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FreeWire Technologies Comments on CEC's RFI for Clean Energy Resources for Reliability

Additional submitted attachment is included below.

Comments of FreeWire Technologies on the
Request for Information on Clean Energy Resources for Reliability

FreeWire Technologies ("FreeWire") appreciates the opportunity to comment on the Request for Information on Clean Energy Resources for Reliability released on November 3, 2022. FreeWire commends the California Energy Commission ("CEC") for its leadership on using distributed energy resources to advance the clean energy transition.

I. Introduction

FreeWire is a leading provider of hardware and software-based Vehicle Grid Integration ("VGI") technologies that are helping to strengthen the electric grid while accelerating transportation electrification. FreeWire's battery-integrated direct current fast chargers ("DCFC") effectively allow for the permanent reduction of electric vehicle ("EV") load while the chargers' software enables further load shifting capabilities and energy services. FreeWire's unique battery-integrated DCFC have already been deployed at scale, namely at small commercial and retail locations like convenience stores and gas stations and at fleet charging stations across the globe, including in California.

FreeWire's technology uses a low-power input from the grid (drawing a maximum of 27 kW) to charge its internal battery energy storage system ("BESS") which then can charge EVs with a high-power output (up to 200 kW). For context, FreeWire's 200 kW DCFC is equivalent to a permanent load reduction of 87% compared to a traditional EVSE with the same output power. FreeWire's solution promotes equitable access to ultrafast EV charging in grid constrained rural and urban areas by using ubiquitous low and medium voltage or even single-phase power unlike most traditional DCFC that require three-phase power at 480v. This minimizes or even avoids the need for time-consuming and costly infrastructure upgrades on both sides of the meter that are often required to support traditional DCFC with a comparable output power.

In addition to using the DCFC's integrated BESS as a buffer to the grid, as described above, FreeWire's unique configuration can also export stored energy to provide a range of energy services to the site host or to the grid. For example, a site host could utilize stored energy to provide their site with backup power during an emergency and with peak load reduction for utility bill management or they could choose to export it to the grid during a grid emergency like an Emergency Load Response Program ("ELRP") event. In short, FreeWire's battery-integrated DCFC is a fully-capable and highly-flexible distributed energy resource ("DER").

II. Context and Recommendations

Senate Bill ("SB") 846 has tasked the CEC with developing a Clean Energy Reliability Investment Plan ("CERIP") and a goal for load shifting. At the same time, Assembly Bill ("AB") 205 has tasked the CEC with developing the Distributed Electricity Backup Assets ("DEBA") program to "incentivize the construction of cleaner and more efficient distributed energy assets that would serve as on-call emergency supply or load reduction for the state's electrical grid during extreme events."[1]

FreeWire urges the CEC to ensure that the CERIP, load shifting goal, and DEBA program recognize the full value of battery-integrated and battery co-located electric vehicles supply equipment ("EVSE"). These VGI technologies are uniquely capable of furthering three of the State's overarching energy goals: (1) supporting grid reliability, (2) increasing the overall amount of clean energy on the grid, and (3) accelerating transportation electrification. However, narrowly focusing the DEBA program on V1G, V2B, and V2G, as proposed in the RFI[2], may not yield the timely results that the CEC and Legislature are looking for. This is because V2B and V2G technologies (herein referred to as "V2X") are very much in their infancy. According to the CEC's ZEV tracker, there are just 32,841 V2X-capable vehicles on the roads in California[3] and only two models of V2X-capable EVSE that are available commercially[4]. The most promising V2X deployments to date are highly-specialized use cases like electric school buses of which there are fewer than 200 in the State[5].

