# TISLA

July 5, 2018

Sam Wade Low Carbon Fuel Standard California Air Resources Board State of California

Subject: Comments on the 15-Day Notice for Proposed 2018 Amendments to the Low Carbon Fuel Standard

Dear Mr. Wade:

I am writing on behalf of Tesla to provide recommendations to the California Air Resources Board (CARB) as a part of the stakeholder comment process for the 2018 Amendments to the Low Carbon Fuel Standard (LCFS). The LCFS regulation is an important tool to reduce carbon emissions in the state's transportation sector and to promote sustainable technology deployment. Within the LCFS, the electricity pathways have great potential to dramatically accelerate Electric Vehicle (EV) adoption, support Direct Current Fast Charging (DCFC) infrastructure deployment and encourage the use of solar energy for EV charging. To realize this potential, we recommend CARB consider several modifications to the regulation in this rulemaking.

#### Tesla provides the following recommendations to the 15-day notice:

- 1. DC Fast Charging Infrastructure (FCI) Pathway:
  - a. remove proposed connector requirement (type and ratio) at a site, as this distorts market conditions and hinders automaker investments;
  - b. remove point-of-sale payment method requirements, as this issue is being addressed by the SB 454 rulemaking;
  - c. reduce the hours-per-day crediting to ensure credits are effectively deployed to maximize the total number of chargers supported by this pathway;
  - d. do not subtract actual electricity dispensed from capacity credit formula to encourage developers to optimize for site utilization;
  - e. increase the site cap to provide developers with more flexibility to meet consumer demands and encourage better economies of scale; and
  - f. remove the charging unit performance verification requirement, as this issue is being addressed by the Division of Measurements and Standards in a separate rulemaking.
- 2. Incremental Credits: 0-Carbon Intensity (CI) and Smart Charging:
  - a. clarify that Electric Distribution Utilities (EDUs) and Load Serving Entities (LSEs) must provide "revenue-grade direct metering data" for residential base and incremental credits;
  - b. establish a hierarchy for residential smart charging credits to provide clarity for the multiple entities who participate in this pathway; and

- c. require VIN-level reporting only for the first-in-line credit generators to minimize the administrative burden on pathway participants and limit the sharing of sensitive information.
- 3. Other Residential Charging Credits:
  - a. issue residential base credits on a quarterly basis; and
  - b. maintain the existing crediting structure for residential multi-unit dwelling (MUD) charging.

### **Direct-Current Fast Charging Infrastructure (FCI) Pathway**

We support the inclusion of DCFC technology in capacity crediting, which the Board directed staff to explore at the April 2018 hearing. The FCI pathway, if designed and implemented effectively, has the potential to significantly accelerate the deployment of DCFC infrastructure in the state in accordance with the Governor's goal of 10,000 chargers by 2025 to support widespread EV adoption in the state.

With Tesla's U.S. vehicle sales already representing a majority of today's DCFC-capable market,<sup>1</sup> Tesla supports initiatives that help offset the cost of DCFC infrastructure deployment to serve growing consumer demand. We have invested significant resources in the Supercharger network, which is designed to enable long-distance travel and remove a barrier to the broader adoption of EVs caused by the perception of limited vehicle range. Supercharger sites typically have between six and twenty chargers and are strategically placed along well-travelled routes. We are also building stations in an increasing number of city centers to enable urban use. The Supercharger network will never be a profit center for Tesla and the cost to consumers, if any, will always remain significantly cheaper than gasoline.

Based on our extensive experience deploying Superchargers in California and around the world, we believe a robust FCI pathway would feature the following characteristics:

- 1. Supports the development of the nascent DCFC industry by removing barriers to participation (e.g. restrictions on connector types and point-of-sale payment methods) so developers can adapt to evolving customer needs
- 2. Protects against overbuilding of sites and charger capacity by setting appropriate crediting levels to ensure developers contribute to the total cost of the infrastructure investment (equipment and installation)
- 3. Encourages faster deployment of chargers to accelerate EV adoption

To achieve these objectives, Tesla offers the following recommendations:

### I. Remove proposed connector requirement (type and ratio) at a site, as this distorts market conditions and hinders automaker investments

The DCFC industry is still nascent, and technology is rapidly evolving based on market demands. Unlike level 2 charging, which is predominantly SAE J1772, there is no universal DCFC connector that all EVs can use. The FCI pathway should provide flexibility to developers

<sup>&</sup>lt;sup>1</sup> IHS/Polk data.

