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On Grant Funding Opportunity Concept on DER Technologies

Additional submitted attachment is included below.

January 8, 2020

California Energy Commission
Re: Docket No. 19-ERDD-01
1516 Ninth Street
Sacramento, CA 95814

Re: Docket No. 19-ERDD-01 – Research Idea Exchange
BNSF Railway Response to Request for Comment on Grant Funding Opportunity Concept on DER Technologies for MDHD BEV Charging Infrastructure

Introduction:

BNSF Railway respectfully submits the following comments and recommendations to CEC staff regarding the Request for Comment on Grant Funding Opportunity DER Strategies for MDHD BEV Charging Infrastructure.

As a unique end-user and operator of hybrid and zero-emission technologies, BNSF looks forward to sharing our implementation experience to guide the CEC in their upcoming Grant Funding Opportunity. Given BNSF's experience with incentive programs and the operation of MHD BEVs at rail yards, we are uniquely positioned to leverage existing vehicles and charging infrastructure to deploy DER strategies in order to reduce emissions, manage electrical load, strengthen the resiliency of distribution and transmission systems, and demonstrate cost-effective deployment of DER and electric vehicle charging infrastructure.

Response to Questions:

1. **Of the candidate use-cases and vehicle types listed above, which ones should we prioritize in this solicitation and why?**

   Given the CEC's stated goal of targeting "MDHD BEV use-cases where availability of vehicles and chargers is not a significant barrier and where fleet owners and operators are already developing plans to electrify," BNSF recommends the following prioritization:

   A. Yard trucks,
   B. Drayage and other short-haul trucks,
   C. Transport Refrigeration Units,
   D. Port equipment
      i. Including forklifts, top picks, and rubber-tired gantry cranes, and
   E. Refuse trucks (e.g. street sweepers).

   In BNSF's experience, availability of vehicles and chargers is not a significant barrier. BNSF is already testing the feasibility and cost-effectiveness of integrating these vehicles into its operations.

1a. Will distribution capacity constraints be a major barrier to the deployment of the charging infrastructure needed for that use-case in the short- to medium term?

Distribution capacity constraints can only be determined by a utility once a proposed project has been prepared and presented at a facility. Whether a capacity constraint will present itself generally depends on the location and amount of turnover of battery-electric vehicles. Typically, smaller facilities and locations do not have the capacity in the short- to medium-term whereas larger locations do. Smaller facilities that are less busy are more attractive locations to deploy a DER pilot since projects are easier to manage and are less likely to impact operations.

While BNSF's facilities run the spectrum of small to large, we will not know if there are distribution capacity constraints until each EV project is reviewed and analyzed with the power serving utility.

1b. Will vehicles and charging equipment be readily commercially available in the short- to medium-term?

While vehicles and charging equipment may be available on the market, additional pilot projects that incorporate more OEMs and use-cases are required to prove commercial viability and cost-effectiveness. Until companies see a successful demonstration on a large scale over an extended time period, there will be apprehension to turn over entire fleets to battery-electric vehicles.

1c. Are there market and policy influences driving electrification in the use-case now?

BNSF sees many policy changes on the horizon and therefore would like to be in the best possible position to make decisions if and when the time comes to fully implement MHD BEVs.

1d. Are there use-cases that would particularly benefit from the reliability and resiliency value of the DER strategy?

Unlike most use-cases, railyards operate on a 24/7, 365 days a year schedule. Rail operations consist of a variety of MHDVs that will require a build out of electrified fleets and load management that can meet the unique and continuous usage requirements of the freight industry with limited downtime. DERs can play an important role to better manage loads and ensure reliable applications of MHD BEVs—including yard hostlers, TRUs, drayage trucks, port equipment, and others listed in response to topic question 1.

As a common carrier within a nationwide freight network, reliability and resiliency concerns are critical to successful operations especially in light of utility public safety power shutoff (PSPS) events. Notably, a loss of reliable service to rail yard facilities would have ripple effects throughout the entire freight transportation network, so rail operations could benefit from a DER strategy if it led to increased reliable power and decreased costs.

1e. Are there vehicle types that are particularly suited to providing reliability services to the grid or to individual buildings during an outage?

Given the types of EVs it plans to test, and the fact that it is a 24/7 operation, BNSF does not expect that its EVs would provide service back to the grid or to its individual buildings.

1f. What incentive or funding mechanisms already exist to support MDHD fleet operators looking to electrify?

Viable incentive programs and funding mechanisms include the IOU's make-ready infrastructure programs, CARB's CORE program, and CARB's Low Carbon Transportation Program.

1g. What is the total potential market size in California for the use-case?

BNSF is still determining potential market size for EV operations at railyards.

