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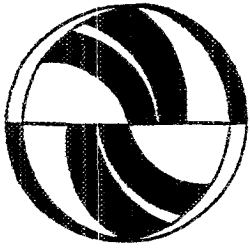
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**Incentive Policies for  
Neighborhood Electric Vehicles**

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Daniel Sperling

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The University of California  
Transportation Center  
University of California  
Berkeley, CA 94720

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**Incentive Policies for  
Neighborhood Electric Vehicles**

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## **Abstract**

This report explores the incentives currently available for the production, sale, and use of neighborhood electric vehicles (NEVs), and suggests other incentives that could be implemented. NEV incentives are needed because the use of NEVs on a large scale would provide significant air quality benefits. NEVs produce no tailpipe emissions and could replace the vast majority of short, heavily-polluting trips. NEVs could also reduce greenhouse gas emissions, increase energy efficiency, enhance energy security, reduce the land-use demands of the automobile system, and promote the development of more "livable" communities.

In addition to the California Air Resources Board zero-emission vehicle mandate, a variety of other federal, state, and local incentives are available to manufacturers and purchasers of NEVs. This report explores the details of these incentive programs, with a particular focus on the specific vehicle definitions used by each. These definitions are important because not all NEV designs may qualify for incentives available to full-sized electric vehicles. Following a discussion of the incentives currently available to NEV manufacturers and consumers, recommendations are made for other incentives that could most effectively encourage the introduction and use of these clean, efficient vehicles.

## **I. Introduction**

Electric vehicles (EVs) have the potential to reduce the air quality and energy problems currently facing urban areas. The primary motivation for automobile manufacturers to produce and sell EVs is the zero-emission vehicle (ZEV) mandate issued by the California Air Resources Board (CARB) in 1990. This mandate requires major manufacturers to produce and deliver for sale a number of ZEVs equal to 2% of their statewide sales in 1998. This percentage rises to 5% in 2001 and eventually reaches 10% in 2003. The northeastern states have requested permission from the U.S. EPA to adopt similar rules.

Battery-power electric drive is the only currently available zero-emission technology usable for motor vehicles. As a result, the ZEV mandate has spurred a renewed interest in EVs. The main obstacle to the introduction of EVs for use on a mass scale is the high cost and poor energy storage capacity of electrical batteries relative to gasoline.

Neighborhood electric vehicles (NEVs) are EVs that are designed to be used only for short, urban trips at relatively low speeds. As such, they are better suited to the limitations of today's batteries than are full-sized EVs designed for high speed highway travel. As complements or supplements to a household's other vehicles, NEVs could be used for short, urban trips. Because these trips account for a disproportionate share of emissions, NEVs provide even greater per-kilometer emission reductions than full-sized EVs (Sperling, 1994).

The use of NEVs would result in significant reductions in petroleum consumption and emissions of criteria pollutants and greenhouse gases, but initial NEV production volumes will be low and unit costs will be high. The successful

introduction of these vehicles will therefore require some degree of subsidization. Monetary and non-monetary incentives can be used to stimulate NEV manufacture, increase their attractiveness to consumers, and ultimately expand their market penetration. As batteries become less costly and NEV production volumes increase, unit costs will drop and monetary incentives for NEVs and other EVs can be slowly phased-out until they are no longer needed to support the goals of the ZEV mandate. Thus, in order to encourage the production, sale, and use of these clean, efficient vehicles, both supply-side and demand-side NEV incentives should be considered.

Indeed, a variety of EV incentive programs are currently in place on the federal, state, and local levels, and more have recently been proposed. These incentives can be divided into several broad categories:

- incentives that reduce manufacturing costs or encourage vehicle manufacture;
- incentives that promote the development of EV infrastructure;
- incentives that encourage vehicle purchases by reducing initial prices, requiring the purchase of ZEVs for use in fleets, or allowing ZEVs to be used as emission reduction offsets; and
- incentives that reduce operation and maintenance costs for consumers or improve NEV convenience.

Within these broad categories, this paper will first examine the background and status of the existing EV incentives available to NEVs. Where relevant, particular attention will be paid to the specific vehicle definitions used by the regulations that promulgate incentives for electric and alternative-fuel vehicles. These definitions are important because in some cases they may exclude various NEV designs.

At the state and regional levels, the focus of this report will be on incentives available in California. Outside of California, few incentive measures have been

signed into law, but recently several states have proposed incentive programs. Section VI of this paper examines the pending bills in the California legislature that contain provisions relevant to NEV incentives. A summary of the EV related incentive proposals in other states can be found in the State Legislative Report in Appendix A.

This report also suggests other incentives that could be implemented to most efficiently increase the attractiveness of NEV production, sale, and use. Recommendations are made for both the short and long term, and are placed within the context of existing incentives available to NEVs. The recommended incentives have been identified based on a preliminary assessment of potential cost-effectiveness, political acceptability, equity impacts, and predictability in efficiently promoting NEV sale and use. Before actual implementation, new incentives should be assessed in detail with regard to their costs and impacts in the specific area for which they are proposed.

## **II. Incentives and Requirements for Vehicle Manufacture**

Manufacturers of NEVs face a market of unknown size and generally unknown character. These vehicles will be introduced into a transportation system dominated by full-sized automobiles and to consumers unfamiliar with their attributes. To make matters more difficult, regulatory and institutional barriers currently exist for NEVs in the form of safety standards, helmet laws, and confusing and inconsistent definitions used in vehicle codes and energy and air quality legislation (Lipman et al., 1994). In addition, specialized roadway infrastructure would be required in some areas to avoid intermingling with larger, faster vehicles and guarantee NEV safety; and support infrastructure such as recharging and maintenance facilities do not exist, with a few notable exceptions (Garrison, 1993; Stein et al., 1994). Finally, the risks to NEV manufacturers of liability suits are acute, given the strength of consumer protection laws in the U.S.

For these reasons, incentives to support vehicle manufacture are of great importance. In light of the many uncertainties surrounding the NEV market, few manufacturers could be expected to produce NEVs in volumes high enough to result in low prices for consumers. Since initial NEV production volumes will be low, incentives for manufacturers are needed to lower manufacturing costs. These lower costs would translate to lower vehicle prices and this, coupled with demand-side incentives to consumers, would help to make NEV purchases attractive to households. As more NEVs are sold and production volumes increase, manufacturing incentives could be slowly phased out. The following section addresses the manufacturing incentives and requirements currently in place.

## Federal Level

### **1) Energy Policy Act of 1992: Electric Motor Vehicle Commercial Demonstration Program**

Subtitle A of Title VI of the Energy Policy Act of 1992 provides funding for the Electric Motor Vehicle Commercial Demonstration Program. This program is designed to accelerate the development and use of electric motor vehicles and is structured to evaluate the performance of EVs in field operation. The program provides up to \$50 million over 10 years, and could fund over ten separate proposals. Solicitations must include a description of the manufacturer or manufacturers of the EVs to be used in the proposal, the proposed users of the vehicles, the metropolitan area involved, the number and type of vehicles to be used, the type of associated equipment to be used, the domestic content of the vehicles to be used, and various financial information (42 USC 13281). In selecting proposals, the Secretary of Energy would consider (42 USC 13282):

- the ability of the manufacturer to develop, assist in the demonstration of, manufacture, distribute, sell, provide warranties for, service, and ensure the continued availability of parts for the EVs in the demonstration;
- the geographic and climatic diversity of the eligible metropolitan area in which the demonstration project is to be undertaken;
- the long-term technical and competitive viability of the EVs;
- the suitability of the EVs for their intended uses;
- the environmental effects of the use of the proposed EVs;
- the price differential between the EVs and comparable conventionally-fueled vehicles
- the extent of involvement of State or local government in the demonstration project;

- the proportion of domestic content of the EVs and associated equipment; and
- the safety of the EVs.

A demonstration project involving any type of NEV would qualify for consideration of funding under this program because the definition of an EV used in this program is broadly defined to include any self-propelled, electrically powered vehicle designed for transporting persons or property on a street or highway (42 USC 7550).

## **2) 10 CFR Part 476: Electric and Hybrid Vehicle Program Small Business Planning Grants**

Under this section of the Code of Federal Regulations, pursuant to section 9(c)(2) of the Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976, small businesses are eligible for planning grants that allow them to help further the development of electric and hybrid vehicle (EHV) technology. The criteria used for awarding the grants, which are available through annual solicitations by Department of Energy (DOE), include the technical merit of the proposal (i.e. its potential for making a significant contribution to accelerating the introduction of EHV and its potential for helping to solve the major problems facing the EHV programs), the capability of the applicant to successfully carry out the proposal, and the "reasonableness" of the applicant's budget for the preparation of the proposal. The grants are only to be used for direct costs incurred in the preparation of contract proposals to DOE, and are only available to businesses which meet the following criteria: total assets under \$3 million, average annual receipts

for the previous three years of under \$3 million, and average annual net income of under \$300,000 for the previous three years (10 CFR Part 476).

These planning grants can help small companies by providing them with the funding necessary to prepare proposals to be submitted to DOE for the EHV programs. In addition to receiving the planning grant, the proposal of a selected business would be considered a "solicited proposal" and would therefore have a greater probability of being selected for funding. The definitions used by the code are inclusive of all EVs, so companies interested in producing NEVs would be fully eligible, but it must be emphasized that the planning grants are only awarded in conjunction with solicitations by DOE. The proposals submitted should therefore address the specific areas of concern of the solicitation, so only insofar as proposals related to NEVs met those areas of concern would they be likely to pass the preliminary review section of the grant award process.

### **3) 40 CFR Part 600: Corporate Average Fuel Economy**

The Chrysler Corporation Loan Guarantee Act of 1979 amended the Electric and Hybrid Vehicle Research, Development and Demonstration Act of 1976 to establish a method of including EVs in the Corporate Average Fuel Economy (CAFE) program. This was accomplished by developing a system for calculating equivalent petroleum-based fuel economy values for EVs. The amendments also required the Secretary of Energy to conduct a seven-year evaluation program on the inclusion of EVs in the CAFE program, and this took place from 1981 to 1987. The intent of this legislation was to provide an incentive for manufacturers to produce EVs by allowing their expected high equivalent fuel economy to be included in the calculation of manufacturer CAFE ratings (59 F.R. 5336).



The Seven-Year EV/CAFE Evaluation Program

DOE proposed a method of calculating the equivalent petroleum-based fuel economy of EVs in May, 1980. The proposed equation factored in the stop-and-go electrical efficiency and the steady-state electrical efficiency to obtain a figure for the "energy equivalent fuel economy value." This equation was as follows:

$$\text{Energy Equivalent Fuel Economy Value} = \frac{36.66}{\{(\text{stop-and-go efficiency value}) \times (0.91) + (\text{steady-state efficiency value}) \times (0.09)\}}$$

In order to account for the installation of petroleum powered heaters or defrosters, the value obtained was multiplied by a Petroleum Equivalency Factor (PEF) according to the following scheme: if no more than 33 percent of the production volume of the EV model type was equipped with one petroleum-powered accessory, the first value was used; if more than 33 percent of the production volume was equipped with one petroleum-powered accessory, the second value was used; and if more than 33 percent of the production volume was equipped with two petroleum-powered accessories, the third value was used. The following table displays PEF values by model year and accessory category for the seven-year evaluation period ending in 1987 (10 CFR Part 474).

**Table 1: Petroleum Equivalency Factors by Model Year and Accessory Category**

<u>Model Year</u>	Accessory Category Number 1	Accessory Category Number 2	Accessory Category Number 3
1981	1.9	1.7	1.6
1982	2.0	1.8	1.6
1983	2.0	1.8	1.6
1984	2.1	1.9	1.7
1985	2.3	2.0	1.8
1986	2.2	2.0	1.8
1987	2.2	2.0	1.8

Source: 10 CFR Part 474.4

The final calculation of the equivalent petroleum-based fuel economy in miles per gallon was made by multiplying the appropriate PEF value with the calculated energy equivalent fuel economy value.

### Proposed New Rules

Until a proposed rule making was published in the Federal Register by DOE on February 4, 1994, no provisions or proposals existed for the incorporation of EVs into the CAFE credit scheme beyond 1987. The new rules proposed by DOE would change the way the electricity generation output, input, and relative value factor terms would be calculated. The updated equations incorporate off-peak EV charging and the relative scarcity of electricity generation fuel sources (59 F.R. 5336). DOE expects the new factors and procedures for calculating the equivalent petroleum-based fuel economy of EVs to be adopted in the first quarter of FY 1995 (Sullivan, 1994).

The new procedures proposed by DOE would revise 10 CFR Part 474 to use the Society of Automotive Engineers Electric Vehicle Energy Consumption and Range Test Procedure J1634, to replace the previously used test procedure J227a. Test Procedure J1634 provides standard tests for determining the energy consumption and range of EVs based on the same highway and urban cycles used for gasoline-powered vehicles. The previous test procedure was based heavily on stop-and-go as opposed to highway vehicle usage because 10 CFR Part 474 was based on the premise that EVs would only be appropriate for urban use. The use of Test Procedure J1634 in place of Test Procedure J227a is also supported by the fact that the older procedure

has a short, repetitive test cycle that does not represent the driving conditions of a gasoline-powered vehicle as well as the proposed Test Procedure J1634 (59 F.R. 5336).

The revised procedures proposed by DOE would implement a more complicated calculation of the PEF values in order to incorporate such variables as percentage output of electricity generation mix ( $E_{total}$ ), percentage input electricity generation of fuel  $i$  ( $I_i$ ), relative scarcity factor of fuel  $i$  ( $V_i$ ), average national electrical transmission efficiency ( $n_i$ ), driving pattern factor (DPF), and accessory factor (AF). The revised equation for calculating PEF values is as follows (59 F.R. 5336):

$$\text{Petroleum Equivalency Factor} = \text{DPF} \times n_i \times \text{AF} \times (E_{total} / \sum I_i V_i)$$

With regard to the driving pattern factor, the Motor Vehicle Information and Cost Savings Act requires that DOE take into account driving patterns of EVs as compared with those of gasoline-powered vehicles. Until DOE has collected sufficient data to show otherwise, however, a factor of 100 percent will be used. The value used for the national electrical transmission efficiency is 91.5 percent, and this value is not expected to change significantly over the next several years. The values used for the accessory factor are 1.00, 0.90, and 0.81, depending on whether the EV is equipped with no petroleum-powered accessories, one accessory, or two accessories (59 F.R. 5336).

The final term in the PEF equation is the ratio of total output electricity generation mix to input electricity generation, weighed by a relative scarcity factor. In order to calculate a value for this term, data must be obtained for total electricity generation, energy sources used in electricity generation, electricity generation mix, fuel source reserves, and consumption of electricity generation fuel sources (59 F.R. 5336). DOE has estimated the values to be used in this term, and the resulting PEF

values. Unlike the current version of 10 CFR Part 474 that required annual updating of PEF values, these values are valid through the year 2004. Table 2 presents the proposed PEF values based on the DOE estimates.

**Table 2: Revised Petroleum Equivalency Factor Calculation**

Driving Pattern Factor (DPF)	Electrical Transmission Efficiency ( $\eta_i$ )	Accessory Factor (AF)	Total Output Electricity Generation Mix (%) ( $E_{total}$ )	Sum of $I_i \times V_i$	Petroleum Equivalency Factor (PEF)
1.000	.915	1.000	.325	.128	2.32
		.900			2.09
		.810			1.88

Source: 59 F.R. 5336

In order to obtain the equivalent petroleum-based fuel economy value in miles per gallon, the appropriate PEF value is multiplied by the electric energy efficiency value. This procedure is similar to that used during the old seven-year evaluation program, with the exception that new factors are used for urban (or stop-and-go) and highway (or steady-speed) efficiency values based on the use of Test Procedure J1634 in place of J227a. Previously, the urban efficiency value was multiplied by 0.91 and the highway efficiency value was multiplied by 0.09. Under the revised scheme, the urban efficiency value would be multiplied by 0.55 and the highway efficiency value would be multiplied by 0.45 (59 F.R. 5336).

