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Report to the Chairman, Subcommittee on Energy and Power, Committee on Energy and Commerce, House of Representatives

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ALTERNATIVE-FUELED VEHICLES

Potential Impact of Exemptions From Transportation Control Measures

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Resources, Community, and
Economic Development Division

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The Honorable Philip R. Sharp
Chairman, Subcommittee on Energy
and Power
Committee on Energy and Commerce
House of Representatives

Dear Mr. Chairman:

In recent years, the Congress has passed legislation to reduce air pollution and petroleum dependence by promoting the increased use of alternative-fueled vehicles (AFV). However, a variety of barriers, including higher vehicle costs and uncertainty about the availability of alternative fuels, may deter businesses and individual consumers from purchasing AFVs. To encourage the acquisition of more AFVs, federal legislation has been proposed that would offer potential buyers exemptions from certain transportation control measures (TCM). TCMs are designed, among other things, to reduce traffic congestion and lower vehicle emissions. Some of these measures, such as high-occupancy-vehicle (HOV) lanes, place restrictions on the operation of vehicles. Exemptions would permit owners of AFVs to avoid these restrictions.

As you requested, we examined the implications of exempting AFVs from TCMs. Specifically, we examined (1) the potential effects of exemptions on achieving the purposes of TCMs, (2) the potential effectiveness of exemptions in increasing the purchase of AFVs and the use of alternative fuels, (3) the views of government and industry officials and others on whether an exemption program should be controlled by the federal government or the states, (4) the potential reaction of the general public to exemptions, (5) the likely impacts of exemptions on the enforcement of TCMs, and (6) the specific types of AFVs that might receive exemptions.

We collected information from two sources. First, we interviewed, in person or by telephone, officials in 44 organizations selected from federal, state, and local government agencies; law enforcement agencies; and various industry and public interest organizations. These agencies and organizations are involved in energy, transportation, and air quality issues. Second, we surveyed by mail 119 metropolitan planning organizations (MPO)—agencies that plan regional transportation—and received responses from 100. These MPOs are located in areas that have not yet attained national air quality goals for ozone and/or carbon monoxide.

These "nonattainment" areas are the ones most likely to be using or considering the use of TCMs as a tool for meeting air quality goals.[1]

Results in Brief

Although little information is available on how well TCMs achieve their objectives or on the impact of exemptions from TCMs, officials in about 61 percent of the organizations we interviewed believed that the objectives of TCMs, such as the reduction of traffic congestion and vehicle emissions, are likely to be somewhat negatively affected if AFVs are exempted from TCMs. Of the MPOs, 25 percent or fewer indicated that exemptions would have an adverse effect on achieving the objectives of TCMs.[2]

Almost two-thirds of the organizations we interviewed said that TCM exemptions could provide an effective incentive to buyers to purchase AFVs. Among the MPOs we surveyed, 35 to 44 percent, depending on the specific TCM, said that granting exemptions to AFVs would be somewhat likely or very likely[3] to increase the use of alternative fuels.

States are opposed to a federally imposed TCM exemption program. Officials of all but one of the 21 state and local environmental, energy, and transportation organizations we interviewed stated that the decision to exempt AFVs should be made at the state or local level. However, vehicle fleet operators and alternative fuel associations believed that federal control of an exemption program is necessary to ensure uniformity across contiguous areas. The responses of the MPOs reflected considerable uncertainty on this issue. Depending on the types of AFVs included, about a quarter to a third of the MPOs said they could support a federal exemption program. The other MPOs said that they would neither support nor oppose a federal exemption program or had no basis for making a judgment.

The Department of Transportation (DOT), three out of four state transportation departments, various other agencies, and almost half of the MPOs expected unfavorable public reaction to TCM exemptions. Among the reasons cited for this view was public resentment of what is perceived as special treatment for certain privileged groups.

[1]App. I contains a more detailed discussion of our scope and methodology; app. II, a list of the organizations we interviewed; and app. III, the survey questions and responses.

[2]On several issues, the interview results are not entirely consistent with the survey data. This inconsistency may reflect differences in the types of organizations interviewed and surveyed. The possible reasons for this inconsistency are discussed in more depth in app. I.

[3]The rationale for grouping these responses together is explained in app. I.

Opinions varied considerably on whether exemptions would significantly increase the difficulty of enforcing TCM rules, but law enforcement agencies believed this task would be more difficult. Enforcing the restrictions on HOV lanes, which present significant enforcement challenges even without exemptions, was seen as particularly difficult by law enforcement agencies. Also, a majority of the MPOs surveyed believed that enforcement problems, including cheating by owners of ineligible vehicles, would be significant under an exemption program.

Opinions varied among officials interviewed and surveyed about whether exemptions should be granted to vehicles that can only run on an alternative fuel (dedicated AFVs) or to vehicles that can run on both alternative and petroleum-based fuels. According to these officials, the choices made would have a significant impact on the degree to which TCMs and exemptions achieve the goals of reducing traffic congestion and petroleum dependence and improving air quality.

Background

Several recent acts include provisions that could lead to reduced traffic congestion, vehicle emissions, and consumption of petroleum-based fuels. One legislative approach found in both the Clean Air Act Amendments of 1990 and the Intermodal Surface Transportation Efficiency Act of 1991 encourages state and regional transportation and air quality officials to plan and implement TCMs. TCMs include a variety of strategies—HOV lanes, ordinances encouraging fewer trips from specific locations, programs to manage the supply of and demand for parking facilities, and tolls or other penalties for travel on congested highways during peak hours, among others. These strategies are designed to reduce the demand for travel within a given area and/or period of time.[4]

Another approach to reducing vehicle emissions and the nation's dependence on petroleum can be found in the Alternative Motor Fuels Act of 1988, the Clean Air Act Amendments of 1990, and the Energy Policy Act of 1992. Through a combination of incentives and mandates, these laws encourage the production, marketing, and purchase of AFVs that operate either exclusively or partially on nonpetroleum fuels, such as ethanol, methanol, natural gas, propane, and electricity.

