December 20, 2017

Peter Christensen and Lisa Williams
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Volkswagen Mitigation Trust D - Beneficiary Mitigation Plan

Dear Mr. Christensen and Ms. Williams:

We are writing on behalf of Tesla to share our comments in response to the California Air Resources Board's (CARB) October 9, 2017 workshop on developing a beneficiary Mitigation Plan for California's allocation of the Volkswagen (VW) Mitigation Trust.

As discussed during the workshop, it will be critical to utilize the $423 million allocated to California under the VW settlement funds from Appendix D to maximize air quality benefits and make progress toward the state's climate goals. Replacing heavy-duty (HD) diesel trucks and investing in light-duty (LD), medium duty (MD) and HD Zero-Emission Vehicle (ZEV) charging infrastructure will help achieve this objective. While Tesla recognizes that all classes of ZEVs are important for meeting the Mitigation Plan's goals, given our expertise in the LD and HD electric vehicle (EV) sectors, our comments focus primarily on LD and HD ZEVs.

Tesla generally supports the Mitigation Trust's primary purpose as specified under Appendix D to address past and future excess emissions of nitrogen oxides (NOx). Our comments below discuss several key principles and strategies for how the Beneficiary Mitigation Plan (BMP) can optimally allocate funds to maximize NOx reductions, in a cost-effective and equitable manner. These include:

1. Focus funds on replacement of diesel vehicles with ZEVs and investment in HD ZEV infrastructure first and foremost wherever feasible.
2. Provide funds as close as possible to point of sale under a first come, first served model.
3. Allocate the full 15% (~$63 million) of eligible ZEV supply equipment funds for investment in LD charging infrastructure and include make-ready infrastructure rebates.
4. Focus LD ZEV infrastructure funds on workplaces and multi-unit dwellings (MUDs).
5. Coordinate with other state agencies and existing CARB programs.

Focus funds on replacement of diesel vehicles with HD ZEVs and investment in HD ZEV infrastructure first and foremost wherever feasible

Appendix D outlines a number of different mitigation actions and expenditures that are eligible to receive funds under the BMP. According to a recent report by the Union of Concerned Scientists (UCS), HD vehicles are the single largest source of smog-producing NOx in California and produce more particulate matter than all of the state's power plants combined.[1] The report further finds that electric and fuel cell buses have lower lifecycle NOx emissions than do diesel and compressed natural gas (CNG) buses, including those

[1] Union of Concerned Scientists, Delivering Opportunity: How Electric Buses and Trucks Can Create Jobs and Improve Public Health in California (2016), p1. Available at: https://www.ucsusa.org/clean-vehicles/electric-vehicles/freight-electrification#.WileYVtSz4Y

with engines certified to meet California's voluntary low NOx standards.[2] HD EVs are also up to four times more efficient than diesel and natural gas engines and provide additional benefits relative to diesel and other near-zero vehicles that should be taken into consideration when developing the BMP.[3] Beyond fuel efficiency, these benefits include reduced noise and overall maintenance cost, among other items.[4]

Given the long term impact the BMP funds can have on reducing NOx and other emissions, we recommend focusing funds first and foremost on ZEVs whenever feasible to achieve maximum NOx emissions reduction relative to replacement of other alternate fuel trucks and buses.[5] This also aligns with the general strategy outlined in other complementary CARB programs and as proposed in the Fiscal Year 2017-2018 Clean Transportation Funding Plan to help meet the state's long term climate goals.[6] The technology to replace diesel vehicles with HD ZEVs is now available. For example, Tesla recently unveiled our Semi Truck, an all-electric Class 8 vehicle that consumes less than two kilowatt-hours of energy per mile and is capable of 500 miles of range.[7] Production is expected to begin in 2019 for the 500 mile range model.[8] Beyond reducing NOx emissions, the Tesla Semi includes enhanced safety features, and will have a lower cost of ownership and superior performance relative to standard, Class 8 vehicles.[9]