#### Benefit of Including EVs in CAFE

The benefit of being able to include the high equivalent fuel economy of EVs into its CAFE rating is only one factor that a manufacturer would consider when making a decision to build EVs, but it could be an important one if a manufacturer needed

additional credits to meet the CAFE standards or if the standards were increased (U.S. GAO, 1991). The proposed method for calculating the equivalent fuel economy of EVs produces slightly higher PEF values than were obtained through the original method, thereby providing a somewhat stronger incentive for manufacturers to produce EVs than at any time during the seven-year evaluation program (Sullivan, 1994). The CAFE ratings are based on sales weighted averages, so the effect of EV production on a manufacturer's rating would only be in proportion to the number of EVs produced relative to conventional vehicles. The ZEV production levels required of manufacturers in the initial years of the mandate (2% of vehicles delivered for sale in states with the mandate in place) may not appear to imply major CAFE benefits for manufacturers because the total number of EVs produced would only be on the order of 1 percent of total production for all 50 states. But, the following example shows that for each NEV or other ZEV produced manufacturers may be able to sell a large number of higher priced, lower efficiency vehicles.

Since the equivalent fuel economy of an EV is calculated by multiplying a PEF value by an electric energy efficiency value for a particular vehicle, the value obtained is directly dependent on the efficiency of that vehicle. NEVs, being lightweight and in general very efficient, would thus be awarded the highest fuel economy values. Using the new method to calculate the equivalent fuel economy of existing EVs such as the Ford Ecostar and Chrysler TEVan, DOE has obtained values of from approximately 200 to 500 mpg (Sullivan, 1994). The calculation of these values did not incorporate the proposed new SAE test procedure, so they are slightly different than the actual values that will eventually be calculated, but they show that even large EVs will have equivalent fuel economies of roughly an order of magnitude greater than those of conventional vehicles. With their greater

efficiencies, NEVs would be given even higher fuel economy ratings than full-sized EVs. The lower manufacturing costs of NEVs (compared to full-sized EVs), coupled with the CAFE benefit, may make the production of NEVs an attractive or even least-cost option for manufacturers to meet the requirements of the ZEV mandate.

### Calculation of Potential Benefit of NEVs

We make these assumptions:

- a NEV has an equivalent fuel economy of 500 mpg;
- the CAFE standard is set at 27 mpg;
- the sale of a 15 mpg gallon vehicle would provide an additional \$500 in profit to a manufacturer in comparison with the sale of a 27 mpg vehicle; and
- the market demand for more such 15 mph vehicles is present.

If we substitute one NEV for a fleet average 27 mile per gallon vehicle, the resulting sale of additional 15 mile per gallon vehicles that would be allowed is given by X in the following equation:

$$\{(X \text{ vehicles}) \cdot (15 \text{ mpg})\} + \{(1 \text{ vehicle}) \cdot (500 \text{ mpg})\} = (X+1 \text{ vehicles}) \cdot (27 \text{ mpg})$$

We obtain a value for X of nearly 40 vehicles. With our above assumptions, this would provide \$20,000 in additional profit to a manufacturer as an eventual consequence of the production of a single NEV.

Calculating the exact impact of such an incentive is complicated by the intricacies of corporate production and marketing decisions; but it seems clear that being able to sell a greater number of cars with higher profit per vehicle would be of significant incentive, and would help manufacturers to recoup any losses incurred by the differential costs of ZEV production. The effect of the inclusion of EVs in the

calculation of CAFE ratings presumably would increase in 2001 and 2003 with the progressive increase in EV sales due to the ZEV mandate, but the true magnitude of the incentive to manufacturers is once again uncertain and would be determined by such factors as market demand and the relative costs of production of EVs and conventional vehicles.

### CAFE Vehicle Definitions

The vehicle definitions used in the CAFE regulations would classify four-wheel NEV designs as "passenger automobiles." EVs are specifically mentioned in the "automobile" definition, and any NEV would be a "passenger automobile" provided that it had four wheels, a curb weight of under 6,000 pounds, and a vehicle frontal area of under 45 square feet; and was manufactured for the transportation of no more than 10 individuals. As "passenger automobiles," such vehicles would qualify for CAFE credits under the proposed new rules. The fate of three-wheeled NEV designs is unclear in that an "automobile" may also be a vehicle that is "substantially used for the same purposes," depending upon a determination by the Secretary of Transportation (40 CFR 600.002). Thus, according to the way in which the definitions are worded, four-wheeled NEVs would be eligible for CAFE credits but three-wheeled NEVs would not be eligible unless a specific determination to the contrary was made by the Secretary of Transportation.

### State Level

#### **1) CCR Title 13, Section 1960.1: California Zero-Emission Vehicle Mandate**

The zero-emission vehicle (ZEV) mandate, announced by the California Air Resources Board (CARB) in 1990, provides a powerful incentive for large automobile manufacturers to produce EVs. Manufacturers selling more than 35,000

vehicles in California per year must produce and deliver for sale a number of ZEVs equal to or greater than a specified percentage of their total annual new vehicle sales. This percentage starts at 2% in 1998, rises to 5% in 2001 and then reaches 10% in 2003. At present, seven manufacturers would be required to produce EVs for the California market: General Motors, Chrysler, Ford, Nissan, Toyota, Honda, and Mazda. In 2003, the mandate will be broadened to include "intermediate volume manufacturers" selling between 3,001 and 35,000 vehicles per year (CCR, Title 13, §1960.1). Several northeastern states have asked permission from the EPA to adopt similar rules, but even if the mandate applies only in California, the production of approximately 35,000 EVs will be required in 1998.

Of primary importance to NEV manufacturers is the degree to which this regulation will apply to all EV designs, or only to full-sized, freeway capable, and/or four-wheeled vehicles. At present, CARB has determined that EVs need not be full-sized or freeway capable in order for manufacturers to earn ZEV credits, but they must have four wheels. Thus, manufacturers of four-wheeled NEVs would earn ZEV credits, which could be traded or sold to other manufacturers, but they would not receive ZEV credits for the production of otherwise identical three-wheeled designs (Evashenk, 1994). The ZEV mandate is reviewed every two years, so the potential exists for this determination to be revised. The latest review in May, 1994, resulted in no major changes to the mandate.

Those that would like to encourage the manufacture of all NEV designs could make the argument that a broadened array of NEVs should be included in the ZEV mandate for three primary reasons. First, NEVs are particularly well suited to the constraints imposed by current lead-acid battery technology due to their high efficiencies and predominant use for local travel (MacCready, 1994). Second, it may be difficult for manufacturers to sell the rapidly escalating numbers of ZEVs that



they are required to produce. Allowing more types of vehicles, particularly smaller and less expensive models, to meet the requirements of the mandate would make it easier for manufacturers to obtain the necessary number of credits, either by direct production of such vehicles or by purchase of credits from other manufacturers. Third, on a per-mile basis NEVs provide tremendous emission reductions in comparison with small gasoline vehicles due to their use for short trips and their total lack of cold-start emissions (Sperling, 1994). Depending on their design, three-wheeled NEVs may not be used in exactly the same way as four-wheeled models, but they would provide positive benefits wherever used. Their production and use should therefore be encouraged.

### **III. Incentives for Infrastructure Development**

The development of public "opportunity" recharging infrastructure is important to all EVs, but it is presumed to be somewhat less important for NEVs due to their use for short trips and the ease of home recharging. The need for specialized roadway infrastructure, however, while unnecessary for full-sized EVs, would potentially be rather acute for NEVs. As small and lightweight vehicles, NEVs will rely on traffic control measures (TCMs) and specialized roadways to insure safety in certain areas (Stein et al., 1994). With careful planning, the need for this infrastructure can be minimized, but some way of separating the traffic of low-speed NEVs from the main traffic flow will be desirable in some areas. Such areas may include those where alternate routes are not available, or where large differentials in vehicle speeds would present a hazard. Thus, infrastructure development is important to NEVs, primarily for specialized roadway and TCM development, but also for recharging infrastructure. The following section addresses the extent to which such infrastructure is being developed, or may be developed and implemented through existing mechanisms and programs.

#### **Federal Level**

Federal assistance for infrastructure development presents one issue with regard to NEVs that should be raised. Typically, if federal funding is involved in a transportation project, federal approval must be granted and American Association of State Highway and Transportation Officials (AASHTO) standards must be met (Steen, 1993). This is problematic because there are no existing standards for lanes, parking spaces, or signs for NEVs, and the issue of federal approval of such projects has not yet been explored. The benefit that smaller vehicles provide in using less

roadway space and increasing parking capacities is one of many that they offer. Thus, in order to develop the infrastructure required for the safe and efficient operation of NEVs, there is a need to develop AASHTO standards that would serve to support the implementation of specialized infrastructure and provide a basis for federal assistance.

**1) Energy Policy Act of 1992: Deduction for Qualified Clean-Fuel Vehicle Refueling Property**

The Energy Policy Act of 1992 provides a tax deduction for businesses of up to \$100,000 for the cost of property used as an EV recharging station. This credit is available for any property that is used for a refueling facility placed in service prior to December 31, 2004. The credit applies to any "qualified clean-fuel vehicle refueling property" which is defined in part as property of such a character as to be subject to the allowance for depreciation and is for the recharging of motor vehicles propelled by electricity, provided that the property is located where the motor vehicles are recharged. For purposes of this section, motor vehicles are defined as having at least four wheels (Energy Policy Act of 1992, Title 19, Section 1913). Recharging facilities specifically for the use of three-wheeled NEVs would thus not qualify for this tax deduction, but this will not generally present a problem since a wide variety of EVs can be assumed to use any recharging facility. It would be impossible and inappropriate to exclude a recharging facility simply because it is sometimes used to recharge a non-qualifying EV.

**2) Energy Policy Act of 1992: Electric Motor Vehicle Infrastructure and Support Systems Development Program**

Subtitle B of Title VI of the Energy Policy Act of 1992 provides funding for large EV "infrastructure and support systems" projects, which are broadly defined as:

...support and maintenance services and facilities, electricity delivery mechanisms and methods, regulatory treatment of investment in electric motor vehicles and associated equipment, consumer education programs, safety and health procedures, and battery availability, replacement, recycling, and disposal, that may be required to enable electric utilities, manufacturers, and others to support the operation and maintenance of electric motor vehicles and associated equipment (42 USC 13271).

This subtitle authorizes up to \$40 million over 5 years, allocated through a process by which a total of 10 projects with a funding limit of \$4 million each will be selected from the proposals solicited by the Secretary of Energy. Research and development, demonstration, and commercial application all are included under the projects supported by the subtitle. These projects may address (42 USC 13292):

- (1) the ability to service electric motor vehicles and to provide or service associated equipment;
- (2) the installation of charging facilities;
- (3) rates and cost recovery for utilities who invest in infrastructure capital-related expenditures;
- (4) the development of safety and health procedures and guidelines related to battery charging, watering, and emissions;
- (5) the conduct of information dissemination programs; and
- (6) such other subjects as the Secretary considers necessary in order to address the infrastructure and support systems needed to support the development and use of energy storage technologies, including advanced batteries, and the demonstration of electric motor vehicles.

The vehicle definitions used under this subtitle are inclusive of all EVs, including NEVs with three or four wheels. Support for the development and construction of NEV infrastructure should be available under the first, second, and sixth criteria.

### **3) Intermodal Surface Transportation Efficiency Act of 1991**

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) provides an additional avenue of funding for EV infrastructure, by providing approximately \$155 billion from 1992-1997 for the development of highways, highway safety, and mass transit. The statement of policy for the act is:

...to develop a National Intermodal Transportation System that is economically efficient, environmentally sound, provides the foundation for the Nation to compete in the global economy and will move people and goods in an energy efficient manner (U.S. DOT, 1991).

The development of NEV infrastructure would be in accordance with the goals of ISTEA, and specific areas of funding have been established for "Congestion Mitigation and Air Quality Improvement", "Urban Access and Mobility," and "Innovative Projects." The funding for these areas amounts to \$6 billion, \$556.1 million, and \$2.36 billion respectively over six years (U.S. DOT, 1991).

### **Regional Level**

#### **1) Utility Infrastructure Development Proposals**

The development of recharging infrastructure, particularly wiring and meters necessary for home recharging, is an important component to the successful introduction of NEVs. In order to make it convenient and inexpensive for consumers to recharge EVs at home, San Diego Gas & Electric (SDG&E) has proposed to pay for the cost of providing wiring, metering, and installation of load management devices for home charging in homes with a secured, dedicated parking facility. The utility estimates that the cost of this program will be approximately \$400 for metering equipment and load management devices and on average about

\$600 to provide an extra charging circuit which can be separately controlled and metered. In addition to eliminating customer expense for retrofitting household circuitry for safe and efficient EV charging, the utility program will also eliminate the customer worry of locating a contractor to install charging circuitry in a timely fashion (SDG&E, 1993).

Customers would only be eligible for this incentive if they agree to accept time of use (TOU) pricing for the load attributable to EV charging, and if they agree to participate in load management and data collection activities. SDG&E will set a maximum payment level for any individual installation, and will not pay for any electrical work necessary to bring a residence up to current code. As part of this program, SDG&E will collaborate with EV dealers so that they may provide information on utility incentive programs and inform the utility when purchases are made. The utility will then arrange for the installation of recharging infrastructure in qualifying residences as quickly as possible. SDG&E believes that approximately 1,300 of the total 4,850 vehicles project for the utility's service area will qualify for and accept this program. Total costs are estimated at \$1.3 million (SDG&E, 1993).

As described in Section IV (below), the Energy Policy Act of 1992 requires certain percentages of new fleet vehicle purchases by government and private sector fleets to be alternative-fuel vehicles, of which EVs and NEVs would be options. This indicates that a significant number of EVs will require charging facilities at non-residential locations. Additionally, some EV owners will desire opportunity charging at locations away from their home in order to extend the effective range of their vehicles. This type of charging is presumed to be somewhat less important for NEVs due to their use primarily for local area trips, but would likely still prove useful on occasion. In order to accommodate these needs, SDG&E has proposed a

commercial / industrial / public infrastructure development program that will include the construction of charging facilities at SDG&E locations, commercial and industrial fleet sites, airports, military installations, multi-family residential sites, public parking lots, office building parking lots, mass transit nodes, and possibly even quick charging service stations. In implementing this program, the utility hopes to gain knowledge and experience in the installation and use of charging systems, and in the development and evaluation of various metering and billing systems. The estimated cost of this SDG&E program is \$2.4 million (SDG&E, 1993).

Similar residential and commercial recharging infrastructure programs are being proposed by other utilities. For example, Southern California Edison (SCE) plans to assist in the provision of EV recharging infrastructure at more than 20,000 locations. The Home Based Infrastructure Program provides for improvements at both the utility side and the consumer side of the meter, including distribution system additions and upgrades, wiring and circuitry upgrades, and the installation of metering and load-management devices. The costs of this program are estimated at approximately \$25 million, and other programs are planned for the development of commercial and public recharging infrastructure (SCE, 1993).