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by not imposing restrictions on technology or connector types at this stage of the industry's development.

When Tesla began developing the Supercharger network in 2012, there were no commercially available connectors that enabled fast charging above 62.5kW, and the vast majority of connectors were limited to 50kW. In order to offer drivers a convenient fast charging service for the larger battery packs in our vehicles, Tesla had to design a new connector. Today, with more Model 3 vehicles on California roads, the demand for Tesla-compatible DCFC infrastructure is expected to increase significantly.

Like Tesla, each automaker, when designing a DCFC-capable EV, selects a connector technology (Tesla, SAE CCS Combo Type 1 or CHAdeMO). However, with the exception of the CHAdeMO adapter that very few Tesla customers purchase, there are currently no adapters that would allow an EV to use a DCFC charger that has a different connector. Therefore, Tesla vehicles are unable to use SAE CCS Combo DCFC chargers and only the few Tesla owners who have an adapter can use CHAdeMO DCFC chargers.

Beyond the connector type, it is important to note the varying rates of charge across vehicles. Not all plug-in vehicles are DCFC-capable. There is only one plug-in hybrid model available today that is capable of DCFC. There are approximately a dozen pure battery EVs available for purchase today, and most, but not all, are capable of DCFC. Tesla vehicles are capable of DCFC up to 120 kW while the other DCFC capable vehicles available today are limited to 50 kW.

As our CEO shared on Tesla's 2018 first quarter earnings call, the Supercharger network is not intended to be a walled garden. Tesla is happy to let other automakers use our Supercharger stations if they pay a share of the cost proportional to their vehicle usage, their vehicles can accept our charger's charge rate and their vehicles can use our connector (directly or with an adapter).<sup>2</sup> At the same time, Tesla will not compromise the performance of our charging hardware for less capable products, possibly leading to congestion and wait times at stations.

The current proposal requires at least one-third of connectors at a site to differ from other connectors at the site, regardless of actual market demand for different types of connectors now or in the future, and will result in under-utilized chargers. The connector requirement directly deters automakers, such as Tesla, from participating in this pathway, placing them at a disadvantage as compared to third party charging companies, because automakers would have to install chargers that their vehicles cannot use. Automakers would have to invest the capital and resources to install, maintain and service chargers that their customers cannot use, either directly or through a third party, incurring significant costs and creating unnecessary operational complexity. Ultimately, the challenges that this proposal presents would impede deployment, hindering the state's progress on the Governor's goals.

If the pathway is designed to encourage all developers, including automakers, to deploy DCFC infrastructure, unnecessary technical limitations would only hinder investment and deployment. The pathway should be technology agnostic so the market determines what type of chargers are deployed. Keeping the pathway technology agnostic will help ensure that the pathway funds chargers that are needed to support the vehicles on the road and minimizes the deployment of chargers that will sit idle. If developers are able to select their own mix of connectors based on consumer demand and site limitations, they will be more invested in the

<sup>&</sup>lt;sup>2</sup> Tesla's Q1 2018 Financial Results and Q&A webcast: https://edge.media-server.com/m6/p/nwvzygvo

long-term viability of the site. The pathway should not force them to fund connector technology that is not core to their business model as it would ultimately result in higher costs and a worse experience for consumers. Therefore, CARB should remove the requirements on the required type and ratio of connectors at each site.

### II. Remove point-of-sale payment method requirements, as this issue is being addressed by the SB 454 rulemaking

The proposed language includes a requirement for each charger to be "capable of supporting a public point-of-sale method that accepts credit or debit card without incurring any additional fees, inconvenience or delays versus other payment or access control methods." However, CARB's rulemaking on the Electric Vehicle Charging Stations Open Access Act (Senate Bill 454) would also determine the requirements of point-of-sale payment methods and interoperability for public charging stations. Since this issue is already being addressed by a separate CARB rulemaking, CARB should remove requirements from the FCI pathway especially because those requirements could be retroactively applied.

