September 21, 2018

Hon. Kathleen H. Burgess
Secretary to the Commission
New York State Public Service Commission
Three Empire Plaza
Albany, NY 12223-1350

Re: Case No.18-E-0138: Proceeding on Motion of the Commission Regarding Electric Vehicle Supply Equipment and Infrastructure.

Dear Secretary Burgess:

Tesla, Inc ("Tesla") appreciates the opportunity to provide additional comments and responses to the August 16, 2018 request of the New York State Public Service Commission ("PSC") for comments regarding the topics discussed at the July 18-19 electric vehicle supply equipment ("EVSE") and infrastructure technical conference.

New York has established itself as a leading supporter of electric vehicles. New York is a signatory to public health and environmental health standards that will require total sales of Zero Emissions Vehicles within the state to reach 800,000 by 2025. Increasing access to charging infrastructure and ensuring customers have a great experience with their electric vehicles ("EV") is important to reaching those goals. Tesla is pleased that various efforts are underway in New York, including this case, to ensure that charging infrastructure is in place to support growing EV adoption. Tesla respectfully recommends that the Commission complete this proceeding expeditiously by focusing on threshold questions that will provide utilities with clarity about their roles so that they can develop EV and EVSE plans.

Tesla's mission is to accelerate the adoption of sustainable energy. Tesla is a developer and manufacturer of the world's most advanced electric vehicles, and electric vehicle charging stations, among other clean energy products and services. Tesla currently produces three all-electric passenger vehicles, the Model S sedan, the Model X sport-utility vehicle, and the Model 3 sedan. The vehicles offer up to 335 miles of range per charge, are the quickest cars in their class, and are among the safest vehicles on the road having achieved 5-Star Safety Ratings in every category from the National Highway Traffic Safety Administration. Tesla is also developing a fully electric Class 8 heavy duty truck, the Tesla Semi, capable of 500 miles of range. To support the accelerated adoption of electric vehicles, Tesla has established a worldwide presence of sales and service centers, and charging stations.

Since 2012, Tesla has been building a Supercharger network of direct current fast chargers ("DCFC") capable of delivering approximately 170 miles of driving range in 30 minutes. The Supercharger network enables

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customers to confidently make road trips with quick charging sessions along highly traveled routes, as well as offering convenient quick charges around town. As of September 21, 2018, Tesla owns and operates 11,000 Supercharger connectors at more than 1,300 stations globally. There are currently 232 Superchargers located across 28 sites in New York with additional sites under construction and planned.[1] The Supercharger network is not intended to be a profit center. Usage of the network is complimentary for many customers, and for customers that pay for use, the service is priced below our costs.

Tesla also works with site hosts to deploy Level 2 charging stations, which provide about 25 to 50 miles of driving range per hour, as part of our Destination Charging network. The network includes publicly accessible chargers located at hotels, restaurants, shopping centers and other local attractions around the country. There are currently over 500 Destination Chargers in New York.

Manufacturing EVs and being an owner/operator of expansive charging networks gives Tesla a unique perspective. Tesla is pleased to provide the following comments to the PSC and is looking forward to working with the PSC, PSC Staff, New York's utilities and other stakeholders to accelerate New York's transition to electric transportation.

Sincerely,

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[1] Existing Supercharger locations and general areas of planned expansion are available at www.tesla.com/findus. The website also shows locations of Sales and Service centers, and Destination Chargers (Level 2).

1. **What role should the utility play in supporting electric vehicle supply equipment (EVSE) deployment? Please address this question from the perspective of utility ratepayers, electric vehicle (EV) suppliers, and providers of EVSE. Should utilities have the opportunity for earnings adjustment mechanisms related to successful EVSE deployment?**

New York's utilities are supporting the deployment of EVSE in a variety of ways. Primarily, the utilities are facilitating EVSE deployment by providing nondiscriminatory service to EVSE owners and operators when and where it is requested. Some utilities in New York have also explored rate designs and other programs to encourage additional development. For example, Niagara Mohawk Power Company ("National Grid") recently kicked off an Electric Transportation Initiative that provides capital upgrades to accommodate the future installation of electric vehicle charging stations at commercial customers' properties, and provides incentives for property owners to encourage the installation of these stations.[2] This "make-ready" infrastructure program is an important first step in expanding foundational EV charging infrastructure, and gaining valuable experience about other ways utilities can further support EVSE deployment.