## **IV. Incentives for Vehicle Purchase**

Incentives for the purchase of EVs have been established on the federal, state, and regional levels. In some cases, these incentives take the form of direct rebates from air quality management agencies or electric utilities, but primarily they are in the form of federal and state tax credits and deductions. None of the incentives currently in place require that a vehicle be of a certain size or have freeway capability, so at least some NEV designs would qualify. In some cases, however, incentive programs are tied to a vehicle definition that includes only four-wheeled vehicles. Three-wheeled NEV designs would thus not be eligible for some incentives. Section VII (below) explores the cumulative effect of these important incentive measures for a few different NEV designs, and how these incentives might be grouped with incentives of other types in order to most effectively promote NEV market penetration.

### **Federal Level**

#### **1) Energy Policy Act of 1992: Tax Credit for Qualified Electric Vehicles**

The Energy Policy Act of 1992 elaborates revisions to the Internal Revenue Code of 1986, including a tax credit to the buyer of a "qualified electric vehicle." The credit is equal to 10 percent of the total purchase price of the EV, up to \$4,000. An EV purchased after June 30, 1993 and prior to December 31, 2004 would qualify for the credit. The credit is phased out according to the following schedule. In 2002, the credit is reduced to 7.5 percent of the cost of any qualified EV. In 2003, the credit is reduced to 5 percent, and in 2004 the credit is reduced to 2.5 percent (Energy Policy Act of 1992, Title XIX, Section 1913).



For purposes of the section, a "qualified electric vehicle" is defined as any motor vehicle that is powered by an electric motor drawing current from rechargeable batteries, fuel cells, or other portable sources of electrical current. A "motor vehicle" is defined as any vehicle that is manufactured primarily for use on public streets, roads, and highways and that has at least four wheels (Energy Policy Act of 1992, Title XIX, Section 1913). Thus, the credit is not available to purchasers of NEVs with fewer than four wheels, but four-wheeled NEVs would be eligible even if not freeway capable.

## 2) Energy Policy Act of 1992: Alternative-Fuel Vehicle Fleet Requirements

The Energy Policy Act also contains provisions for government and private fleet purchases of alternative-fuel vehicles (AFVs), which may include EVs. There are no specific requirements for the purchase of EVs, so the decision to purchase them would be up to each government agency or other fleet owner. There are differing requirements for federal, state, and other fleets to purchase AFVs. The numbers or percentages of AFVs that must be purchased under the Act are as follows:

### Federal Fleets (42 USC 13212)

1993:	5,000 AFVs
1994:	7,500 AFVs
1995:	10,000 AFVs
1996:	25% of all vehicles purchased must be AFVs
1997:	33% of all vehicles purchased must be AFVs
1998:	50% of all vehicles purchased must be AFVs
1999 (& on):	75% of all vehicles purchased must be AFVs

### State Fleets (42 USC 13257)

1996:	10% of all vehicles purchased must be AFVs
1997:	15% of all vehicles purchased must be AFVs
1998:	25% of all vehicles purchased must be AFVs
1999:	50% of all vehicles purchased must be AFVs
2000 (& on):	75% of all vehicles purchased must be AFVs

Other Fleets (42 USC 13257)

1999:	20% of all vehicles purchased must be AFVs
2000:	20% of all vehicles purchased must be AFVs
2001:	20% of all vehicles purchased must be AFVs
2002:	30% of all vehicles purchased must be AFVs
2003:	40% of all vehicles purchased must be AFVs
2004:	50% of all vehicles purchased must be AFVs
2005:	60% of all vehicles purchased must be AFVs
2006(& on):	70% of all vehicles purchased must be AFVs

For purposes of the requirements for federal fleets, the term "federal fleet" means a group of 20 or more light duty motor vehicles that are:

- used primarily in a metropolitan area with a 1980 population of more than 250,000;
- centrally fueled or capable of being centrally fueled; and
- owned or controlled by a Federal executive department, military department, Government corporation, independent establishment, or executive agency; the United States Postal Service, the Congress, the courts of the U.S., or the executive office of the President.

Some vehicles, including law enforcement vehicles, emergency vehicles, or those used for purposes of national security, are excluded from the AFV federal fleet requirements (42 USC 13212). The definition of a "fleet" used under the requirements for state and other fleets is similar to that of a "federal fleet" given above, with the additional provision that the fleet must be owned or operated by a governmental entity or other person that owns or controls at least 50 light duty vehicles (Energy Policy Act of 1992, Title III, Section 301).

**3) Executive Order 12844: Federal Fleet Conversion Task Force**

Executive Order 12844, signed on April 21, 1993, required federal agencies to exceed the AFV purchase requirements of the Energy Policy Act of 1992 and established a

Federal Fleet Conversion Task Force. For three years starting in 1993, the Order requires a 50 percent increase in AFV purchases by the federal government over the levels established by the Energy Policy Act. The Task Force, comprised of 35 public and private sector individuals, released a draft report recommending that 38 metropolitan areas be divided into three tiers according to air quality, federal and other fleet vehicle concentration, AFV refueling infrastructure, and state and local air quality or energy programs requiring clean fuels. The report recommended that the majority of federal AFV purchases occur in Tier 1 cities in 1994, Tier 1 and 2 cities in 1995, and Tier 1, 2, and 3 cities in 1996. In order to meet the goals recommended by the Task Force, budget requests are \$28 million for FY 1993, \$18 million for FY 1994, and \$30 million each for FY 1995 and FY 1996 (SDG&E, 1993).

#### **4) The Clean Air Act Amendments of 1990: Clean-Fuel Fleet Vehicle Program**

In addition to complying with the fleet requirements of the Energy Policy Act, both public and private fleets in any of the 22 worst air quality non-attainment areas must also meet Clean Air Act fleet purchase requirements. These requirements apply to any fleet of 10 or more vehicles with central refueling capability, and stipulate that clean-fuel vehicles must constitute 30% of purchases in 1998, 50% in 1999, and from 50 to 70% (depending on vehicle weight) in 2000 and thereafter. Clean fuel vehicles may run on a variety of fuels, including electricity (SDG&E, 1993).

### **State Level**

#### **1) California State Sales Tax Exemption**

As of July 1, 1992, low-emission vehicles in California are eligible for an exemption from state and local sales tax. In order for vehicles to qualify, they must be certified by CARB as low-emission vehicles. The portion of the low-emission vehicle cost

that is exempted from sales tax is the "incremental cost," which is the portion of the cost of the vehicle that exceeds the cost of a comparable gasoline-powered vehicle. The incremental cost eligible for the sales tax exemption is capped at 50% of the manufacturer's suggested retail price of a comparable vehicle for non-electric vehicles, and 200% of the retail price of a comparable vehicles for EVs (SDG&E, 1993). The greater potential exemption for EVs reflects their additional costs and benefits. NEVs would be eligible to receive up to the maximum allowable 200% credit, provided that they were certified "low-emission" vehicles by CARB. The sales tax exemption is scheduled to expire on December 31, 1994, but (if enacted) Senate Bill 1883 would extend the exemption until January 1, 1999 (State Analysis, 1994). Also, Senate Bill 668 would alter the exemption from applying to the tax on the cost differential between a ZEV and a conventional vehicle to applying to the total cost of the ZEV. Under this measure, the exemption would be in effect until December 31, 2000 (U.S. DOE, 1994).

## **2) California State Income Tax Credit**

A California state income tax credit can be claimed for 55% of the cost differential between a CARB-certified low-emission vehicle and a comparable gasoline-powered vehicle. This credit became available on January 1, 1991 and is subject to a statewide cap of \$750,000 per year. The maximum credit is \$1,000 per passenger vehicle, 2-person vehicle, or motorcycle. On October 6, 1993, Governor Wilson signed Senate Bill 146, extending the tax credit to December 31, 1995 (SDG&E, 1993). This credit is not based on a specific vehicle definition, so any NEV certified by CARB as a low-emission vehicle would qualify.

### **3) CARB Mobile Source Emission Reduction Credit Program**

The concept of emission reduction trading was introduced by the federal Clean Air Act in 1977. This legislation allowed new industrial sources of air pollution to be offset by the acquisition of emission reduction credits from another existing company, resulting in no net increase in emissions. This concept allowed emissions to be reduced in the most cost-effective way, and allowed industry flexibility in meeting air quality goals.

In November of 1993, CARB adopted formal guidelines that allowed air quality management districts to establish mobile source emission reduction credit programs. These programs would provide even greater flexibility to industry by allowing credits to be obtained from reductions in emissions from cars, buses, or other mobile sources that exceed reductions required by federal, state, and local laws. Mobile source emission reduction credits can be used to offset emissions from temporary sources, improve air quality in general, or serve as an alternative to controls otherwise required of industrial sources (CARB, 1994a).

Credits can be generated in a variety of ways, including accelerating the retirement of older vehicles, purchasing low-emission transit buses, purchasing ZEVs, or retrofitting light, medium, and heavy-duty vehicles. The generation of credits by the purchase of ZEVs is complicated by the existence of the ZEV mandate and the need to prevent emission benefits from being double-counted. ZEVs used to generate mobile source credits can be counted toward the production levels required by the ZEV mandate (2% in 1998 increasing to 10% in 2003), but they cannot be included in manufacturer's calculations of fleet average non-methane organic gas (NMOG) emission rates. Additionally, manufacturers cannot sell or bank emissions credits for ZEVs that are used to generate mobile source credits, regardless of when the ZEVs are sold. This requirement is necessary to ensure that such ZEVs provide

emissions reductions in excess of those already required by the CARB low-emission vehicle (LEV) regulations (CARB, 1994a).

Emissions reductions associated with the purchase of a ZEV are calculated assuming a ten-year, 100,000 mile vehicle life. The reductions are based on the difference between the average emission rate of a new, emitting vehicle and the ZEV because CARB believes that the purchase of a ZEV would be in place of the purchase of a new vehicle if the ZEV were not available. The emission reduction provided by a ZEV is the sum of the exhaust, evaporative, and running loss emissions, plus the emissions associated with gasoline marketing, minus the power plant emissions associated with generating electricity used in EVs. Since the emissions associated with electricity generation are negligible compared to tailpipe emissions, CARB has decided not to subtract these emissions from the emission reduction credit. Thus, the emissions reduction credits associated with the purchase of ZEVs, in excess of the requirements of the low-emission vehicle (LEV) regulations, are calculated according to the following formula:

$$\text{ZEV Credit (per vehicle)} = \text{Exhaust, Evaporative, and Running Loss Emission Reductions} + \text{Gasoline Marketing Emission Reductions}$$

Since the ZEV credit is based on comparisons with the newest vehicles, the credit given for purchases in each model year decreases with time as average vehicle emissions decline in accordance with the requirements of the LEV program. For example, in 1996 roughly 1,900 ZEV purchases would be required to generate 25 tons/year of combined NMOG and NO<sub>x</sub> emission credits, while in 2003 about 4,500 ZEV purchases would be required to generate the same reductions (CARB, 1994a). The total emission reductions from the purchase of a ZEV in model years 1996 to 2003 are given in Table 3.

**Table 3: Total Emission Reductions from the Purchase of a ZEV by Calendar Year (per vehicle, assuming a 10 year, 100,000 mile life)**

Model Year	Lifetime Emissions (pounds)		
	NMOG	NOx	CO
1996	130	130	640
1997	95	110	610
1998	75	97	550
1999	65	80	510
2000	51	65	470
2001	51	64	470
2002	51	64	460
2003	49	61	420

Source: CARB, 1994a.

### Regional Level

#### **1) Sacramento Metropolitan Air Quality Management District: Low Emission Vehicle Rebate**

Regional air quality management districts may offer financial incentives to purchasers of low emission and zero emission vehicles. For example, the Sacramento Metropolitan Air Quality Management District (SMAQMD) offers financial incentives to purchasers of vehicles that provide significant emissions reductions in comparison with comparable conventional vehicles. These incentives are not of fixed dollar amounts, but vary in accordance with vehicle costs and the emissions reductions offered. Vehicle purchasers must submit a proposal to SMAQMD that details the type and specifications of the vehicle purchased, the emissions of the vehicle, and the cost-effectiveness of the emission reductions that

the vehicle provides. Proposals are evaluated according to the following three criteria:

- 1) magnitude of emissions reduced, in comparison with similar conventional vehicle;
- 2) whether or not the vehicle manufacturer is a reputable original equipment manufacturer (OEM); and
- 3) potential for leveraging SMAQMD funds with other funding sources.

Proposals may be submitted to SMAQMD at any time, but incentives are awarded on an annual basis (Swenson, 1994).

At present, SMAQMD is targeting emission reductions of nitrogen oxides due to the fact that the pollutant is considered to be the most important contributor to ozone formation in the Sacramento air basin. Heavy-duty vehicles produce much greater quantities of nitrogen oxides than light-duty vehicles and, as a result, SMAQMD is particularly interested in encouraging the use of heavy-duty vehicles that produce reduced levels of nitrogen oxide emissions (Swenson, 1994). Light-duty vehicles are eligible for incentives, however, and proposals on behalf of NEV purchases may be viewed favorably for two reasons. First, because there is virtually no electricity production within the region, SMAQMD only considers tailpipe emissions when evaluating emission reductions. Since NEVs have no tailpipe emissions, they provide a 100% reduction of nitrogen oxides within the framework of SMAQMD's analysis. Second, while emissions of nitrogen oxides are of primary concern to the air district, emissions of hydrocarbons are also important to ozone formation and are of concern as well. In replacing short trips by conventional vehicles, NEVs provide dramatic reductions in hydrocarbon emissions due to their lack of "cold start" and "hot soak" emissions. For these reasons, proposals



submitted to SMAQMD by NEV purchasers may be viewed favorably and may qualify such purchasers for significant financial incentives.

## 2) Utility Incentives

The five major utilities in California are proposing incentive programs in order to help offset the initial purchase cost of EVs. The programs suggested by the publicly owned utilities are being assessed by the Public Utilities Commission, and negotiations are ongoing regarding the amount that they will be able to spend on subsidizing EV purchases by their customers, and on providing adequate recharging infrastructure.

San Diego Gas and Electric (SDG&E) has made a specific proposal for an EV program. One element of the program proposed by SDG&E is a cash incentive for the purchase of EVs in order to: 1) encourage customers to purchase the safest and most energy efficient vehicle that is compatible with electric system power quality needs, and 2) to help "jump start" the EV market by encouraging the development of such vehicles. The incentive has been termed a "battery incentive" because the utility has recognized that a primary contributor to the high cost of early EVs is the relatively high cost of batteries and the need to replace them every few years.

SDG&E hopes that the incentive will not only help to remove a primary disincentive to EV purchase (i.e. high initial cost) and to stimulate early purchases of EVs, but will also help the utility to gain necessary experience with the actual consumer operation of various EVs. In order to facilitate this process, customers accepting the battery incentive would be asked to participate in data collection and load management activities (SDG&E, 1993).

The battery incentive proposed by SDG&E would apply to the purchase or lease of two basic categories of EVs. An incentive of \$1,500 would be available to vehicles meeting various requirements including:

- the Federal Motor Vehicle Safety Standards (FMVSS) without exemptions or waivers;
- the CARB ZEV definition;
- performance, power quality, power train, and battery warranties;
- liability insurance; and
- vehicle efficiency.

Such vehicles are presumed by SDG&E to be EVs produced by larger manufacturers, made from the "ground up" to be EVs. An incentive in the amount of \$1,000 would be available to EVs that meet similar standards, but that are FMVSS certified through exemptions or waivers. Such vehicles would include after market conversions and other early EVs that may not be built to meet all of the FMVSS (SDG&E, 1993). Many NEV designs would probably qualify for the \$1,000 incentive, as opposed to the \$1,500 incentive, due to the fact that they may have difficulty meeting the FMVSS without exemptions or waivers.