In general, any point-of-sale payment method requirement should provide the flexibility for companies to meet the evolving needs of consumers, which is moving away from physical card readers on each charger toward mobile payments on the phone or within the vehicle. Mobile payments are becoming increasingly common as more people adopt smartphone and mobile payment technology. The Pew Research Center estimates that 77% of people in the US have a smart phone in 2018, which has more than doubled since 2011, and adoption has been increasing including in lower-income households.<sup>3</sup> Cell phone ownership is estimated at 92% and smartphone ownership at 67% in households earning less than \$30,000 per year.<sup>4</sup>

As a result, mobile payments that offer a more seamless experience for customers through an app or within the vehicle will become increasingly popular and accessible. Today, Supercharging sessions, to the extent a customer is charged a fee, are seamlessly completed through the vehicle and requires no additional physical card reader on each charger. Traditional credit card companies such as Visa and MasterCard are also investing in the development of invehicle payment options in response to consumer demand for secure, in-vehicle payments.<sup>5</sup> These mobile payment methods should be recognized as alternatives to physical credit card readers – not simply additional options – especially as credit card ownership continue to decline.<sup>6</sup>

## III. Reduce the hours-per-day crediting to ensure credits are effectively deployed to maximize the total number of chargers supported by this pathway

Reducing the crediting assumption not only encourages developers to be more costefficient but also ensures the credits available under the pathway funds as many chargers to reach the Governor's goal. The proposed formula for calculating FCI credits is currently six hours per day for all charger capacities. The estimated credit value generated based on six

<sup>&</sup>lt;sup>3</sup> http://www.pewinternet.org/fact-sheet/mobile/

<sup>&</sup>lt;sup>4</sup> http://www.pewinternet.org/fact-sheet/mobile/

<sup>&</sup>lt;sup>5</sup> https://www.pymnts.com/the-digital-drive/ and https://www.pymnts.com/news/payment-

methods/2017/mastercard-general-motors-partner-on-digital-payments-connected-car/

<sup>&</sup>lt;sup>6</sup> https://news.gallup.com/poll/168668/americans-rely-less-credit-cards-previous-years.aspx

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hours per day would equate to ~90% of the estimated capex cost for a 50kW charger.<sup>7</sup> We recommend reducing max crediting to five hours per day for a 50kW charger, which would increase the required investment from the developer from ~10% to ~27% and incentivize the developer to ensure the long-term success of the charger.

Higher power rating chargers should also not be over-incentivized relative to lower power rating chargers. Under the current crediting formula, a charger with a simultaneous power rating of 150kW receives three times as many credits as a 50kW charger when all other factors are equal. However, the capex cost for a 150kW charger does not equal three times the cost of a 50kW charger. As a result, the estimated credit value generated based on six hours per day would equate to ~200% of the estimated capex cost of a 150kW charger, which incentivizes developers to overbuild for charger capacity.<sup>8</sup>

CARB can use a scale factor to reduce the daily crediting for higher capacity chargers so the estimated cost recovery is within the same range as the cost recovery for a 50kW charger at five hours per day of crediting. For example, applying a scale factor that reduces the crediting for a 150kW charger (maximum power rating allowed for crediting under the pathway) to 2.39 hours per day would result in a similar level of investment required for a 50kW charger based on 5 hours per day of crediting (see table below for potential hours of crediting for different charger capacities). This type of dynamic crediting would ensure developers install chargers with the appropriate power rating at a site as opposed to installing chargers with the highest power rating in order to maximize credit generation.

Charger Capacity	Current Crediting Assumption / Credit Generation	Dynamic Crediting Assumption / Credit Generation
50kW	6 hours / 422	5 hours / 351
75kW	6 hours / 633	3.65 hours / 385
100kW	6 hours / 843	2.99 hours / 420
125kW	6 hours / 1,054	2.60 hours / 456
150kW	6 hours / 1,265	2.34 hours / 493

#### Scenarios for Different Charger Capacities<sup>9</sup>

### IV. Do not subtract actual electricity dispensed from the capacity credit formula to encourage developers to optimize for site utilization

The current capacity credit calculation formula, which subtracts actual electricity dispensed, reduces the incentive for developers to optimize projects for utilization. A developer that does not match renewable electricity with DCFC charging would receive the same quantity of credits through the FCI pathway on a 50kW charger that is never used (0kWh of actual electricity dispensed) as a 50kW charger that dispenses 26MWh of electricity every quarter.

