December 7, 2020
Clerk of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Proposed 2020-21 Clean Transportation Incentives Funding Plan

Chair Nichols and Members of the Board:

Tesla appreciates the opportunity to provide feedback on the proposed 2020-21 Clean Transportation Incentives Funding Plan. Given the current budgetary environment, Tesla is broadly supportive of the approach reflected in the Plan, whereby the limited funding that is currently available is allocated to those programs that face the most significant near-term funding challenges and which also provide the highest net benefits. To that end, Tesla strongly supports the proposed allocation of AQIP funds primarily to support HVIP. This program plays a fundamental role in driving adoption of zero-emission heavy duty vehicles, a role made even more important in light of the Governor's recent Executive Order N-79-20, which calls for "100% of all medium- and heavy-duty vehicles in the state to be zero emission by 2045 for all operations where feasible and by 2035 for drayage trucks", ARB's recent adoption of the Advanced Clean Truck Regulation, as well as the forthcoming Clean Fleet Rule. Tesla fully concurs with staff's appraisal that, "Recently adopted heavy-duty zero-emission regulations—and more on the horizon—will drive faster deployment of zero-emission technologies, making HVIP's technology preparation and market transformation goals even more important."[1] In addition to addressing funding allocations in the current fiscally constrained environment, the funding plan also proposes a range of amendments to current programs, including changes to incentive levels, eligibility criteria and other programmatic elements. Here again, Tesla agrees with the thrust of these amendments. However, as discussed in more detail below, we do have a number of substantive concerns that we encourage the Board to address before adopting the Funding Plan.

Our recommendations include the following:

- Reduce the value of HVIP vouchers to more reasonably reflect battery system costs.
- Eliminate the fuel cell multiplier that provides fuel cell vehicles access to more valuable HVIP vouchers.
- Rather than establishing a rolling soft cap on the number of HVIP vouchers that can be issued for a given manufacturer's vehicles, establish more stringent conditions around when incentivized vehicles must be delivered.
- Graduate plug-in hybrid vehicles from CVRP altogether.
- Establish parity between fuel cell and battery electric vehicle rebates under CVRP.

[1] Funding Plan, p. 27

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- Increase the cap on the number of CVRP rebates that commercial entities purchasing vehicles in the 8,501-10,000 lbs GVWR weight class can receive.

HVIP Recommendations

Reduce the Value of HVIP Vouchers to More Reasonably Reflect Battery System Costs

Based on the level of demand for vouchers HVIP has seen over the past two years, it is clear the program will remain significantly oversubscribed absent fairly substantial changes. The infusion of AQIP funds, while certainly helpful and much needed, will make only a small dent in overall demand for HVIP vouchers. Even the potential addition of Greenhouse Gas Reduction Fund monies appropriated by the Legislature seems unlikely to result in HVIP, in its current form, becoming a dependable source of funding that can effectively drive investment decisions unless ARB takes substantial steps to further modify the program. To address this reality, staff has proposed a number of reforms to the program, including changes to the incentive framework and the resulting incentive amounts offered, as well as the imposition of various caps that would limit the extent to which a single heavy-duty vehicle owner/operator or manufacturer can reserve funds.

With regard to the proposed reforms to the incentive levels, Tesla encourages ARB to go significantly further in reducing the value of the vouchers that vehicles can receive. The level of the incentives offered is the most significant lever that ARB has at its disposal to address the issue of oversubscription and restoring some level of program certainty. Staff appears to recognize this as well, stating that "[r]educing voucher amounts may reduce the risk of funding shortfalls and waitlists for these projects. Budget shortfalls and waitlists adversely impact the market for advanced technologies by creating uncertainty and artificially starting and stopping demand. As primary goals of these projects are to support the market for zero-emission technologies, staff considers stability in funding voucher availability to be paramount."[2] However, despite this language, the reformed framework put forward in the proposed Funding Plan only results in a modest reduction in voucher values, reducing incentives for certain categories of vehicles by only 8-10 percent.[3] To meaningfully improve the certainty of funding and the program's overall sustainability, Tesla believes the voucher values need to be reduced by at least 50%. As proposed, the value of vouchers remains far too high if the goal is to address the oversubscription concern. Importantly, these incentives also appear in excess of what is needed to drive adoption based on current battery costs.

