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MEMORANDUM IN SUPPORT OF MODEL STATE STATUTE FOR HOV LANE BENEFITS

To reduce the United States' greenhouse gas emissions by at least 80% from 1990 levels by 2050 will require increased fuel economy standards in excess of 100 miles per gallon for light duty vehicles such as cars and sport utility vehicles. It also will require deployment of approximately 300 million alternative fuel vehicles, specifically hydrogen fuel cell vehicles ("HFCVs"), battery electric vehicles ("BEVs"), and fuel efficient plug-in hybrid vehicles ("PHEVs").[1/] One pathway is for federal and state governments to encourage the purchase of HFCVs, BEVs and PHEVs that qualify as "super ultra-low emission vehicles" or "SULEVs" by allowing such SULEVs to use high occupancy vehicle or HOV lanes without regard to the number of passengers they carry. SULEV is a U.S. classification for passenger vehicle emissions, based on the vehicle producing 90% fewer emissions than the average gasoline powered vehicle.[2/]

HOV lanes, commonly known as "carpool lanes," are available across thousands of miles of highways in 20 states, both on interstate highways and state highways. Aiming to move people more efficiently, HOV lanes generally require that vehicles have a minimum of 2 or 3 occupants during peak traffic hours. Some fourteen states exempt alternative fuel vehicles from the occupancy requirements in order to encourage acquisition of vehicles with ultra-low or super-ultra-low mobile source emissions of nitrogen dioxide, particulates and greenhouse gases ("GHG"). Vehicles eligible for exemption vary by state. Some states, for example, exempt internal combustion engine vehicles ("ICEVs") if they burn natural gas. [3]

States may establish HOV lanes on state highways without federal authorization. However, federal programs have advanced the implementation of HOV lanes by offering state and local transportation authorities access to federal funding if their HOV lanes meet (or exceed) federal requirements, which have changed over the decades. The Federal Highway Administration ("FHWA") first allowed state transportation agencies to spend federal funds on HOV lanes beginning in the 1970s.[4/] The 1990 Clean Air Act Amendments authorized the U.S. Environmental Protection Agency ("EPA") to restrict FHWA HOV lane funds to those states

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1/ Michael Gerrard & John Dernbach, *Legal Pathways to Deep Decarbonization in the United States* (Environmental Law Institute, 2019), Ch. 14, at 353, 360. See also, Chris Gearhart, *Implications of Sustainability for United States Light-Duty Transportation Sector*, 3 MRS Energy & Sustainability 1, 7, note 6 (2016).

2/ http://alternativefuels.about.com/od/glossary/g/SULEV.htm.

3 A 7/3/2019 Compendium of Existing HOV Lane; Alternative Facilities Fuels in the Data Center: United Sates, Alternative U.S. Fuel Vehicles Department and High Occupancy Transportation, Vehicle 2008 Lane http://ops.fhwa.dot.gov/publications/fhwahop09030/index.htm (http://ops.fhwa.dot.gov/publications/fhwahop09030/index.htm).

4/ http://ops.fhwa.dot.gov/freewaymgmt/hov.htm

federally mandated to reduce air pollution and allowed these states to include HOV lanes in their state implementation plans. In 1991, the Intermodal Surface Transportation Efficiency Act allowed these states to use Congestion, Mitigation and Air Quality funds to develop new HOV lanes at the full federal cost-match ratio for highway infrastructure. [5/] (The restriction of funds to certain states is no longer in effect.)

The Fixing America's Surface Transportation Act ("FAST Act") in 2015 extended the ability of public authorities to offer HOV access for low emission and energy-efficient vehicles, such as hybrid electric vehicles ("HEVs"), through 2019, if the vehicles pay a toll. Because the federal support for HOV access for HEVs ended in 2019, we do not propose to include HEVs as beneficiaries of HOV access in our model state statute.