Another VGI solution, battery-integrated and battery co-located EVSE (herein collectively referred to as "battery-backed EVSE"), like FreeWire's and those of several other major EVSE companies[6] and smaller start-ups, are commercially available today, can achieve

[1] AB 205 Energy. Article 2, Section 25791(a).
[2] Request for Information Clean Energy Resources for Reliability at page 3.
[3] These are all Nissan LEAFs which are so far the only V2X-capable light-duty vehicles aside from the recently released Ford F-150 Lightning. Electric Vehicle Chargers in California
[4]https://www.businesswire.com/news/home/20221005005527/en/Fermata-Energy%E2%80%99s-Newest-V2X-Bidirectional-Charger---the-FE-20-%E2%80%93-Available-Q1-2023
[5] Electric Vehicle Chargers in California
[6] For example, see Electrify America has now deployed Tesla Powerpacks at over 140 charging stations | Electrek

similar benefits as V2X without compromising driver experience, and can offer additional benefits that V2X cannot (such as the ability to charge EVs while the grid is down and defer or avoid distribution system upgrades). FreeWire recommends that the CEC use the CERIP, load shifting goal, and DEBA to fill gaps in existing policy and funding support to accelerate the adoption of battery-backed EVSE as follows:

- DEBA program design should include an upfront $/kW incentive program to offset the incremental costs of installing a battery-backed EVSE to compensate for their ability to provide permanent load reduction. The amount shall be calculated as follows:
  - In the case of a new battery-backed EVSE, the amount of the $/kW incentive should be calculated as the delta between the output power and the input power.
  - To further incentivize load reduction via the replacement of traditional EVSE (non battery-baked) with battery-backed EVSE, a bonus $/kW incentive should be awarded that is calculated based on the delta between the nameplate power of traditional EVSE that has been replaced and the input power of the battery-integrated EVSE.
- DEBA program design should include a monthly $/kW incentive for peak demand reduction below nameplate capacity during local peaks.
- DEBA program design should include an upfront $/kW incentive for public battery-backed EVSE that avoid the need for significant upgrades to the distribution grid (such as avoided line extension, new transformers, and other distribution grid equipment).
- CERIP should include battery-integrated EVSE as a separate Resource Type in Tables 1 Supply Resources, Table 2: Demand Resources, and Table 3: Supply/Demand Resources

III. Incentives for Battery-Integrated EVSE and Inclusion in CERIP

Despite the many benefits that battery-backed EVSE offer, this type of VGI solution is not widely promoted nor incentivized through any CEC or utility programs making this unique configuration largely underrepresented in California. On the contrary, utility "make ready" programs and demand charge relief tariffs distort the competitive market for EVSE by unfairly socializing the cost of utility- and certain customer-side of the meter grid upgrade costs among all ratepayers and therefore do not properly allocate the impact that traditional EVSE (non battery-backed) have on the grid. The effect of these “make ready” programs and tariffs is that customers have no incentive to choose battery-backed EVSE despite their ability to reduce total system costs, manage EV load, provide additional benefits such as backup power during emergencies, and alleviate congestion in backlogged utility service interconnection queues. FreeWire recommends that DEBA be used to correct this market failure by providing an appropriate incentive such as those discussed in the previous section.

At a high-level, there are estimated to be over 6,000 public DCFC ports in California[7]. If the nameplate capacity of each DCFC port averages 100 kW that would equate to a theoretical peak demand of 600 MW for all of the public DCFC ports in California. If these were all replaced with FreeWire’s battery-integrated DCFC with a maximum 27kW input and 200kW output, that would result in a permanent load reduction of approximately 73% while doubling the output of the EVSE. Additionally, if each of those 6,000 chargers were replaced with FreeWire’s battery-integrated DCFC containing a 160 kWh BESS that would bring nearly 960,000 kWh of dispatchable storage onto the California electric grid. The potential load reduction and amount of dispatchable storage will increase by approximately 67% if California is successful in its goal of building 10,000 public DCFC ports by 2025[8].

Given the significant potential benefits that battery-backed EVSE can provide to all stakeholders, including the grid, EVSE site hosts, EV drivers/fleet operators, and utility ratepayers in general, FreeWire believes that the CEC should add battery-backed EVSE to the CERIP. This could be done by adding the technology as a seperate Resource Type as follows: in *Table 1: Supply Resources* in the “*Storage” category;* in *Table 2: Demand Resources* in the “*End-Use & Enabling Technology Combinations for Demand Response (DR) or Demand Flexibility (DF)*” and in the “*Permanent Load Shift (PLS)*” categories; and in *Table 3: Supply/Demand Resources* in the “*Distributed Technologies*" category.

