1992.

In "Curbing Gridlock," parking cash-out is strongly recommended as an adjunct to congestion pricing, and other market-based commuter-pollution reduction measures:

*Federal law should treat the tax-exempt status of parking and transit subsidies equally and should require employers who provide parking subsidies to give employees the option of taking this subsidy in the form of cash.*<sup>45</sup>

At the end of "Gridlock's" list of recommendations, there is a particularly cogent summation of the effects of California's model parking cash-out ordinance which bears reprinting, since it is hard to improve upon:

*Employees who want to continue to drive and park are allowed to do so. Employees who can find other options for getting to work can take the benefit in cash. Employers bear little or no additional expense, and governments receive taxes on the benefit when given in cash rather than in kind.*<sup>46</sup>

### 3. Paratransit Deregulation

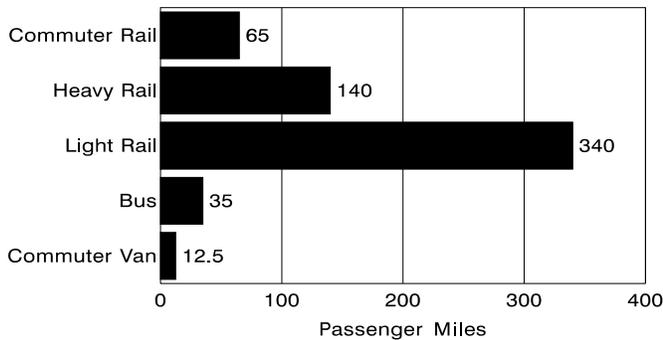
*The current rail transit plan for Los Angeles cannot be justified in terms of results achieved for the funds expended. Their cost-ineffectiveness is staggering, and their wastefulness compares with the worst excesses of federal military purchases in the 1980s.*<sup>47</sup>

<sup>45</sup> Committee for Study on Urban Transportation Congestion Pricing, National Research Council, *TRB Special Report 242: Curbing Gridlock, Volume 1*, Executive Summary, p. 13, 1994.

<sup>46</sup> Committee for Study on Urban Transportation Congestion Pricing, National Research Council, *TRB Special Report 242: Curbing Gridlock, Volume 1*, Executive Summary, p. 13, 1994.

<sup>47</sup> Gordon, P. and Richardson, H.W., "The Counterplan for Transportation in Southern California: Spend Less, Serve More," Reason Foundation, *Policy Study No. 174*, February 1994.

Figure 3  
**Transit Cost Effectiveness**  
**Total Cost per Passenger Mile**  
 (1985 Cents/Passenger Mile)



Source: Congressional Budget Office

That is how Gordon and Richardson characterize Southern California's current transit situation in "The Counterplan for Transportation in Southern California: Spend Less, Serve More," and Southern California is not alone in this regard. Indeed, studies have indicated that most of the nation's mass transit systems can also wear this description.<sup>48</sup> Given such lackluster performance, it is not surprising that mass transit developments have consistently been greeted with little enthusiasm by the driving public.

Studies of paratransit, however, tell a different tale. Paratransit systems, encompassing such things as commercially run vanpools, jitneys and shuttles have demonstrated impressive performance and cost-effectiveness in both foreign and domestic systems. Extensive modeling of the effectiveness of wide-scale paratransit implementation indicates probable reductions in VMT of about 2 percent. Paratransit, especially when combined with widespread implementation of High Occupancy Vehicle (HOV) lanes, can provide cleaner, more comfortable, and cheaper alternatives to either public mass-transit systems or solo-commuting. Overseas, countries that rely on paratransit have much lower rates of solo commuting than those which rely on monolithic governmentally created and administered mass-transit programs.<sup>49</sup>

