DOCKETED	
Docket Number:	19-ERDD-01
Project Title:	Research Idea Exchange
TN #:	231460
Document Title:	The Lion Electric Co Comments on 19-ERDD-01
Description:	N/A
Filer:	System
Organization:	The Lion Electric Co.
Submitter Role:	Other Interested Person
Submission Date:	1/10/2020 4:25:40 PM
Docketed Date:	1/10/2020

Comment Received From: The Lion Electric Co.
Submitted On: 1/10/2020
Docket Number: 19-ERDD-01

The Lion Electric Co Comments on 19-ERDD-01

Additional submitted attachment is included below.

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January 10, 2020

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

RE: Comments from The Lion Electric Co. regarding Grant Funding Opportunity through the Electric Program Investment Charge (EPIC) Program

To Whom It May Concern,

The Lion Electric Co. would like to thank the California Energy Commission (CEC) for supporting efforts to reduce emissions in California through the deployment of clean transportation technology. We appreciate the opportunity to provide comments on the EPIC program exploring how the targeted use of distributed energy resource (DER) technologies and strategies can be used to enable the faster and more cost-effective integration of charging infrastructure for medium and heavy-duty (MDHD) battery electric vehicles (BEVs). We look forward to continuing to work with the CEC to accelerate the deployment of zero-emission heavy-duty vehicles throughout California.

Lion is a leading Original Equipment Manufacturer (OEM) of all-electric medium- and heavy-duty vehicles, including zero-emission shuttle buses, zero-emission school buses, and Class 8 zero-emission trucks. We have over 200 electric school buses in operation in North America that have been safely carrying kids to and from school every day for the last 3 years, with over 2 million miles of service achieved. Our zero-emission Class 8 truck can drive up to 250 miles on a single charge and is a demonstration of the rapid advancement of zero-emission technologies that are commercially available to serve Class 8 deployments, with existing investments and funding programs that overcome the upfront capital costs and help realize the economic savings and environmental benefits.

Please see our comments on the proposed Grant Funding Opportunity (GFO) concept below:

1. *Of the candidate use-cases and vehicle types listed, which ones should we prioritize in this solicitation and why?*
   We respectfully request prioritizing zero-emission school and shuttle buses, municipal vehicles, and trucks as their return-to-base duty cycle and fixed routes will help enable their utilization as a reliability DER technology to enable the faster and more cost-effective integration of charging infrastructure for MDHD vehicles, as well as help improve resiliency and reliability. School buses are ideally suited to serve as a DER, as they are only used during school days (~180 days/year) and are unused during the summer months. With bi-directional charging these idle energy storage assets can help reduce peak load and demand on the grid, as well as provide needed resiliency for critical infrastructure facilities during power shutoffs. Shuttle buses are also ideal candidates as DERs due to their ability to become a useful backup source of energy when not in use. Trucks as well can function as valuable DER assets as their versatile applications means they can serve as resiliency tools in a variety of locations, situations, and times of day. We recommend prioritizing public fleets, such as school districts and cities, because they often have

fewer resources to invest in new and innovative technologies and can provide direct public benefits.

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?*
For each of the vehicle types mentioned above, distribution capacity constraints may represent a barrier to deployment of charging infrastructure. However, if DER technologies are invested in and explored, as through this proposed GFO, the barrier may become less difficult to overcome. In the short-term, this barrier may be a hurdle for some fleets as they electrify and deploy their necessary charging infrastructure, but in the medium- and long-term, as DER technologies are researched and deployed, they will mitigate the negative effects of these barriers and accelerate the electrification of most fleets.

b. *Will vehicles and charging equipment be readily commercially available in the short- to medium-term?*
Yes, the priority vehicles included above are commercially available. There is a need to develop and demonstrate the capability of these vehicles to reliability serve as a DER and continue to meet the needs of each fleet. In addition, zero-emission MDHD are currently more expensive than their fossil fuel counterparts. Incentive programs in the near-term will help accelerate the deployment of zero-emission MDHD to help bring down the costs to be commensurate with fossil fuel vehicles.

c. *Are there market and policy influences driving electrification in the use-case now?*
For each of the vehicle types mentioned above, there are policy and market influences driving the electrification of these vehicles types. For market influences, more and more fleets and individuals are beginning their transition to electric. As the demand for electric vehicles, both light-duty and heavy-duty, increases, more and more fleets every day will realize the advantages of electrification and start their transition to electric as well. Like a positive feedback loop, more demand for electric vehicles will create additional demand for these vehicles. As far as policy influences go, California especially is one of the states with the strongest policy influences on electrification. Various state agencies such as the California Air Resources Board, the local Air Districts, and the California Energy Commission itself, are strongly driving the policies that are influencing the state's transition to electric. As more and more state and local agencies create policies to accelerate the deployment of ZEVs, the forces driving statewide electrification will continue to grow and spur the electrification of all fleets.