Other utilities have asked for permission from the Public Utilities Commission to offer similar incentives. For example, Southern California Edison (SCE) is proposing to offer a battery incentive of \$715 to \$1530 to qualified EVs. SCE estimates that 66 percent of EVs in its service area will qualify for such an incentive, and the SCE service area is targeted for receiving an allocation of approximately 56% of the EVs needed to meet the requirements of the ZEV mandate. The total cost of this program alone would be substantial, but it would help to increase EV market penetration in the worst air quality non-attainment zone in the U.S.

## V. Incentives for Vehicle Operation

The operation of NEVs could be encouraged in various ways, both financially and non-financially. NEVs could be made exempt from parking fees and could be provided with free recharging at public parking lots, shopping centers, malls, and transit stations. Utilities could offer reduced rates for NEV recharging, particularly at off-peak hours. Perhaps even more powerful incentives would be non-financial convenience incentives. NEVs could be allowed to operate in automobile restricted zones and dedicated lanes. They could be provided with dedicated parking spaces, preferentially located near store entrances and transit stops. Still another type of incentive for NEV use would be based on transportation control measures (TCMs) that require employers to obtain mandated levels of average vehicle ridership (AVR) among employee work trips. NEVs and other EVs might receive higher levels of credit than gasoline-powered vehicles, allowing employers to more easily meet mandated AVR levels.

At present, few such programs exist. Most are merely concepts that have not been implemented on a large scale. One innovative program, the Palm Desert Golf Cart Demonstration Program, shows how some NEV use incentives might be implemented. When completed, this trial program may provide insight into the importance of convenience based incentives in promoting the operation of NEVs. At present, only municipal utilities are allowed to offer reduced electricity rates for EV recharging. The Sacramento Municipal Utility District (SMUD) and the Los Angeles Department of Water and Power (LADWP) have instituted programs where EV and NEV owners can receive reduced rates for recharging their vehicles. A recent California law allows owners of clean-fuel vehicles to obtain "BLUE SKY"

license plates that provide special parking privileges in certain public lots. Finally, the TCM-based incentives developed by the South Coast Air Quality Management District (SCAQMD) demonstrate how innovative applications of incentives might help to encourage the use of EVs and improve regional air quality.

### State Level

#### **1) California Department of Motor Vehicles: The Rosenthal Blue Sky License Plate Program**

On October 11, 1993 Governor Wilson signed into law Senate Bill 314. One provision of the resulting regulations in Chapter 1159 of California law requires the California Department of Motor Vehicles to issue special "Blue Sky" license plates. These license plates will be designed by CALSTART and will be decorated with a distinctive environmental design. Owners or lessees of clean fuel vehicles, including all NEVs classified as passenger vehicles, would be eligible to apply for these plates starting on November 1, 1995. If fewer than 5,000 applications have been received by CALSTART by November 1, 1996, applications will be refunded and the license plates will not be issued. If the program does go into effect, vehicles with Blue Sky plates will receive special parking privileges in designated public parking areas (Chapter 1159, Section 5).

### Regional Level

#### **1) The Palm Desert Golf Cart Demonstration Program**

In Palm Desert, California, and in some other cities, golf carts are allowed to operate on public streets even though they do not meet the National Highway and Traffic Safety Administration (NHTSA) safety standards. An opinion by the California Attorney General in 1990 legalized the operation of golf carts on any street with a

speed limit of 25 miles per hour or less. The decision required that golf carts be registered with the DMV, have license plates, and be equipped with certain minimal safety features, similar to those of motorcycles (i.e. headlights, reflectors, etc.). Prior to this decision, golf carts could be operated on streets with speed limits of 25 miles per hour or less, but only within 1.5 miles of a golf course. The primary effect of the 1990 ruling was to allow golf carts to operate in all areas, regardless of their proximity to a golf course (Attorney General, State of California, 1990).

On January 1, 1993, Palm Desert began a pilot program to allow golf carts legal access to public streets, even those with speed limits in excess of 25 miles per hour. In order to be driven throughout the town, carts must be registered with the city and equipped with headlights, turn signals, a rear view mirror, side mirrors, a horn, and reflectors. The city has developed an extensive program to facilitate the use of golf carts as an alternate mode of transportation. The city only allows electric carts to be used, and special stations with electrical outlets have been installed at various locations to facilitate recharging. In order to minimize commingling with larger vehicles, designated cart routes have been identified. Lanes have been painted on these streets specifically for golf carts, and signs have been installed to identify the routes. Additionally, special golf cart parking spaces have been provided at various locations. (City of Palm Desert, 1993).

The Palm Desert program has not been operational long enough to formulate any definitive conclusions about the effectiveness of dedicated infrastructure in providing an incentive for the use of golf carts on public roads. Clearly, however, the widespread use of the vehicles within the city since the inception of the program provides anecdotal support for the assertion that the provision of an adequate operating environment for the vehicles has done much to encourage their use. According to a University of California - Davis study, golf cart operators in Palm

Desert are in favor of the infrastructural modifications that have been made because they now are able to use their vehicles over a greater area than was previously possible, and with a greater degree of convenience (Kurani and Stein, 1994). Thus, the Palm Desert program provides early evidence that convenience incentives are important to encouraging the use of small electric vehicles.

## **2) Electric Utility Recharging Subsidies: Time-of-Use Rates for EV Owners**

Some utilities have offered (or proposed to offer) their residential customers reduced electricity rates during off-peak hours. The Los Angeles Department of Water and Power (LADWP) offers a discount for time-of-use (TOU) EV recharging. Between 8:00pm and 10:00am on weekdays and all-day weekends, EV owners would receive a \$0.025 per kWh discount for electricity used for vehicle recharging. The discount would be applicable for up to 800 kWh of electricity use per month. As of August 1993, off-peak recharging would cost \$0.046 per kWh (CARB, 1994). The total value of this incentive over the lifetime of a typical EV has been estimated at \$1,139 (U.S. DOE, 1994).

The Sacramento Municipal Utility District (SMUD) has instituted a program whereby EV owners can install a separate meter and receive discounted rates for vehicle recharging during off-peak hours. Between 8:00pm and 2:00pm on summer weekdays, 8:00pm and 7:00am on winter weekdays, and all-day on weekends, EV owners can recharge vehicles at a rate of \$0.042 per kWh. The total value of this incentive have been estimated at \$1,907 (U.S. DOE, 1994).

The non-municipal utilities in California, Pacific Gas & Electric (PG&E), San Diego Gas & Electric (SDG&E), and Southern California Edison (SCE), are in the process of applying to the California Public Utilities Commission for permission to offer similar TOU rates to EV owners (CARB, 1994). These incentives would in

general be of somewhat greater magnitude than those offered by SMUD and LADWP with estimated total values of over \$3,000 (U.S. DOE, 1994). Other utilities that have offered TOU rates include Potomac Electric Power Company, Detroit Edison Company, Duke Power Company, Pennsylvania Power and Light Company, and Philadelphia Electric Company. The estimated total values of the incentives offered by these companies range from \$911 to \$2,965 (U.S. DOE, 1994).

### **3) South Coast Air Quality Management District: Indirect Source Trip Reduction Regulation**

The South Coast Air Basin has the worst air quality problems in the nation. Regulatory agencies in the basin have been forced to draft an aggressive air quality management plan (AQMP) in order to reach attainment with federal and state air quality standards. In order to reduce emissions from mobile sources, which account for two-thirds of the pollution in the district, the South Coast Air Quality Management District (SCAQMD) has created incentives to encourage the use of clean-fuel vehicles. Due to the extreme non-attainment classification of the SCAQMD, all feasible transportation control measures (TCMs) must be used to improve air quality. One element of the indirect source trip reduction regulation, the work trip reduction plan, attempts to increase the average vehicle ridership (AVR) of work trips (SDG&E, 1993).

Large employers of over 100 employees in the SCAQMD must attain AVR levels through the development of work trip reduction plans. In calculating the AVR for a worksite, any AFVs used for work commute trips receive credit toward reducing the number of vehicles entering the worksite and raising the AVR. EVs and NEVs would receive 10 credits, the highest number, followed by 6 credits for natural gas vehicles and 5 credits for methanol or propane vehicles (SDG&E, 1993). Thus, the use of NEVs would be encouraged, particularly as employers are forced to

meet increasing mandated AVR levels. Employers could offer preferential parking or cash incentives in order to encourage the use of AFVs, and NEVs and other EVs should receive the greatest level of incentive support.



## **VI. Incentives Measures Pending in California**

A variety of bills have come before the California legislature in relation to the commercialization of EVs. These primarily are in the form of tax incentives for EVs, and financial backing for EV development and the construction of EV support infrastructure. These bills are in various stages of the legislative process, and their status is described as of June, 1994 (State Analysis, 1994). The number of incentives under consideration reflects the determination of several state legislators to make the use of EVs under the ZEV mandate in California a reality. Similar bills have been proposed in many other states, and a comprehensive list of proposed EV and clean fuel legislation can be found in the June, 1994 State Legislative Report in Appendix A. Proposed EV incentive legislation in California includes the following Senate and Assembly Bills.

### **Senate Bills**

**S.B. 668: ZEV Development Incentive Program.** This bill would give a 100% state sales tax exemption to ZEV purchasers, and would also establish a tax credit for EV R&D and infrastructure development. Funding would be provided by a \$1.00 statewide vehicle registration fee. This bill was introduced on March 3, 1993 by Senator Gary Hart (D) and has passed the Senate Revenue and Taxation Committee, the Senate Appropriations Committee, and the full Senate. It is pending in the Assembly Revenue and Taxation Committee.

**S.B. 1327: Special Employment Training Projects.** This bill would allocate up to 20% of the state's Employment Training Fund to fund special training projects, including the development of an electric vehicle industry. The bill was introduced on January 24, 1994 by Senator Patrick Johnson (D). It has passed the Senate Industrial Relations Committee and the full Senate. It is pending in the Assembly Labor and Employment Committee.

S.B.1455: State Fleet ZEV and LEV mandate. This bill is similar to A.B. 2677 in that it would mandate that 10% of state fleet vehicles purchased be LEVs and ZEVs, and it would require the California Department of General Service to include private and other agency fleets in the LEV and ZEV procurement process. This bill is different from A.B. 2677 in that it specifies only that the combined percentage of LEVs and ZEVs be 10%, and not that 5% be ZEVs and 5% be LEVs. It was introduced by Senator Herschel Rosenthal (D) on February 10, 1994 and it has passed the Senate Governmental Organization Committee, the Senate Appropriations Committee, and the full Senate. It is pending in the Assembly Transportation Committee.

S.B. 1593: Calstart Appropriation. This bill would appropriate an unspecified amount of state funds for grants to Calstart for use in providing services to California advanced transportation technology companies, including those for the development of clean fuels and EVs. The bill would also establish Project Hatchery, a business incubator to encourage the start-up of advanced transportation technology firms. This bill was introduced on February 22, 1994 by Senator Herschel Rosenthal (D). It has passed the Senate Appropriations Committee on April 18, and the full Senate on April 28. It is pending in the Assembly Transportation Committee.

S.B. 1883: Extension of State Sales Tax Exemption for LEVs. This bill would amend the existing law in order to extend until January 1, 1999 the current exemption from the state's sales and use tax on the incremental costs of new low-emission vehicles. The bill was introduced by Senator Tom Campbell (R) on February 25, 1994. It has passed the Senate Revenue and Taxation Committee and is pending in the Senate Appropriations Committee.

### Assembly Bills

A.B. 2247: Sacramento Metropolitan Air Quality Management District Registration Fee Increase. This bill, introduced by Assemblyman Philip Isenberg (D) contains provisions that include authorizing the SMAQMD to increase motor vehicle registration fees for the next five years. The funds would be used in part to provide financial incentives to minimize the price difference between gasoline-powered vehicles and AFVs. This bill was introduced on March 5, 1993 and passed the Assembly on May 28, 1993. It is currently pending in the Senate Transportation Committee.

**A.B. 2677: ZEV and ULEV Mandate for State Fleet Vehicles.** This bill would require 5% percent of state fleet vehicles purchased annually to be ZEVs, and another 5% to be ULEVs. This bill was introduced on February 3, 1994 by Assemblyman Dede Alpert (D) and is pending in the Assembly Transportation Committee, but it will not receive further consideration because it missed the deadline to be out of the House of origin. The main provisions of A.B. 2677 have been merged into A.B. 2910 (below).

**A.B. 2910: AFV Mandate for State Fleets.** This bill would require the state to purchase AFVs for use in fleets at a level of 25% starting in 1996, and rising to 33% in 1997, 50% in 1998, and 75% in 1999 and thereafter. These percentages could be reduced if the state's Department of General Services determines that state fleets cannot acquire the required percentage of AFVs at a reasonable cost. Assemblyman Joe Baca (D) introduced this bill on February 17, 1994 and it has passed the Assembly Transportation Committee, the Assembly Ways and Means Committee, and the full Assembly. It is pending in the Senate Appropriations Committee.

**A.B. 2921: Riverside EV Acquisition.** This measure would appropriate \$300,000 from the state's petroleum violation escrow account to the Riverside County Transportation Commission for the purchase of three twelve passenger, electric vans. The funds would also cover the construction of an EV recharging facility, and operating expenses for a one-year demonstration project. This bill was introduced by Assemblyman Ray Haynes (R) on February 17, 1994. It passed the Assembly Transportation Committee on April 12, and is pending in the Assembly Ways and Means Committee.

**A.B. 3448: Santa Clara County LEV and EV Pilot Program.** This bill would establish a three-year pilot program in Santa Clara County under which EVs and LEVs could be operated on exclusive or preferential use lanes. Assemblyman Charles Quackenbush (R) introduced this bill on February 24, 1994 and it passed the Assembly Transportation Committee on May 19. It is currently pending a floor vote by the full Assembly.

The bills listed above all provide incentives or program funds that would presumably be applicable to the use or support of at least some NEVs. To the extent that some of these bills will apply only to certain vehicle types, it may not be clear to

what extent they will include various NEV designs until they go into law. Bills are frequently amended as they proceed through the legislative process, and often they are somewhat vague when first proposed. Some bills may tie incentives to the definition of a "low-emission motor vehicle" as given in Section 39037.05 of the Health and Safety Code, and others may require simply that the vehicle be certified as a zero-emission vehicle by CARB. The definition for a "low-emission motor vehicle" given in the California Health and Safety Code is as follows (California Health and Safety Code, § 39037.05):

**"Low-emission motor vehicle" means a motor vehicle which has been certified by the state board to meet all applicable emission standards and which meets at least one of the following additional requirements:**

- a) Is capable of operating on methanol, as determined by the state board, and will have an adverse impact on ambient ozone air quality not greater than a vehicle which meets the requirements of subdivision (c).
- b) Is capable of operating on any available fuel other than gasoline or diesel and, in the determination of the state board, will have an adverse impact on ambient ozone air quality not greater than a vehicle operating on methanol.
- c) Operates exclusively on gasoline and is certified to meet a hydrocarbon exhaust emission standard which is at least twice as stringent as otherwise applicable to gasoline vehicles of the same year and class.

## VII. Recommendations

### Short Term

In the short term, during the period from 1994-1998, the primary need for NEV incentive policy development is for the encouragement of NEV manufacture through the development and implementation of supply-side incentive programs. The production of EVs is not required by the ZEV mandate until 1998 and at present no procedures exist for incorporating EVs into manufacturer CAFE ratings. Until these powerful incentives take effect, little incentive exists for manufacturers to introduce NEVs into the U.S. automobile market. This is particularly true in light of the uncertainty that exists with regard to the size of the NEV market. NEV production must be encouraged as soon as possible so that enough NEVs can be manufactured and sold prior to 1998 to allow economies of scale and improvements in manufacturing techniques to lower unit prices for the start of the ZEV mandate.