Figure 3, taken from a detailed study of the shuttle van concept by Robert Poole of the Reason Foundation, illustrates the comparative cost-effectiveness of various transit modes compared to commuter vans in which the driver is not paid a salary. In cases where the driver is paid, such as airport shuttles, a van with 6 passengers only costs 23.3 cents per passenger mile, or 17.5 cents per passenger mile with 8 passengers. These costs are significantly below bus costs, and even farther below the costs of transit by light, heavy, or commuter rail. Later in the study, Poole lays out a scenario for a door-to-door shuttle van service for commuters that is attractive from both a time-in-traffic standpoint, and from an economic standpoint as well. Table 4 shows how travel-time and daily round trip costs compare for shuttle vans at various occupancy levels with single occupancy vehicle under several scenarios.<sup>50</sup>

In situations where shuttle vans have access to HOV lanes, and either congestion pricing or employee-paid parking is implemented, shuttle van commuting becomes a very attractive option that takes only slightly longer than commuting by single occupancy vehicle and is considerably less expensive.

<sup>48</sup> Gordon, P. and Richardson, H.W., "The Counterplan for Transportation in Southern California..." Reason Foundation, *Policy Study No. 174*, February 1994.

<sup>49</sup> Roth, G. and Wynne, G.G., *Free Enterprise Urban Transportation*, Transaction Books, New Brunswick, N.J., 1982.

<sup>50</sup> Poole, Jr., Robert W., and Griffin, M., "Shuttle Vans: The Overlooked Transit Alternative," Reason Foundation, April, 1994.

Table 4

Effect of Lower Freeway Speed on Van Competitiveness		
	1-way Trip Time	Daily RT Cost
Baseline Trip (12.5 mi. 1-way)		
Van, 4-pass.	25.4	\$8.75
Van, 6-pass.	28.5	5.82
Van, 8-pass.	32.5	4.38
SOV-25 mph on fwy.	30.8	3.75
SOV-25 mph + parking	30.8	8.04
SOV-HOT + parking	17.6	12.79
Longer Trip (20 mi. 1-way)		
Van, 4-pass.	33.6	\$14.00
Van, 6-pass.	36.6	9.32
Van, 8-pass.	40.7	7.00
SOV-25 mph on freeway	48.8	6.00
SOV + 25 mph + parking	48.8	10.29
SOV-HOT + parking	26.5	18.79

Source: Reason Foundation

4. Fleet Clean-up

*In a situation where more than half the pollution comes from only 10 percent of the vehicles, one might predict very cost-effective pollution reduction by identification and repair of those gross polluting vehicles.<sup>51</sup>*

Programs targeting gross polluters are now being pilot tested in Los Angeles at both the regional level, and as an adjunct to ETR programs. In one pilot program in Los Angeles, a major aerospace employer will begin remote-sensing of its commuter fleet and will offer incentives to drivers of gross polluters to clean up their cars. In return for running this program, the employer will be given credit for fulfilling the intent, if not the letter, of Reg. XV.<sup>52</sup> In another pilot program, the City of Los Angeles itself will use remote-sensing devices at strategic points such as freeway on-ramps to identify and notify “gross polluters” of their status, and of their need to have their cars smog-checked and repaired in short order to avoid penalties.<sup>53</sup>

Table 5 shows the results of a remote-sensing study of highway traffic in Provo Utah. Fifty percent of CO and HC emissions were produced by only 9 percent and 13.5 percent of the of the monitored fleet, respectively.<sup>54</sup>

A rigorous program of remote-sensing combined with vehicle repair or scrappage has been proposed as a major revision to Reg. XV, though as mentioned earlier, there is some controversy surrounding the use of this measure as a complete fulfillment of ECO requirements.

<sup>51</sup> Waldman, A., “Ridesharing Reconsidered,” *Los Angeles Business Journal*, October 1994.

<sup>52</sup> *Costs and Effectiveness of Transportation Control Measures (TCMs): A Review and Analysis of the Literature*, January 1994.

<sup>53</sup> Ernst and Young, “Rule 1501 Cost Survey,” *South Coast Air Quality Management District*, August 1992.

<sup>54</sup> Bishop, G.A., et al., “A Cost-Effectiveness Study of Carbon Monoxide Emissions Reduction Utilizing Remote Sensing,” July 1993, pp. 978–988.