At $156/kWh[4], a 500 kWh battery pack (sufficient to provide a Class 8 truck a range of approximately 250 miles) would cost $78,000. If one assumes, for the sake of simplicity, that this amount represents the incremental cost relative to a conventional Class 8 vehicle, at

[2] *Id.*, p. 45
[3] *Id.*, p. 24
[4] This estimate is an average 2019 battery pack cost as reported by Bloomberg New Energy Finance. See "Battery Pack Prices As Market Ramps Up With Market Average at $156/kWh In 2019"; https://about.bnef.com/blog/battery-pack-prices-fall-as-market-ramps-up-with-market-average-at-156-kwh-in-2019/

$120,000 to $150,000 per Class 8 vehicle, the proposed voucher is substantially higher than what is needed to cover the entire cost of the battery. More realistically, the cost differential between a BEV and a conventional vehicle will be somewhat less than the cost of the battery pack since the costs associated with the ICE engine would need to be netted out, suggesting that the amount by which the proposed voucher value exceeds what is necessary to cover any cost differential is even greater. This is further compounded by the fact that BEVs are anticipated to provide substantial operational savings in the form of reduced fueling and maintenance costs.

In an ideal world, the value of the HVIP voucher would be tied directly to the all-electric range of a vehicle since, ultimately, this is the dimension of a vehicle's performance that is most directly related to the benefits this program seeks to generate and which also drives the incremental costs compared to a conventional vehicle due to the higher capital cost of batteries and fuel cells. To establish such a framework ARB would need to determine a standardized amount of battery or fuel cell capacity per mile of all-electric range for vehicles of different weight classes. ARB would additionally need to assume a certain cost per unit of capacity and determine what percent of that cost the HVIP voucher should offset. Under this approach, if a prototypical class 8 BEV is assumed to need 2 kWh per mile of all-electric range, the cost of batteries is assumed to be $156/kWh and the voucher is intended to offset 60% of the cost, the voucher would be set at (2 kWh/mile * $156/kWh * .6 =) $187/mile of all- electric range. Thus, a Class 8 vehicle with an all-electric range of 250 miles would be eligible for a $46,800 voucher. The voucher amount for vehicles in lower weight classes would be less, recognizing that the capacity needed per mile of zero-emission range for these vehicles would also be less. For example, if a Class 3 vehicle requires only 1 kWh of battery capacity per mile of all electric range, and keeping all other inputs the same, vehicles in this weight class would be eligible for an incentive of (1 kWh/mile * $200/kWh * .6 =) $120/mile of all electric range. A Class 3 vehicle with an all-electric range of 250 miles would therefore be eligible for an incentive of $23,400.

Tesla recognizes that this framework is more complex and would additionally require some means of validating the all-electric ranges of participating vehicles, which does not currently exist. A second-best alternative would be to calculate the value of the voucher based on the size and estimated cost of the battery pack. Staff has already indicated that the proposed base level incentive, which increases as function of vehicle weight class, is intended to be a proxy for the size of the battery system employed. The Funding Plan explains that, "…recognizing that battery size is the largest determinant of battery-electric vehicle (BEV) cost, staff recommends that HVIP should offer a base incentive by vehicle weight rating."[5] Tesla agrees with the underlying thought process regarding the role the battery system plays in driving costs but disagrees with the logical leap staff then appears to take in proposing a framework where the voucher value is a function of weight class. Rather than using GVWR as a proxy for battery size, it would make more sense to directly tie the base incentive value to the size of the battery pack being employed. Under this approach, ARB would establish a voucher value per kWh of battery capacity. This would then be multiplied

[5] Funding Plan, pp. 23-24

by the battery size associated with a given application to determine the voucher value a given vehicle is eligible to receive. Tesla suggests that offsetting 60% of the battery cost would be sufficient to cover most if not all of the differential between a conventional vehicle and BEV. Again, assuming a battery cost of $156/kWh, then the voucher would be set at $94/kWh and a vehicle with a 500 kWh battery back (e.g. a Class 8 Semi with a 250 mile range) would be eligible for a $46,800 voucher. Over time the assumptions regarding battery costs should be updated, perhaps by explicitly tying this input to a battery cost index or other independent source that provides robust estimates. This would ensure that over time, the incentive provided adjusts to the needs of the market.