Rate designs can also encourage the development of EVSE. As Tesla stated in its July 23, 2018 letter in this docket, demand charges can be an impediment to investments in EVSE because they can lead to high operating costs for EVSE operators. This is particularly true when EVSE utilization is low, which is to be expected with EV adoption still relatively low. Rate designs that discount or convert demand charges to volumetric rates while EVSE deployment and EV adoption are in the early stages can help provide EVSE owners with additional clarity about their operating expenses and confidence to make charging station investments while EV adoption grows. Con Edison's recently approved Business Incentive Rate ("BIR") for DCFC,[3] although currently challenging to qualify for due to a requirement for receiving additional incentives, is an example of how New York's utilities can further encourage EVSE deployment.

Tesla supports utilities having the opportunity for earnings adjustment mechanisms ("EAM") related to successful EVSE deployment or other metrics associated with accelerating electric transportation given the societal and ratepayer benefits that EVs can provide.

2. **What are the most significant changes the Commission can make in order to enhance the utilities' roles in supporting EVSE deployment? What are the benefits and problems with utility ownership of EVSE?**

At this early stage of EVSE development and EV adoption, it is important to remove barriers to EVSE deployment and to quickly resolve threshold questions about the utility's role so that programs can be developed just as more EV models come to market and customer adoption grows. The Commission can provide utilities with general guidance about their role in increasing access to charging infrastructure (and how

[2] National Grid's Electric Transportation Initiative was approved by Commission Order in Case 17-E-0238 on March 15, 2018.
[3] Case 17-E-0814, Ordered by the Commission on April 26, 2018.

such costs can be recovered), such as designing EVSE rate programs, examining line extension policies, and under what circumstances and how utilities can invest directly in EVSE. General guidance and quickly resolving threshold questions is important at this early stage as it allows different models to be tested and for utilities to design programs that they believe best fit the needs of their customers and service areas.

As previously noted, Tesla's charging networks are not intended to be a profit center. Tesla welcomes all investments in EVSE, including investment by utilities so long as their programs maintain a level playing field for all EVSE participants. Tesla believes competition can help improve customer access to charging, charging network reliability, and ultimately provide EV owners with a great user experience.

3. What role should the utility play in encouraging EV adoption? Should the role of the utility extend beyond customer education and awareness? Please address this question from the perspective of utility ratepayers, EV suppliers and providers of EVSE. How should utility costs, if any, be compensated or recovered?

Education and awareness is critical to EV adoption, and utilities have an obvious role in that area. Utilities are trusted sources of information for many customers, and they can provide customers with information about charging locations, the best times to charge, rate designs, or the availability of EV or EVSE rebates and incentives. Indeed, most, if not all, of New York's investor owned utilities already have EV education and awareness campaigns or EV focused sections of their websites. Tesla has also participated in utility ride and drive events, which are great ways for the public to experience an EV, learn more about their utility's EV offerings, and to increase customer awareness and engagement.

The utility's role in encouraging EV adoption should also extend to programs that reduce the total cost of ownership of an EV. The programs can include EVSE rebates, make-ready programs, or other programs that increase access an EV driver's access to charging. These programs can allow for both cost-effective charging and additional revenues for utilities that exceed their marginal costs and contribute to revenue requirements.

As discussed in Tesla's July 23, 2018 letter in this case, to help drive EV adoption and the associated ratepayer benefits, several utilities and utility commissions across the country have implemented residential time-of-use ("TOU") EV charging rates, and DCFC-applicable charging rates that include a reduced demand charge. Continued utility support of these new tariffs is critical to help ensure a successful transition to EVs, and to increase the ratepayer benefits of electrification. While Tesla heavily invests in our DCFC Supercharger network, Tesla believes the best way to charge is Level 2. Most cars sit idle over 20 hours a day, and that presents a great opportunity to charge the vehicle on Level 2 chargers, not only because it is integrating seamlessly into the driver's daily routine, but because it is also a cheaper option for the customer, EVSE operator and grid. This is especially true for charging that occurs during off-peak periods, which typically occurs overnight.