As can be seen in Section IV above, significant monetary incentives currently exist for the purchase of EVs, including NEVs. Vehicles that could be brought to market at competitive prices could presumably, with the help of the incentives offered, achieve significant market penetration. The primary problem for existing NEV manufacturers is that unit costs at present are so high that even the incentives in place in California are not sufficient to lower vehicle prices to levels competitive with conventional vehicles.

A variety of programs could help to encourage NEV manufacture prior to the start of the ZEV mandate. These programs could encourage NEV production by reducing manufacturing costs, thereby lowering unit costs and retail prices. Or, programs could encourage manufacture by reducing the uncertainty and risk for

vehicle producers. Incentives targeted in this way would play a critical role in the short term in helping manufacturers to overcome the critical problem of being unable to produce enough vehicles to sell them at competitive prices. Once the powerful effects of the ZEV mandate come into play and production levels begin to increase, other measures that have been implemented to encourage NEV manufacture can be phased-out.

A few possible manufacturing incentive programs and their potential advantages and disadvantages are discussed below. The measures are presented in order of preference based on the following criteria: cost-effectiveness, political acceptability, and ease of implementation.

#### Potential Short-Term NEV Manufacturing Incentive Programs

1) **Large Volume Government Purchase Program.** Among the most significant barriers to NEV production is uncertainty about the size of the NEV market. A large volume government purchase program would guarantee substantial sales to at least one manufacturer. This would allow greater production volumes for the manufacturer or manufacturers that were awarded the purchase contract, and would aid in reducing unit costs for consumer sales. Only \$400,000 has been committed for EV purchases in FY 1994 and only \$1.25 million for FY 1995 (U.S. DOE, 1994). Substantial increases in federal funding for purchases of NEVs and other EVs would demonstrate the government's commitment to EVs and strengthen consumer confidence.

**Advantages:** Purchases of NEVs for use in federal fleets would assist in meeting Energy Policy Act mandated levels of AFV purchases. The mandated percentages of AFV purchase are currently in effect for most federal fleets. Guaranteed high-volume sales would help manufacturer(s) to reduce unit costs and retail prices, which would aid in penetrating consumer markets.

**Disadvantages:** Costs to federal government would be significant, depending on volumes purchased. Federal fleets would need to coordinate purchases in order for a single, large contract to be awarded. Political acceptability may be a problem, as this program could be criticized for being biased against other AFV providers.

**2) Government Financed Manufacturer Rebate.** Through this type of program, manufacturers could offer rebates to purchasers of NEVs. The federal government would provide a tax credit to manufacturers in the amount of the rebate offered.

**Advantages:** Rebates would add to current incentives to reduce first costs of NEV purchases. Manufacturers may be more likely to go into production knowing that the rebates would lower retail prices and improve product marketability.

**Disadvantages:** Costs to government would be significant through lost tax revenue. Political acceptability is questionable.

**3) Accelerated Depreciation for NEV Production Investments.** This program would allow manufacturers of NEVs or NEV componentry to more rapidly depreciate investments in NEV manufacture.

Accelerated depreciation for investments in NEV manufacture would increase the attractiveness of these investments relative to those for other products.

**Advantages:** This program could help to stimulate new production of NEVs. Existing manufacturers would benefit and could potentially lower NEV retail prices. Probably more politically acceptable than more direct subsidies.

**Disadvantages:** Potentially significant costs to government through lost tax revenue. Effectiveness of program in stimulating NEV manufacture uncertain.

## Long Term

In the longer term, incentive policies should focus on two areas: 1) ensuring that NEV costs to consumers are low enough for vehicles to be sold, and 2) establishing convenience incentives to compensate purchasers for accepting the limited top speeds and operating ranges of NEVs. Assuming that manufacturing incentive programs, the ZEV mandate, and the revised CAFE rules are effective in encouraging the production of NEVs, an emphasis must then be placed on reducing the purchase prices of NEVs to levels competitive with (or below) those of other vehicles, and encouraging the use of NEVs. Table 4 shows the effect of current and proposed incentives on the net prices of three NEV models: the four-wheeled Kewet "El-Jet," the three-wheeled City-Com "City-El," and the four-wheeled Trans2.

As can be seen in Table 4, the cumulative effect of the incentives currently in place in California is a significant decrease in the overall cost of a NEV purchase. But since the cost of these NEVs based on their current low production levels is still higher than the cost of comparable conventional vehicles, the current incentives may or may not be adequate to close the gap. In 1998, the value of the incentives available to NEVs may be somewhat less than the current value (using pessimistic assumptions), or much greater (using optimistic assumptions). In the case of the Kewet "El-Jet," the range in incentive values results in a final consumer cost in 1998 of from over \$5,000 more than the cost of a comparable conventional vehicle to nearly \$1,000 less. In the case of the City-Com "City-El," the range of incentive values is somewhat smaller but still results in a cost differential of from over \$5,000 to well under \$3,000. In contrast to the "El-Jet" and the "City-El," the Trans2 vehicle is priced at a level competitive with a comparable vehicle. Also, the vehicle is of a design to qualify it for all available incentives. As a result, the incentives available are adequate to lower the final consumer cost to a level well below that of a



comparable vehicle. Under optimistic assumptions, the value of incentives available to the Trans2 in 1998 may actually be greater than the vehicle's retail price, but under pessimistic assumptions only a \$1,500 price reduction would be provided.

**Table 4: Estimated Potential Impact of Incentives on NEV Purchase Prices in California**

		Kewet "El-Jet"	City-Com "City-El"	Trans2
Retail Price of Base Model (w/8% sales tax)		\$15,186 <sup>8</sup>	\$8,100	\$5,990 <sup>9</sup>
Federal Income Tax Credit	at present	\$1,400	n/a	\$550
	after 1998 (low) <sup>6</sup>	n/a	n/a	n/a
	after 1998 (high) <sup>7</sup>	\$1,400	n/a	\$550
State Sales Tax Exemption <sup>1</sup>	at present	\$475	\$360	\$73
	after 1998 (low) <sup>6</sup>	n/a	n/a	n/a
	after 1998 (high) <sup>7</sup>	\$475	\$360	\$73
State Income Tax Credit <sup>2</sup>	at present	\$1,000	\$1,000	\$1,000
	after 1998 (low) <sup>6</sup>	n/a	n/a	n/a
	after 1998 (high) <sup>7</sup>	\$1,000	\$1,000	\$1,000
Utility Incentive <sup>3</sup>	at present	n/a	n/a	n/a
	after 1998 (low) <sup>6</sup>	n/a	n/a	n/a
	after 1998 (high) <sup>7</sup>	\$1,000	\$1,000	\$1,000
ZEV Credit Transfer Payment <sup>4</sup>	at present	n/a	n/a	n/a
	after 1998 (low) <sup>6</sup>	\$1,500	n/a	\$1,500
	after 1998 (high) <sup>7</sup>	\$4,250	n/a	\$4,250
Total Incentives	at present	\$2,875	\$1,360	\$1,623
	after 1998 (low) <sup>6</sup>	\$1,500	\$0	\$1,500
	after 1998 (high) <sup>7</sup>	\$8,125	\$2,360	\$6,873
Final Consumer Cost	at present	\$12,311	\$6,740	\$4,367
	after 1998 (low) <sup>6</sup>	\$13,686	\$8,100	\$4,490
	after 1998 (high) <sup>7</sup>	\$7,061	\$5,740	-\$883
Comparable Conventional Vehicle Retail Price <sup>5</sup>		\$8,050	\$3,000	\$4,895
Net Cost Difference	at present	\$4,261	\$3,740	-\$528
	after 1998 (low) <sup>6</sup>	\$5,636	\$5,100	-\$405
	after 1998 (high) <sup>7</sup>	-\$989	\$2,740	-\$5,778

Notes to Table 4:

<sup>1</sup>Scheduled to expire December 31, 1994.

<sup>2</sup>Scheduled to expire December 31, 1995.

<sup>3</sup>Currently under negotiation. Actual incentive available to NEVs will probably range from \$700-\$1,000, but may only be available in some areas.

<sup>4</sup>Approximation based on penalty of \$5,000 for ZEV mandate non-compliance. \$1,500 has been assumed for a low value and \$4,250 has been assumed for a high value. The high value assumes that 85% of the \$5,000 credit value would be passed on to the consumer. The transfer payment would be made from a major automobile manufacturer to the NEV manufacturer, who would then pass a percentage of the payment along to the consumer. In the case of the Trans-2 with the "high" values, a negative final consumer cost results. In reality, this would not occur since the NEV dealer would not pass the full value of the ZEV transfer payment to the consumer if the resulting price would be negative.

<sup>5</sup>Value for Kewet "El-Jet" has been set by CARB. Value for City-Com "City-EI" is based on cost of mid-range motorcycle. Value for Trans2 has been set at \$1000 more than the cost of a basic model Club Car electric golf cart (the Trans2 has significantly better components and provides better handling).

<sup>6</sup>The low values assume that California state incentives are not extended beyond their current expiration schedules, that federal tax credits are not available for all vehicles due to the cap on total funding (\$750,000), that there is no utility incentive, and that the ZEV transfer payment is only \$1,500.

<sup>7</sup>The high values reflect the extension of California state incentives beyond 1998, the continued availability of the federal tax credit to all qualifying vehicles, a \$1,000 utility incentive, and a \$4,250 value for the ZEV transfer payment.

<sup>8</sup>The retail price given for the Kewet "El-Jet" is the current vehicle price, based on low production volumes.

<sup>9</sup>The retail price given for the Trans-2 is a pre-production target price.

These figures highlight the following two critical points: 1) NEV purchase prices can be dramatically lowered if current incentive programs are continued, the utilities are allowed to offer a direct incentive, and consumers receive a sizable ZEV credit transfer payment; and 2) NEVs that are brought to market with competitive retail prices may be highly attractive to consumers because even modest incentives will lower final costs to below the costs of comparable vehicles.

Given that it seems unlikely that consumers will pay a premium price for vehicles with significant range and top speed limitations, and that initial NEV prices will be high, the success of the NEV concept may depend on the availability of significant incentives to lower purchase costs and increase NEV convenience. In general, EV costs are expected to drop to levels competitive with conventional vehicles by 2005, so price reduction incentives could be slowly phased-out over a

seven to ten year period (U.S. DOE, 1994). Convenience incentives encouraging the use of NEVs should be maintained in order to maximize air quality and energy use benefits.

Following are a variety of potential NEV price reduction and convenience incentives. The general advantages and disadvantages of each incentive measure are discussed, and they are ordered by preference in consideration of cost, potential effectiveness in stimulating NEV market penetration, political acceptability, ease of implementation, and potential equity impacts.

### **Potential Long-Term NEV Purchase Cost Reduction Incentives**

**1) Revenue Neutral Fee-Bate Through Registration Fees.** This type of scheme, similar to the Drive+ Program once proposed for implementation in California, would base registration fees on vehicle emissions characteristics. Heavily polluting vehicles would pay higher registration fees and the additional revenue would be returned to owners of low- and zero-emission vehicles through reduced registration fees. The fees could be set to be revenue neutral, making government subsidies unnecessary.

**Advantages:** Politically acceptable due to revenue neutrality. Highly effective due to direct incentive for NEV purchase and disincentive for purchase of conventional vehicle. Relatively low administrative cost.

**Disadvantages:** Potential for regressive equity impacts due to the fact that as a group, poorer people drive older, higher-emitting cars.

**2) Fee-Bate Through Sales Taxes.** Similar to the Fee-Bate Through Registration Fees, this measure would base vehicle sales taxes on emissions characteristics. Heavily polluting vehicles would be taxed at a substantially higher rate than low- and zero-emission vehicles, thereby lowering the total costs of NEVs and other clean vehicles.

**Advantages:** Politically acceptable due to lack of need for significant government subsidy. Highly effective due to direct incentive for clean

vehicle purchase and disincentive for polluting vehicle purchase. Potentially more equitable than registration fee-bate scheme due to application only to new vehicles.

**Disadvantages:** There is already a partial sales tax exemption available to NEVs and a proposed total exemption. The effectiveness of this measure would not be as strong as it would be in the absence of the existing exemption, and it would be further diminished if the proposed total exemption is implemented. Measure would require some level of administration to set taxes based on emission levels.

**3) Registration Fee Exemption.** This measure would render qualifying vehicles, including NEVs, exempt from state registration fees for the lifetime of the vehicle.

**Advantages:** Easily implementable. Probably effective although not targeted directly at reducing NEV purchase price. Relatively high political acceptability.

**Disadvantages:** Some cost to government due to lost revenue. Cost reductions are spread out over time, which may not be perceived by consumers as being as valuable as one-time, up-front cost reductions.

**4) State Income Tax Deduction for Interest on NEV Purchase Loans.** This measure would allow a state income tax deduction equal to the amount of interest paid on loans for qualified electric vehicles, including NEVs. In effect, this measure would provide interest free loans for NEV purchases.

**Advantages:** Would be effective in making NEV purchases more attractive by helping buyers overcome high first costs. Relatively easy to implement.

**Disadvantages:** Probably not as effective as some other measures. Requires state subsidy due to revenue lost through deduction.

## **Potential Long-Term NEV Convenience Incentives**

**1) Free Parking at Designated Spaces.** This measure would provide designated parking spaces for NEVs, free of charge, at various public locations. The parking spaces would be preferentially located near work locations, transit stops, store entrances, etc. This measure could be combined with free opportunity recharging in order to increase the strength of the incentive.

**Advantages:** Potentially effective, particularly in densely populated areas where parking is scarce and expensive. Politically acceptable, except for foregone revenue and cost of implementation. Easily implemented, especially in California due to existing "Blue Sky" license plate program. Parking efficiency would be increased due to small size of NEVs.

**Disadvantages:** Some cost for implementation due to need to install signs and restripe lots. Some loss of revenue. Not as easily implemented as some other measures.

**2) Dedicated NEV Lanes on Surface Streets.** This measure would create specialized NEV lanes in some areas in order to enhance NEV safety and minimize commingling with larger vehicles.

**Advantages:** Would help to improve NEV safety, alleviating the potential barrier of consumer safety concerns. Potential for NEVs to impede traffic flows would be reduced. Would provide a significant convenience incentive in congested areas.

**Disadvantages:** Costly, particularly if new pavement is needed. Of questionable political acceptability, particularly if bicycle lanes are compromised. No standards exist for construction of NEV infrastructure, making availability of federal funding questionable.

## VIII. Conclusion

Neighborhood electric vehicles can provide significant air quality and energy use benefits to urban areas in the U.S. NEVs also have many other direct and synergistic benefits, including reductions in greenhouse gases, downsizing of automobile infrastructure, reduced vehicular noise, the development of more "livable" communities, and potential mobility benefits for some segments of society. Despite these attractive advantages, however, the introduction of NEVs is impeded by an array of regulatory, infrastructural, and economic barriers.

In order to promote the production and sale of NEVs, and to encourage the realization of their societal benefits, economic and convenience NEV incentives are needed. Possible incentives include those that reduce manufacturing costs, promote the development of NEV infrastructure, reduce initial vehicle prices, require the purchase of NEVs for use in fleets, allow NEVs to be used as emission reduction offsets, reduce operation and maintenance costs for consumers, or improve NEV convenience. Since NEV prices should drop significantly over time with increased levels of production, economic incentives could be slowly phased-out until they are no longer necessary.

In fact, many incentives applicable to NEVs already exist at the federal, state, and local levels. The most notable of these are the California ZEV mandate, the alternative-fuel vehicle fleet requirements of the Clean Air Act and the Energy Policy Act, and the various federal and state tax credits and exemptions for EVs. Due to the particular definitions used in various incentive programs, however, and given their current phase-out schedules, not all currently available incentives will be of much use in encouraging the production, sale, and use of NEVs. For this

reason, and because initial NEV production levels will be low and prices will be high, new NEV incentives should be considered.