<sup>&</sup>lt;sup>7</sup> Assumes \$125 credit pricing and \$60,000 capex cost for an average 50kW charger in California.

<sup>&</sup>lt;sup>8</sup> Assumes \$125 credit pricing and \$80,000 capex cost for an average 150kW charger in California.

<sup>&</sup>lt;sup>9</sup> Assumes 5 years of credit generation using the current credit calculation formula and no actual electricity dispensed.

This could result in developers purchasing cheap land in a rural area and deploying chargers that remain under-utilized in lieu of deploying chargers in more expensive areas.

Although there may be some sites with low utilization, such as sites along rural highway corridors, the vast majority of sites built through this pathway should be located in areas that are optimized for high utilization. The amount of actual electricity dispensed is directly proportional to reducing greenhouse gas emissions and reducing the carbon intensity of the transportation system, so the pathway should encourage the deployment of infrastructure that is more likely to be used.

### V. Increase the site cap to provide developers with more flexibility to meet consumer demand and encourage economies of scale

We support staff's intent to encourage more sites through this pathway; however, certain use cases such as major highway corridors and urban charging, especially to support electric ridesharing services, may warrant more, higher capacity chargers than currently supported by this pathway. The current proposal limits capacity credit generation to 1,500kW at a single site, which equates to 10 chargers assuming max simultaneous power of 150kW per charger. We recommend CARB increase the site cap to 3,000kW (20 chargers at 150kW per charger) to strike a balance between ensuring more sites are deployed and providing developers with additional flexibility to meet consumer demand and encouraging economies of scale.

## VI. Remove the charging unit performance verification requirement as this issue is being addressed by the Division of Measurements and Standards (DMS) in a separate rulemaking

In 2016, the California DMS began a pre-rulemaking process to develop regulatory language for EV charging stations requirements.<sup>10</sup> This effort is complemented by the National Institute of Standards and Technology's (NIST) continued updates to Handbook 44, Section 3.4 for EV fueling systems at the national level.<sup>11</sup> However, the DMS effort is still in the pre-rulemaking stage, and stakeholders have not received updated draft regulatory language. Therefore, it is premature to make an explicit reference to regulatory language that has not been finalized. Once the DMS process is finalized and regulatory language has been adopted, this requirement can be retroactively referenced in the context of LCFS.

If staff believes the proposed language regarding weights and measures must be included, we recommend modifying the text to say: "The County Department of Weights and Measures is in the process of establishing standards for verifying charging unit performance to enable a FSE to sell electricity by kWh. Once these requirements are adopted in state code, they will also apply to the FCI pathway."

### Incremental Credits: 0-Carbon Intensity (CI) and Smart Charging

We support staff's proposal to permit additional credit generation based on the matching of recorded EV charging with renewable solar energy generation (0 CI electricity) and smart

<sup>&</sup>lt;sup>10</sup> https://www.cdfa.ca.gov/dms/pdfs/regulations/EVSE\_Pre\_Rule\_Wkshop\_Presentation\_8-17-2016.pdf

<sup>&</sup>lt;sup>11</sup> https://www.nist.gov/pml/weights-and-measures/nist-handbook-44-2018-current-edition

charging when there is an excess of renewable electricity on the grid for both residential and non-residential EV charging. These proposals are aligned with California's broader renewable energy goals and will help spur near-term EV adoption. To enhance the clarity of staff's proposal and ensure administrative feasibility, we request the following modifications:

## I. Clarify that Electricity Distribution Utilities (EDUs) and Load Serving Entities (LSEs) must provide "revenue-grade direct metering data" to generate residential base and incremental credits

For residential metered EV charging, Fueling Supply Equipment (FSE) is defined in the proposed regulation as "a piece of equipment or on-vehicle telematics capable of measuring the electricity dispensed for EV charging." This suggests the definition for "metered charging" has been expanded to include other forms of data (e.g. telematics, non-revenue grade networked charger data), but it is unclear if residential charging captured by any type of FSE will now be considered "metered residential charging". This has important implications because EDUs currently must provide revenue-grade, direct metering data to generate base metered residential credits, but the proposed language suggests that EDUs can now use vehicle telematics data or non-revenue grade charger data to report "metered charging" for credits.