Programs that enable greater access to off-peak Level 2 charging solutions, and encourage customers to use those solutions, will result in higher utility system utilization. This provides more electricity sales that exceed the

utility's marginal costs and contribute to the system's revenue requirements. MJ Bradley & Associates estimated that by 2030, each plugin EV in New York would provide $265 of net present value benefits annually. Of those benefits, utility customers would have a benefit of $166/EV/year due to higher utility revenues from EV charging obviating the need for future rate increases.[4]

With regard to utility costs related to integrating EVs, it is worth noting that costs and impacts are currently very small and manageable. Utilities in California, which has the highest penetration of EVs in the country, have found that fewer than 0.2% of EVs required distribution system upgrades, and in 2017, the utilities spent $500,000 on EV associated system upgrades out of a collective distribution capital budget of more than $5 billion.[5] As discussed later in these comments, Tesla recommends that any incremental utility costs associated with EVs should be recovered through volumetric rates. Given the additional public benefits that EVs provide, including reduction of ozone-forming nitrogen oxide emissions and greenhouse gas emissions, it is reasonable to recover these costs equally across all rate classes.

4. What is the best way for utilities, charging station providers, and site hosts to work together to locate charging stations where they best meet electric system, customer and community needs? What data is needed to further this collaboration?

There are a variety of factors considered when selecting and developing charging stations. These factors include the number of charging stalls necessary to meet demand in an area, space available to install equipment, proximity to amenities for drivers (restrooms, wifi hotspots, restaurants and entertainment), proximity to utility infrastructure to minimize construction costs and/or easements, and finding willing site hosts that will allow stations to be installed on their property. Once a site is selected, Tesla works closely with New York's utilities to establish electric service at the parking and charging locations.

While there are some ways the service connection process can be improved to accommodate EVSE that Tesla highlights later in this section, Tesla recommends that the general framework for new service requests should remain intact. Trying to locate charging sites based on electric system needs can complicate and slow down the development process, may occur at the expense of customer experience, and is inconsistent with new service requests for other customers. For example, most stores and property developments are sited based on the customer needs rather than the needs of the electric system. Given the relatively low adoption of EVs and grid impacts, Tesla recommends that efforts to site charging locations based on electric system needs be limited to pilot programs at this time.

Through Tesla's experience working with utilities on establishing new service for charging stations, Tesla has found that single points of contact or a dedicated team at the utility to handle EVSE service requests has helped streamline the development process and improve communication. Moreover, consultative site walks

[4] MJ Bradley and Associates. 2017. State-Wide Costs and Benefits of Plug-in Vehicles in Five Northeast and Mid-Atlantic States.
[5] Avi Allison and Melissa Whited. March 2018. "Electric Vehicles Still Not Crashing the Grid: Updates from California." Synapse Energy Economics, Inc. on behalf of Natural Resources Defense Council.

with utility engineers prior to submitting the service request can help inform site plans, reduce delays and lower development costs.

5. Are there any communities or customer groups that require special consideration in the placement of EVSE facilities? What role should the utility play in encouraging or facilitating increased EV usage by low- to moderate-income households?

Simply put, if drivers do not have access to convenient charging solutions, they are less likely to purchase an EV. Therefore, particular focus on communities and customer groups that lack adequate charging is necessary, including drivers that live in multi-unit dwellings or rely on street parking, and low- to moderate-income households. Utilities can develop programs to increase charging access in those areas, either through make-ready infrastructure programs that encourage private sector charging investment, or direct utility investment in EVSE because the competitive EVSE providers are not serving the areas. Low-income communities typically bear the brunt of transportation emissions which have significant health impacts. The American Lung Association's 2018 State of the Air Report estimates that there are more than 1.1 million New Yorkers with adult asthma, and more than 300,000 cases of pediatric asthma. Electrifying transportation in poor air quality communities can help reduce the human health impact of transportation related ozone emissions.

6. What rules, requirements, and standards are needed to enable EVs and EVSE to operate as a source of grid services and system value, including possible data and instrumentation needs?

