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California Air Resources Board
1001 "I" Street
Sacramento, CA 95814
Submitted via the ARB website at:
https://www.arb.ca.gov/lispub/comm2/bcsubform.php?listname=vwzevinvestplan-ws&comm_period=1

March 28, 2017

Re: Comments on VW California ZEV Investment Plan: Cycle 1, Public Version

Dear Chair Nichols:

Thank you for the opportunity to provide comments on the VW California ZEV Investment Plan: Cycle 1, Public Version, that was made available on March 14, 2017. Plug In America is the national consumer voice for plug-in electric vehicles (PEVs) and works to promote policies and programs nationwide that put more PEVs on the road.[1] Our members are passionate PEV advocates and have driven PEVs for many years, affording Plug in America a unique perspective on how consumers think about PEVs and what actually inspires a consumer to purchase a PEV.

Plug In America commends the California Air Resources Board (ARB) for their leadership with the VW Settlement thus far. Plug In America is supportive of the VW California ZEV Investment Plan: Cycle 1 except for the fact that the plan includes no mention of deployment of Level 1 charging infrastructure. We respectfully offer the following comments on Level 1 charging infrastructure and the need to include Level 1 as part of the first 30 month VW California ZEV Investment Plan:

1. **We urge the ARB to require the VW plan to include Level 1 charging infrastructure at workplaces and multi-unit dwellings within the deployment mix.**

The charging infrastructure to be installed under the VW California ZEV Investment Plan must reflect actual PEV driving behavior. The ARB already understands that most charging, around 85%, occurs at home. Even with more public charging becoming available, most drivers will choose to charge at home in order to maintain the most control over when the vehicle is charged. While the VW investment dollars will not be used to install charging infrastructure at single family residences, the second best place to install charging infrastructure that reflects consumer driving behavior is at the workplace and at multi-unit dwellings. At the workplace during the day and at multi-unit dwellings at night, vehicles will typically spend eight or more hours parked, representing a perfect opportunity to charge.

[1] More information available at: www.pluginamerica.org

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Level 2 charging at the workplace and at multi-unit dwellings is not the only charging that should be available through the VW Investment Plan. The ARB must require the VW plan to include Level 1 charging infrastructure at these locations. Given the fact that 93% of drivers commute less than 35 miles one way to work each day, Level 1 will be able to provide enough charge throughout an eight hour workday for the driver to head home on a full charge.[2] Level 1 is AC charging at 120V, the level of power that is supplied by a normal household outlet, and supplies 3 to 5 miles of range per hour to a typical electric vehicle, or up to 40 miles of range for an 8-hour connection during a typical work day.

Level 1 charging can be implemented with a simple outlet on a dedicated 15A or 20A circuit, with GFCI if outdoors. In that case, the driver is required to use the charging cable that comes with all PEVs, to connect the vehicle to the outlet. This can be a hassle for the driver, having to expose a $300 - $600 charge cable to a dirty environment and potential theft, depending on the location.

A more convenient way to implement Level 1 charging is with a charging station. Although marginally more expensive than a regular outlet, the additional expense is small when amortized over the lifetime of the installation and compared to the cost of electricity dispensed. A Level 1 charging station is more convenient and more secure for the PEV driver. Stations equipped with multiple charge ports combined with proper positioning of the station can serve multiple parking spaces in a variety of facilities (e.g., garage, open lot and curbside).

Plug In America sees a major opportunity for the widespread use of Level 1 charging at workplaces and MUDs. A recent report from the U.S. Department of Energy (DOE) also explored how L1 charging can provide a successful workplace charging solution.[3] The DOE report gives the example of installing Level 1 charging at GM:

> GM, a Workplace Charging Challenge Partner, started a workplace charging program in 2010 by installing over 100 Level 2 EVSE across key employee parking lots. A few years later, GM wanted to provide more charging stations to keep up with demand as more employees purchased new Chevrolet Volts. Not only did GM choose to expand its Level 2 offerings, but it also chose to start installing Level 1 outlets to maximize the number of employees that would have access to workplace charging while staying within available budgets. Installing Level 1 outlets cost significantly less than installing a Level 2 EVSE. GM reported a rule-of-thumb estimate in March 2016 of $10,000 to install a Level 2 EVSE and $1,000 to install a Level 1 outlet. Considering the available parking lot power supply, (generally) GM could install twice as many Level 1 outlets than Level 2 before it needed to pay for more costly electrical upgrades. Overall, choosing Level 1 outlets enabled GM to expedite workplace charging projects and provide workplace charging