The same line of reasoning could be applied to LSEs, who are the first-in-line to claim both metered and non-metered residential charging incremental credits. The proposed language suggests LSEs could also use multiple types of "metered" data to claim those credits. The language also seems to suggest that LSEs could provide vehicle telematics data or nonrevenue grade networked charger data for base residential credit generation. We recommend that CARB update the definitions and make it clear that EDUs and LSEs must provide revenuegrade direct metering data to generate base and incremental credits. Entities other than EDUs and LSEs can provide alternative forms of charging measurement data in accordance to the proposed credit generation hierarchy.

## II. Establish a hierarchy for residential smart charging credits to provide clarity for the multiple entities who participate in this pathway

Unlike the incremental credits for 0-CI electricity, it seems like CARB has not proposed a hierarchy for claiming smart charging credits. When multiple entities report the same FSE data for residential smart charging credits, which could be either directly metered charging data, vehicle telematics or data from other charging equipment, no entity would receive the credits. The lack of certainty would make it very difficult for any entity to offer smart charging programs to consumers because no entity would know if they will receive smart charging credits for a customer. CARB can avoid this situation by establishing a similar hierarchy as the 0-CI charging credits. To be the first-in-line credit generator, an entity would provide smart charging data with the customer's permission and VIN so it can be subtracted from a comprehensive total provided by the relevant automaker.

## III. Require VIN-level reporting only for the first-in-line credit generators to minimize the administrative burden on pathway participants and limit the sharing of sensitive information

The proposed language includes a requirement for all 0-CI and smart charging credit generators to provide VIN-level reporting data. However, reporting requirements for existing LCFS pathways have minimized the sharing of sensitive personally-identifiable information, protecting consumer data privacy and reducing administrative burden for stakeholders. To remain consistent with this principle, we ask CARB to only require VIN-level reporting from entities that are the first-in-line credit generators.

As automakers are not first-in-line credit generators, they should be able to provide the aggregated charging data across their fleet of vehicles. A VIN-level reporting requirement for automakers would be substantially more burdensome than for other parties due to the sheer volume of charging records. Furthermore, CARB has DMV registration information that could be used to determine how much, when and where each individual is charging if paired with comprehensive VIN-level charging data from automakers.

The first-in-line credit generators would report VIN-level charging information, which can then be subtracted from the total charging amount (in kWh) provided by the relevant manufacturers of those EVs, eliminating the risk of double-counting. There is precedent for this approach within the LCFS program; credits that an electric forklift operator claim directly are subtracted out from the total forklift credits given to EDUs.

### **Other Residential Charging Credits**

We support the CARB Board's decision to reform existing residential base credit-funded utility programs and the ongoing effort by stakeholders to create a statewide, point-of-purchase EV rebate program for California consumers. A meaningful program could dramatically spur EV adoption and reduce the CI of the state's transportation system. As part of that process, we propose the following modifications to the regulation:

### I. Issue residential base credits on a quarterly basis

We support CARB staff's proposal to issue residential base credits on a quarterly basis rather than an annual basis.<sup>12</sup> This would provide utilities with more liquidity and them to replenish program funding more quickly, which should result in more benefits to consumers.

## II. Maintain the existing crediting structure for residential multi-unit dwelling (MUD) charging

Given the statewide point-of-purchase EV rebate from residential base credits is under development, we recommend that staff not separate residential charging credits for MUDs from single-family homes at this time.

\* \* \*

Based on the foregoing, we believe CARB should modify the FCI pathway, the incremental 0-CI and smart charging pathways, as well as the residential charging credit

<sup>&</sup>lt;sup>12</sup> § 95491(d)(3)(A)(1).

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provisions, to address the issues identified in this letter. These changes could be implemented before the second 15-day notice is published on August 1, 2018.

Tesla appreciates the opportunity to provide comments. We believe in the potential of this program to dramatically accelerate California's transition to sustainable, zero-emission transportation. We share CARB's vision for a sustainable future and look forward to continuing to collaborate with staff to achieve the goals of the program. Thank you for your time and consideration in this matter.

Sincerely,

Fei Chi Manager, Business Development Tesla, Inc.