In the near-term, the primary role of NEV incentives should be to promote vehicle manufacture by encouraging investments and providing a minimum level of guaranteed sales. Such incentives might include government purchase programs and direct rebates to NEV purchasers to guarantee sales, and accelerated depreciation for NEV manufacturing investments. In the longer-term, an emphasis should be placed on reducing initial vehicle costs for consumers until NEV prices become competitive, and encouraging the use of NEVs through convenience incentives. Cost-reduction options include fee-bate schemes, registration fee exemptions, and interest-free loans for NEV purchases. NEV convenience could be enhanced through the installation of free parking spaces in desirable areas and dedicated lanes on or adjacent to crowded surface streets.

As a new vehicle type, NEVs face a range of institutional and economic barriers: high initial prices; a lack of support infrastructure; and atypically small vehicle sizes. These problems are compounded by vehicle definitions in air quality and energy legislation that exclude some NEV designs, a rigid automobile regulatory system, and a legal system that imposes great liability risks on NEV manufacturers. Incentives alone will not solve all of these problems. But, if coupled with regulatory reforms and roadway infrastructure modifications, well-designed NEV incentives will play a critical role in overcoming the barriers that currently exist and allowing urban areas to realize the significant positive benefits of this new class of vehicle.

## **Appendix A**

### **State Legislative Report**

**June, 1994**

**Prepared for the Electric Transportation Coalition by:**

**State Analysis  
2400 N. John Marshall Drive  
Arlington, VA 22207  
(703) 534-1700**



## ALASKA H.B. 330 \*

**SPONSOR:** Representative Joseph Green (R)

**SUMMARY:** H.B. 330 contains provisions that would promote the use of natural gas as a motor vehicle fuel in state-owned vehicles. One of the main provisions of the measure would establish a joint venture between the state and private or other public partners in order to foster the availability of natural gas for all auto fuel consumers. H.B. 330 would also establish as an official state policy the use of natural gas in state fleet vehicles whenever feasible and require the Department of Natural Resources to annually evaluate the possibility of natural gas purchases.

**STATUS:** Introduced on January 10. Passed the House Transportation Committee on March 16. Passed the House Finance Committee on March 23. Passed the House on March 29. Passed the Senate Finance Committee on April 6 and passed the Senate Labor and Commerce Committee on April 15. Passed the Senate Rules Committee and the full Senate on May 7. *Pending signature by the Governor.*

**COMMENTS:** The Governor has until June 29 to sign or veto this measure. If the Governor takes no action, H.B. 330 automatically becomes law.

## CALIFORNIA A.B. 2247 \*

**SPONSOR:** Assemblyman Philip Isenberg (D)

**SUMMARY:** A.B. 2247 contains provisions that would fund a variety of air quality programs by authorizing the Sacramento Metropolitan Air Quality Management District to increase the motor vehicle registration fee for the next five years. Air quality programs would include those that provide financial incentives to replace high-emission vehicles with low-emission vehicles by minimizing the price difference between gasoline-powered vehicles and alternatively-fueled vehicles.

**STATUS:** Introduced on March 5, 1993. Passed the Assembly on May 28, 1993. *Pending in the Senate Transportation Committee.*

**COMMENTS:** The Senate must take action on this measure before the end of August, when the legislature is scheduled for adjournment.

*Please note: An asterisk \* denotes bills that have been previously reported. New information on such bills is underlined. The most recent action taken on bills is indicated by italics in the status section. Bills that were reported as having a final action in the previous report have been deleted from this month's report.*

## **CALIFORNIA A.B. 2677 \***

**SPONSOR:** Assemblywoman Dede Alpert (D)

**SUMMARY:** A.B. 2677 would require that 10% of the annual state fleet vehicle purchase be zero-emission vehicles (ZEV) and ultra-low emission vehicles (ULEV). The bill specifies that 5% be ZEVs and 5% be ULEVs. It also directs the California Department of General Services to include private and other agency fleets when acquiring fleet vehicle purchases.

**STATUS:** Introduced on February 3. *Pending in the Assembly Transportation Committee.*

**COMMENTS:** According to legislative staff, although A.B. 2677 will not receive further consideration because it missed the deadline to be out of the House of origin, the main provisions of A.B. 2677 have been merged into A.B. 2910 (see below).

## **CALIFORNIA A.B. 2910 \***

**SPONSOR:** Assemblyman Joe Baca (D)

**SUMMARY:** A.B. 2910 would require the state to promote the development and use of alternative fuel vehicles by setting requirements for the percentages of alternative fuel vehicles that must be purchased annually by the state for its fleet. Beginning in 1996, at least 25% of the state fleet must be powered by an alternative fuel, including electricity, natural gas and liquefied petroleum, among others. The percentages for subsequent years are as follows: 33% in 1997, 50% in 1998 and 75% in 1999 and each year thereafter. The percentages may be reduced if it is determined that acquiring alternative fuel vehicles for state fleets cannot be done at a reasonable cost. A minor amendment to the bill would require the state's Department of General Services to determine the reasonable cost amount.

**STATUS:** Introduced on February 17. Passed the Assembly Transportation Committee on May 3. Passed the Assembly Ways and Means Committee on May 26 and passed the Assembly on May 31. Amended in the Senate Governmental Organization Committee. Pending in the Senate Appropriations Committee.

## **CALIFORNIA A.B. 2921 \***

**SPONSOR:** Assemblyman Ray Haynes (R)

**SUMMARY:** A.B. 2921 would appropriate \$300,000 from the state's petroleum violation escrow account to the Riverside County Transportation Commission for the purchase of three electric 12-passenger vans. The funds would also be used for the construction of an electric vehicle charging facility and operating expenses for

a one-year demonstration project.

**STATUS:** Introduced on February 17. Passed the Assembly Transportation Committee on April 12. *Pending in the Assembly Ways and Means Committee.*

**COMMENTS:** Because this bill missed the June 3 deadline to be out of the House of origin, it will no longer receive consideration although it will not be technically dead until the legislature adjourns at the end of August.

### **CALIFORNIA A.B. 3239 \***

**SPONSOR:** Assemblyman Mickey Conroy (R)

**SUMMARY:** Existing state law requires the Public Utilities Commission (PUC) to authorize public utilities to pursue various activities in the interest of utility ratepayers, such as research and development of electric, compressed natural gas, and other low-emission vehicles. A.B. 3239 would define "interests" to mean direct benefits for ratepayers in the form of safer, more reliable, nondiscriminatory or less costly gas and electrical service.

**STATUS:** Introduced on February 24. Passed the Assembly Utilities and Commerce Committee on May 17. *Pending in the Assembly Ways and Means Committee.*

**COMMENTS:** A.B. 3239 was amended in the Assembly several times and most of the original language has been deleted. Original language within the bill would have required the PUC to submit a report to the Governor and the Legislature on January 1, 1995 on the status and cost of the activities being undertaken by public utilities. It would also have required the PUC to divide the alternative fuel vehicle programs into separate parts for electric and natural gas vehicles. The preceding summary relates only to the new language.

### **CALIFORNIA A.B. 3448 \***

**SPONSOR:** Assemblyman Charles Quackenbush (R)

**SUMMARY:** A.B. 3448 would establish a three-year pilot program in Santa Clara County under which electric vehicles and low-emission vehicles may be operated on exclusive or preferential use lanes.

**STATUS:** Introduced on February 24. Passed the Assembly Transportation Committee on May 19. *Pending a floor vote by the Assembly.*

## CALIFORNIA A.B. 3809 \*

**SPONSOR:** Assemblywoman Martha Escutia (D)

**SUMMARY:** A.B. 3809 would expand the existing law that authorizes the State Air Resources Board to issue permits for the testing of experimental or prototype vehicles which have low-emission characteristics to include permits for the testing of prototype motor vehicles that appear to have zero-emission characteristics.

**STATUS:** Introduced on February 25. *Pending in the Assembly Transportation Committee.*

**COMMENTS:** A.B. 3809 missed the deadline (June 3) to be out of the House of origin. Although it will not be considered officially dead until the California legislature adjourns, the measure will no longer receive consideration.

## CALIFORNIA S.B. 335 \*

**SPONSOR:** Senator Herschel Rosenthal (D)

**SUMMARY:** Original language in S.B. 335 would have permitted the Public Utilities Commission (PUC) to authorize electric utilities to purchase and provide public demonstrations of electric vehicles and other forms of electric transportation. The original language in the bill was deleted by the Senate last month, however, and the bill no longer relates to electric vehicles. Current language within the measure concerns a solar project in Southern California.

**STATUS:** Introduced on February 18, 1993. Passed the Senate Energy and Public Utilities Committee on April 21, 1993. Passed the Senate Appropriations Committee on May 4, 1993. Passed the full Senate on May 20, 1993. Passed the Assembly Utilities and Commerce Committee on June 15. Pending in the Assembly Ways and Means Committee.

**COMMENTS:** Industry sources indicated that the bill is no longer being monitored.

## CALIFORNIA S.B. 668 \*

**SPONSOR:** Senator Gary Hart (D)

**SUMMARY:** S.B. 668 would enact the Zero-Emission Vehicle Development Incentive Program, to be administered by the State Air Resources Board. It would exempt zero-emission vehicles from the state, but not the local, sales and use tax. The measure would also establish a tax credit under the Bank and Corporation Tax Law for the development of zero-emission vehicle technologies. The state board would be required to periodically determine the amount of credits that may be

California Department of General Services to include private and other agency fleets in the procurement process of acquiring low- and zero-emission vehicles.

**STATUS:** Introduced on February 10. Passed the Senate Governmental Organization Committee on April 20. Passed the Senate Appropriations Committee on June 1 and passed the Senate on June 2. Pending in the Assembly Transportation Committee.

**COMMENTS:** While A.B. 2677 specifies the percentages of ZEVs and ultra-low emission vehicles (ULEVs) to be 5% of each (see above), S.B. 1455 mandates that the total combined purchase of low, ultra-low and zero-emission vehicles be 10%.

### **CALIFORNIA S.B. 1593 \***

**SPONSOR:** Senator Herschel Rosenthal (D)

**SUMMARY:** S.B. 1593 would appropriate (no amount specified) state funds for grants to Calstart, a nonprofit organization established to promote the development of clean fuel and other advanced transportation technologies. The funds would be used to provide services to California advanced transportation technology companies. The bill would also develop and manage Project Hatchery, a business incubator project for the start up of advanced transportation technology firms.

**STATUS:** Introduced on February 22. Passed the Senate Appropriations Committee on April 18. Passed the Senate on April 28. *Pending in the Assembly Transportation Committee.*

### **CALIFORNIA S.B. 1819 \***

**SPONSOR:** Senator David G. Kelley (R)

**SUMMARY:** S.B. 1819 would prohibit the Public Utilities Commission (PUC) from authorizing any program that allocates costs needed for electric or natural gas powered vehicles. It would also restrict the development of facilities and technologies that are intended to promote the development and use of such vehicles unless certain conditions are met.

**STATUS:** Introduced on February 24. *Pending in the Senate Energy and Public Utilities Committee.*

**COMMENTS:** According to legislative staff, because the Senate Energy and Public Utilities Committee did not take action on S.B. 1819, it is generally considered to be dead.

## **CALIFORNIA S.B. 1883 \***

**SPONSOR:** Senator Tom Campbell (R)

**SUMMARY:** S.B. 1883 would amend existing law in order to extend the exemption from the state's sales and use tax the incremental costs of a new low-emission vehicle until January 1, 1999.

**STATUS:** Introduced on February 25. Passed the Senate Revenue and Taxation Committee on April 20. *Pending in the Senate Appropriations Committee.*

**COMMENTS:** According to legislative staff, even though this measure is technically alive, it is unlikely to receive further consideration because it is still pending in the House of origin.

## **CALIFORNIA S.B. 1952 \***

**SPONSOR:** Senator Herschel Rosenthal (D)

**SUMMARY:** Provisions in S.B. 1952 would rename the California Alternative Energy Source Financing Authority Act to the California Alternative Energy and Advanced Transportation Financing Authority Act. It would also revise the membership and authorize financial assistance for projects that relate to the development and commercialization of advanced transportation technologies.

**STATUS:** Introduced on February 25. Passed the Senate Energy and Public Utilities Committee on April 19. Passed the Senate Appropriations Committee on May 26 and passed the Senate on June 1. Pending in the Assembly Transportation Committee.

## **CONNECTICUT S.B. 333 \***

**SPONSOR:** Joint Transportation Committee

**SUMMARY:** S.B. 333 provides tax credit incentives to corporations that convert motor vehicles to utilize electricity, compressed natural gas, liquefied petroleum gas or liquefied natural gas. The tax credit is equal to 50% of the total conversion cost. The bill also mandates that no tax credits for emission reductions be given to any corporation unless they are engaged in promoting alternative fuels and electricity for all operations.

**STATUS:** Introduced on March 3. Passed the Joint Transportation Committee on March 16. Passed the Joint Finance, Revenue and Bonding Committee on March 31. Passed the Joint Energy and Public Utilities Committee on April 26. Passed the Senate

on April 28 and passed the House on May 3. Signed by the Governor on June 2.

COMMENTS: S.B. 333 has become Public Act 94-170 and will be effective on July 1.

### DISTRICT OF COLUMBIA BILL 10-605 \*

SPONSOR: Councilman John Ray (D)

SUMMARY: This measure would create the Clean Fuel Fleet Vehicle Program Act of 1994. It would require private and government fleets of ten or more vehicles operating in the District to purchase clean fuel vehicles. Clean fuels are defined within the measure to include electricity. The bill would also establish guidelines to convert traditionally-fueled vehicles to clean fuel vehicles. An additional provision of the bill would provide a credits program designed to encourage fleets to go beyond the minimum requirement in acquiring clean fuel vehicles.

STATUS: Introduced on March 18. Merged into 10-658 (see below).

### DISTRICT OF COLUMBIA BILL 10-658 \*

SPONSOR: D.C. Environmental Regulations Administration

SUMMARY: The Washington D.C. Environmental Regulations Administration, a division of the city's Air Resources Management Department, has developed new regulations and legislation for alternative and clean fuel vehicles. The plan would mandate that 35% of all federal, district and private fleets be comprised of clean fuel vehicles by 1998. The percentage would rise to 50% in 1999 and 75% in 2000.

STATUS: Introduced on May 17. Pending in the Public Works and the Environment Committee. Scheduled for a vote on June 27.

COMMENTS: Provisions of Bill 10-605 have been merged into Bill 10-658. Several amendments have been made to 10-658 and the current language is different from the original version of both bills. Legislative staff indicated that the new version of 10-658 will not be available to the public until the week of June 27.

### ILLINOIS H.B. 2352 \*

SPONSOR: Representative Laurel Prussing (D)

SUMMARY: H.B. 2352 would create the Clean Alternate Fuels Act. Under the provisions of

the bill, the state of Illinois would issue alternative fuel bonds for the purpose of developing the use of alternative fuels and alternative fuel vehicles in Illinois. Proceeds from the bonds would be deposited into an Alternative Fuel Fund. Moneys deposited in the fund would be used for research, conversion of passenger cars and trucks, and the purchase of alternative fuel equipment for manufactured vehicles registered and operated in Illinois. The Clean Alternate Fuels Act would be administered by the Illinois Department of Energy and Natural Resources.