[2] Source: U.S. Department of Transportation, Bureau of Transportation Statistics, Omnibus Household Survey (2014)
[3] http://energy.gov/sites/prod/files/2016/07/f33/WPCC_L1ChargingAtTheWorkplace_0716.pdf

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> for many more employees than it could have if it only chose Level 2 EVSE.[4] … Leaving a vehicle at a Level 1 charging station all day can be more convenient and a better use of an employee's time than having to move a vehicle mid-day to share a Level 2 EVSE.

The DOE report also states that one of the major benefits to Level 1 charging is the lower electricity consumption costs compared to higher power charging options. The report states, "Assuming drivers have a commute of 10–25 miles one-way, the potential electricity consumed by one Level 1 charging station could range from 867–2,167 kWh/year. Assuming a commercial electricity rate of 10.59 cents per kilowatt-hour results in an annual cost of $92–$229 electricity consumption for each Level 1 charging station."[5] The workplaces that are selected for the VW Investment will need some certainty about what the electricity costs will likely be over time from the charging stations installed. Level 1 charging can provide more predictability about what the electricity costs will be, as higher demand charges that are associated with DC fast charging and multiple Level 2 chargers are "rarely a concern for Level 1 charging."[6]

Furthermore, Level 1 charging at the workplace and other long-dwell locations may be more desirable over Level 2 in the long run in order for the vehicle to provide grid services over a longer dwell time. Level 1 can participate in grid services just as well as Level 2. The vehicles can still respond to one-way demand response signals while connected to the grid via a Level 1 charger, as demand response requires signaling in the station or the car.

VW states on page 15 of their plan that one of the "key guiding principles used to design the network include the following: …**Focus on a variety of use cases** based on anticipated charging behaviors of ZEV drivers" (bold emphasis added).[7] A comprehensive variety of use cases should absolutely include EV drivers that will utilize Level 1 charging.

2. We urge the ARB to consider free charging for drivers in some scenarios under the VW California ZEV Investment Plan: Cycle 1.

Plug In America encourages the ARB to explore free charging for drivers in some scenarios. There is substantial evidence that proves consumers love free things, and free charging can certainly fall into this category.[8] To jump start the more rapid adoption of PEVs in California, the ARB should consider allowing cities and communities to offer free L1 charging, and possibly also free L2 charging in areas where PEV adoption has been slow. With L1 charging, the total cost of charge will be relatively minor, as electricity

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[4] See page 6 of the DOE report: https://www.energy.gov/sites/prod/files/2016/07/f33/WPCC_L1ChargingAtTheWorkplace_0716.pdf
[5] See page 8 of the DOE report: https://www.energy.gov/sites/prod/files/2016/07/f33/WPCC_L1ChargingAtTheWorkplace_0716.pdf
[6] Ibid.
[7] https://www.arb.ca.gov/msprog/vw_info/vsi/vw-zevinvest/documents/vwinvestplan1_031317.pdf
[8] One example is the MIT paper, "Zero as a special price: The true value of free products," available at: http://web.mit.edu/ariely/www/MIT/Papers/zero.pdf

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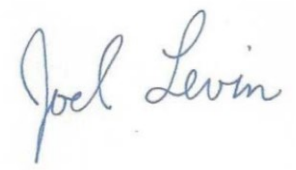
prices are in the cents/kWh range and not the dollars/kWh range. There is currently a wide range of PEV adoption rates throughout California, and offering free charging could help to bring those with lower adoption up to speed quickly.

Communities with low PEV adoption would benefit from offering free L1 charging for drivers as this would encourage early adoption, whereas communities with high PEV adoption would likely experience too much competition for the free chargers. The ARB could establish a set of criteria for the cities and communities that would be eligible to offer free charging and receive reimbursement from the VW settlement funding. As PEV adoption accelerates, the ARB could evaluate PEV adoption in each community and end any free charging programs.

We would be happy to discuss these recommendations further with you. Please send any questions to Katherine Stainken, Policy Director, at kstainken@pluginamerica.org. We thank you for this opportunity to provide comments on the VW California ZEV Investment Plan: Cycle 1, public version, and look forward to working with you.

Best regards,



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