Table 5

Summary of Provo Remote Sensing Statistics			
	Northbound I-15 Ramp		Southbound I-15 Ramp*
	CO	HC	CO
Mean %	1.17 ± 0.02	0.22 ± 0.01	1.00 ± 0.03
Median %	0.45	0.127	0.19
Mean g/gallon	375.2	108.2	160
Median g/gallon	156	69.7	65.9
Percent of total emissions from dirtiest 20% of fleet	71	61	83
Percent of fleet responsible for 50% of emissions	9.00	13.5	9.26
Fleet emission 50% cut point in percent	3.52	0.414	4.33
Number of measurements	12,066	10,244	5,376
Number of unique vehicles	7,160	6,257	2,875
Average fleet age (years)	8.1	8.2	7.2

\* Equipment malfunction in sensor made HC data unusable.

To demonstrate how effective such scrappage programs can be, Unocal ran a test program in mid-1990, in which approximately \$6 million was spent to purchase and retire 8400 pre-1971 cars. The retired vehicles were among the least fuel-efficient vehicles in the fleet, averaging 12 miles per gallon in city driving.<sup>55</sup> When all the numbers were tallied, the Unocal SCRAP program removed nearly 13 million pounds of pollutants from Southern California's air, equivalent to removing about 150,000 brand new cars from the road.<sup>56</sup>

Table 6 shows the relative efficacy, either observed or predicted, for the TCMs described above compared to the observed efficacy of ETR programs such as Reg. XV. Ranked from maximum effectiveness to lesser effectiveness, ETRs place near the bottom of the list is a clear indication that it should be a measure of last resort.

Table 6

Travel and Emissions Effectiveness: Estimated Potential Regional Daily Reductions (in percent)*		
TCM	VMT	Trips
Congestion pricing	5.0%	5.0%
Land use planning	5.2	**
Parking pricing (work)	3.0	2.5
Paratransit	2.0	**
HOV lanes	1.4	0.5
Telecommuting	1.1	1.0
Employer trip reduction	1.0	0.8
Transit improvements	1.0	0.8
Bicycle/pedestrian facilities	< 0.1	< 0.1

Notes:

\* Values for Land use planning, HOV lanes, Telecommuting, and bicycle/pedestrian facilities based on conservative estimates in NARC report. Though some of these estimates are on the low end of what is found in the literature, the conservative values are appropriate as estimators of effectiveness. Values for other categories from various cited sources, again, mainly conservative in estimation.

\*\* Specific estimates not available.

<sup>55</sup> Unocal, "SCRAP: A Clean-Air Initiative from Unocal," Brochure, Unocal (no address), c. 1992.

<sup>56</sup> Unocal, "SCRAP: A Clean-Air Initiative from Unocal," c. 1992.

## B. Don't Make the Same Mistakes Twice.

Some MPOs may still be required to implement employer-based trip reduction measures by State or Local governmental agencies. For these MPOs, the Reg. XV experience carries several lessons that should not be lost when considering ETR measures.

- All employers, all cities, and all commuting populations are **not** alike. Each municipality faces distinct challenges in finding ways to encourage employees to use alternatives to single-occupant commuting. Inflexible regimes of incentives and disincentives cannot serve all employers equally well.
- Even when given the option of implementing a subset of incentives from a defined list, employers may be inhibited in development and implementation of novel and possibly more efficacious measures which are not on the “officially approved” list.
- Employers do not exist in a static economy, with a static employee population in a static transportation environment. Each of these parameters is in constant flux, and recently, in the age of corporate rightsizing, often radical flux.