In a third approach that has been proposed to address air quality and petroleum dependence problems, elements of the two strategies described

[4]App. IV contains a more detailed discussion of TCMs and defines the specific measures discussed in this report.

above are combined. The program would encourage potential buyers to acquire AFVs by offering them exemptions from TCMs. An AFV owner might, for example, be granted special parking privileges or lower tolls, or might be permitted to operate an AFV with no passengers in an HOV lane.

Exemptions May Hamper Achievement of TCM Goals

Our discussions with officials in the 44 organizations we contacted suggested that quantitative data are generally unavailable on the effectiveness of TCMs in achieving their underlying purposes or on the impact of exemptions from TCMs. Officials of 27 (61 percent) of the organizations we interviewed said that exemptions are likely to offset some of the positive effects of TCMs, such as reduced traffic congestion and vehicle emissions. For example, HOV lanes are intended to reduce the number of vehicles on the highways by encouraging car pools. But several organizations, such as DOT and the Houston Metropolitan Transit Authority, which oversees an extensive network of HOV lanes, suggested that exemptions could encourage single-occupant AFVs as alternatives to car pools. Efforts to reduce the number of vehicles on the road would thus be undermined. Therefore, to the extent exemptions are effective in helping AFVs penetrate the market, they could lead to increased congestion, particularly in HOV lanes.

According to Environmental Protection Agency (EPA) officials, the impact of TCM exemptions on achieving air quality goals is not entirely clear, partly because the relationship between traffic congestion and air quality is not well understood. Nonetheless, EPA officials believed that granting TCM exemptions could enhance air quality if only vehicles with very low emissions, such as dedicated AFVs, are exempted. In fact, under the Clean Fuel Fleet Program mandated by the Clean Air Act, EPA is taking this approach in its plan to grant a wide range of TCM exemptions to a class of vehicles called inherently low-emission vehicles.

On the other hand, EPA officials believed that if all types of AFVs, regardless of their relative emissions benefits, were granted exemptions, air quality could suffer as a result. Air quality could be negatively affected if, for example, large numbers of dual-fueled and flexible-fueled vehicles—those that can run on both alternative and petroleum-based fuels—were granted exemptions but failed to use alternative fuels much of the time.

Some organizations supported exemptions even though they anticipated an adverse effect on achieving TCM goals. Thirty organizations (68 percent) supported some form of exemptions. Of these organizations, 19 believed

that exemptions are likely to adversely affect the achievement of TCM goals to some extent. Twelve of these 19 organizations favor "sunset provisions," under which the exemptions would be phased out when they begin to adversely affect these goals too much. However, officials of six organizations we contacted pointed out certain intrinsic shortcomings of sunset provisions that make it less desirable to include them in exemption legislation.[5] For example, it may be difficult to establish an appropriate time for phasing out an exemption program or determining when the objectives have been achieved. This issue is discussed in detail in appendix V.

Several organizations considered the potential negative effects of exemptions unacceptable and generally do not support them. These organizations include DOT, the California Department of Transportation, and the California Air Resources Board, all of which are concerned that exemptions could aggravate traffic congestion and complicate the enforcement of TCM rules.

Few of the MPOs we surveyed believed that exemptions would adversely affect the achievement of TCM goals. The questionnaire included questions on six different TCMs and three different types of AFVs; responses varied with the type of TCM and AFV considered. Depending on the specific measure and type of AFV being considered, between 3 and 25 percent of the MPOs believed that exemptions would have a somewhat negative or very negative effect on achieving these goals. The other MPOs did not expect an adverse effect or did not take a position on how exemptions would affect the achievement of TCM goals. Appendix III shows how the MPOs responded to each of the survey questions.

Views Were Mixed on Whether Exemptions Would Encourage AFV Purchases and Alternative Fuel Use

Officials in almost two-thirds of the organizations we contacted believed that TCM exemptions are likely to provide an effective incentive for the purchase of AFVs, although they were uncertain about the extent of the incentive. For instance, automakers, alternative fuel associations, and academic experts agreed that exemptions are likely to be effective incentives. A majority of the transportation and energy agencies we contacted shared this view.

While a majority of environmental agencies also believed exemptions are likely to be effective incentives for the purchase of AFVs, key exceptions

[5]The six organizations are the American Automobile Association, the California Air Resources Board, the Department of Energy (DOE), DOT, the New York Metropolitan Transportation Council, and the Sierra Club.

included the California Air Resources Board and the Northeast States for Coordinated Air Use Management. Officials of these organizations indicated that significant concerns on the part of the general public about the fairness of granting exemptions are likely to seriously undermine the credibility of exemption programs as incentives for purchasing AFVs. In addition, officials of the American Automobile Association and the Sierra Club suggested that exemptions may have limited appeal to potential AFV buyers because the implementation of TCMs has been limited.

Opinions varied on the relationship between TCM exemptions and fundamental barriers to AFV acquisition, such as the higher vehicle cost, the limited number of service stations offering alternative fuels, and the typically lower driving distance of AFVs compared with that of conventional vehicles. Officials of several organizations, including an official of the California Energy Commission, which promotes AFV fleet purchases, said that these barriers must first be addressed before exemptions would have any value to potential AFV purchasers. On the other hand, automakers and fleet operators viewed exemptions as a way to offset some of these negative aspects of AFV ownership.