Compared to the framework currently in the proposed Funding Plan, this capacity-based approach ensures that the amount any vehicle draws from the program is calibrated to the key underlying cost driver.[6] Tesla submits that this approach, while far preferable to the staff proposal, is sub-optimal relative to the ideal framework discussed above because it fails to factor in the relative efficiency of different technologies in converting energy stored in the battery system or fuel cell into zero-emission miles. If one vehicle is able to get 250 miles of range out of a 500 kWh battery pack and another is only able to get 150 miles, it does not seem reasonable that they should both receive the same incentive, since the former delivers substantially more "bang for the buck". However, for purposes of HVIP this approach may be sufficient, and certainly brings the incentive framework into closer alignment with the notion of calibrating the incentives to underlying cost drivers.

Eliminate the Fuel Cell Modifier

In addition to the change above, Tesla asks that modifier applied to fuel cell vehicles (FCVs) be eliminated in its entirety. By offering substantially higher incentives for FCVs, ARB is inappropriately placing its thumb on the scale in favor of fuel cell technologies, despite the fact that the relative benefits offered by fuel cell vehicles, in terms of emission reduction potential and commercial viability, have not been explained or demonstrated. This proposed amendment to the draft Funding Plan is entirely consistent with the letter submitted to Governor Newsom on November 10, 2020 by nine legislators in which they asked that, in implementing policy to effectuate the goals of the clean transportation executive order, agencies, including ARB,[7] maintain an approach of technological neutrality. In sharp contrast to this principle of technological neutrality, under the proposed framework in the Funding Plan, an FCV would receive twice the incentives that a BEV is eligible to

[6] One potential critique of this approach is that it may create an incentive to oversize the battery to capture more incentive value. However, because the incentive only covers a portion of the battery costs, end use customers would still be motivated to purchase vehicles with batteries that are sized optimally to address the specific application the vehicles are intended to address. Additionally, weight limitations should also discourage oversizing of batteries beyond what is necessary for a given application/use case. This does suggest that the ARB would need to update the battery cost assumptions over time and adjust the voucher amount accordingly to ensure that end-use customers still have "skin in the game".

[7] Letter dated November 10, 2020 sent to Governor Newsom regarding E-79-20 A Technology-Neutral Approach to Zero Emission Mobility by Senators Archuleta and Skinner, and Assemblymembers Irwin, Levine, Quirk, Gipson, Carillo, Burke and Ramos.

receive. For example, a Class 8 BEV would receive $120,000 in voucher value while a Class 8 FCV would receive a voucher worth $240,000.

We understand that staff's approach to set the value of the vouchers is based on an assessment of the costs of different vehicle types and technologies. While the application of modifiers is reasonable to account for inherent cost differences that may exist based on the application (e.g. school buses vs. goods movement) or to encourage greater adoption of zero emission solutions in those communities that currently bear a disproportionate share of the state's pollution burden (e.g. disadvantaged communities), there does not appear to be a policy rationale to offer a higher incentive for a given zero emission technology versus another. In the face of limited budgets, the urgent need to accelerate the deployment of zero emission technologies in the heavy-duty space, and the noted demand for vouchers, we believe the fuel cell modifier is profoundly flawed. It will dramatically reduce the number of vehicles the program is able to support and also insulates manufacturers and technologies from any meaningful competitive pressure to get their costs under control. For these reasons, the FCV modifier should be eliminated from the framework.

In Lieu of a Rolling Soft Cap on the Number of HVIP Vouchers that can be Issued for a Given Manufacturer's Vehicles, Establish More Stringent Conditions Around When Incentivized Vehicles Must Be Delivered