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[7] Electric Vehicle Chargers in California

[8] California readies $1.4B push to help reach electric vehicle charging, hydrogen refueling goals | Utility Dive.

IV. Response to RFI Questions on Resource Types and Evaluation Attributes

List of Resource Types and Evaluation Attributes

The RFI seeks feedback on the following questions regarding the list of preliminary resources and qualitative and quantitative attributes by which they will be evaluated:

1. *Are the categories (indicated in Tables 1, 2 and 3) appropriately representing how the CEC should be evaluating resources?*
    a. The categories capture the breadth of different technologies, solutions, and approaches that the CEC should be evaluating for the CERIP. However, the CEC should consider that some solutions will span multiple categories. As discussed further in question 3 of this section, the CEC should consider a solution's full-range of capabilities when assessing it qualitatively and quantitatively, regardless of which category (or categories) the resource fits into. Solutions and technologies that are able to act as Supply, Demand, and Supply/Demand resources are exactly the type of flexible resources that SB 846, AB 205, as well as numerous other State policies are intended to support.

2. *Are there resources that should be added to or removed from the preliminary list under each of the categories (shown in Tables 1, 2, and 3)?*
    a. Other Vehicle Grid Integration ("VGI") solutions besides V1G, V2B, and V2G should be added. Specifically, FreeWire encourages the CEC to add battery-backed EVSE as a seperate Resource Type as follows: in *Table 1: Supply Resources* in the "*Storage" category;* in *Table 2: Demand Resources* in the "*End-Use & Enabling Technology Combinations for Demand Response (DR) or Demand Flexibility (DF)*" and in the "*Permanent Load Shift (PLS)*" categories; and in *Table 3: Supply/Demand Resources* in the "*Distributed Technologies*" category.

As the name implies, battery-backed EVSE contain a BESS that is integrated into the EVSE or in some cases, external to but co-located with the EVSE. This configuration allows battery-backed EVSE to provide similar benefits to the grid and to the EVSE site host as V2X technologies. However, unlike V2X, battery-backed EVSE are not constrained by whether or not a V2X-capable EV is connected to a V2X-capable EVSE. This makes battery-integrated EVSE a more deployable, predictable, and reliable resource, both to the grid and to the site host. As such, they should be added to the list of resources for the CERIP.

3. *Are there other attributes that should be considered, in addition to the ones listed in Table 4? If so, should those be considered for the qualitative and/or quantitative evaluation?*
    a. FreeWire recommends that the CEC assess resources both qualitatively and quantitatively. Additionally, the CEC should add an attribute to Table 4 called Time-to-Deployment. This variable should capture a realistic assessment of how long it takes to go from Purchase Order to Commercial Operation Date.

<u>Resource Characterization</u>

The RFI seeks feedback on the following questions for each potential resource.

1. *Please provide a general overview of the resource, including the following: a. Resource category (e.g., supply, demand) and type (e.g., solar) and scale (e.g., utility, distributed)?*
    a. Resource Type: Battery-backed EVSE
    Resource Category: Supply and Demand Resource
    Scale: Distributed

2. *How does the resource compare to conventional generation in terms of greenhouse gas and priority pollutant emissions?*
    a. Battery-backed EVSE reduce emissions of greenhouse gasses and priority pollutants in several ways.
        i. <u>Absorb Excess Renewable Energy</u>: Battery-backed EVSE can charge from the grid during the day when intermittent solar generation is highest thus

"flattening the belly of the duck" and reducing the potential for solar curtailment.

ii. Accelerate Transportation Electrification and Promote EV Charging Equity: FreeWire's battery-integrated DCFC can defer or avoid the need for costly and time-consuming infrastructure upgrades on both sides of the meter thereby reducing both the cost of transportation electrification to all ratepayers and reducing time-to-deployment to a matter of weeks. These characteristics also allow for FreeWire's solution to be installed in areas where traditional EVSE would be cost-prohibitive due to grid constraints such as in lightly-populated rural areas and densely-populated urban ones (including many LMIs and DACs). These areas are often subject to excessive amounts of GHG and local air pollutants from the combustion of fossil fuels related to power generation, industrial manufacturing, or idling trucks.