On the other hand, under the FAST Act a wide variety of AFVs and plug-in electric vehicles (BEVs and PHEVs) may continue to be granted free or discounted access to HOV lanes through 2025, when support for HOV lane exemptions sunsets, unless extended. 23 U.S.C. section 166 provides in subsection (b)(5) that until September 30, 2025, public transportation authorities may allow the use of HOV lanes by "alternative fuel vehicles and any motor vehicle described in section 30D(d)(1) of the Internal Revenue Code of 1986." Section 30D(d)(1) describes a "new qualified plug-in electric drive motor vehicle ... of less than 14,000 pounds ... propelled to a significant extent by an electric motor which draws electricity from a battery which--(i) has a capacity of not less than 4 kilowatt hours, and (ii) is capable of being recharged from an external source of electricity."

The model state statute we propose would be more restrictive with respect to PHEV battery capacity than allowed under federal law. Under the model statute, access to HOV lanes would be limited to a subset of PHEVs that have a battery capacity of 8 kWh or greater. This would include the presently most efficient PHEV models. The Toyota Prius PHEV, the Ford Fusion Energi, the Hyundai Ioniq PHEV and the Subaru Crosstrek PHEV each have an 8.8-9.0 kWh battery. The top-selling Mitsubishi Highlander PHEV has a 12 kWh battery. The Chevrolet Volt has an 18.4 kWh battery and an electric range of 53 miles. The Chrysler Pacifica Hybrid family van has a 16 kWh battery and an electric range of 22 miles.[6/]

Moreover, 23 U.S.C. section 166(f)(1) defines "alternative fuel vehicle" broadly--in our view, too broadly—as: "a vehicle that is solely operating on--(A) methanol, denatured ethanol, or other alcohols; (B) a mixture containing at least 85 percent of methanol, denatured ethanol, and other alcohols by volume with gasoline or other fuels; (C) natural gas; (D) liquefied petroleum gas; (E) hydrogen; (F) coal derived liquid fuels; (G) fuels (except alcohol) derived from biological materials; (H) electricity (including electricity from solar energy); or (I) any other fuel that the Secretary prescribes by regulation that is not substantially petroleum and that would

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5/ A 7/3/2019 Compendium of Existing HOV Lane, *supra* note 3.

6/ https://insideevs.com/features/336577/top-6-plug-in-hybrids-ranked-my-electric-range.

yield substantial energy security and environmental benefits, including fuels regulated under section 490 of title 10, Code of Federal Regulations (or successor regulations)."

23 U.S.C. section 166(d)(2)(C) permits public authorities to implement a more stringent definition of low emission and energy-efficient vehicles in order to better manage the performance of their HOV lanes. The proposed state statute implements a more stringent definition. The inclusion of vehicles operating on fuel other than hydrogen fuel cells or electricity will not achieve the goal of reducing GHG emissions 80% from 1990 levels by 2050, and is not justified by "energy security" reasons, given the abundance of solar and wind resources in the U.S. Burning 85% ethanol mixtures lowers life-cycles emissions on average, as compared to conventional gas, by 34% if the source is corn or 51% if cellulose.[7/] Burning natural gas lowers life-cycles emission on average, as compared to conventional gas, by only 5-11%.[8/] Burning liquefied petroleum gas or propane lowers life-cycle emissions on average, as compared to conventional gas, by only 13%.[9/] Burning coal derived liquid fuels doubles life-cycle emissions on average, as compared to conventional gas![10]In fact, most states with HOV lanes agree and choose not to extend an exemption for single occupancy vehicles that operate on the fuels we choose to exclude, with the notable exceptions that California, North Carolina, Utah and New Jersey allow natural gas vehicles to enter HOV lanes.[11/]

We do not propose a threshold EPA mileage rating for PHEVs, because the EPA generally calculates their mileage separately for the PHEV operating in electric mode and another mpg for the PHEV operating on gasoline. The EPA sometimes provides an overall combined gas-electric fuel economy rating ("Driver MPG") for some models after they have been operating for a year or so.[12/] The EPA "Driver MPG" indicates, and an empirical study finds, that dividing the total miles driven in PHEVs by the gallons of gas purchased, the result may well exceed 100 mpg.[13/] This is because PHEVs are predominantly used for commuting short distances during which they operate on electricity stored in the battery rather than on gas. Thus, extending benefits to PHEVs

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7/ https://afdc.energy.gov/vehicles/flexible_fuel_emissions.html.