While EVs and EVSE have the potential to provide grid services, customers primarily purchase vehicles for mobility purposes and customers view EVSE infrastructure as on-demand resources available when they need it. With EV adoption still relatively low, and EVs being a new technology for most drivers, Tesla believes the Commission should avoid establishing specific rules or requirements that customers or EVSE providers participate in active grid services programs, or must procure technologies that would enable them to do so. Instead, Tesla recommends harmonizing EVs within existing demand response or grid services programs and signals, thus allowing customers to choose the best way to respond and participate, whether it is by curtailing their EV charging session, dispatching a stationary storage unit, or changing the temperature on their thermostat.

7. What are barriers to treating EVs and EVSE as distributed energy resources? How does rate design affect the ability of EVs and EVSE to provide this value? How does rate design affect the extent to which the value provided by EVs and EVSE (including environmental and economic benefits) is compensated?

As noted above, a primary barrier to treating EVs and EVSE as distributed energy resources ("DER") is that the vast majority of customers currently view their cars as mobility resources, whereas traditional DER technologies are intended to manage customer electricity consumption, costs, or to provide grid services. Sending price signals through rate designs, however, can help encourage beneficial charging behavior and shape customer charging habits such that the majority vehicle charging occurs during off-peak hours. Rates and programs should be flexible and designed carefully to recognize that not all customers have easy access to charging, and

therefore may need solutions on demand regardless of the time of day or location. Designing programs with these considerations in mind will help ensure customer satisfaction of EV ownership remains high, and that customers do not feel penalized because of how they use their EVs and EVSE.

8. Should EVs and EVSE be treated as DERs? If so, what factors need to be addressed to include EVs and EVSE within the DER market and compensation structure for DERs?

Given the relatively low uptake of EVs and limited customer experience of using EVs as DER, Tesla recommends that a determination not be made at this time. Instead, Tesla recommends that the Commission continue to monitor the uptake of EVs and deployment of DER, while also tracking customer participation and preferences with using their vehicles and EVSE as DER or grid resources.

9. What considerations should be taken into account in designing rates for charging stations? For example, should a typical three-part tariff (customer, demand and energy charge) be applied? Should the rate design be different for residential versus commercial use? Should the rate design be expected to change over time as EV penetration increases? Should time-of-use rates be required for EV charging? Should utility residential EV charging tariffs (filed in Case 18-E-0206) be modified? Please address these questions from the perspective of utility ratepayers, EV owners, and EVSE suppliers.

As discussed in the July 23, 2018 letter to the Commission, Tesla is supportive of demand charge-free or reduced rates for commercial customers deploying both Level 2 and DCFC charging. For DCFC, demand charges represent a significant barrier to the development of DCFC infrastructure. A recent study conducted by the Rocky Mountain Institute found that when utilization of DCFC stations is low, which is common given the nascent nature of EV technology, demand charges can account for up to 90% of a station's monthly electricity bill, resulting in prohibitively high operating costs.[6] This conclusion is also consistent with the findings of a 2015 study commissioned by New York State Energy Research and Development Authority ("NYSERDA").[7] For similar reasons, demand charges can present problems for commercial customers deploying Level 2 workplace or fleet charging.

As utilization of charging stations increases, and EVSE operating costs are less driven by high peaks in demand, typical three-part tariffs may make sense as a long-term rate design. However, in the current climate of lower EVSE utilization, commercial rates should focus on demand charge holidays or reduced rates over the short- to medium-term periods and transition to a longer-term rate design. Such programs would enable EVSE to mitigate high operating and development costs for Level 2 and DCFC while EV adoption and EVSE utilization increase. The phased in approach will also allow for possible demand management technologies to come down cost.

[6] Fitzgerald, Garrett and Chris Nelder*, EVgo Fleet and Tariff Analysis*, Rocky Mountain Institute, 2017, p. 1, available at https://www.rmi.org/wp-content/uploads/2017/04/eLab_EVgo_Fleet_and_Tariff_Analysis_2017.pdf.

[7] Electricity Rate Tariff Options for Minimizing Direct Current Fast Charger Demand Charges, Final Report, Energetic Incorporated, prepared for NYSERDA (December 2015) p. 1.