3. *How does the resource support reliability (e.g., supply, permanent load reduction, net peak reduction, or emergency asset?) (List all that apply.) How can the resource be used as an incremental on-call resource during emergencies?*
   a. Battery-backed EVSE are a truly flexible DER that can increase system reliability as follows: supply, permanent load reduction, net peak reduction, and emergency asset.
   b. Battery-backed EVSE can provide incremental on-call backup power during emergencies in many ways. For example,. the asset owner could choose to reserve a given amount of stored energy to provide emergency backup power to the site instead of using that energy to charge EVs or exporting that energy to the grid. Alternatively, the asset owner could decide to allow their distribution utility to reserve a given amount of capacity to use for net peak load reduction on the system. While distinct from providing incremental supply or load reduction, battery-backed EVSE could allow for the charging of EVs during emergencies, even if the grid is down. In all of these scenarios, this unique configuration provides permanent load reduction if the input power is lower than the output

power, as is the case with FreeWire's battery-integrated DCFC (which has a maximum 27 kW input and 200 kW output).

4. *How many new MWs and MWhs can the resource provide per year, taking into account resource characteristics and known barriers between now and 2035? How is that different if used incrementally as an emergency asset during an extreme heat event?*
    a. There are estimated to be over 6,000 public DCFC ports in California[9]. If the nameplate capacity of each DCFC port averages 100 kW that would equate to a theoretical peak demand of 600 MW for all of the public DCFC ports in California. If these were all replaced with FreeWire's battery-integrated DCFC with a maximum 27kW input and 200kW output, that would result in a permanent load reduction of approximately 73% while doubling the output of the EVSE. Additionally, if each of those 6,000 chargers were replaced with FreeWire's battery-integrated DCFC containing a 160 kWh BESS that would bring nearly 960,000 kWh of dispatchable storage onto the California electric grid. The potential load reduction and amount of dispatchable storage will increase by approximately 67% if California is successful in its goal of building 10,000 public DCFC ports by 2025[10]

5. *What is the levelized cost for the resource in $/MW-yr. and $/MWh-yr. from 2023 to 2035?*

6. *What is the average length of time from ordering or purchasing the resource to operation? How long does that typically take in today's market? What conditions must be met to deploy the technology rapidly? (e.g., transmission interconnection, building electrification or upgrades, etc.)*
    a. Generally speaking, FreeWire's battery-integrated DCFC takes 10-14 weeks to go from Purchase Order to Commercial Operation Date and can be installed and ready for use within one day once onsite. There are often no additional

[9] Electric Vehicle Chargers in California
[10] California readies $1.4B push to help reach electric vehicle charging, hydrogen refueling goals | Utility Dive.

infrastructure requirements as FreeWire's solution can use existing 208 V or 240 V input power allowing for increased distance from transformers. Additionally, the integrated 160 kWh BESS does not require any additional hardware to support 200 kW fast charging. The unit is roughly 40" x 43".

7. *For an emerging technology, when will it be ready for deployment, and at what scale?*
    a. The technology is commercially available and being deployed at scale worldwide.

8. *Is the target customer primarily residential, commercial, agricultural or industrial?*
    a. The target site is primarily commercial, agricultural, and industrial.