ETR measures should reflect these dynamisms, and should be responsive enough to allow employers to vary their own unique trip reduction strategies accordingly. Thus, when implementing ECO, Municipal Planning Organizations might consider ways to maximize ETR flexibility up-front by allowing credit for the use of alternative fuels, remote-sensing emission reductions programs, cash-for-clunker programs, telecommuting programs, remote-work centers and chained-trips (such as dropping off children at day-care) can produce trip or emission reductions while maximizing the freedom of the individual employee to choose the commute mode which best suits his or her overall needs. Many of these programs are being pilot tested and final data are not yet available. Still, predictive models indicate that these programs could produce considerable results. Preliminary data from telecommuting pilot studies, using assumptions that 10 percent of the work force would telecommute 2 days per week, predicted about a 1-percent reduction in trips, VMT and hydrocarbon emissions as a result.<sup>57</sup>

## C. Remove Existing Obstacles to ETR Success

Before implementing an ETR measure as an ECO cure, there are several existing regulatory measures which common sense suggests are in violation of the Hippocratic injunction to “First, do no harm.” While it is difficult, if not impossible, to establish precise estimates of the harm they do, measures which actively discourage the use of alternatives to the automobile can only exacerbate a region's transportation/air pollution problem. For example, regulations which hamper the ability of communications companies to offer more home-shopping and information services can only hinder the market's ability to respond to consumer aversion to traffic congestion, leading the consumer away from the phone and toward the car. In the same vein, imposition of local sales taxes upon out-of-state mail order shopping can only reduce the monetary incentive to shop by mail, leading people away from catalog shopping and toward the local mall. Removal of such barriers to success would seem to be a logical adjunct to ETR implementation.

## D. Seek Legislative Relief

The ECO requirements of the Clean Air Act are logically flawed in several ways, and, while the momentum of the political process suggests it is unlikely they will be changed anytime soon, it is certainly in the interest of promoting sound environmental policy to challenge them on their lack of merit. Indeed, the recent political upheaval in Congress might betoken an unprecedented opportunity for rapid action in removing unfunded and burdensome mandates such as ECO. Challenges to ECO might stress that there are numerous points at which the logic of ECO requirements becomes rather tenuous.

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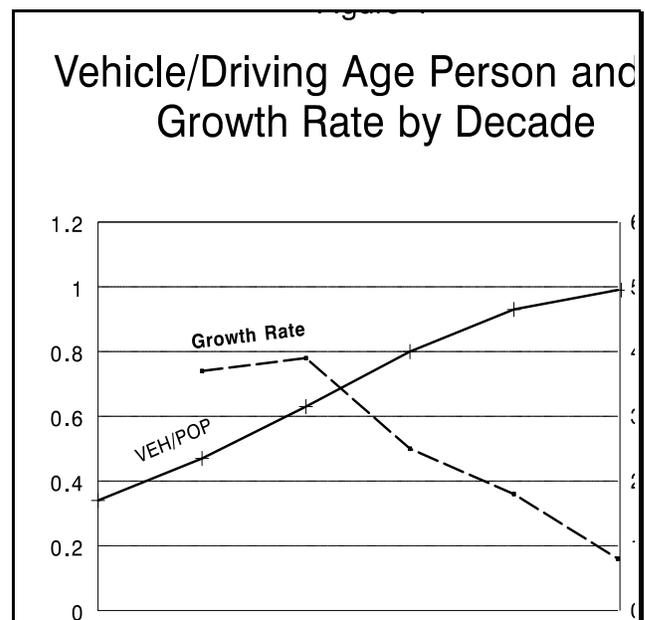
<sup>57</sup> *Costs and Effectiveness of Transportation Control Measures (TCMs): A Review and Analysis of the Literature*, January 1994.

