

GENERAL MOTORS

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Subject: GM Comments relative to NJBPU Follow-up Task 1 Questions

Dear Mr. Hornsby:

General Motors LLC (GM) appreciates the opportunity to provide input on the BPU's "Follow-up Task 1 Questions". We've focused our responses on the questions in sections in 4, 5, and 6, and defer to other industry experts to weigh in on the remaining questions.

EV charging infrastructure today has not attracted sufficient investment to establish a compelling foundation of EV charging stations. This market will become more viable and competitive over time, but this early market currently requires additional investment to close the infrastructure gap and establish a network of charging stations that is highly visible to consumers and drives consumer-confidence in the ability to drive EVs anywhere in the state. EV infrastructure is also key to attracting innovative and advanced mobility solutions to New Jersey, such as car-sharing, ride-hailing, and autonomous vehicles. The ability to introduce and grow these advanced mobility services relies on a robust foundation of EV charging infrastructure, especially DC fast-charging, as soon as possible.

Comments to Follow-up Task 1 Questions:

4.1 What is the state of the technology that could allow the EV to be utilized as a demand response technology? What is the availability of the technology now and how/when will that availability evolve? What actions should NJBPU take to take advantage of the use of EVs as demand response technology? If not why not?

- GM is currently productionizing Smart Grid API's (available Q3 2018) and will make this telematics solution available to utilities wanting to initiate programs that engage Volt/Bolt EV drivers in demand response (smart charging) programs. This advanced technology will allow utilities to communicate directly with GM's EV drivers, who can opt-in to a utility program to manage the charging (stop/start) of their EVs, while preserving key personal options (such as, ensure my EV is fully charged each morning by 6am). The NJBPU should encourage utilities to begin to develop pilot programs to demonstrate this capability with GM.

4.2 V2X: Is the two way communication of the EV to the grid a commercially available technology or not? If so why? If not why not? What is the availability of the technology now and how/when will that availability evolve? What actions should NJBPU take and when to take advantage of the use of EVs in V2X technology?

- GM currently believes most of the advantages that EVs can provide to the grid can be achieved without bi-directional power flow. However, as battery technology matures, GM is certainly open to providing this solution if consumers view it as beneficial. We would recommend the NJBPU currently focus on implementing and optimizing one-way power flow solutions, such as demand response (see 4.1).

4.3 Could the EV electric customer access the energy markets directly, through an aggregator or Network Operations Center (NOC), through the electric utility or blockchain?

- All of the above. It is important to demonstrate the various pathways to better understand the advantages and/or disadvantages. GM will begin to offer utilities a direct pathway to GM's EV drivers (see 4.1), thus we would prioritize this pathway in the near-term.

4.5 What are the types and level of benefits to the grid of EVs in a demand response program and what would be the overall costs to develop and implement this program?

- From roughly 2010-2012, GM successfully performed several demonstrations of the telematics communication pathway from a utility (or transmission system operator) through OnStar and to an EV customer's vehicle. On a signal (in one case it was a signal that wind was blowing on the system), the EVs successfully began to start and stop charging. The ability to start and stop charging a vehicle (with customer opt-in) can provide broad benefits to the electrical grid – particularly when EVs reach large scale in the market. Benefits include intermittent renewables integration, peak shaving, and ancillary services such as frequency regulation. To engage GM's EV customers, utilities would need to develop a customer-facing application or web portal that communicates with GM's Smart Grid API's, and provide simple messaging and perhaps a beneficial financial incentive (such as TOU rates or rebates) to encourage customers to participate in the program.

4.6 If the EV could be utilized as a demand response technology, should the BPU consider changes to demand charges? If so why? If not why not?

- Although we understand the reasoning and methodology behind demand charges, EVs provide new and unique benefits to the grid by virtue of their large potential load and the flexibility of this load, such that studying alternatives to the demand charge methodology is warranted. And that for some near-term study period, it may well make sense to adjust demand charges so as not to overly penalize EV customers or EV charge station operators during this very early market. For example, utilities might create an EV-specific rate or view the entire charging network as a single load vs assessing demand charges on a per station basis.

4.7 Should the BPU consider the use of telematics (such as Con Edison's SmartCharge New York program) in any demand response program and to address changes to demand charges. If so why? If not why not?

- The BPU should remain open to all technology demonstrations as we all seek learnings. See above responses.