9. *What are the key non-financial barriers to the development and implementation of this resource (including, but not limited to, permitting, interconnection, supply chain, customer acceptance, and alignment with policy goals)?*
    a. Deployment is already possible in existing regulatory constructs, however, additional measures could be enacted to facilitate additional scale. Two of the biggest impediments to widespread adoption of battery-backed EVSE are utility's "make ready" programs and tariffs that reduce or eliminate demand charges for EVSE. Both of these severely distort the competitive market for EVSE by unfairly socializing the cost of utility- and certain customer-side of the meter grid upgrade costs among all ratepayers and therefore do not properly allocate the impact that traditional EVSE (non battery-backed) have on the grid. The effect of these "make ready" programs and tariffs is that customers have no incentive to choose battery-backed EVSE despite their ability to reduce total system costs, manage EV load, provide additional benefits such as backup power during emergencies, and alleviate congestion in backlogged utility service interconnection queues.

10. *What are the key financial barriers to the development and implementation of this resource?*

a. Battery-backed EVSE can have a higher upfront capital cost due to the BESS. While the BESS may allow for decreased operating costs which helps to make up the difference in the long-term (for example through reduced demand charges), customers currently have no incentive to choose an EVSE that minimizes systemwide grid impact or benefits to ratepayers, as discussed in question 9 in this section.

11. *What types of benefits or impacts is the resource anticipated to have on low income and disadvantaged communities, and tribes, if any in terms of development and deployment?*
    a. FreeWire's battery-integrated EVSE can positively impact low income and disadvantaged communities, and tribes. Many of these communities are in areas that lack grid capacity to support traditional DCFC. FreeWire's solution can provide these communities with charging equity by offering them ultrafast EV charging without having to pay for expensive and time-consuming grid upgrades, either directly or through higher electricity rates.

<u>Input on Distributed Electricity Backup Assets Program Design</u>

The Distributed Electricity Backup Assets program can provide incentives for two main categories of projects:

1. *Efficiency upgrades, maintenance, and capacity additions to existing power generators.*
2. *Deployment of new zero- or low-emission technologies, including, but not limited to, fuel cells or energy storage, at existing or new facilities.*

The statute also requires that all funding recipients participate as on-call emergency resources for the state during extreme events.

The RFI seeks feedback on the following questions, in addition to the information requested in the questions above, to help inform the design of the Distributed Electricity Backup Assets program and its phased development and launch:

1. *What size of resource and what types of customers should the program target?*
    a. The DEBA program should target commercial, agricultural, and industrial customers. The size of the BESS needed would depend on the site load, EV charging requirements, and local grid needs. The DEBA program should be flexible in its incentive structure and allow the awards to scale accordingly

2. *What types of incentive structures and amounts are needed to accelerate the development and deployment of this resource?*
    a. *FreeWire recommends the following incentive structures:*
        i. An upfront $/kW incentive program to offset the incremental costs of installing a battery-backed EVSE to compensate for their ability to provide permanent load reduction. The amount shall be calculated as follows:
            1. In the case of a new battery-backed EVSE, the amount of the $/kW incentive should be calculated as the delta between the output power and the input power.
            2. To further incentivize load reduction via the replacement of traditional EVSE (non battery-baked) with battery-backed EVSE, a bonus $/kW incentive should be awarded that is calculated based on the delta between the nameplate power of traditional EVSE that has been replaced and the input power of the battery-integrated EVSE.
        ii. A monthly $/kW incentive for peak demand reduction below nameplate capacity during local peaks.
        iii. An upfront $/kW incentive for public battery-backed EVSE that avoid the need for significant upgrades to the distribution grid (such as avoided line extension, new transformers, and other distribution grid equipment).

3. *What types of conditionalities and measurement and verification requirements should the program include to ensure funded resources participate and deliver during emergency events?*

a. FreeWire strongly recommends that the DEBA program allow submeters embedded in battery-backed EVSE and other DERs to be used to measure performance. Baselining methodologies such as the "10x10" methodology used in other programs such as ELRP and the Demand Response Auction Mechanism and the Firm Service Level methodology used in the Base Interruptible Program are inappropriate for this type of program and will undermine the impact of the DEBA program by undercounting the amount of energy supplied by DERs.

FreeWire appreciates the opportunities to provide these comments to the RFI and looks forward to continuing to participate in this docket.

Sincerely,

C. Silverman

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