The table below includes descriptions of recent commercial charging rates approved and considered by utility Commissions across the country:

Utility	Commercial EV Charging Rate Design
Southern California Edison, CA	Approved demand charge free rate for all non-residential charging load for a five-year period, followed by the phase-in of a modest demand charge over the following five years. Time-of-use (TOU) volumetric energy charges increased to recover costs previously recovered in the demand charge.
Eversource, CT	Approved demand charge free rate for all DCFC charging load with increase in volumetric energy charge to recover costs previously recovered in the demand charge. No limit on term of rate offering.
NV Energy (North and South territories), NV	Approved DCFC rate with a ten-year transitional demand charge (2019-2028).
Con Edison, NY	Approved economic development rate for DCFC, that includes a demand charge discount for seven years.
Pacific Power, OR	Approved rate beginning with a demand charge discount of 90%, phasing in at 10% per year until the demand charge is restored at 100%. Volumetric energy charges are adjusted to recover costs previously recovered in demand charges.
PECO, PA	Proposed five-year pilot rate in which the customer receives a fixed demand credit, initially equal to 50% of the combined maximum nameplate capacity rating for all DCFCs connected to the service to the customer's billed distribution demand.

As mentioned previously, customer facing rates and programs should be flexible and designed carefully so that customer satisfaction of EV ownership remains high. Customer choice for rates is important, particularly for residential customers. Some customers may be comfortable with shifting their entire home to TOU rates because they can change their consumption behavior, others may be less willing to try TOU because of uncertainty about what the impacts will be on their routines or electric bills. Therefore, Tesla recommends exploring voluntary TOU rates or programs that mimic TOU rates.

The rates proposed in 18-E-0206 have some attractive features but also could benefit from further refinement. Most utilities have a provision that allows EV customers to receive a credit following the first year of enrollment in a TOU rate for the difference, if any, between what the customer paid on the TOU rate and what the customer would have paid on the non-TOU residential rate. Essentially providing customers with a risk-free trial for switching to a TOU rate is a great way to encourage additional customers to enroll in the rate. One area of potential improvement for the TOU rates is to reduce the length of the on-peak period so that it is easier for customers to change their behavior. For example, the peak period for National Grid's TOU rate is from 7 a.m. to

11 p.m. Most charging needs can likely be served during the off-peak periods in the rate, but it is difficult for customers to shift the rest of their home's consumption to off-peak periods, and therefore may not feel comfortable enrolling.

10. How should the cost of recovering distribution network upgrades for EVSE be recovered if not through the demand charges?

At present, customers requesting new service are responsible for any system upgrade costs above the allocated allowance amount established in the utility's tariff and line extension policies. For allocated allowance costs in the near term, Tesla recommends that all distribution-related costs for non-residential charging be recovered through volumetric rates. As discussed above, even in California with the highest penetration of EVs in the country, EV associated system upgrades were minimal, representing only approximately 0.01% of utility distribution capital expenditures in 2017.

11. In designing EV and EVSE programs, how can the Commission ensure compatibility with ongoing regional initiatives, programs offered in other states, and potential private investment?

There are variety of potential forums to ensure compatibility and complimentary efforts with ongoing initiatives and private investment. These include yearly or biennial meetings in which stakeholders can provide updates about market developments and program designs, or coordinating efforts at NARUC and MACRUC meetings.

12. Should the Commission address electrifying light-duty passenger vehicles, and medium and heavy-duty vehicles within this Case?

Tesla believes it is important for the Commission to consider all segments of vehicles, including light-duty passenger vehicles, medium and heavy-duty vehicles in this case. While most of the focus in this case has been on light-duty vehicles, it is timely to consider the unique use cases and EVSE requirements that will enable truck and bus fleets to electrify. More electric buses and trucks are expected to be developed and deployed in the next few years.

13. How should Staff structure future stakeholder engagement in this proceeding? Should additional issue-specific working groups be held prior to Staff issuing recommendations?

Tesla recommends limiting issue-specific working groups to focus on threshold questions so that New York utilities have clarity and can develop their plans just as the EV and EVSE markets grow. These threshold questions include the role of utilities, cost recovery mechanisms, and rate designs.