5.1 Is vehicle charging a fully competitive market across all market sectors (e.g. residential, public L2, public DCFC, low income communities and Multi Unit Dwellings)? If not which market sectors are not competitive and why not? Which market sectors are competitive? What is the business case for the EVSE industry and where does the business case fail?

- EV charging infrastructure today has not attracted sufficient investment to establish a compelling foundation of EV charging stations across the market sectors. This suggests that the EV charging infrastructure market remains a challenging business case and thus uncompetitive. This market will become more viable and competitive over time, for example, as hardware costs decrease, as installations become more streamlined through enabling building codes, and as station utilization improves. But this early market currently requires additional investment to close the infrastructure gap and establish a network of charging stations that is highly visible to consumers and drives consumer-confidence in the ability to drive EVs anywhere in the state. EV infrastructure is also key to attracting innovative and advanced mobility solutions to New Jersey, such as car-sharing, ride-hailing, and autonomous vehicles. The ability to introduce and grow these advanced mobility services relies on a robust foundation of EV charging infrastructure, especially DC fast-charging.

5.2 If the charging market sections are not competitive should the utilities be allowed to develop managed charging programs for the non-competitive charging market sections? If not why not?

- Yes, utilities should be allowed to develop both EV charging infrastructure and managed charging programs. Today, all options should be on the table as no single path to a successful, competitive market has emerged. In fact, the more varied the role of utilities in the development of early market EV charging infrastructure, the better - as we all seek to understand the most cost-effective and customer-friendly paths going forward.

5.3 If the charging market sections are competitive should the utilities be allowed to develop managed charging programs for the competitive charging market sections? If not why not?

- If the charging market sections were competitive, we expect there would be much more evidence of investment in charging station networks and in managed charging programs.

5.4 If the utilities are allowed to develop managed charging programs is there a time limit or other criterion that should be imposed on this participation? If so what timeframe? Should any utility managed charging program have a sunset date?

- It is too early to know whether managed charging programs will result in a cost-effective pathway to programs that benefit both consumers and the grid. But it is very important to understand this capability. And since the market is nascent and currently non-competitive, utility programs should be encouraged in order to drive increased learnings, so that the opportunities and/or challenges can be better understood as the market grows and so that the grid can begin to benefit from every EV in the market sooner rather than later.

5.5 If the utilities are allowed to develop managed charging programs what guidelines should be developed for this participation? If not why not?

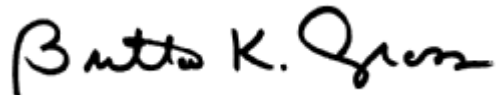
- Yes, utilities should be allowed to develop managed charging programs. The measure of success of all infrastructure projects and managed charging programs is EV consumer satisfaction (cost/savings convenience, reliability,...) and the reliability and resiliency of the grid. These factors should be central to all decision-making.

6.1 Should electric utilities engage in rate-based "Charge Ready" programs? What additional measures beyond Charge Ready are appropriate in non-competitive markets? Should utilities offer rebates on EV chargers or own/operate EV chargers in non-competitive markets?

- All options should be on the table as today no single path to a successful, competitive market has emerged. The NREL "National PEV Infrastructure Analysis" (September 2017) report estimates that to support just 335,000 EVs in New Jersey in 2030, 480 public DC fast-charge stations, 5,000 L2 public stations, and 7,700 workplace charging stations will be required. Given that today there are only 33 DC charging stations in New Jersey (compliant with the SAE industry standard), this suggests that much more effort and sustained investment in infrastructure is required to achieve even this relatively modest scale of EV adoption. Thus, the involvement of utilities to address the early market needs of this projected market will serve to both grow the EV market and provide both the automotive and electric utility industries with important learnings. And with EV scale, station utilization grows, and with it, a positive business case that will drive competition and further investment.

In summary, we encourage the state to directly engage all electric utilities in the strategic planning and execution of EV infrastructure to ensure the most cost-effective and grid-responsible EV charging solutions. Investing today in foundational infrastructure and EV awareness will spur EV market growth and will help attract even more advanced transportation technologies to New Jersey. GM greatly appreciates New Jersey's commitment to support the strategic transition to transportation electrification and all efforts to help drive this emerging market.

Sincerely,

A handwritten signature in black ink that reads "Britta K. Gross". The signature is written in a cursive, flowing style.

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