DOCKETED	
Docket Number:	19-ERDD-01
Project Title:	Research Idea Exchange
TN #:	231353
Document Title:	Centrica Business Solutions US, Inc Comments - RFC RE DER Strategies for MDHD BEV Charging Infrastructure
Description:	N/A
Filer:	System
Organization:	Centrica Business Solutions US, Inc.
Submitter Role:	Public
Submission Date:	12/30/2019 4:54:37 PM
Docketed Date:	12/30/2019

Comment Received From: Centrica Business Solutions US, Inc.
Submitted On: 12/30/2019
Docket Number: 19-ERDD-01

19-ERDD-01 and Research Idea Exchange - RFC RE DER Strategies for MDHD BEV Charging Infrastructure

Additional submitted attachment is included below.

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Subject: comments related to Docket 19-ERDD-01 Project Title: Research Idea Exchange - REQUEST FOR COMMENTS RE: DER Strategies for MDHD BEV Charging Infrastructure.

Fabio Mantovani, Director of Technology Strategy and Innovation at Centrica Business Solutions US, Inc., respectfully submits the following comments and recommendations to the CEC staff in connection with Docket 19-ERDD-01 and topic “DER Strategies for MDHD BEV Charging Infrastructure”:

As a general comment, we respectfully suggest the explicit inclusion of the following items in the “Intended Research Objectives”:

- assessment of the operational and logistical constraints of vehicle owners and operators, including ways of interfacing across fleet/scheduling management systems, building management system and energy management systems to achieve optimal energy outcomes under specific operational constraints.
- coordination and integration of energy management systems, EV charging systems, fleet/scheduling management systems and building management systems to achieve desired EV site operator and grid outcomes.

The CEC staff is seeking input from interested stakeholders on the following questions:
*1. **Of the candidate use-cases and vehicle types listed above, which ones should we prioritize in this solicitation and why?***
a. 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?
b. Will vehicles and charging equipment be readily commercially available in the short- to medium-term?
c. Are there market and policy influences driving electrification in the use-case now?
d. Are there use-cases that would particularly benefit from the reliability and resiliency value of the DER strategy?
e. Are there vehicle types that are particularly suited to providing reliability services to the grid or to individual buildings during an outage?
f. What incentive or funding mechanisms already exist to support MDHD fleet operators looking to electrify?
g. What is the total potential market size in California for the use-case?
h. Which use-cases have the most potential to replicate the DER package and achieve a meaningful scale?

FM Comments:

1a. It depends on the specific use case and location. In general, the most challenging use cases are those involving 1) high number of EV charged during feeder peak load periods (commercial/industrial vs residential dominated feeders) 2) rigid operational constraints preventing flexible scheduling and 3) limited current and forecasted feeder spare capacity.

1b. Yes, in general we don't see this being a major issue. Europe is leading the way in this area, but more commercial EVs are becoming available in the US. A few EV charging areas that could be accelerated through technology development grants, such as the development of full DC (DC in DC out) fast chargers for DC-microgrids.

1c. Yes, but to various degrees, depending on the use case and state.

1d. and 1e. If these questions aim to address the EV charging "resilience and reliability" (as opposed to the grid resilience and reliability), then yes, there are a few use cases we think are especially compelling:

1. Ensuring continued operations for transit buses, school buses, municipal vehicles, port equipment, etc.: ensure basic level of public service in the event of grid outage, natural disaster or public safety power shutoffs (PSPS). On site resources such as solar PV + electric energy storage, hydrogen fuel cells and hydrogen storage, perhaps combines with FC-based vehicles should be considered and tested.
2. Ensuring automated vehicle-to-building capabilities via a microgrid to manage short- and medium-duration outages and PSPS.

1f. <blank>

1g. <blank>

1h. Under our internal P50 scenario for electrification and based on our company's experience in Europe, public transit and short-range delivery vehicles depot have the highest potential in terms of short and medium term DER benefits. In California the resiliency value stream will have incremental value because of PSPS.

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?
a. What metrics should be used to evaluate the cost and performance of the baseline incumbent technology? Metrics currently under consideration include:
i. Itemized balance of system costs considering both site host costs and utility costs,
ii. Carbon intensity,
iii. Cost of delays associated with upgrading upstream distribution systems/substations, and
iv. Risks associated with long-term investments in permanent upgrades.
b. 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?

FM Comments:

2a. In addition to the suggested metrics: 1) cost/impact of outages for site host and 2) all-in levelized cost of electric fuel.