The MPOs that responded to our survey were somewhat uncertain whether granting exemptions to AFVs would increase the use of alternative fuels. Depending on the specific TCM in question, 35 to 44 percent of the MPOs said it was somewhat likely or very likely that exemptions would promote alternative fuel use. Sixteen to 23 percent of the MPOs did not believe that exemptions would promote alternative fuel use, while about 40 percent said that this result was neither likely nor unlikely, or that they had no basis for making a decision.

Opinions Varied on Whether States or the Federal Government Should Control TCM Exemptions

States are united in opposition to a federally imposed exemption program, according to an official of an organization representing air quality officials in every state.[6] Moreover, officials of all but 1 of the 21 state and local environmental, energy, and transportation organizations we interviewed stated that control over exemptions belongs in the hands of state and/or local authorities.[7] These authorities are already responsible for deciding whether to include TCMs in their air quality and transportation plans.

[6]State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officials.

[7]One state transportation department did not take a position on this issue.

Fleet operators and alternative fuel associations supported federal control of exemptions. These groups believed that uniformity across contiguous areas is needed. They maintained that conflicting exemption rules in contiguous areas would impose additional burdens on fleets operating in these areas.

EPA officials, along with officials of the National Resources Defense Council and the Sierra Club, recommended a balance between these two approaches. EPA officials said they recognize the legitimate desire of states to make decisions about programs that they are required to implement under federal statutes. However, these officials also expressed concern that the nation might lose the potential air quality benefits to be gained from low-emission AFVs if states were given complete control over exemptions and then decided not to implement them.

In our survey, the MPOs were not asked directly about the issue of state versus federal control. However, they were asked about the degree to which they would support or oppose exemptions to three types of AFVs if the federal government granted them. In this context, depending on which vehicle type was considered, from 24 to 36 percent of the MPOs indicated they would support exemptions, while 10 to 17 percent said they would oppose them. The other MPOs said that they would neither support nor oppose TCM exemptions granted by the federal government, or that they had no basis for making a judgment on this issue.

Unfavorable Public Reaction Is Considered Likely by Some Organizations

DOT and three of the four state transportation departments we contacted told us that public reaction to exemptions is likely to be unfavorable and may weaken public acceptance of TCMs themselves. This reaction may be especially true for HOV lanes, which are already controversial, according to these organizations. The three law enforcement agencies we contacted expressed similar views, as did the California Air Resources Board and the two associations representing state and local environmental officials.[8] One of the reasons cited for this view is the expectation that some members of the public would regard exemptions as preferential treatment for "big business" or the wealthy, who can afford AFVs. Public relations efforts would not be sufficient to counteract negative public reaction to HOV-lane exemptions, according to an official of the National Association of Regional Councils.

[8]Northeast States for Coordinated Air Use Management and State and Territorial Air Pollution Program Administrators/ Association of Local Air Pollution Control Officials.

While they agreed that some adverse public reaction is likely, EPA, the Natural Resources Defense Council, the Sierra Club, and two California air quality management districts suggested that good public relations could overcome the anticipated public resentment toward exemptions. Two alternative fuel associations suggested that public acceptance would be enhanced by a well-designed method for identifying eligible vehicles and justifying the special treatment afforded to these vehicles.

Of the MPOs, 48 percent said that it was somewhat or very likely that erosion of public acceptance of TCMs would be a significant problem if exemptions were granted. Twelve percent said such erosion of public acceptance is unlikely. The other MPOs did not believe that exemptions would elicit this negative public reaction or were uncertain on this issue.

Opinion Was Divided on How Exemptions Would Affect Enforcement of TCMs

Officials we interviewed disagreed on whether exemptions would complicate the task of enforcing TCMs. Ten organizations had no position on this issue; the other 34 groups were evenly divided among those who expected significant enforcement problems and those who believed the problems would be minimal. Opinions also differed among organizations with similar missions. For example, environmental agencies we contacted were almost evenly split on the issue.

Law enforcement agencies, which are likely to have additional enforcement responsibilities under an exemption program, said that exemptions would complicate the task of enforcing the rules for at least one type of TCM—HOV lanes. In their view, these lanes, which are already difficult to patrol, would be a particular problem. For example, in Houston, officers patrolling the freeways must determine whether each vehicle in an HOV lane has the required number of occupants. Furthermore, the requirement varies during different periods of the day. Requiring officers to also identify the type of vehicle or the type of fuel in use would make their task more complex.

Three groups that are likely to benefit from exemptions—the automakers, alternative fuel providers, and fleet operators—said that enforcement of exemptions would probably not present serious problems. While these groups acknowledged that developing an adequate vehicle identification system poses significant challenges, they agreed that this problem can be resolved—by using a special license plate or decal, for example.

The questionnaire mailed to the MPOs asked how likely it was that three specific enforcement issues—increased use of HOV lanes by ineligible vehicles, identification of eligible vehicles, and adequate enforcement resources—would become significant problems. Fifty-four percent of the MPOs said that increased use of HOV lanes by ineligible vehicles would likely develop into a significant problem. Similarly, 75 percent believed identification of eligible vehicles would be a problem, while 72 percent anticipated a lack of adequate resources to enforce more complex TCM rules. The other MPOs said that these issues were unlikely to become significant problems, or that they were uncertain about these enforcement issues.