1h. Which use-cases have the most potential to replicate the DER package and achieve a meaningful scale?

While EV railyard equipment is a promising use-case that potentially could be replicated across California's rail yards and port properties, pilots and demonstrations are still necessary to determine how useful a DER system can be—including duty cycles and the operation of the BEVs. Since every facility is different, the same DER strategy may or may not work at each site.

2. What is the best way to characterize the grid impacts and other costs associated with deploying MDHD BEV charging infrastructure without a managed charging/DER strategy?

Without a managed charging/DER strategy, there is limited ability to utilize cheaper TOU rates. Charging BEVs during peak periods likely flips the customer economics negatively as compared to diesel. DER also provides a layer of resiliency against grid outages, especially when vehicles are relying solely on electricity.

2a. What metrics should be used to evaluate the cost and performance of the baseline incumbent technology?

BNSF has no response for this item at this time.

2b. What information about existing grid infrastructure, beyond the Integration Capacity Analysis (ICA) maps, is needed to evaluate capacity constraints that could limit deployment of MDHD BEV charging infrastructure?

BNSF has no response for this item at this time.

3. How does the target technology need to improve?

Our first suggestion is to improve grid connectivity—primarily the communication with real time rate tariff costs throughout the day in order to better utilize onsite storage and smart charging.

Second, there needs to be better wireless communication between the vehicle power system, the charging system, and the systems our operators use to complete work order volumes for the day. Our operators need some way to determine how to manage the power loads in the vehicle as compared to the amount of work they need to complete during a shift (i.e., how to manage loads in relation to remaining work vs. battery life).

Example: If an operator has 70 work orders (moves) to perform, and that would require the vehicle to have 65% state of charge (SOC), ideally the charger would only charge the vehicle 65% of capacity, not more.

3a. What are the current balance of system costs associated with deploying DERs as a non-wires solution for integrating MDHD BEV charging equipment?

With demand charges in SCE territory, demand cost avoidance cannot be taken into the financial payback model. Rate tariff arbitrage is not enough savings to achieve favorable net present value/return on investment. PG&E's new EV small and large rate tariff will create a similar dilemma.

3b. What publicly available resources provide visibility into these costs?

Rate tariffs available online provide visibility into these costs.

3c. What types of costs can be further reduced through innovation and require demonstration (e.g., soft costs, software, design, hardware, permitting, interconnection, etc.)?

Costs that can be further reduced include:

- Rate tariff arbitrage savings, potential (future) demand costs savings,
- Maintenance costs,
- Redundant second primary utility feed (second energy feed from different utility substation), and
- Backup diesel generator fuel, maintenance, and capital costs.

3d. What is the revenue-generation potential and business model for the targeted technology (e.g., customer bill savings, low carbon fuel standard, wholesale market participation, distribution grid services, resiliency, etc.)?

Revenue-generation potential and business model for the target technology include:

- Utility bill savings - rate arbitrage,
- Utility bill savings - demand cost avoidance,
- Utility rate optimization,
- LCFS generation,
- Carbon emissions reduction, and
- Power factor correction.

3e. What metrics can be used to evaluate cost and performance attributes of the targeted technology?

Metrics that can be used to evaluate cost and performance of the targeted technology include:

- kWh reduction,
- kWh tariff usage analysis,
- kW reduction,
- kWh PV production,
- kWh storage optimization,
- Power factor correction,

- kWh usage per hour,
- kWh usage per move,
- Operating cost per hour, and
- Operating cost per move.

3f. How can those metrics be normalized across different use-cases and project sizes (e.g., ratio of PV size to stationary energy storage size, ratio of soft costs to hardware costs, load factor on the utility distribution system, resiliency/reliability metrics)?

These metrics can be best normalized across different use-cases and project sizes specifically through energy usage profile smoothing after DER is deployed. Normalized metrics include:

- kWh and kW usage per truck per hour or per mile,
- kWh and kW usage per truck per ton mile moved, and
- GHG per ton mile moved.

3g. How well can the targeted technology meet the operational requirements of the priority use cases?

The most important component is to ensure there is always enough state of charge in a BEV to complete its job(s). On-site storage with on-site generation that communicates with smart chargers and BEVs can assist in meeting operational requirements by reducing kW spikes.

4. **What level of investment would be needed from EPIC to make a meaningful difference on this issue?**

A 50% level of investment would be needed from EPIC to make a meaningful difference on this issue.

4a. What size of a project should we be targeting (MW, MWhs, number of charging ports, number of vehicles, etc.)?

BNSF has no response for this item at this time.

4b. What portion of the DER equipment costs should be covered by EPIC in order to appropriately incentivize site host participation?

BNSF has no response for this item at this time.

Sincerely,

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On behalf of BNSF Railway