d. *Are there use-cases that would particularly benefit from the reliability and resiliency value of the DER strategy?*
Shuttle buses, school buses, and municipal vehicles such as refuse trucks would especially benefit from the reliability and resiliency offered by DERs. Shuttle buses that have many end-users who rely on them every day to get to work, school, or accomplish other errands depend on such vehicles to transport them in as reliable a way as those who use personal or single-occupancy vehicles. The use of DER strategies would help ensure that the electrification of shuttle fleets is a smooth transition and also help with the reliability and resiliency of electric shuttle buses. For school buses, DER strategies would be especially helpful because of the number of students that depend on school buses every day to get to school. In this use-case, DER strategies would help school bus fleets electrify and keep an

already safe and reliable transportation service as safe and reliable as possible. In the same way, municipal vehicles such as refuse trucks would also benefit from DER strategies because they perform a necessary public good that must be carried out on-time and reliably in order to function properly and serve the community.

e. *Are there vehicle types that are particularly suited to providing reliability services to the grid or to individual buildings during an outage?*
The types of vehicles that would be especially reliable in providing services to the grid or particular buildings would be those with large battery capacities (because they can provide many hours of power to a particular building, or many kilowatts of power back to the grid) and those with the ability to function as DERs in a variety of situations and locations. For these reasons, shuttle buses, school buses, delivery and urban trucks, and municipal vehicles such as refuse trucks may be perfect applications for initial DER research. These vehicles all have the ability to travel around various parts of cities and the areas they frequent (as opposed to port vehicles or drayage trucks for example) and typically need range abilities that demand large battery capacities. Because of their versatile uses and their capacity for large batteries, they would make perfect candidates for providing reliability services to the grid or individual buildings.

f. *What incentive or funding mechanisms already exist to support MDHD fleet operators looking to electrify?*
In California there are grants and incentives currently available to support MDHD fleet operators as they begin their transition to electric. There are CARB and CEC grants, including Carl Moyer, HVIP, Prop 1B/GMERP, VIP, Bulk School Bus, and others help MDHD fleet operators electrify. There are also grants and incentives more locally administered, such as AB923 and local gas taxes, to help fleets in their transition to electric. Although there are many incentives that help MDHD fleet operators buy ZEVs to begin their transition, there are not as many funding opportunities readily available for related charging infrastructure and other relevant projects (such as research into DER technologies). Thus, funding through programs such as this proposed GFO are necessary to cover the gaps in funding for charging infrastructure and related technologies (like DERs).

g. *What is the total potential market size in California for the use-case?*
With regards to DER potential for the above mentioned use-cases, Lion has not yet investigated the total potential market size for these use-cases.

h. *Which use-cases have the most potential to replicate the DER package and achieve a meaningful scale?*
As discussed in Question 1E, shuttle buses, school buses, delivery and urban trucks, and municipal vehicles such as refuse trucks would likely have the most potential to replicate the DER package and achieve a meaningful scale. Because they are often vehicles deployed in great numbers and all throughout cities, they would make versatile candidates as potential DER packages that can achieve results on a meaningful scale.

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?*
If MDHD BEVs were deployed on a massive scale without managed charging/DER strategies, it would put a large strain on the grid with the demand of energy needed to charge all the new

BEVs (especially since these are MDHD BEVs and not just light-duty). The amount of demand on the grid would necessitate the creation of more energy resources, preferably renewable energy sources like solar and wind. All of these projects would increase the costs associated with deploying more BEVs without a strategy to manage their energy consumption. In addition, upgrades to the grid infrastructure would be needed in order to manage the draw on the grid when hundreds of HD BEVs begin charging simultaneously. Because of all the costs associated with these types of projects, managed charging/DER strategies are necessary to execute widespread electrification efficiently.

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.

The metrics currently under consideration listed above should be incorporated, as well as additional metrics including the cost of delays when there are problems with the grid, such as blackouts or public safety shutoffs, and the cost of delays on part of the various utilities as they need to devote greater and greater amounts of time to helping end-users electrify while they may themselves have bandwidth issues (not enough time/staff, etc.).

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?

Various basic information is needed about existing grid infrastructure in order to evaluate potential capacity constraints that could limit MDHD BEV infrastructure deployment. This includes the ability of the grid to support millions of MDHD BEVs in the future as their battery capacities increase and their draw on power increases as well; and the ability of the grid to support the charging of hundreds or potentially thousands of MDHD BEVs as they simultaneously begin charging (as when an entire fleet of shuttle buses begin charging after a day's work, for example). These factors represent different resiliency characteristics of the grid that must be researched and evaluated before MDHD BEV infrastructure is deployed on a massive scale.

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?*

    Deploying DER technologies will decrease the costs associated with mass electrification of fleets (especially on the grid and infrastructure), but will incur its own costs. In order to jumpstart the deployment of DER technologies, funding must be provided for initial research and exploration into the uses and applications of DER technologies, which will be a separate cost on its own. In order to enable MDHD BEVs to become DER technologies, it will also presumably increase the cost of these MDHD BEVs and likely include some costs, however minimal, on the side of the utilities/grid in order to make it more compatible with the new DER strategies that will be employed in the near future.

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

    Lion has no comments on this question at this time.