Selecting Eligible Vehicles Was Viewed as a Key Decision

A majority of the organizations we interviewed indicated that selecting which types of AFVs would be granted exemptions is a key issue in designing an exemption program. As noted earlier, this selection helps determine how exemptions would affect the accomplishment of TCM goals. For example, offering exemptions to all AFVs could do more to reduce the nation's dependence on petroleum fuels than limiting exemptions to dedicated AFVs. However, making all AFVs eligible for exemptions could exacerbate the potential undermining of TCM objectives like reducing traffic congestion and vehicle emissions.

In addition, according to law enforcement officials, vehicle selection would play an important role in determining how difficult enforcing HOV-lane rules would be. In their view, the more subtle the distinctions law enforcement officials must make, the more difficult the enforcement task will become. Several other officials, including those at DOE and DOT, agreed on this point. They noted that enforcement may become especially difficult if officers are required to identify dual- and flexible-fueled AFVs and determine whether the drivers are actually using an alternative fuel at the time they take advantage of an exemption. One law enforcement official and officials at the California Air Resources Board and DOE said that technological solutions to this challenge, such as fuel-use indicator lights, appear susceptible to tampering or counterfeiting, which would further complicate enforcement.

Focusing an exemption program on dedicated AFVs rather than on dual- and flexible-fueled vehicles also has implications for the number of refueling facilities that might be developed. Officials of EPA and DOE agreed that exemptions could promote the increased use of alternative fuels by encouraging more AFV purchases. However, they had differing opinions on

how various types of AFVs might affect the development of refueling facilities for alternative fuels.

EPA officials believed that dedicated vehicles may present a better opportunity to encourage more fuel facilities, despite the likelihood that fewer of these vehicles than dual- or flexible-fueled AFVs would be purchased. Fuel providers could count on the fact that dedicated vehicles would use alternative fuels. But, in the absence of a rule requiring that alternative fuels be used in AFVs, owners of dual- and flexible-fueled vehicles may or may not use these fuels. In any case, such a fuel-use requirement would be difficult to enforce.

DOE officials, on the other hand, suggested that granting exemptions to dual- and flexible-fueled vehicles is likely to result in an increase in the total number of AFVs. In their view, these vehicles may have greater appeal to the public than dedicated vehicles—in part because concern about fuel availability is less. As a result, exemptions for dual- and flexible-fueled vehicles could have greater relative value to potential AFV purchasers. DOE also believed that large numbers of vehicles that are capable of using alternative fuels could do more to promote fuel availability, because fuel providers would choose to compete to capture that potentially larger market.

Somewhat more MPOs indicated support for granting exemptions to dedicated vehicles (36 percent) than for dual-fueled (24 percent) or flexible-fueled (25 percent) AFVs. These differences may occur because more MPOs believed granting exemptions to dual- and flexible-fueled vehicles would have a negative effect on the goals of reducing congestion and emissions. Ten percent of the MPOs did not support exemptions for dedicated AFVs, and 17 percent did not support them for dual- and flexible-fueled vehicles. The other MPOs said they had no basis for making a decision on exemptions for any of the three AFV types, or said that they neither support nor oppose exemptions.

Observations

Opinions are divided among the organizations we contacted with respect to their overall support for a TCM exemption program and how it should be implemented. Before a decision is made about implementing an exemption program, consideration should be given to using other means to address the fundamental barriers to AFVs, such as higher vehicle cost and lack of fuel availability. For instance, in one effort to address the basic barrier of higher AFV costs compared with the cost of conventional vehicles, the

Energy Policy Act of 1992 provides tax incentives to encourage the purchase of AFVs.

If an exemption program is then deemed necessary, it appears that a program including the following approaches would attract the broadest base of acceptance:

- Allow state and local authorities, who are required by federal law to consider TCMs in their air quality and transportation planning, to be responsible for making decisions on TCM exemptions. It is reasonable that state and local authorities should wish to maintain control over exemptions from those TCMs that they choose to implement. Furthermore, these officials are in the best position to determine what exemptions will be both effective and politically acceptable in their areas. We recognize, however, that local control may result in a wide variety of different programs that could be confusing and inconvenient for motorists and particularly for fleet operators. Coordination of these concerns among federal and state agencies could help maintain some level of uniformity across contiguous areas.
- Recognize that important trade-offs exist between the incentive value of exemptions from certain TCMs and the degree of controversy those exemptions are likely to generate. For example, it appears that HOV-lane exemptions would be highly valued as incentives by potential AFV purchasers, such as vehicle fleet operators. However, in our discussions, officials consistently identified exemptions from HOV rules, more than any other measure, as having the potential to affect the achievement of TCM goals, enforcement, and public acceptance. State and local planners may find exemptions from other TCMS, such as parking management programs that offer special parking for HOVs, easier to implement but correspondingly less valuable as incentives.
- Minimize the negative impacts of exemptions on congestion and air quality. Two approaches may be helpful in this regard. First, sunset provisions may help mitigate concerns about gradual increases in negative impacts over time. Second, appropriately selecting which types of AFVs will be eligible for the program may help ensure that exemptions provide the desired incentive while not seriously undermining the effectiveness of TCMs in reducing congestion and emissions.

Agency Comments

As requested, we did not obtain written agency comments on a draft of this report. However, we discussed the contents of the report with officials of the Office of Demand Policy, DOE; Office of the Secretary, Federal

Highway Administration, and Federal Transit Administration, DOT; and Office of Regulatory Programs and Technology, EPA. These officials raised no concerns about how we have characterized their agencies' views, and we have incorporated their comments into the report where appropriate.