Additionally, reducing NOx emissions is critical for California to meet federal air quality standards for ozone in 2023 and 2031.[10]In the 2016 Mobile Source Strategy, CARB highlighted that "near-term focused electrification and progress toward zero emission is critical to address the remaining localized risks of cancer and other adverse effects near major freight hubs, and must also play a growing role in reducing GHG emissions and petroleum use."[11] Existing regulations are projected to reduce HD vehicle NOx emissions by nearly 70 percent from 2015 to 2031 but they will not meet the entire reduction need.[12]It is, therefore, important that BMP funding target the remaining high NOx emitting fleet and further narrow the NOx reduction gap by replacing these vehicles with HD ZEVs wherever feasible.

Lastly, Tesla is pleased to see that Appendix D includes HD charging infrastructure as an eligible expenditure under each section of the eligible truck replacement mitigation actions and expenditures.[13]This should be explicitly highlighted in California's BMP. We also recommend including make-ready[14] components of the charging infrastructure as eligible expenditures under this section of the BMP as it improves the business case for a fleet owner to transition to HD ZEVs, thereby increasing adoption and further reducing overall NOx and GHG emissions.

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[2] *Ibid*, p. 14.
[3] *Ibid*, p.2.
[4] CARB, Advanced Clean Local Trucks Workshop (April 2017), slide 7. Available at: https://www.arb.ca.gov/msprog/actruck/mtg/170425workshoppresentation.pdf.
[5] NASEO, VW Mitigation Plan Toolkit, Table 1.Available at: https://www.naseo.org/Data/Sites/1/03-27-17_naseo-vw-beneficiary-mitigation-plan-toolkit-final.pdf .
[6] CARB, Fiscal Year 17-18 Clean Transportation Funding Plan. Available at: https://www.arb.ca.gov/msprog/aqip/fundplan/proposed_1718_funding_plan_final.pdf
[7] Tesla. Available at: https://www.tesla.com/semi/.
[8] *Ibid*
[9] *Ibid*
[10] CARB, Heavy-Duty Low-NOx (August 2017). Available at: https://www.arb.ca.gov/msprog/hdlownox/hdlownox.htm.
[11] 2016 Mobile Source Strategy, p.79. Available at: https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf.
[12] 2016 Mobile Source Strategy, p.78. Available at: https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf.
[13] Consent Decree Appendix D, p.3. Available at: https://www.arb.ca.gov/msprog/vw_info/vsi/vw-mititrust/documents/appendixd2.pdf .
[14] "Make-ready" includes the electrical infrastructure to support electric vehicle charging. Make-ready refers to the 'full circuit' infrastructure (i.e. panels, conduit, wiring) required for the EVSE to be connected up to but excluding the charging station itself.

Provide funds as close as possible to point of sale under a first come, first served model

Depending on the funding structure that is ultimately adopted by the BMP, we recommend that any incentive be offered as close as possible to the point of sale, which is broadly considered the most effective method of driving EV sales.[15] An incentive closer to the point of sale can also help provide some certainty to the customer for availability of funding.[16] Furthermore, to facilitate a seamless customer experience and ease of program administration, we support a first-come, first-serve project administration structure rather than a competitive bidding process, similar to the structure that CARB has already embraced for programs like Hybrid and Zero-Emission Truck and Bus Voucher Incentive Program (HVIP).

Allocate the full 15% (~$63 million) of eligible ZEV Supply Equipment funds for investment in LD charging infrastructure and include make-ready infrastructure rebates

During the October 9, 2017 workshop on the BMP, several stakeholders highlighted the continued lack of LD EV charging infrastructure as compared to the expected need especially when considering California's goal of 1.5 million ZEVs by 2025. Numerous reports have attempted to estimate the state's EV charging infrastructure need, with some analysts estimating that 125,000 to 200,000 publicly accessible charging ports will be necessary by 2020,[17] which is well beyond the approximately 12,000 available in California today.[18] Even when considering the on-going and additional investments in LD charging infrastructure being made by the investor-owned utilities (IOUs), the California Energy Commission (CEC) grant funding, and the remaining VW settlement funds being deployed by Electrify America, it appears that the state is far from meeting the need. In its analysis, Electrify America indicated that it expects to meet only 4-8% of the infrastructure needed in California metro areas that were analyzed.[19] Therefore, Tesla recommends that the BMP allocate the full possible 15% of the funding to LD charging infrastructure.