The Funding Plan proposes to implement a cap on the number of vouchers that may be issued to a given fleet owner/operator and to a given manufacturer. Although Tesla supports reasonable limits on the number of vouchers that a given fleet operator may receive, we oppose establishing caps on the number of vouchers that may be issued to a given manufacturer. Tesla appreciates that the Funding Plan envisions a rolling, soft cap, but even with these elements, we are concerned that the manufacturer cap will serve to limit customer choice and prevent customers from being able to leverage HVIP to support procurement from their preferred vehicle manufacturer. Should a customer find that their preferred vendor is capped out of the program, it is not a forgone conclusion that they will simply go with another vendor who has headroom under the cap. At this stage of market development, there may not be a plethora of options for vehicle owner/operators to choose from that meet their specific needs. Even in circumstances where there are additional options, there are also many advantages for fleets to utilize a single manufacturer that would be lost if they need to split their procurement to include multiple manufacturers because their preferred vendor has reached its cap. For small and medium sized fleets in particular, the need to support vehicles from different manufacturers can add complexity and costs that may be prohibitive. Further, this cap could put manufacturers in the unenviable position of having to decide which of their customers can get access to their limited manufacturer vouchers. The "soft" element of the cap might help address this situation by allowing CARB and the HVIP administrator to allow a manufacturer to exceed the cap, but it is not guaranteed that such requests would be granted and so, at best, the proposed cap introduces additional uncertainty into an already fraught process.

The Funding Plan justifies the manufacturer cap on the grounds that it will help motivate manufacturers to "improve voucher availability and encourage fast vehicle delivery."[8] Regarding voucher availability, Tesla submits that what manufacturer's vehicles are ultimately supported by HVIP should be determined by the market. ARB should not intervene in the market to limit the ability of heavy-duty vehicle owner/operators to leverage this program to procure whatever vehicle from whichever manufacture they have determined is best able to fulfill their needs. Regarding the view that the proposed cap will encourage fast vehicle delivery, the proposed approach appears to be a very oblique way of addressing this concern. A far more direct path would be to implement a more stringently enforced set of timeframes within which a voucher needs to be redeemed. Currently, a voucher must be redeemed with three months from the time of issuance. However, it can be extended in three-month intervals for up to 18 months with those extension requests essentially being rubber-stamped. It is only if an extension is requested after 18 months that the request appears to be subject to any review whatsoever. This process could be made significantly more stringent. For example, Tesla would support modifying the current process such that manufacturers have 12-18 months to deliver a vehicle from the date of voucher issuance but allow 6-month extensions beyond that only if the manufacturer can demonstrate tangible progress in terms of its ability to manufacture the vehicles. Such proof might include demonstration that the voucher holder is pursuing meaningful investments in the charging infrastructure necessary to support the operation of the associated vehicles. Our reasoning is that given the high costs of infrastructure, companies may be reluctant to commit the substantial resources required to infrastructure development if they don't have confidence that those vehicles will actually be delivered.

Should the Board decide to retain the manufacturers cap, Tesla recommends that it be removed once a manufacturer has demonstrated that they are well on the path to volume production. What that criterion might consist of should be addressed via a working group process subsequent to Board adoption of the Plan. We can appreciate the concern of allowing a given manufacturer to reserve a large share of funding prior to there being some clear indication that vehicles will be produced and delivered. However, once this has been demonstrated, it is not clear what role the cap plays that cannot be more directly and effectively addressed by simply enforcing delivery timelines as discussed above.

CVRP Recommendations

Graduate Plug-In Hybrid Electric Vehicles from CVRP Altogether

Tesla supports the various modifications to the Clean Vehicle Rebate Program (CVRP) identified in the Funding Plan, including the shift to utilizing the United States Environmental Protection Agency's (U.S. EPA) all-electric ranges in lieu of the Urban Dynamometer Driving Schedule (UDDS) all-electric range estimates, as well as the increase in the minimum all-electric miles that plug-in hybrid electric vehicles (PHEVs) must be capable of in order to be eligible. This proposal makes environmental and budget sense, especially in a time of fiscal austerity. By increasing the minimum all-electric range of

[8] *Id.*, p. 25

qualifying PHEVs, going from the current 25 miles EPA to 30 miles EPA, the Proposed Funding Plan increases the likelihood that participating PHEVs will contribute toward emission reductions.