Our work was conducted between August 1992 and February 1993 in accordance with generally accepted government auditing standards. We are sending copies of this report to the Secretaries of Energy and Transportation; the Administrator, EPA; and other interested parties. We will make copies available to others on request.

Please contact me at (202) 512-3841 if you or your staff have any questions. Major contributors to this report are listed in appendix VI.

Sincerely yours,

Victor S. Rezendes
Director, Energy and Science
Issues

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Abbreviations

AFV	alternative-fueled vehicle
DOE	Department of Energy
DOT	Department of Transportation
EPA	Environmental Protection Agency
GAO	General Accounting Office
HOV	high occupancy vehicle
MPO	metropolitan planning organization
TCM	transportation control measure

Scope and Methodology

We used two principal approaches to meet our objectives: (1) interviews, by telephone or in person, with officials of government agencies at all levels, law enforcement agencies, and industry and public interest groups and (2) a survey of agencies that plan regional transportation. We found some inconsistencies in the information gathered from these two sources.

Our assignment focused on six transportation control measures (TCM), among the measures available, because these six TCMs appear to be the most adaptable to the granting of exemptions.[1] In contrast, exemptions do not appear to be applicable to various other TCMs, such as work schedule changes or bicycling.

Telephone and In-Person Interviews

To obtain information about TCM exemptions, we conducted 44 telephone and in-person interviews from August to October 1992. To make our selections, we identified organizations from both the public and private sectors that are involved in energy, transportation, and air quality. These organizations are thus likely to have knowledge of and experience with TCMs, alternative fuels, and alternative-fueled vehicles (AFV).

Those interviewed included officials of (1) the Department of Energy (DOE), Department of Transportation (DOT), and Environmental Protection Agency (EPA); (2) energy, transportation, and air quality agencies for the states of California, Michigan, New York, and Texas; (3) local metropolitan planning organizations (MPO) for Detroit, Houston, Los Angeles, and New York City; (4) law enforcement agencies in California, Texas, and Virginia; (5) the three major U.S. automakers and a group representing foreign automakers; (6) trade associations representing producers of AFVs and alternative fuels, including natural gas, methanol, propane, and electricity; (7) organizations representing vehicle fleet operators; (8) public interest and environmental groups; and (9) three universities with faculty members who specialize in transportation issues. We selected the above-listed states and cities because they had implemented or were planning to implement TCMs, were located in areas that have not yet attained air quality goals for ozone and/or carbon monoxide, or were identified as having experience with alternative-fueled vehicles. A complete list of the organizations we contacted for interviews is provided in appendix II.

Our discussions with these officials suggested that quantitative data are generally unavailable on the effectiveness of TCMs in achieving their underlying purposes. Consequently, officials expressed considerable

[1]The six measures we selected are described in app. IV.

uncertainty about the results of implementing TCMs and about the extent to which TCMs will be planned and implemented in the future. This information led us to conclude that sufficient data were not available to use a quantitative model on the effectiveness of TCM exemptions. We also concluded that, given the uncertainty surrounding the issue, conducting additional interviews was unlikely to add value to our review.

Consequently, we decided to base a substantial portion of this report on an analysis of the opinions of the 44 officials we interviewed. Without quantitative data, we had to rely on the best judgment of these officials, who were familiar with the issues we were reviewing. Despite their uncertainty about the issues, these officials represent organizations that must either make decisions regarding the implementation of TCMs and the granting of exemptions or deal with the consequences of such decisions. Thus, they appeared to be qualified to offer opinions on possible future developments in this area.

In analyzing the responses of officials to each of our questions, we tried to identify patterns of responses—similar answers from most or all the organizations in a given category, for example. Since we solicited open-ended responses to our questions, identifying equivalent responses required the exercise of some judgment on our part. Moreover, the officials interviewed had different perspectives based on their experience with TCMs and AFVs and the institutional goals of the organizations they represented. As a result, we were frequently unable to identify a clear consensus.

Where appropriate, we have highlighted the responses of certain officials who appear to have greater expertise than others on specific questions. For instance, we considered the opinions of law enforcement officials most important on the enforcement issues. Similarly, the views of transportation officials on traffic congestion and environmental officials on vehicle emissions were given extra consideration.

We used additional documentation to corroborate and/or supplement the information obtained in interviews. For example, the proceedings of April 1992 hearings on the House energy bill were useful in clarifying the position of DOT on TCM exemptions. Similarly, an EPA notice of proposed rulemaking on the Clean Fuel Fleet Program provided information on EPA's views on TCM exemptions, and the written comments of various organizations in response to this notice of proposed rulemaking supplemented the comments made to us during interviews.

Survey of Metropolitan Planning Organizations

To supplement the information obtained through interviews, we added questions dealing with exemptions to a survey on TCM issues conducted for a separate GAO review. This survey was sent to 119 MPOs—the agencies that plan regional transportation. The survey addressed a number of fundamental questions about TCMs, including their effectiveness, benefits, and implementation. The 119 MPOs are located in areas that have not yet attained national ambient air quality standards for ozone and/or carbon monoxide. Consequently, these MPOs are likely to already be using TCMs or to be considering TCMs in their future transportation plans. We received responses from 100 MPOs, an 84-percent response rate.

Our analysis of the MPOs' responses to the questions on exemptions has been incorporated into this report to supplement the information obtained through interviews. The exemption portion of the survey, including the MPOs' responses, is reproduced in appendix III.

In analyzing the survey data, we sometimes looked for patterns of responses by grouping related responses. For example, on questions about the likelihood of certain occurrences, we were more interested in distinguishing whether MPOs felt the occurrence was "likely" or "unlikely" than in the distinction between "somewhat likely" and "very likely." Consequently, in these cases, we generally grouped the latter two responses for analysis.