2b. <blank>

3. How does the target technology need to improve?
a. What are the current balance of system costs associated with deploying DERs as a non-wires solution for integrating MDHD BEV charging equipment?
b. What publicly available resources provide visibility into these costs?
c. What types of costs can be further reduced through innovation and require demonstration (e.g., soft costs, software, design, hardware, permitting, interconnection, etc.)?
d. 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.)?
e. What metrics can be used to evaluate cost and performance attributes of the targeted technology?
f. 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)?
g. How well can the targeted technology meet the operational requirements of the priority use cases?

FM Comments:

3a. It depends on so many variables that it is not practical to answer in this context. However, we believe it is important that the industry develops a framework to compare these costs across vendors and projects in an apples-to-apples fashion.

3b. NREL, SEPA and others[1] have done work in this area. Ultimately utilities are the best project partners are the best resources to provide transparency in and accuracy of such costs.

3c. The following cost areas would benefit from additional innovation funding:

- DC-microgrids to support EV Charging infrastructure with DERs could lower integration costs.
- Additionally, software integration between energy management system, building management system and fleet management system is an area that could benefit of additional research and standardization.
- Interconnection fast-track for large EV Charging project that operate under a utility pre-approved DER-supported/managed charging scenario.
- Effective financing is an often-overlooked area to ensure scalability of early-stage technologies. Financing of buses and charging infrastructure capex and opex in exchange for a fixed, predictable $/mile fee, subject to the desired performance requirements has received extremely positive feedback from many clients in US and Europe. There may be an opportunity to develop standardized contracts for various use cases, similar to the PPA templates created by the Solar Energy Industry Association (SEIA)[2].

3d. and 3e. and 3f. – As a proxy, this is an example of bottom up metric for how a novel concept based on DC-microgrid and an innovative financing model for New York State for the public transport sector.

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[1] https://www.nrel.gov/docs/fy18osti/71232.pdf; (https://sepapower.org/resource/preparing-for-an-electric-vehicle-future-how-utilities-can-succeed/)
[2] https://www.seia.org/research-resources/model-leases-and-ppas

At scale, we expect this concept could generate the following incremental 10-yr impact for NYS:[3]

	Business as usual	Traditional EVSE	DC-microgrid
Levelized cost of fuel, including EVSE capex [$/mile]	Diesel: >1 $/mile CNG: >0.57 $/mile	0.18 $/mile	0.15 $/mile
Societal savings for avoided infrastructure	-	-	>$120M
Accelerated adoption of electric buses	-	baseline	+100%
10-year GHG emissions (tCO2e)	48M	39M	29M
Value of GHG reduction compared to BAU (@ $50/tonCO2e)	-	$560M	~$1B
Resilience metric	~3-day supply	No resilience	TBD*

*Table 1 – Green = more favorable; Amber = average; Red = less favorable; assumptions and bottom-up calculations available upon request. * to be investigated in this project.*

3g. <blank>

4. What level of investment would be needed from EPIC to make a meaningful difference on this issue?
a. What size of a project should we be targeting (MW, MWhs, number of charging ports, number of vehicles, etc.)?
b. What portion of the DER equipment costs should be covered by EPIC in order to appropriately incentivize site host participation?

FM Comments:

4a. and 4b. We suggest an accelerated two-phase approach. Phase 1 consist of an initial EV deployment equal to 5%-10% of the number of vans in the site fleet, deployment of DER. Upon successful demonstration of operations, follow on expansion to up to 50% of the number of vans in the site fleet.

For example, in the case of a parcel sortation center phase 1 would cover 20 electric vans for parcel distributions with 6x 300kW (1.8 MW load) DC charging stations, ~300kWdc rooftop, and 1MW/2MWh energy storage systems and integration of fleet management system and energy management system. It would also include demonstration of on-site backup power through PV + Energy Storage.
We estimate the total phase 1 cost at $6M and recommend EPIC funds to cover 50% of the cost, or $3M.

Upon successful execution of Phase 1, Phase 2 will consist of an additional deployment of 80 electric vans and an additional load of 20x300kW fast chargers (6 MW load) for a total max EV load of 7.8 MW. The energy storage system will be extended by an additional 2MW/4MWh. Potentially deployment of hydrogen-based fuel cells and electrolyzers to create hydrogen at the site and store it for clean back-up power could be investigated.

[3] Bottom-up assessment and calculations available upon request.