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DOCKET
08-AAER-1B
DATE OCT 16 2008
RECD. OCT 16 2008

October 16, 2008

California Energy Commission
Docket No. 08-AAER-1B
Docket Unit
1516 Ninth Street, Mail Station 4
Sacramento, California 95814-5504

Via Email: Docket@energy.state.ca.us

Re: Comments for Docket No. 08-AAER-1B, Energy Efficiency of Battery Chargers

SCE respectfully submits the following comments on 45-Day Language for the 2008 Appliance Efficiency Rulemaking, Phase I, Part B regarding battery charger test procedure. In discussion with other California utilities, it has become apparent that the procedure is overly broad in scope with regard to one segment of the battery charger industry, and this could jeopardize its potential for large-scale implementation if not properly identified.

The Procedure is divided into two sections: Part 1 and Part 2. The scope of Part 1 and Part 2 is paraphrased below.

> Part 1 applies to single-phase chargers with nameplate input power rating of 2 kW or less, and to battery charger systems (charger together with battery) with a battery capacity of up to 50 kWh.
>
> Some examples of battery charger systems included are: cellular and cordless telephones, cordless power tools, laptop computers, cordless shavers, uninterruptible power supplies emergency egress lighting, golf carts, portable lawn tools, and rechargeable toys, and marine and recreational vehicle chargers,.
>
> Part 2 includes test and analysis methods to evaluate the energy usage and impact of battery chargers for batteries powering motive equipment.
>
> Some examples of battery charger systems included in the scope of Part 2 are chargers for batteries used in motive equipment, such as golf carts, electric material handling equipment and vehicles, including lift trucks (forklifts), airport electric ground

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support equipment (EGSE), port cargo handling equipment; tow tractors, personnel carriers, sweepers and scrubbers.

Part 2 specifically excludes on-road electric vehicles and plug-in hybrid-electric vehicles (Scope, Section D), as its procedures are not adequately designed for those vehicles.

After reviewing more closely the scope and procedures in Part 1, it is apparent that Part 1 encompasses:

a. Large systems (up to 50 kWh in energy storage)
b. On-road full-function (high-speed and long-range) electric vehicles (EVs)
c. On-road full-function plug-in hybrid-electric vehicles (PHEVs)

All of the above systems should be excluded from Part 1.

This discussion may be generalized into small battery charger systems and large battery charger systems. Precedent for small charger procedures includes the Energy Star® and Department of Energy programs. The Energy Star battery charger system scope of eligibility encompasses those systems with battery packs of less than 42 volts nominal and nameplate input power between 2 and 300 watts. As part of its program to determine if energy efficiency standards for battery charger systems in consumer appliances are feasible, DOE has adopted the EPA Energy Star test procedures ("Test Methodology for Determining the Energy Performance of Battery Charging Systems," December 2005). For the purposes of discussion, small battery charger systems include those which function using standard 120 V, 15 A to 20 A supply, and complete their charging process in a reasonable amount of time – overnight for example.

Part 2 includes the systems that exceed those power and energy requirements, and also those devices that are in the small system segment according to power, but that are designed for moving persons or materials. These procedures have no equivalent on the state or federal level.

Large energy storage systems generally require high-power charging systems in order to have a reasonable charging time. The fact that Part 1 applies to only those chargers of 2 kW and lower, makes a high energy system of 50 kWh irrelevant to Part 1. A 2 kW charger would require 24 hours or more to charge a depleted battery of that size. The type of energy storage systems in Part 2 are comparatively large (approaching 50 kWh) so Part 2 is appropriate for those systems. In general, it is not necessary to define a limit for energy content, but it may be useful to define a maximum charging time.

Part 1 should not include on-road EVs and PHEVs in scope, because:

a. It was not designed to properly assess them.
b. None were evaluated.
c. Their market segments were not given comparable time (as with small appliances) for sufficient industry representation and stakeholder review.
d. They may be in the jurisdiction of other agencies.

Part 1 was designed and evaluated for small consumer appliances, much like preceding efforts from EPA. As such, and having gone through the structured vetting process that is required, it does a good job at measuring the proper quantities, and laying out a path to reduce the relatively high inefficiencies seen in those devices. The devices in Part 2 do not behave in the same way, and that is why Part 2 has a different set of methods. On-road EVs and PHEVs also do not behave in the same manner, although they require different methods from Part 2. On-road EVs and PHEVs are more highly sophisticated vehicles than the golf carts, neighborhood electric vehicles and personal mobility vehicles included in the scope of Part 2. The authors acknowledged this by specifically excluding them from Part 2. We believe they should be excluded from Part 1 as well.

No on-road EVs or PHEVs were subjected to the test methods of Part 1 in the procedure development. If they were, the methods of the procedure would be shown to be inadequate to generate the data necessary to identify the areas where savings could be generated to increase efficiency. These vehicles have in most cases: advanced batteries with inherently higher efficiency, battery pack management systems, thermal management systems that may include refrigeration cycles, and voltage conversion for auxiliary systems. Special methods must be taken to both acquire data from these systems and appropriately define measures to account for them in efficiency assessment.

The test procedure was first presented to the automotive industry at the EPRI Infrastructure Working Council (IWC), PHEV Working Group, in June 2008 in Dearborn, Michigan. The assembled group of automotive industry representatives (including GM, Ford, and Nissan) was generally surprised by the presentation. Other attendees included utility representatives and component manufacturers. In the October 2008 EPRI IWC meeting, the steering committee had a discussion with the automakers about this topic. Although they do welcome energy efficiency and power quality standards, they feel this procedure is not applicable to their vehicles. Instead, they would rather work with the Commission to develop their own procedure in the future. No automakers have submitted comments to this procedure. SCE has close working relationships with major OEM automakers to help them understand utility infrastructure issues, and in this regard, adequate time is required to allow them to properly assess any such procedures for this unanticipated application and respond appropriately.

The Air Resources Board (CARB) has released preliminary procedures to evaluate PHEVs. Recently, CARB has been holding hearings for stakeholders to evaluate and submit comments. Inherently, the procedure evaluates battery charger system energy efficiency. For vehicles, it is more clearly appropriate to include some work cycle in the efficiency evaluation and rating. This has been done for years with vehicle fuel economy labels. If CARB, and quite likely, EPA ultimately rates EVs and PHEVs, how would the Energy Commission procedures apply? This could be cause for confusion in the industry.

In conclusion, the teams of authors wish to support their approval for the battery charger system test procedure. The vehicles which should be excluded from Part 1 have high relative efficiency, and require more sophisticated methods that can take into account the on-board vehicle charging systems as well as building-attached infrastructure. There is a public policy justification for ensuring that only highly efficient electric vehicles get utility incentives for their charging infrastructure and the vehicles themselves. A test procedure could be developed to address these types of devices to support this end. The team has experience with evaluating these types of devices, and proposes working on defining methods together with the Energy Commission and other agencies to formulate an appropriate procedure, which could be a separate procedure, or a "Part 3" to the existing procedure.

Sincerely,

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