8/ https://afdc.energy.gov/vehicles/natural_gas_emissions.html.

9/ https://afdc.energy.gov/vehicles/propane_emissions.html.

10 https://www.rand.org/content/dam/rand/pubs/monographs/2008/RAND_MG754.pdf

11/ https://afdc.energy.gov/laws/state. The attractiveness of natural gas is premised in large part on its low price compared to gasoline and diesel fuel. B. Canis, R. Pirog, B. Yacobucci, Congressional Research Service, "Natural Gas for Cars and Trucks: Options and Challenges" (11/19/2014), available at https://fas.org/sgp/crs/misc/R43791.pdf.

12/ See www.fueleconomy.gov, and search results for "EPA Combined city/hwy MPG" for "plug-in hybrids." The 2018 Chevrolet Volt achieved an overall Driver MPG rating of 112.9 mpg, the 2018 Toyota Prius Prime a rating of 128.4, the 2018 Honda Clarity PHEV a rating of 95.9, the 2014 BMW i3 REX, which is more like a BEV than a PHEV, achieved a Driver MPG of 136.1 or 227.2 depending on the battery. These ratings are not available for many PHEV models, and in any event, the ratings are not available in advance of the new model year for sticker disclosure. As of August 2019, there are no available EPA Driver MPG figures for popular 2019 PHEVs.

13/ Patrick Plotz, Simon Funke, Patrick Jochem, *Real-World fuel economy and carbon dioxide emissions of plug-in hybrid electric vehicles*, Working Paper Sustainability and Innovation, No. S- 1/2015, at 22.

helps reduce GHG emissions by as much as 80%, by reducing gasoline consumption by as much as 80%.

Finally, even though they are only Partial Zero Emission Vehicles (as opposed to Zero Emission Vehicles) all PHEVs meet the most stringent GHG emission standards--Federal Tier 3 Bin 30 and California LEV-III SULEV 30--and receive a perfect GHG score of 10 in California's Model Year 2019 Green Vehicle Guide. For this reason, enumerating quantified emission standards no longer seems necessary for application of the HOV exemption to PHEVs. (California categorizes PHEVs as "Transitional Zero Emission Vehicles" only if they come with an extended 15 year/150,000 mile emissions warranty and a 10 year/150,000 mile warranty on the energy storage device. This requirement also no longer seems necessary for application of the HOV exemption to PHEVs.)

The specific vehicle models states choose to exempt has traditionally been informed by vehicle purchase trends and technology advancements to prevent significant HOV lane congestion.[14] We have chosen to draft a model law that exempts from the multiple occupant requirement only HFCVs, BEVs, and PHEVs with battery capacities of at least 8 kWh. If this leads to "degradation" of the HOV lane (to use the federal term of art for unacceptably reduced speeds), then we propose that the occupancy requirement for ICEVs be increased to a minimum of three people, in order to effectively achieve an mpg rating per rider that is closer to the Driver MPG of single occupancy PHEV. The average ICEV's EPA rating for combined city and highway driving is only about 25 mpg; with two riders, that is the equivalent of 50 mpg per rider (50% less than the Driver MPG of the most efficient PHEVs); with three riders, that is the equivalent of 75 mpg per rider, which begins to approach the Driver MPG of the most efficient PHEV.

Because the federal statutes and regulations that provide funding for HOV lanes sunset the occupancy requirement exemptions on September 30, 2025, the proposed state statute sunsets on the same date. If the federal authorization pursuant to Section 166 of Title 23 of the United States Code is extended beyond that date, the state legislature should consider substituting the extended expiration date for the current expiration date throughout the statute.

As this commentary reflects, the federal legal framework for HOV benefits could also use some adjustments. In particular, 23 U.S.C. section 166(f)(1) should be amended to define “alternative fuel vehicle” narrowly to include at this time only HFCVs, BEVs and PHEVs.

The proposed state statute that follows is loosely based on California Vehicle Code section 5205.5, as amended in 2018, effective January 1, 2019. It omits California's exclusions from the AFV exemption of car owners who received rebates with their purchase, among other provisions.

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[14] A 7/3/2019 Compendium of Existing HOV Lane, *supra* note 3.