**STATUS:** Introduced on March 10, 1993. Passed the House Agriculture and Conservation Committee on March 11, 1993. Passed the House on April 22, 1993. *Pending in the Senate Rules Committee.*

### **ILLINOIS H.B. 2535 \***

**SPONSOR:** Representative David D. Phelps (D)

**SUMMARY:** H.B. 2535 would create the Clean Alternative Fuels and Conservation Act, which mandates that by the year 2000, at least 75% of all new passenger trucks, light duty trucks and vans be capable of operating on a clean alternative fuel. Clean fuels in the bill are defined as electric, natural gas, propane, methanol and high percentages of ethanol. The bill also contains provisions for the creation of the Alternative Fuels Advisory Board responsible for the development of a long-range comprehensive clean alternative fuels plan.

**STATUS:** Introduced on October 28, 1993. Passed the House Rules Committee on April 7. Passed the House Environment and Energy Committee on April 20. *Pending a floor vote by the House.*

### **ILLINOIS S.B. 1606 \***

**SPONSOR:** Senator William Mahar (R)

**SUMMARY:** Provisions in S.B. 1606 would establish the Clean Alternate Fuels Act, which is a program to provide rebates to individuals who purchase alternate fuel vehicles or convert existing vehicles to those that use alternate fuels. The program would be funded by revenue bonds issued by the state's Bureau of Budget. Also, the bill would establish the Alternate Fuel Advisory Board to analyze original equipment manufacturer (OEM) technologies for alternative fuels.

**STATUS:** Introduced on March 4. *Pending in the Senate Rules Committee.*



## **MASSACHUSETTS H.B. 112 \***

**SPONSOR:** Division of Energy Resources of the Department of Economic Affairs

**SUMMARY:** H.B. 112 would promote the use of compressed natural gas vehicles, by exempting, under certain conditions, the rates and terms for the sale of natural gas by a fueling station from regulation by public utilities.

**STATUS:** Introduced on January 5. Placed into study order H.B. 4731 from the Joint Energy Committee on April 7. *Pending in the Joint Rules Committee.*

**COMMENTS:** H.B. 4731 is a study order that contains twenty-three bills regarding a wide variety of issues. Bills are placed into study order compilations to enable legislators to study various issues. Study orders usually do not receive much consideration.

## **MASSACHUSETTS H.B. 1828 \***

**SPONSOR:** Representative Daniel J. Valianti (D)

**SUMMARY:** H.B. 1828 defines alternative fuels and encourages the use of alternative fuel vehicles. Alternative fuels as defined in the bill include electricity, methanol, ethanol and natural gas, among others. It would also provide for fuel efficiency in the operation of motor vehicles.

**STATUS:** Introduced on January 5. Passed the Joint Energy Committee on April 14. *Pending in the House Science and Technology Committee.*

## **MASSACHUSETTS H.B. 1964 \***

**SPONSOR:** Representative James T. Brett (D)

**SUMMARY:** H.B. 1964 would provide tax deductions for corporations that purchase vehicles that use liquified gas or compressed natural gas, or the conversion of traditionally-fueled vehicles to those using liquified petroleum or natural gas. The bill would also allow deductions for the installation of facilities that distribute such gases.

**STATUS:** Introduced on January 5. *Pending in the Joint Taxation Committee.*

## **MASSACHUSETTS H.B. 2008 \***

**SPONSOR:** Representative Albert Herren (D)

**SUMMARY:** H.B. 2008 would facilitate the use of alternative fuels in the operation of motor vehicles by exempting from regulation the rates, prices and charges of a gas company that sells and distributes gas to an end user for motor vehicle propulsion.

**STATUS:** Introduced on January 5. Placed into study order H.B. 4731 from the Joint Energy Committee on April 7. *Pending in the Joint Rules Committee.*

**COMMENTS:** H.B. 4731 is unlikely to receive much consideration.

### **MASSACHUSETTS H.B. 4423 \***

**SPONSOR:** Representative James T. Brett (D)

**SUMMARY:** H.B. 4423 would provide for a tax credit for the purpose of promoting the use of alternative fuel vehicles.

**STATUS:** Introduced on January 5. *Pending in the Joint Taxation Committee.*

### **MASSACHUSETTS S.B. 221 \***

**SPONSOR:** Senator Robert Durand (D)

**SUMMARY:** S.B. 221 would provide state aid to public schools for the purpose of purchasing zero-emission vehicles for buses and other vehicles that transport students. Beginning in 1995, each school district would receive aid for the purchase of alternative fuel buses or the conversion of buses to ones that use alternative fuel. The amount granted to the school districts would be \$5,000/vehicle for the year in which the vehicle was purchased or converted. The amount would be reduced by \$1,000/year for each year the vehicle remains in operation.

**STATUS:** Introduced on January 5. Placed into study order H.B. 4860 on May 5. *Pending in the Joint Education, Arts and Humanities Committee.*

### **MASSACHUSETTS S.B. 413 \***

**SPONSOR:** Senator W. Paul White (D)

**SUMMARY:** S.B. 413 would allow gas companies to expand and improve their activities to facilitate the use and operation of environmentally-improved motor vehicles. It would also exempt the activities of a gas company that sells separately metered, direct gas to be used in alternatively-fueled vehicles from regulation.

**STATUS:** Introduced on January 5. Placed into study order H.B. 4731 from the Joint Energy Committee on April 7. *Pending in the Joint Rules Committee.*

**COMMENTS:** H.B. 4731 is unlikely to receive further action.

### **MASSACHUSETTS S.B. 951 \***

**SPONSOR:** Senator Robert Durand (D)

**SUMMARY:** S.B. 951 would establish a revolving fund within the Executive Office of Environmental Affairs to provide loans for the purchase and/or conversion of zero-emission vehicles by school districts, non-profit agencies and governmental authorities within the state.

**STATUS:** Introduced on January 5. Passed the Joint Natural Resources and Agriculture Committee on May 2. *Pending in the Senate Ways and Means Committee.*

### **MASSACHUSETTS S.B. 1500 \***

**SPONSOR:** Senator W. Paul White (D)

**SUMMARY:** S.B. 1500 would provide tax credits as incentives to increase the use of low-emission vehicles within the state.

**STATUS:** Introduced on January 5. *Pending in the Joint Taxation Committee.*

### **NEW HAMPSHIRE S.B. 756 \***

**SPONSOR:** Senator Beverly Hollingworth (D)

**SUMMARY:** Previous law defined "gross receipts" as all receipts of the public utility received from the sale of electricity or gas from franchises granted by the state, except receipts from sales of electricity or gas for use outside the state or from another public utility also subject to the payment of this tax. Original language of S.B. 756 would have excluded receipts from the sale of electricity and compressed natural gas to operate motor vehicles from the definition of "gross receipts" for the purpose of the state's franchise tax. S.B. 756 was amended and the references to natural gas in the definition of "gross receipts" were deleted. The definition of "gross receipts" now includes the receipts received from the sale of electricity only to operate motor vehicles.

**STATUS:** Introduced on January 5. Passed the Senate Environment Committee on January

20. Passed the Senate Ways and Means Committee and the full Senate on March 10. Passed the House Ways and Means Committee on May 4. Passed the House on May 11. Signed by the Governor on June 2.

**COMMENTS:** S.B. 756 has become Public Law Chapter 263 and was effective upon signing.

### **NEW HAMPSHIRE S.B. 768 \***

**SPONSOR:** Senator Beverly Hollingworth (D)

**SUMMARY:** This measure is part of New Hampshire's Alternative Fuel Study Committee's legislative package. It contains provisions that facilitate the commercialization of alternative fuel vehicles that utilize electricity and natural gas for generation. Specifically, the bill exempts non-utility entities that are engaged in the sale of electricity and natural gas for the use of motor vehicles from the jurisdiction of the Public Utilities Commission (PUC). Additionally, it requires the PUC to establish rates and charges relating to the sale of electricity or natural gas used for motor vehicles which are consistent with the cost of providing the service. Finally, S.B. 768 requires inter-agency review and development of safety standards for electric and natural gas vehicles. An amendment to the bill requires the PUC to submit a report to the Speaker of the House, the Senate President and the Governor on November 1, 1997 evaluating the effectiveness of the program established by the passage of this bill.

**STATUS:** Introduced on January 5. Passed the Senate Environment Committee on January 20. Passed the full Senate on February 3. Passed the House Science, Technology and Energy Committee on April 14. Passed the House on April 19. Signed by the Governor on June 6.

**COMMENTS:** S.B. 768 has become Public Law Chapter 299. Most of the law's provisions will go into effect on August 5. However, the establishment of rates and terms for the sale of vehicular electricity and natural gas, as well as procedures necessary to provide for the administration of provisions within this bill, went into effect immediately.

### **NEW HAMPSHIRE S.B. 788 \***

**SPONSOR:** Senator Beverly Hollingworth (D)

**SUMMARY:** S.B. 788 requires certain utilities, federal, state, municipal and private facilities to purchase a specific percentage of alternative fuel vehicles. Beginning in 1995, federal entities are required to make 25% of their heavy and light duty trucks powered by alternative fuel. In 1997, state facilities will be required to make 15% of their light duty fleet alternatively-fueled vehicles; in 1998, 30% of their

heavy duty fleet must be comprised of alternative fuel vehicles. Utilities are required to purchase enough alternatively-fueled light duty vehicles to comprise 30% of their fleet beginning in 1997 and enough alternatively-powered heavy duty vehicles to make up 50% of their fleet starting in 1998. Municipal and private fleets are required to make 50% of their heavy duty fleet alternatively-fueled vehicles in 1998, and 30% of their light duty fleet alternative vehicles in 1999. An amendment to the bill establishes the Clean Fuel Fleet Advisory Committee, comprised of members from the state legislature, as well as representatives from the Public Utilities Commission, the Department of Transportation, the Department of Safety, the Department of Environmental Services and the Governor's office. The committee will be required to perform an on-going evaluation of the effectiveness of the clean fuel fleet program.

The bill also authorizes the New Hampshire Department of Environmental Services to establish an emission reduction credit program by which individuals may apply for and purchase credits for the purchase of alternative fuel vehicles.

**STATUS:** Introduced on January 5. Passed the Senate Environment Committee and the full Senate on February 15. Referred back to and passed the Senate Finance Committee on March 21. Passed the full Senate on March 22. Passed the House Environment and Agriculture Committee on April 14 and passed the House on April 19. Passed the House Appropriations Committee on May 4. Passed the House on May 11. Signed by the Governor on June 6.

**COMMENTS:** S.B. 788 has become Public Law Chapter 302 and went into effect upon signing.

### **NEW JERSEY A.B. 313 \***

**SPONSOR:** Assemblyman Richard Bagger (R)

**SUMMARY:** A.B. 313 would exempt alternative fuels from the state's motor fuels tax and would provide a tax credit for corporations that convert traditionally-fueled vehicles to vehicles utilizing alternative fuels. Alternative fuels are defined in the bill as compressed natural gas, methanol, ethanol, propane, hydrogen and other blends of fuels.

**STATUS:** Introduced on January 1. Passed the Assembly Environment Committee on May 19. *Pending in the Assembly Appropriations Committee.*

### **NEW JERSEY A.B. 1429 \***

**SPONSOR:** Assemblyman Michael J. Arnone (R)

**SUMMARY:** A.B. 1429 would provide a five<sub>4</sub> year sales and use tax exemption for vehicles that

## **NEW YORK A.B. 7150 \***

**SPONSOR:** Assemblyman Paul Tonko (D)

**SUMMARY:** A.B. 7150 would establish a comprehensive plan to encourage the purchase or modification of vehicles to run on alternative fuels. The measure would permit, for a five year period, rate recovery of utility costs associated with the marketing and conversion to electric and natural gas vehicles and refueling stations. It would exempt electricity and natural gas from the gross receipts tax, the motor fuel tax, and the sales and compensating use tax. Finally, A.B. 7150 would require public authorities, municipalities and school districts to phase-in the purchase or lease of alternatively-fueled vehicles in their vehicle fleets.

**STATUS:** Introduced on March 30, 1993. Passed the Assembly Ways and Means Committee on June 8 and referred to the Assembly Energy Committee. *Referred back to the Assembly Ways and Means Committee on May 10.*

**COMMENTS:** According to industry staff, A.B. 7150 and S.B. 6172 (see below) are the two most important alternative fuel bills within the state legislature, with the greatest chance of passage.

## **NEW YORK A.B. 8912 \***

**SPONSOR:** Assemblyman Paul Tonko (D)

**SUMMARY:** A.B. 8912 would amend the state's energy and education law in order to establish the Alternative Fuel Incentive Aid Program. The program would provide incentives for school districts to either purchase alternative fuel school buses or convert existing buses to ones that utilize alternative fuels, including electricity and natural gas.

**STATUS:** Introduced on October 19, 1993. *Pending in the Assembly Energy Committee.*

## **NEW YORK A.B. 9626 \***

**SPONSOR:** Assemblyman Paul Tonko (D)

**SUMMARY:** A.B. 9626 contains provisions specifying under which circumstances the construction and operation of a fueling station for alternative fuels would be an economical investment for utilities. The operation of an alternative fuel filling station would be deemed prudent if a utility determines that it could recover 75% of its costs within ten years of such an operation through its customers.

**STATUS:** Introduced on February 28. *Pending in the Assembly Energy Committee.*

have been manufactured to operate on alternative fuels or have been converted to run on such fuels. Alternative fuels are defined in the bill to include electricity, compressed methane gas, and distilled alcohol fuels. The tax exemption would be allowable for a period of five years.

**STATUS:** Introduced on March 7. Passed the Assembly Environment Committee on May 19. *Pending in the Assembly Appropriations Committee.*

### **NEW JERSEY A.B. 1494 \***

**SPONSOR:** Assemblywoman Charlotte Vandervalk (R)

**SUMMARY:** A.B. 1494, entitled the "Comprehensive Alternative Motor Fuels Promotion Act," would increase the number of alternatively-fueled vehicles within the state. The bill would exempt the sale of electricity, natural gas and other alternative fuels from public utility taxes and would require the Department of Community Affairs and the Department of Environmental Protection to adopt rules concerning the construction of alternative fuel filling stations. Also, A.B. 1494 would require that all state agency and local unit vehicle fleets be comprised of alternative fuel vehicles to the greatest extent possible.

**STATUS:** Introduced on March 7. Passed the Assembly Environment Committee on May 19. *Pending in the Assembly Appropriations Committee.*

### **NEW YORK A.B. 6129 \***

**SPONSOR:** Assemblyman Richard L. Brodsky (D)

**SUMMARY:** A.B. 6129 would nullify the California auto emission standards as they apply to automobiles made in 1993 and 1994 unless it is determined that the standards will not prevent the sale of vehicles in New York to residents of neighboring states, or unless the federal Environmental Protection Agency (EPA) mandates that the standards are necessary for the state's compliance with the federal Clean Air Act.

**STATUS:** Introduced on March 17, 1993. *Pending in the Assembly Environmental Conservation Committee.*

**COMMENTS:** According to industry staff, this measure will probably not receive further consideration.

## **NEW YORK A.B. 10032 \***

**SPONSOR:** Assemblyman Paul Tonko (D)

**SUMMARY:** A.B. 10032 would require the New York State Thruway Authority, after June 1, 1995, to provide an alternative fuel refueling station for use by the public every 120 miles on both sides of the New York state thruway. Alternative fuels are defined in the bill to include electricity, natural gas, hydrogen, methanol and ethanol.

**STATUS:** Introduced on March 1. Passed the Assembly Energy Committee on May 10. *Pending in the Assembly Ways and Means Committee.*

**COMMENTS:** According to industry staff, there is some interest in this measure. One drawback, however, is that the bill does not include a funding method for the installation of refueling stations.