The results of the overall survey, which addresses the effectiveness, benefits, and implementation of TCMs, will be summarized in a separate report.

Inconsistencies Between Interview and Survey Information

On several issues, the interview results are not entirely consistent with the survey data. One possible reason is that our open-ended interviews, with the opportunity for lengthy responses and follow-up questions, enabled officials to recall aspects of an issue that they may have overlooked if confronted with the limited explanations and response options of a survey instrument. Furthermore, the officials we interviewed represented a wide variety of organizations, many of which are concerned with the practical implementation of TCMs and AFVs. On the other hand, the MPO officials we surveyed are a more homogeneous group, with a primary focus on developing future transportation plans.

Organizations Contacted for Interviews

Environmental Agencies	U.S. Environmental Protection Agency Northeast States for Coordinated Air Use Management State and Territorial Air Pollution Program Administrators/ Association of Local Air Pollution Control Officials California Air Resources Board Michigan Department of Natural Resources New York State Department of Environmental Conservation Texas Air Control Board South Coast Air Quality Management District (California) Sacramento Metropolitan Air Quality Management District
Energy Agencies	U.S. Department of Energy California Energy Commission New York State Energy Office Texas General Land Office
Transportation Agencies	U.S. Department of Transportation California Department of Transportation Michigan Department of Transportation New York State Department of Transportation Texas Department of Transportation National Association of Regional Councils Houston-Galveston Council of Governments Houston Metropolitan Transit Authority New York Metropolitan Transportation Council Southeast Michigan Council of Governments Southern California Association of Governments
Law Enforcement Agencies	California Highway Patrol Virginia State Police Houston Metropolitan Transit Authority Police
Automobile Manufacturers	Chrysler Motors Corporation Ford Motor Company General Motors Corporation Association of International Automobile Manufacturers

Alternative-Fuel Industry Trade Associations	American Methanol Institute Electric Transportation Coalition LP Gas Clean Fuels Coalition Natural Gas Vehicle Coalition
Fleet Operator Associations	American Trucking Associations National Association of Fleet Administrators
Public Interest and Environmental Groups	American Automobile Association Commuter Transportation Services Corporation (Commuter Computer—Los Angeles) Natural Resources Defense Council Sierra Club
Universities	George Mason University, Institute of Public Policy University of California at Los Angeles, Graduate School of Architecture and Urban Planning University of California at Riverside, Center for Environmental Research and Technology

Survey Responses of Metropolitan Planning Organizations

We sent a questionnaire to 119 metropolitan planning organizations (MPO)—located in areas that have not yet attained national ambient air quality standards for ozone and/or carbon monoxide—to obtain the views of transportation officials on transportation control measures. Section IV of the questionnaire, presented in this appendix, pertains to the advisability of exempting alternative-fueled vehicles (AFV) from certain transportation control measures. Percentages show how the responses of the 100 MPOs that returned the questionnaire were distributed among each of the seven questions in that section.

The other sections of the questionnaire pertain to the effectiveness, benefits, and implementation of TCMs. We are analyzing those responses, and the results of our work will be presented in a subsequent report.

SECTION IV: EXEMPTION OF ALTERNATIVE FUELED VEHICLES TO TCMs

Alternative fuels, such as compressed natural gas and alcohol fuels, could help reduce our dependence on imported petroleum-based fuels. As an incentive to encourage the use of alternative fuels, House Subcommittee on Energy and Power is considering including certain TCM exemptions for alternative-fueled vehicles (AFVs) in energy legislation. The Subcommittee requested GAO to examine the effects of TCM exemptions on fuel consumption, traffic congestion, and emissions reduction.

Examples of exemptions are: 1) lowering or eliminating bridge and highway tolls for AFVs and 2) allowing single-occupant AFVs to use HOV lanes.

AFVs include three basic configurations: 1) those operating only on alternative fuel (dedicated), 2) those able to operate on either petroleum-based or alternative fuel (dual-fueled), or 3) those able to operate on a varying mixture of petroleum-based fuel and alternative fuel (flexible-fueled).

20. In your opinion, how likely would granting exemptions to alternative-fueled vehicles from the following TCM elements further the objectives of increasing the use of alternative fuels?

	Check one for each						
TCM Elements	Very likely (1)	Somewhat likely (2)	Neither likely nor unlikely (3)	Somewhat unlikely (4)	Very unlikely (5)	No basis to judge (6)	No opinion * (7)
1. HOV lanes	5	30	16	8	15	25	1
2. Parking management program (e.g., special parking for HOVs)	7	37	18	5	11	21	1
3. Auto use restrictions (e.g., time of day on deliveries)	8	31	18	8	12	22	1
4. Peak period fees/congestion pricing	12	31	15	4	14	23	1
5. Trip reduction ordinances	6	31	15	11	12	24	1
6. Existing tolls on bridges and highways	8	29	16	4	13	29	1

* The "no opinion" column was added after data were collected. One survey was completed by several MPO officials, and they frequently did not reach consensus on which choice was correct for each of the TCM elements.

21. In your opinion, what effect (if any) would granting exemptions to **dedicated AFVs** have on the effectiveness of the following TCMs in relieving **traffic congestion**?