Appendix D provides several definitions that impact the development of the LD funding allocation under the BMP. Appendix D defines "'infrastructure' as the equipment used to enable the use of electric powered vehicles (e.g., electric vehicle charging station)."[20] It also states that "each Beneficiary may use up to fifteen percent (15%) of its allocation of Trust Funds on the costs necessary for, and directly connected to, the acquisition, installation, operation and maintenance of new light duty zero emission vehicle supply equipment for projects as specified below."[21] While not explicitly defined in Appendix D, we strongly encourage the BMP to include funding of Level-2 make-ready infrastructure, which includes wiring, conduit and subpanel installation, etc. given that is often the greatest cost of installing EV charging stations.[22]

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[15] "Cash at the time of purchase is by far the best financial incentive – over twice the value of a tax credit." Plug in America, *Evaluating Methods to Encourage Plug-in Electric Vehicle Adoption: A review of reports on PEV incentive effectiveness for California Utilities* (October 2016), p.13.

[16] ICCT, Principles for Effective Electric Vehicle Design (June 2016), p. 6. Available at: http://www.theicct.org/sites/default/files/publications/ICCT_IZEV-incentives-comp_201606.pdf .

[17] UC Berkeley School of Law, Plugging Away: How to Boost Electric Vehicle Charging Infrastructure (June 2017), p. 4. Available at: https://www.law.berkeley.edu/wp-content/uploads/2017/06/Plugging-Away-June-2017.pdf .

[18] *Ibid*

[19] Electrify America, Supplement to the California ZEV Investment Plan (June 2017). Available at: https://www.arb.ca.gov/msprog/vw_info/vsi/vw-zevinvest/documents/california_zev_investment_plan_supplement_062917.pdf.

[20] Consent Decree Appendix D, p.12. Available at: https://www.arb.ca.gov/msprog/vw_info/vsi/vw-mititrust/documents/appendixd2.pdf.

[21] Consent Decree Appendix D, p.8. Available at: https://www.arb.ca.gov/msprog/vw_info/vsi/vw-mititrust/documents/appendixd2.pdf

[22] Southern California Edison, Charge Ready Advisory Board Meeting Number 5(August 2017), Slide 11.

Limiting funding to the final charging connector (only), unless leveraging alternative funds for EV make-ready infrastructure, indirectly hinders an essential component of an EV-ready parking structure – the electrical capacity upgrade and wiring. Including EV make-ready infrastructure (not just the electric vehicle supply equipment (EVSEs)) as approved criteria for funding could substantively reduce barriers to EVSE deployment, particularly in multi-unit dwellings (MUDs)**.** Thus, Tesla recommends funding focus on both make-ready infrastructure as well as EVSE.

Making funds available to support EV make-ready infrastructure in new and existing common parking areas could result in greater adoption of EVs by those residents who may be considering switching from a gasoline vehicle. Once a parking area or structure is EV make-ready, a relatively nominal amount of funds (<$1000) are then required to purchase and connect an EVSE at each occupant parking space.

Different rebate amounts can be provided for make-ready and EVSE components as the make-ready infrastructure can often represent a significantly higher portion of the installation costs. A separate rebate for the EVSE-only would also allow customer preference of EVSE depending on their required application. To ensure funds are better applied, CARB should also consider economies of scale to improve overall cost-effectiveness of funding disbursement and thus set a minimum EVSE port requirement per project, similar to the requirements in the California Investor IOU's MUD and workplace programs.[23] Additionally, the choice of EVSE should be left up to the site owner so that they can choose what best suits their needs.