## **NEW YORK A.B. 10673 \***

**SPONSOR:** Assemblyman Paul Tonko (D)

**SUMMARY:** A.B. 10673 would add alternatively-fueled vehicles and fueling facilities to the list of energy conservation measures eligible for financing through the state's Energy Investment Loan Program. Fueling facilities and equipment are defined in the bill as those that provide electricity, natural gas, propane, hydrogen and alcohol for use in an alternative fuel vehicle.

**STATUS:** Introduced on March 29. Passed the Assembly Energy Committee on May 10. *Pending in the Assembly Ways and Means Committee.*

**COMMENTS:** The companion bill to A.B. 10673 is S.B. 8322, introduced by Senator James L. Seward (R) on May 4. *S.B. 8322 is pending in the Senate Energy Committee.*

## **NEW YORK S.B. 661 \***

**SPONSOR:** Senator Owen H. Johnson (R)

**SUMMARY:** S.B. 661 would be known as the New York State Electric Vehicle Demonstration Act. It would mandate that by January 1, 1998 10% of vehicles purchased for the state fleet consist of electric vehicles. The Office of General Services would be required to submit a report to the Governor and the legislature by January 1, 1997 in order to outline its efforts to comply with the ten percent requirement. It would also provide for increased vehicle occupancy and electric vehicle parking facilities for state offices. Specifically, three percent or 10 spaces (whichever is



less), of parking lots owned or leased by the state that contain at least 100 parking spaces must be designated specifically for electric vehicles. Such spaces would be equipped with recharging stations as soon as an industry standard for such stations is established. The bill also allows electric vehicles to utilize high-occupancy vehicle lanes, regardless of the number of passengers.

**STATUS:** Introduced on January 1, 1993. It passed the Senate on February 1 and is *pending in the Assembly Environmental Conservation Committee.*

**COMMENTS:** A.B. 9871 is the companion bill for S.B. 661. It was introduced by Assemblyman Kevin Cahill (D) on March 1. *It is pending in the Assembly Environmental Conservation Committee.* Because S.B. 661 has passed one chamber, it will no longer receive consideration until A.B. 9871 has passed the Assembly. Once A.B. 9871 passes, one bill will be substituted for the other and be sent to the Governor to be signed.

### **NEW YORK S.B. 4355 \***

**SPONSOR:** Senator James L. Seward (R)

**SUMMARY:** S.B. 4355 would exempt earnings from the sale of electricity for use in electric vehicles from the gross receipt tax on utilities. It would also exempt electricity, natural gas, methanol, ethanol and hydrogen from the motor fuel tax.

**STATUS:** Introduced on March 30, 1993. *Pending in the Senate Energy Committee.*

### **NEW YORK S.B. 4356 \***

**SPONSOR:** Senator James L. Seward (R)

**SUMMARY:** S.B. 4356 would require the state fleet to switch a substantial number of its vehicles from petroleum-based to alternative fuel vehicles. Such fuel switching would be encouraged by various incentives and tax credits designed to equal the cost of conversion. Provisions within S.B. 4356 also allow non-utilities a deduction from the income tax for electricity used as a motor fuel. The expected result of S.B. 4356, if passed, is the conversion of 930 more vehicles to alternative fuels over the next six years than New York would be required to convert under federal legislation over the same time period.

**STATUS:** Introduced on March 30, 1993. Passed the Senate Energy Committee on June 16, 1993. Passed the Senate Rules Committee on June 30, 1993. *Referred back to, and pending in, the Senate Energy Committee.*

## **NEW YORK S.B. 4357 \***

**SPONSOR:** Senator James L. Seward (R)

**SUMMARY:** S.B. 4357 would amend the Public Service Law to permit rate recovery for utility costs associated with the development of electric vehicles and natural gas vehicles over a five year period. The provisions of this measure are a result of efforts to provide regulatory incentives to develop the electric and natural gas vehicle industries in New York.

**STATUS:** Introduced on March 30, 1993. Passed the Senate Energy Committee on June 16, 1993. Passed the Senate Rules Committee on January 5, 1994. *Referred back to, and pending in, the Senate Energy Committee.*

## **NEW YORK S.B. 6172 \***

**SPONSOR:** Senate Rules Committee

**SUMMARY:** In addition to containing similar provisions to S.B. 4356, this measure would require state agencies to increase the number of vehicles powered by alternative fuels in their fleets. State agencies would be encouraged to switch to alternative fuels by tax credit incentives and designated preferential parking for alternative fuel vehicles in parking lots.

**STATUS:** Introduced on July 4, 1993 in the Senate Rules Committee. Passed the Senate Energy Committee on March 1. *Pending in the Senate Finance Committee.*

**COMMENTS:** This bill is supported by the Governor, the New York State Energy Office, the Public Service Commission and the Environmental Conservation Department. It is also part of the New York State Energy Plan, the draft of which was recently released. According to industry staff, S.B. 6172 has more chance of passage than A.B. 7150 (see above) because it has more support.

## **NEW YORK S.B. 7987 \***

**SPONSOR:** Senator George Pataki (R)

**SUMMARY:** Provisions in S.B. 7987 would amend existing law to exempt the receipts from the retail sale of new zero-emission vehicles, flexible-fuel vehicles and alternatively-fueled vehicles from the state's sales and use tax.

**STATUS:** Introduced on May 3. *Pending in the Senate Energy Committee.*

## **NEW YORK S.B. 7990 \***

**SPONSOR:** Senator George Pataki (R)

**SUMMARY:** S.B. 7990 would provide a tax deduction for the depreciation of alternative fuel vehicles, which are defined in this bill as being those that are powered exclusively by electricity. Such a deduction would be applicable to the construction, reconstruction or erection of electric vehicle charging stations.

**STATUS:** Introduced on May 3. *Pending in the Senate Investigations, Taxation and Government Operations Committee.*

## **NEW YORK S.B. 8400 \***

**SPONSOR:** Senator John B. Daly (R)

**SUMMARY:** The Alternative Fuel Incentive Aid Program would be established by provisions within S.B. 8400. The program would provide incentive aid to school districts for the conversion of petroleum-based fuel school buses to those that are powered by alternative fuels. Alternative fuels are defined in the bill to include electricity, natural gas, ethanol and methanol. The program would also provide incentives for the purchase of alternatively-fueled buses. Incentive aid would be based on the lower costs associated with the operation and maintenance of an alternative fuel school bus compared to a petroleum-based fuel school bus for one year.

**STATUS:** Introduced on May 4. Passed the Senate Energy Committee on June 14.  
*Pending in the Senate Rules Committee.*

## **OHIO S.B. 87 \***

**SPONSOR:** Senator Richard Schafrath (R)

**SUMMARY:** S.B. 87 would grant exemptions from the state's sales tax until December 31, 2001 for purchases of alternatively-fueled vehicles and equipment. It would also require decals for vehicles powered by an alternative fuel. Provisions in the bill encourage the use of alternative fuels in order to comply with the federal Clean Air Act.

**STATUS:** Introduced on March 24, 1993. Passed the Senate on July 1, 1993. *Pending in the House Ways and Means Committee.*

**COMMENTS:** According to industry staff, this measure is unlikely to move out of the House Ways and Means Committee.

## **OKLAHOMA H.B. 1218 \***

**SPONSOR:** Representative Michael E. Tyler (D)

**SUMMARY:** Provisions in H.B. 1218 would amend definitions in the Oklahoma Alternative Fuels Conversion Act to include electricity and ethanol as alternative fuels. The definition of alternative fuels previously referred to liquefied petroleum gas, liquefied natural gas and compressed natural gas. The Oklahoma Alternative Fuels Conversion Act requires that a flat fee of \$100 be levied on alternative fuel vehicles and requires every person operating a vehicle using an alternative fuel to obtain a decal annually for each automobile.

**STATUS:** Introduced on February 1, 1993. Passed the House Transportation Committee on February 4, 1993 and passed the full House on March 1, 1993. Passed the Senate Economic Development Committee on March 29, 1993 and passed the Senate on April 14, 1993. *Died pending a House vote on amendments.*

**COMMENTS:** The end of Oklahoma's legislative session was May 27.

## **OKLAHOMA H.B. 1886 \***

**SPONSOR:** Representative Michael E. Tyler (D)

**SUMMARY:** H.B. 1886 modifies language in Oklahoma's current statutes and adds a provision that develops a training curriculum for technicians who install alternative fuel dispensing stations. It also modifies language relating to the conversion of school and government vehicles to alternative fuels, as well as investment credits in qualified clean-burning motor fuel vehicle property.

**STATUS:** Introduced on February 7. Passed the House Transportation Committee on February 17. Passed the House on March 7. Passed the Senate Natural Resources Committee on March 28 and passed the Senate on April 14. Passed a joint conference committee on May 27. Signed by the Governor on June 11.

**COMMENTS:** H.B. 1886 has become Public Law 379 and will be effective on September 1. This measure was amended several times. A summary of the latest version of the bill will appear in next month's report.

## **OREGON**

Although the Oregon legislature did not meet this year, it has been conducting interim committee hearings to discuss issues and possible legislation for the upcoming session. The Joint Land Use Committee held an informational meeting on April 25 during which the issue of electric vehicles was tentatively scheduled to be discussed. According to committee staff, however, the subject

was not brought up during the meeting. The Senate Agriculture and Natural Resources Committee has scheduled a hearing for June 29. On the agenda is a presentation from a representative of the National Conference of State Legislatures (NCSL) regarding various state initiatives pertaining to alternative fuel legislation.

### **PENNSYLVANIA H.B. 1061 \***

**SPONSOR:** Representative David K. Levdansky (D)

**SUMMARY:** H.B. 1061 contains provisions that would establish the Pennsylvania Alternative Fuels Act and encourage the use of alternative fuels by state agencies. The bill would also authorize the Pennsylvania Energy Office to initiate a study of the use of alternative fuel vehicles, including the performance, fuel economy, safety, performance in cold weather and operating costs of such vehicles. The Energy Office would be required to submit a report to the Governor and General Assembly containing the results of the study and recommendations for future use of alternative fuel vehicles.

**STATUS:** Introduced on March 29, 1993. *Pending in the House Transportation Committee.*

### **PENNSYLVANIA H.B. 2567 \***

**SPONSOR:** Representative Richard J. Cessar (R)

**SUMMARY:** H.B. 2567 would prohibit the Governor or a designee from serving on the Ozone Transport Commission (OTC) and requires the Governor's representative to withdraw the state's membership from the OTC. It also prohibits the expenditure of government funds for any operation associated with the OTC. .

**STATUS:** Introduced on March 8. *Pending in the House Transportation Committee.*

**COMMENTS:** According to legislative staff, even if the measure passes both houses, the Governor is expected to veto the bill.

### **PENNSYLVANIA H.R. 243 \***

**SPONSOR:** Representative Richard J. Cessar (R)

**SUMMARY:** H.R. 243 urges the General Assembly to request the Governor to withdraw the state of Pennsylvania from the Ozone Transport Commission (OTC) if the OTC proceeds with its action to mandate a "California Car" program for the OTC's thirteen members (twelve northeastern states and the District of Columbia).

**STATUS:** Introduced and passed the full House on February 2. *Pending in the Senate Rules and Executive Nominations Committee.*

### **PENNSYLVANIA S.B. 1284 \***

**SPONSOR:** Senator Gerald J. LaValle (D)

**SUMMARY:** S.B. 1284 contains provisions for Pennsylvania's vehicle code. On February 7, the Senate amended the bill to include measures in response to the recent Ozone Transport Commission's vote in favor of a Low-Emission Vehicle Proposal. The amendments include: 1) prohibiting Pennsylvania agencies or political subdivisions from spending funds to advocate, approve or enforce a low-emission vehicle program; 2) requiring the adoption of a concurrent resolution by the General Assembly before emissions control strategies approved by the Ozone Transport Commission can be implemented; 3) authorizing the General Assembly to direct or change the vote of the state's representative on the Ozone Transport Commission on any emissions control strategies; and 4) prohibiting the Pennsylvania Department of Transportation from undertaking actions to implement Enhanced Vehicle Emission Inspection and Maintenance Program until the U.S. Environmental Protection Agency and California reach an agreement on the state's emissions testing program.

**STATUS:** Introduced on July 9, 1993. Passed the Senate Transportation Committee on February 1. *Pending a motion to be voted on by the full Senate.*

**COMMENTS:** Arthur Davis, Secretary for the Department of Environmental Resources and Pennsylvania's delegate to the OTC, voted in favor of the OTC's Low-Emission Vehicle Proposal against the wishes of the General Assembly.

### **RHODE ISLAND H.B. 8043 \***

**SPONSOR:** Representatives Peter Kilmartin (D) and George Zainyeh (D)

**SUMMARY:** H.B. 8043 would establish financial and regulatory incentives designed to promote the manufacturing, purchase or lease of electric motor vehicles. Some of the financial incentives include a tax credit on the purchase, development and installation of equipment used to maintain an electric vehicle. The tax credit would amount to 10% of the expenditures in years prior to January 1, 2000 and subsequently decrease by 2.5% until the year 2004, after which no tax credit would be given. Also, H.B. 8043 would allow a complete tax exemption on personal property tax for any electric vehicle for a period of ten years.

**STATUS:** Introduced on January 26. Passed the House Finance Committee on February 2. Passed the House on February 10. *Held for further study in the Senate Finance*

Committee.

**COMMENTS:** H.B. 8043 has been held in the Senate Finance Committee for further study because Representative Kilmartin was not present to testify on the bill when it was heard in committee. Legislative staff indicated that there is a chance the bill will be heard again in the Senate Finance Committee the week of June 27.

**RHODE ISLAND S.B. 2359 \***

**SPONSOR:** Senator John F. McBurney III (D)

**SUMMARY:** S.B. 2359 would provide a sales and use tax exemption for motor vehicles powered by natural gas. It also provides an exemption for the storage and use of conversion equipment that is used to convert traditionally-fueled vehicles to natural gas fueled vehicles.

**STATUS:** Introduced on February 9. *Pending in the Senate Finance Committee.*

**COMMENTS:** Although the end of the legislative session in Rhode Island has yet to be determined, because S.B. 2359 has not passed out of the committee of origin, it is unlikely to receive further consideration.

**RHODE ISLAND S.B. 2378 \***

**SPONSOR:** Senator John F. McBurney III (D)

**SUMMARY:** S.B. 2378 would amend existing law to exempt natural gas used in alternative fuel vehicles from the state's sales tax. The sale, storage, use and consumption of natural gas used as a fuel for alternative fuel vehicles would be exempt from the sales tax.

**STATUS:** Introduced on February 9. *Pending in the Senate Finance Committee.*

**COMMENTS:** S.B. 2378 is unlikely to receive further consideration because it is still pending in the committee of origin.

**RHODE ISLAND S.B. 3158 \***

**SPONSOR:** Senator William Irons (D)

**SUMMARY:** S.B. 3158 would mandate that the ownership or operation of a facility by a company which sells natural gas at retail for use as a motor vehicle fuel does not

make the company a public utility.

**STATUS:** Introduced on March 3. *Pending in the Senate Corporations Committee. Recommended for indefinite postponement.*

**VERMONT H.B. 640 \***

**SPONSOR:** Representative Gary Bressor (I)

**SUMMARY:** H.B. 640 would establish California vehicle emission standards on model year 1998 passenger cars and light trucks sold or registered in the state if legislators in New York or Massachusetts adopt similar provisions. The decision of whether to adopt the California standards is up to the Secretary of Natural Resources. If New York or Massachusetts do not adopt similar standards, the Secretary has the option of delaying or modifying these rules.

**STATUS:** Introduced on January 25. *Died in the House Natural Resources and Energy Committee.*

**COMMENTS:** The end of Vermont's legislative session was June 11.



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