	Check one for each						
TCM Elements	Very negative effect (1)	Somewhat negative effect (2)	Little or no effect (3)	Somewhat positive effect (4)	Very positive effect (5)	No basis to judge (6)	No opinion * (7)
1. HOV lanes	8	13	47	9	1	21	1
2. Parking management program (e.g., special parking for HOVs)	2	17	49	14	1	16	1
3. Auto use restrictions (e.g., time of day on deliveries)	4	17	45	15	1	17	1
4. Peak period fees/congestion pricing	3	16	42	16	1	21	1
5. Trip reduction ordinances	3	19	43	11	3	20	1
6. Existing tolls on bridges and highways	4	13	43	9	3	27	1

22. In your opinion, what effect (if any) would granting exemptions to **dedicated AFVs** have on the effectiveness of the following TCMs in **reducing emissions**?

	Check one for each						
TCM Elements	Very negative effect (1)	Somewhat negative effect (2)	Little or no effect (3)	Somewhat positive effect (4)	Very positive effect (5)	No basis to judge (6)	No opinion * (7)
1. HOV lanes	2	4	45	26	1	22	0
2. Parking management program (e.g., special parking for HOVs)	0	4	51	25	2	18	0
3. Auto use restrictions (e.g., time of day on deliveries)	0	5	42	30	2	20	1
4. Peak period fees/congestion pricing	1	5	38	27	4	24	1
5. Trip reduction ordinances	0	5	44	23	5	23	0
6. Existing tolls on bridges and highways	0	3	43	20	3	30	1

23. In addition to dedicated AFVs, in your opinion, what effect (if any) would granting exemptions to **dual and flexible-fueled AFVs** have on the effectiveness of the following TCM elements in relieving **traffic congestion**?

	Check one for each						
TCM Elements	Very negative effect (1)	Somewhat negative effect (2)	Little or no effect (3)	Somewhat positive effect (4)	Very positive effect (5)	No basis to judge (6)	No opinion (7)
1. HOV lanes	10	14	45	7	1	23	0
2. Parking management program (e.g., special parking for HOVs)	3	16	51	9	0	21	0
3. Auto use restrictions (e.g., time of day on deliveries)	5	16	49	9	0	21	0
4. Peak period fees/congestion pricing	6	17	41	10	2	24	0
5. Trip reduction ordinances	5	20	44	7	1	23	0
6. Existing tolls on bridges and highways	5	14	43	4	3	31	0

24. In your opinion, what effect (if any) would granting exemptions to **dual and flexible-fueled AFVs** have on the effectiveness of the following TCM elements in **reducing emissions?**

TCM Elements	Check one for each: Very negative effect (1)	Somewhat negative effect (2)	Little or no effect (3)	Somewhat positive effect (4)	Very positive effect (5)	No basis to judge (6)	No opinion (7)
1. HOV lanes	4	7	42	19	1	27	0
2. Parking management program (e.g., special parking for HOVs)	1	7	46	18	1	27	0
3. Auto use restrictions (e.g., time of day on deliveries)	2	9	42	22	1	24	0
4. Peak period fees/congestion pricing	1	11	37	19	3	29	0
5. Trip reduction ordinances	1	13	38	19	2	27	0
6. Existing tolls on bridges and highways	1	7	40	15	2	35	0

25. In your opinion, if TCM exemptions are granted to AFVs, how likely would the following issues become significant problems?

TCM Elements	Check one for each: Very likely (1)	Somewhat likely (2)	Neither likely nor unlikely (3)	Somewhat unlikely (4)	Very unlikely (5)	No basis to judge (6)	No opinion * (7)
1. Increased use of HOV lanes, special parking, etc. by ineligible vehicles	22	32	9	8	8	20	1
2. Confusion over identification of eligible AFVs (decals, special license plates, etc.)	33	42	3	3	2	16	1
3. Lack of adequate resources to enforce more complex TCM rules	42	30	7	2	1	18	0
4. Increased administrative costs (e.g., processing exemption requests)	40	39	4	0	1	15	1
5. Erosion of public acceptance of TCMs	13	35	21	8	4	18	1
6. Equity issues in states that adopt California emissions standards, where conventional vehicles may have emissions similar to some AFVs	26	34	8	1	1	29	1

26. In your opinion, if the federal government decided to grant TCM exemptions to the different classes of AFVs, how supportive or opposed would your organization be to these exemptions?

	Check one for each						
TCM Elements	Strongly opposed (1)	Somewhat opposed (2)	Neither opposed nor supportive (3)	Somewhat supportive (4)	Strongly supportive (5)	No basis to judge (6)	No opinion * (7)
1. Dedicated AFVs	3	7	21	20	16	32	1
2. Dual Fuel AFVs	7	10	24	16	8	34	1
3. Flexible Fuel AFVs	8	9	24	17	8	34	0

Transportation Control Measures

According to EPA's guidance on TCMs, emissions from mobile sources of pollution were greatly reduced during the 1970s and 1980s as a result of improvements in vehicle technology. Nevertheless, net reductions in emissions from all mobile sources have been lower than expected because of increases in vehicle miles traveled. The Clean Air Act Amendments of 1990 and the Intermodal Surface Transportation Efficiency Act of 1991 encourage and, in some cases, require officials in areas that have not attained national air quality standards for ozone or carbon monoxide to include TCMs in their air quality and transportation plans. These measures could offset increases in vehicle trips and vehicle miles traveled and improve air quality.