- **ECO requirements are expensive and address an insignificant part of the air pollution problem.** They waste limited time and resources of both regulatory agencies and the regulated community.
- **ECO is essentially a shot in the dark.** ECO sets arbitrary targets for increases in average vehicle occupancy, despite insufficient understanding of fleet emission characteristics and a lack of a rigorous model relating fleet vehicle occupancy to fleet pollutant emissions.
- **The problem may be solving itself.** The need for ECO measures is predicated upon an assumption that the steady decline in emissions evident since at least 1982<sup>58</sup> will be reversed sometime in the year 2005 as a result of increases in VMT projected due to projected population growth and demographic changes.<sup>59</sup> This expectation is called into question in a paper by Charles A. Lave, of the Economics Department of the University of California, Irvine.<sup>60</sup> Lave points out that past trends of increasing vehicle ownership and increasing vehicle use are in fact unlikely to continue into the indefinite future. During the 1960s, 1970s, and into the early 1980s, the coming of age of the baby-boomers and the entry of large numbers of women into the work force drove sharp increases in VMT and vehicle trips. These factors will not continue indefinitely, and indeed, vehicle demand may well be approaching saturation.

Figure 4 shows the trend in vehicle ownership per driving-age person. This curve, an aggregate pattern for the entire United States, clearly indicates a trend toward equilibrium of vehicle ownership and the driving-age population, rather than the continued increase in vehicle ownership upon which many air-pollution models are based.

If Lave is correct (or even substantially correct), the assumptions of a reversal in the declining rates of vehicular pollution may be in error and the problem of nonattainment may solve itself as new vehicles continue to pollute less, and older vehicles are retired. Programs which identify gross polluters and result in their repair or scrappage could accelerate this process considerably according to several pilot studies conducted by Unocal and others.<sup>61</sup>

Given institutional momentum and governmental resistance to more effective, market-based measures, along with the fact that some regulators and planners support ECO requirements for their incremental value, it is unlikely that the ECO requirements will be eliminated from the Clean Air Act over the near term. Nevertheless, given the potential waste of resources represented by widescale implementation of ECO across the country, and the new opportunities for legislative reform as a result of recent Congressional



<sup>58</sup> *Urban Transportation: Reducing Vehicle Emissions with Transportation Control Measures (Report to Congressional Requesters)*, United States General Accounting Office, August 1993.

<sup>59</sup> Kessler, J. and Schroerer, W., "Meeting Mobility and Air Quality Goals: Strategies that Work" (draft), *U.S. EPA Office of Policy Analysis*, April 1993.

<sup>60</sup> Lave, C.A., "Future Growth of Auto Travel in the US: A Non-Problem," *Economics Department, University of California, Irvine*, 1994.

<sup>61</sup> Dudek, D.J. and Walton, T., "Mobile Emission Reduction Crediting: A Clean Air Act Incentive Program for Retiring High-Emitting Vehicles," Presented at the 86th Annual Meeting and Exhibition of the Air and Waste Management Association, June 1993.

changes, campaigning for the repeal of the ECO requirements should not be neglected by ECO opponents.

## VI. CONCLUSION

There are better ways to satisfy ECO than traditional ETR measures as exemplified by Reg. XV. The Reg. XV approach has been studied extensively, and has been shown to be both costly and ineffective at reducing either congestion or air pollution. While such measures might satisfy the EPA, in the long-term they are extremely costly, and will only aggravate urban environmental problems by misdirecting limited resources and losing the support of the regulated community.

**MPOs can minimize the need for draconian ETR measures by implementing regional measures that are more equitable, more effective, and less costly than ETR measures.** Implement congestion pricing, parking cash-out, zoning reform, and paratransit deregulation, all of which will contribute to significant increases in ridesharing, allowing more modest ETR measures which simply consist of verification of AVR levels at large employers. Some research may be required to identify legal barriers to the implementation of several of these programs, but entrenched bureaucratic interests should not be permitted to prevent the implementation of intelligent solutions to environmental problems.

**MPOs can maximize the flexibility of any implemented ETR measure up-front.** The regulated community has a vested interest, as it were, in finding cost-effective solutions to regulatory mandates. Allowing AVR credit for the use of alternative fuels, remote-sensing emission reductions programs, cash-for-clunker programs, telecommuting programs, remote-work centers and chained-trips (such as dropping off children at day-care) taps into that vested interest. These programs can produce trip reduction and emission reductions while maximizing the freedom of the individual employee to choose the commute mode which best suits his or her overall needs.