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

Among the above stated examples of additional costs, related software costs can be further reduced through advanced innovation in software technologies and perhaps future funding opportunities devoted to supporting the research and deployment of new software to help with the facilitation of DER strategies. The same can be said for hardware. As the technology behind related hardware continues to be researched and refined, the costs of such hardware will decrease just as many other technologies have decreased in cost over time (even though their performance has increased). Costs related to permitting and interconnection can be reduced by implementing policies or other measures to help streamline and accelerate the deployment of DER technologies by reducing the amount of permit-related barriers that may slow such deployments. Not only would this reduce the actual cost of such permitting activities, it would also reduce the cost to end-users due to potential delays.

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.)?

For each of the targeted technology types listed, customer savings, LCFS credits, and resiliency would manifest as potential revenue-generating opportunities. By exploring the applicability of DER strategies to the above mentioned use-cases, customers of electric utility providers (virtually all end-users) would presumably see savings on their electric bills because of the benefits of managed charging/DER technologies. Without these strategies, electricity use to charge MDHD BEVs would be much higher and thus electric bills would be much higher. LCFS credits generated by the use of DER technologies also represents a revenue-generating opportunity. End users who net such credits can benefit from selling or trading them and can use those profits to invest in additional technologies or strategies that generate even more credits. All parties, including end-users and electric utility providers, would benefit from increased resiliency provided by the use of DERs. An increased reliability of the grid would mean decreased losses for utilities when the number of power outages and public safety shutoffs decreases and would also benefit end-users who will no longer be negatively impacted by such events.

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

The cost and performance attributes of DER technologies can be evaluated using a variety of metrics. The cost of DERs can be measured in the actual physical cost it took to launch a particular DER technology, as well as the cost in time, labor, and other factors to implement a project that most likely included designing, engineering, permitting, construction, and other activities. The performance of DER technologies can be measured in the benefits the DER has created after its deployment. Benefits may include savings to the end-user or utility for having a DER at its disposal and the amount of potential lost time recovered by using a DER during an event such as an outage. The benefits can also be measured in the amount of money saved by not having to implement expensive activities such as infrastructure upgrades to the grid so that it can handle charging new HD BEVs.

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)?*

The above examples would be able to be used across a variety of use-cases and project sizes, in addition to several other versatile metrics. The metrics proposed in Question 3E would be able to be used across many use-cases regardless of project size.

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

The proposed priority use cases mentioned above included: shuttle bus, school bus, delivery vehicles, drayage and other short-haul trucks such as delivery and urban trucks, and municipal vehicles such as refuse trucks. DER technologies would be able to meet the operational requirements of shuttle buses because it would help such buses continue to provide reliable services to end-users even during events that would otherwise have resulted in downtime of vehicles of other services related to such systems. The same principle applies to school buses, as they have fixed routes on fixed schedules and serve end-users that depend on reliable transportation in order to get where they need to go. For delivery vehicles such as short-haul trucks and urban trucks, DER technologies would help meet the operational requirements of these applications because it would reduce vehicle downtime in the event of issues such as outages and would fit the needs of this more varied application (some trucks may not have set routes like shuttle and school buses often do). Municipal vehicles such as refuse trucks would have their operational requirements met by DER technologies much in the same way shuttle and school buses would.

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

Although the proposed $16m would be greatly beneficial in jumpstarting the research and exploration into DER technologies, it is respectfully recommended that additional funding be reserved in the near future to continue to implement and support DER deployment. As DER technologies become more and more complex and interconnected, additional funding may be needed to support the research and activities that are necessary to make these projects sustainable and replicable. The initial $16m is an effective start to the EPIC program, but more funding is recommended for future years in order to further DER deployment throughout the state.

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

We respectfully request targeting a variety of project sizes using a variety of metrics. The above proposed project sizes are an effective place to begin. It would be useful to target projects by MW because then it can gauge the overall demand on the grid that either will happen or would have happened had the DER technology not been employed in that case. If a project is measured in MWh, however, that would also be effective, but in this case for measuring the demand on the grid in terms of charging an entire fleet simultaneously, for example, or by staggering fleet charging to reduce demand on the grid. Measuring a project in terms of the number of charging ports deployed would also accurately capture a different facet of the project. It would help determine factors like MW, MWh, number of vehicles, and activities employed to reduce demand on the grid (such as the staggering of charging

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fleet vehicles, as mentioned above). Finally, if a project is measured in number of vehicles, that would help with characterizing the factors at place in a project that includes a sizable fleet, such as a shuttle bus project at a yard that houses potentially hundreds of buses. If the battery capacity of each vehicle is known, then even more characteristics of the project could be captured and a different type of project category could be informed.

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

We respectfully request including 75-80% to cover the DER equipment costs to appropriately incentive site host participation. We recommend including some match to encourage participations to have responsibility for the project and equipment that they are implementing. We also respectfully request the ability to utilize and leverage other state incentives to help expand the scope and size of the project.

The Lion Electric Co. would like to thank the CEC for taking the time to consider our comments. We look forward to continuing to work with you, and the fleets of California, as we continue to electrify the transportation sector of this great state.

Sincerely,

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