That said, there are good reasons to remain skeptical of the efficacy of including PHEVs at all. A recent study by the International Council on Clean Transportation (ICCT) found that PHEV fuel consumption and tail-pipe CO2 emissions in real-world driving, on average, are approximately two to four times higher than the certification standard.[9] Moreover, the real-world share of electric driving for PHEVs, on average, is about half the share considered in the certification standard. This suggests CARB should actually increase the minimum all-electric range to 60 miles EPA. The ICCT study also found that on average, private plug-in hybrid vehicles are driven only 37% of their mileage in electric mode and for company car vehicles it is only 20%.[10]

CARB's own research evaluating plug-in hybrids casts further doubt on the benefits of PHEVs. Among ARB's findings, as discussed at the ACC2 workshop held on September 16, 2020 is that high power cold start emissions from truck/SUV PHEVs are 170% higher than the certification standard.[11] More fundamentally, continuing to include PHEVs seems inconsistent with the Governor's recent Executive Order which envisions 100 percent of passenger vehicle sales being zero emission vehicles by 2035. It simply makes no sense for taxpayers to continue subsidizing polluting PHEV vehicles, which confer little if any environmental benefit compared to the most fuel-efficient ICE vehicles, at the expense of legitimately zero-emission vehicles.

To the degree that PHEVs are viewed as important to include in CVRP as a means of enabling lower income households to benefit from the program, Tesla suggests ARB consider a more narrowly tailored approach. Rather than blanket eligibility, ARB could limit eligibility to utilize CVRP rebates for the purchase of a PHEV to low-income households.

Establish Parity Between Fuel Cell and Battery Electric Vehicle Rebates Under CVRP

In the spirit of technology-neutrality, we continue to suggest eliminating the $2500 adder for fuel cell vehicles and including these vehicles under the same MSRP cap that applies to all other eligible vehicles. As we argued last year, after about 30 years of some form of public subsidy or support, we question when fuel cells will reach an acceptable level of deployment that will convince CARB to, at the very least, put them on equal footing. As of 2019, we estimate that the state has provided about $30,527 in vehicle and fueling

[9] Plotz, Moll, et al, 2020. Real-world usage of plug-in hybrid electric vehicles - Fuel consumption, electric driving, and CO2 emissions. The International Council on Clean Transportation. https://theicct.org/publications/phev-real-world-usage-sept2020

[10] "Real-world usage of plug-in hybrid electric vehicles: Fuel consumption, electric driving, and CO2 emissions", By Patrick Plötz, Cornelius Moll, and Yaoming Li (Fraunhofer ISI); Georg Bieker, Peter Mock; ICCT, September 9, 2020; https://theicct.org/publications/phev-real-world-usage-sept2020

[11] CARB, Advanced Clean Cars (ACC) II Workshop Presentation (Sept. 16, 2020), at slides 38-39 https://ww2.arb.ca.gov/sites/default/files/2020-09/ACC%20II%20Sept%202020%20Workshop%20Presentation%20%28Updated%29.pdf

infrastructure incentives or awards, for each of the approximately 5,528 FCEVs on CA roads today–compare this with about $2,351 per BEV.

Increase the Cap on the Number of CVRP Rebates that Commercial Entities Purchasing Vehicles in the 8,501-10,000 lbs GVWR Weight Class Can Receive

The draft Funding Plan raises the minimum weight for purposes of HVIP eligibility to 10,001 lbs. while at the same time increasing the maximum weight of vehicles eligible to participate in CVRP to 10,000 lbs. However, in making this change, the Funding Plan limits the ability of commercial vehicles that would have previously qualified for HVIP to receive incentives. Currently CVRP offers commercial vehicles very limited access to incentives, with businesses generally limited to one rebate, though transportation network companies (TNCs), rental companies and public fleets may apply for 20-30 rebates[12]. To address this, Tesla recommends raising the cap on the number of rebates businesses are eligible to receive under CVRP for vehicles that would have previously qualified for HVIP, specifically vehicles that fall in the 8,501-10,000 lbs GVWR weight class. Tesla suggests that ARB consider making the cap applicable to these vehicles equivalent to the cap that currently applies to TNCs and rental companies.

Conclusion

Tesla thanks ARB and ARB staff for the opportunity to provide feedback on the 2020-21 Clean Transportation Funding Plan. As reflected in these comments, we are strongly supportive of the proposed funding allocation given the hard choices that have to be made in the current budgetary environment. We are also directionally supportive of many of the proposed changes to enable allocated funds to go further, though as detailed, Tesla believes a number of additional amendments to the Funding Plan are necessary further enhance the efficacy of HVIP and CVRP.

Thank you for your consideration.

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[12] See https://cleanvehiclerebate.org/eng/fleet-resources#business