**MPOs can remove obstacles to the success of implemented ETR measures.** Measures which tax mail-order goods at local rates; which prevent communications companies from bringing their products and services into people's homes; which prevent people from having home-businesses; which hinder telecommuting and the formation of remote work-centers are all self-defeating with regard to ETR success.

**MPOs have an excellent opportunity to petition the new Congress for repeal of the ECO requirements of the Clean Air Act.** The ECO requirements represent a burdensome unfunded mandate from the federal government. While institutional momentum makes such mandates difficult to repeal, the new Congress might be more hospitable to proposals for ECO repeal than they have been in the past. The ECO mandate is costly and logically flawed in several ways. It is certainly in the interest of promoting sound environmental policy to challenge them on their lack of merit. It should be pointed out that these are not simply theoretical arguments: numerous studies of California's Reg. XV have shown that the ECO approach is expensive, inefficient, and inequitable.

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## ENDNOTES, REFERENCED BUT NOT CITED

- Beckerman, W., "Pricing for Pollution," *The Institute of Economic Affairs*, Westminster, London, 1975.
- Bryant, J. et al., "Development and Implementation of Land Use Measures to Reduce Automobile Dependency," *Presented at the 86th Annual Meeting and Exhibition of the Air And Waste Management Association*, June 1993.
- Cadle, S.H., Gorse, R.A. and Lawson, D.R., "Real-World Vehicle Emissions: A Summary of the Third Annual CRC-APRAC On-Road Vehicle Emissions Workshop," *Journal of the Air and Waste Management Association*, August, 1993.
- California Air Pollution Control Laws, 1992 Edition*, California Air Resources Board, 1992.
- California Clean Air Act of 1988*, AB 2595, Sections 43013 and 43018, California Health and Safety Code, 1988.
- California Clean Air Act Transportation Requirements Guidance*, Transportation Strategies Group, Office of Strategic Planning, California Air Resources Board, February 1990.
- Calvert, J.G., et al., "Achieving Acceptable Air Quality: Some Reflections on Controlling Vehicle Emissions," *Science*, p. 261, July 1993.
- Cameron, M., "Transportation Efficiency: Tackling Southern California's Air Pollution and Congestion," Environmental Defense Fund & Regional Institute of Southern California, March 1991.
- Cromwell, T.T., and Cookson, N.C., "Market-based Approaches to Compliance with the 1990 Clean Air Act Amendments," *Presented at the 86th Annual Meeting and Exhibition of the Air and Waste Management Association*, June 1993.
- Dagang, D.A., and Loudon, W.R., "Guidelines for the Evaluation of TCM Impacts," *Presented at Transportation Research Board 1994 Annual Meeting*, JHK & Associates, January 1994.
- DeCorla-Souza, P., "Applying the 'Cashing Out' Approach to Congestion Pricing," *Presented at Transportation Research Board 1994 Annual Meeting*, January 1994.
- Draft Staff Report for Phase II Amendments to Regulation XV: Trip Reduction/Indirect Source, Rule 1501 and Rule 1502*, South Coast Air Quality Management District, December 1992.
- Ernst, R.J., "A Practical Market-Based Concept to Solve Certain Air Quality Problems in California," *Presented at the Claremont Institute, Cal EPA Conference on Air Quality*, Los Angeles, Calif., January 1993.
- Final 1991 Air Quality Management Plan, South Coast Air Basin*, South Coast Air Quality Management District and Southern California Association of Governors, July 1991.
- Final Air Quality Management Plan, 1991 Revision, Final Appendix IV-E, Transportation and Land Use Control Measures*, South Coast Air Quality Management District, July 1991.
- Giuliano, G., "Transportation Demand Management, Promise or Panacea?" *Journal of the American Planning Association*, 58:3, Summer 1992.
- Hamwi, B.G. and Braaksma, J.P., "Propensity for Ridesharing: Some Key Factors," *Presented at the 73rd Annual Meeting of the Transportation Research Board*, January 1994.