LD ZEV infrastructure funds should be focused on Workplace and Multi-Unit Dwellings

Appendix C of the VW settlement allocates $800 million in California and more than $1.2 billion nationally for ZEV charging infrastructure through Electrify America.[24] Phase one of the investment plan is to spend 82% of the funds on a national Level-3 'Direct Current (DC) fast charging' network that covers almost every state, representing more than 2,500 DC fast chargers.[25] Future phases of the investment plans may target additional DC fast charging infrastructure. This initiative will satisfy some of the long distance charging needs along major highway corridors; however, Tesla acknowledges the need for more Level-2 home and workplace charging, where more than 80% of EV charging occurs.[26]

We recommend that CARB focus the 15% of LD ZEV charging infrastructure funds primarily on multi-unit dwellings and workplaces. In the context of MUDs, residents may not have access to any charging infrastructure nor have the ability to deploy such infrastructure to the extent that they do not own the physical property where the charging infrastructure would need to be deployed. Even in instances where residents can deploy this infrastructure, the costs of retrofitting a single parking spot can be prohibitive. Notably, in many cases, standard parking lots in multi-unit residences and workplaces do not have either the electrical capacity needed to charge EVs, nor do they have the correct wiring to connect an EV charging post and connector (EVSE).

Therefore it is critical that LD ZEV infrastructure funds target MUDs to reduce cost barriers associated with electrical upgrades and EVSE installation. The costs for a make-ready MUD infrastructure projects can be minimized through economies of scale by enabling multiple make-ready parking spaces per garage, thereby

[23] California Public Utilities Commission, Zero-Emission Vehicles, Charging Infrastructure section. Available at: http://www.cpuc.ca.gov/zev/.
[24] EPA, VW Clean Air Act Civil Settlement. Available at: https://www.epa.gov/enforcement/volkswagen-clean-air-act-civil-settlement.
[25] Electrify America, Investment Plan. Available at: https://www.electrifyamerica.com/our-plan.
[26] Idaho National Laboratory, Charging Behavior Revealed. Available at:https://www.inl.gov/article/charging-behavior-revealed-large-national-studies-analyze-ev-infrastructure-needs/.

reducing the per-space cost. The Charge Ready Program initiated by Southern California Edison (SCE) found that in the case of retrofitting a building with EV make-ready infrastructure, a five space project averaged approximately $14,000 per space; however, a 25 space project resulted in a $7,000 cost per space.[27]

Specifically, Tesla recommends that LD ZEV infrastructure funds focus on upgrading the electrical capacity (i.e. adding panel breaker space) to support a minimum of 20% of total parking spaces, and install the necessary wiring to support as many additional spaces as possible.

Coordination with other State Agencies should be undertaken

As consistently referenced in stakeholder discussions at CARB, the California Energy Commission (CEC), and the California Public Utilities Commission (CPUC), coordination of investments between these California regulatory bodies is critical to ensure funding is maximized and duplication does not occur.[28] Additionally, it will be important for CARB staff from similar LD and HD ZEV funding programs to be closely integrated with the development of the BMP. The impact from the expenditures under Appendix D should be incremental to what is already being done in the state, particularly when it comes to the deployment of EV charging infrastructure. One mechanism that could be helpful in tracking funding is maintaining a central database accessible to relevant state agencies that details project and funding categories for charging infrastructure and ZEVs. In addition, an Advisory Committee could be established comprised of the state agencies including local air districts and stakeholders to provide on-going input on mitigation actions.

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Tesla appreciates the opportunity to provide feedback on development of the BMP at this early stage of process, as well as the level of transparency being provided by CARB in designing this plan. As outlined above, Tesla provides several recommendations to help guide the development of the BMP, including maximizing LD EV infrastructure investments, a ZEV-centric strategy, replacement of heaviest NOx emitters, and coordination among relevant state agencies.

We look forward to continuing to engage in the development process and to reviewing the draft BMP once available.

Sincerely,

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[27] Southern California Edison, Charge Ready Advisory Board Meeting Number 5(August 2017), Slide 11.
[28] http://www.energy.ca.gov/renewables/tracking_progress/documents/electric_vehicle.pdf