According to EPA, TCMs encompass elements of strategies for managing both transportation systems and transportation demand. Strategies for managing transportation systems include using transportation improvements that do not require much capital to increase the efficiency of transportation facilities and services. These strategies can include high-occupancy-vehicle (HOV) lanes, car-pool and van-pool programs, parking restrictions, and traffic flow improvement projects. Strategies for managing transportation demand include policies, programs, and actions directed towards increasing the use of HOV lanes and mass transit, bicycling, and walking. Demand-management strategies can also include actions that encourage commuting outside of congested peak travel periods, such as imposing tolls in periods of peak highway congestion and time-of-day restrictions on the use of certain roads. The Clean Air Act Amendments of 1990 require EPA to prepare basic information documents on TCMs and make them available to federal, state, and local environmental and transportation agencies. Local decisionmakers are to use the information in assessing different strategies to solve mobile source emission problems in their areas.

In this appendix, we provide definitions for the six TCMs that were the focus of our review.

HOV Lanes

HOV lanes are travel lanes designated for the exclusive use of high-occupancy vehicles, such as car pools, van pools, and transit vehicles. The intent of HOV lanes is to increase the capacity of highways to transport people in congested corridors, while reducing the number of vehicle trips and miles traveled.

Parking Management	The management of parking demand and supply—including public and private parking facilities—covers both on-street and off-street parking. Parking management strategies can include pricing policies and zoning restrictions that are intended to reduce the number of vehicles driven to certain areas by making parking more expensive or less available.
Auto-Use Restrictions	Auto-use restrictions limit the access of specific types of vehicles to certain areas or locations during particular times of the day, days of the week, and so on. (These restrictions are also known as temporal or time-of-day restrictions.) For example, commercial delivery vehicles might be prohibited from traveling within a central business district during peak commuting hours.
Peak-Period Fees or Congestion Pricing	Peak-period fees or congestion pricing consist of a system of tolls that financially penalize travel on congested highways during peak commuting times. For example, under one scenario described by DOT, tolls for vehicles with a single occupant would be higher during peak periods than during other parts of the day, while HOVs would not be charged tolls at any time.
Trip Reduction Ordinances	Trip reduction ordinances are requirements designed to encourage the use of alternative transportation modes other than single-occupant vehicles. Local or regional government regulations or ordinances—such as building codes or zoning ordinances—may enact trip reduction requirements. These requirements may include limitations on the volume of trips generated from specific employment sites. For example, in California, the South Coast Air Quality Management District's Regulation 15 requires employers of 100 or more persons at a single work site within the district to take steps to increase the average number of riders per vehicle for their commuting employees.
Toll Exemptions	Toll exemptions reward alternative-fueled vehicles or HOV use by granting exemptions from existing tolls on highways, bridges, and tunnels.

Sunset Provisions

Sunset provisions are generally written into legislation to ensure that certain measures are phased out once they have fulfilled their purpose and are no longer needed. Nineteen of the 44 organizations we contacted endorse the use of sunset provisions in conjunction with TCM exemptions. Support is widely scattered among the types of organizations. Twenty organizations expressed no opinion on sunset provisions, while five organizations oppose them.

Among those organizations that support sunset provisions, all of the automakers and university experts and several of the transportation and environmental agencies said their position was based on the belief that such provisions could help ensure that the negative impacts of exemptions on underlying TCM goals would not reach unacceptable levels. The remaining groups that support sunset provisions, including two alternative fuel associations, said that the provisions are needed so that exemptions are phased out once AFVs have achieved a desired level of market penetration.

However, officials of the five organizations opposed to sunset provisions—the American Automobile Association, the California Air Resources Board, DOE, DOT, and the Sierra Club—and one local transportation agency that supports them pointed to potential problems with such provisions. These problems include the difficulty of establishing appropriate trigger mechanisms for the provisions and the political pressures that sometimes make the implementation of sunset provisions quite difficult in practice. The following detailed discussion of these potential drawbacks of sunset provisions is based on a compilation of the views of officials of these six organizations.

According to these officials, if the primary goal of a sunset provision is to phase out exemptions when they are no longer needed, the trigger mechanism for the phase-out would be the achievement of a certain level of market penetration by AFVs. If the primary goal is to minimize any negative impacts of exemptions on the original TCM goals, the trigger would be some measure of the impact, such as the level of overcrowding in HOV lanes. However, according to these officials, it might be difficult to decide which goal is primary and thus to establish such a trigger mechanism. As a result, establishing the criteria for phase-out could be controversial.

Moreover, these types of triggers could not be tied to a specific date, so the precise time when the exemptions would become unavailable could

not be predicted in the early stages of the program. The incentive value of the exemptions could thus be weakened, since potential AFV purchasers would not be certain how long they would be able to take advantage of them. This inability to predict the life span of exemptions would pose a particular problem for fleet operators, to whom long-range planning is important and whose efficiency and profits could be directly affected by exemptions.

On the other hand, these officials contend, the problem described above could be eliminated by simply establishing an exact date in the future when the sunset provision would take effect. Doing so would probably enhance the incentive value of exemptions, because purchasers would know precisely how long they would enjoy the benefits of exemptions.

However, this strategy would create another potential problem, according to these officials, because there is no guarantee that the date established at the outset would be appropriate. Such an arbitrary date could, for example, result in a phase-out of exemptions well before AFVs had become firmly established in the marketplace. On the other hand, an arbitrary date could allow negative impacts on congestion or emissions to continue after they had reached unacceptable levels.

These officials also expressed concern that implementing sunset provisions might become difficult once exemptions have been in place for some time and users have gotten used to them. They are concerned that the government's efforts to promote AFVs might cause the market to become overly dependent on incentives, and that pressure to support this market could make it politically difficult to withdraw incentives. For example, an earlier AFV program in New Zealand became heavily dependent upon government incentives. When these incentives were withdrawn, the market for AFVs collapsed. To prevent that from happening here, these officials believe that incentives originally intended to be temporary might end up becoming permanent.

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