- Handy, S.L., Mokhtarian, P.L. and Salomon, I., "A Review of Studies of Telecommuting: Key Issues in the Estimation of Travel, Energy, and Air Quality Impacts," *Institute of Transportation Studies, University of California, Davis*, November 1993.
- Harrison, D. Jr. and Nichols, A.L., "Market-Based Approaches to Reduce the Cost of Clean Air in California's South Coast Basin," *Final Report Prepared for California Council for Environmental and Economic Balance*, December 1990.
- Hwang, K. and Giuliano, G., "Working Paper No. 38: The Determinants of Ridesharing: Literature Review," *The University of California Transportation Center, University of California, Berkeley*, May 1990.
- Kocheisen, C., "Headaches Of Air Quality and Transport Laws Addressed In Intergovernmental Meeting," *Nation's Cities Weekly*, March 7, 1994.
- Lambert, W., "Businesses Must Wean Workers From Their Cars," *Wall Street Journal*, November 4, 1993, Legal Beat section.
- Lopez-Aqueres, W., "A Conceptual Framework to Study the Effectiveness of Employer Trip Reduction Programs," *South Coast Air Quality Management District*, December 1, 1992.
- Lopez-Aqueres, W., "The Implementation of Rule 1501, Status and Process," *South Coast Air Quality Management District*, January 15, 1991.
- Lupa, M.R., "The Feasibility of Employee Trip Reduction as a Regional Transportation Control Measure," *Presented at the 73rd Annual Meeting of the Transportation Research Board*, December 1993.
- Naghavi, B. and Stopher, P.R., "Remote Sensing, Means, Medians, and Extreme Values: Some Implications for Reducing Automobile Emissions," *Presented at the 72nd Annual Meeting of the Transportation Research Board*, January 1993.
- Noble, B.P., "Getting Them There Is Half the Job," *New York Times*, November 21, 1993, At Work section.
- Orski, K.C., "Employee Trip Reduction Programs—An Evaluation," *Transportation Quarterly*, 47, No. 3, July 1993.
- Person, W.R., Gertler, A.W. and Bradow, R.L., "Comparison of the SCAQS Tunnel Study with Other On-Road Vehicle Emission Data," *Journal of the Air and Waste Management Association*, November 1990.
- Preview to the 1994 Air Quality Management Plan*, South Coast Air Quality Management District, March 1994.
- Replogle, M., "Transportation Strategies for Clean Air and Efficient Growth," *Resource Papers for the 1994 ITE International Conference*, January 1994.
- Rule 1501 - Rule 1503*, South Coast Air Quality Management District Library, March, 1994.
- Rutherford, G.S., et al., "Transportation Demand Management: Case Studies of Medium-Sized Employers, Preprint," *Presented at the 73rd Annual Meeting of the Transportation Research Board*, January 1993.
- Stewart, J., "Current Problems in Performing Accurate Cost-benefit Evaluations of Employer-based Vehicle Trip Reduction Programs," *Paper presented at the 73rd Annual Meeting of the Transportation Research Board*, January 1994.

Stewart, J., "Reducing Drive Alone Rates at Small Employer Sites—The Costs and Benefits of Local Trip Reduction Ordinances," *Paper presented at the 73rd Annual Meeting of the Transportation Research Board*, January 1994.

Stewart, J., et al., "What Price Success? Rule 1501 Trip Reduction Plans: Investment Patterns and Cost Effectiveness," *Commuter Transportation Services, Inc.*, April 1992.

Wachs, M., "Learning from Los Angeles: transport, urban form, and air quality," *Transportation*, 20, June 1993.

Wachs, M., "Regulating Traffic by Controlling land Use, the Southern California Experience," *Transportation*, p. 16, 1990.

Wachs, M., "U.S. Transit Subsidy Policy: In Need of Reform," *Science*, p. 244, June 1989.

Willson, R. and Shirazi, E., "Transportation Demand Management: Policy Implications of Recent Behavioral Research," *Presented to Public Policy Program, UCLA Extension*, December 1989.