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NRDC Comments on CEC Battery Chargers Proceeding

2010 Rulemaking Proceeding Phase II on Appliance Efficiency Regulations: Docket Number 09-AAER-2

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Submitted by:
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On behalf of the Natural Resources Defense Council and our more than 250,000 members and online activists in California, we respectfully submit these comments on the battery charger efficiency standard proposal presented by PG&E in the October 11, 2010 CEC staff workshop.

Battery chargers are becoming increasingly common in consumer and commercial products. PG&E and Ecos estimate that there are approximately 170 million products that contain battery chargers are in use in California's homes, offices, retail stores, medical facilities, and warehouses. These products use an estimated 7,700 GWh annually, representing nearly 3 percent of California's total electricity use and equivalent to the entire production of 2 medium-sized 500MW power plants.

While the external power supplies used by some chargers are already regulated, battery charger system efficiency also depends on other components such as internal power supplies, charge control circuits and the batteries themselves. Overall system efficiency is typically less than 50 percent. PG&E and Ecos estimate that of all the energy consumed by battery chargers in California, only 40% of it is eventually delivered from the battery to power our rechargeable products. The efficiency of some consumer end-use products is as low as 2%, meaning 98% of the energy is wasted as heat, providing no value, but costing money to the user and causing the generation of unnecessary greenhouse gases and air pollution.

This high level of energy waste leads NRDC to support the setting of a minimum energy performance standard for battery chargers in California. NRDC believes this is important to reduce energy waste, greenhouse gas emissions and air pollution in California, as well as to provide leadership and influence federal regulatory efforts on battery chargers to extend these benefits to the rest of the US.

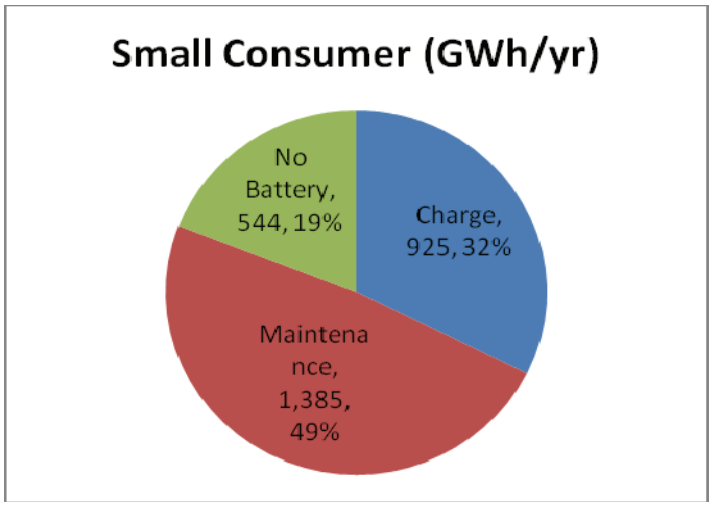
Below we provide additional comments on the PG&E Battery Charger CASE report.

Pursuing a standard in California is important despite the current federal effort on consumer battery chargers. The scope of the current DOE effort is limited to consumer battery chargers. It does not cover non-consumer battery chargers. PG&E's data shows that non-consumer battery chargers account for 3,838 GWh annual energy use, an equivalent amount to consumer battery chargers. It is therefore important to include non-consumer battery chargers in the scope of the California standard.

Regarding consumer battery chargers which may be pre-empted by the upcoming DOE standard, NRDC believes it is important that California sets its own standard before a federal standard comes into effect, in order to influence the federal standard, ensure it is sufficiently stringent, and capture the benefits from the California standard coming into force up to 18 months earlier than the federal one.

Setting a standard in California earlier than at the federal level would result in avoiding the CO2 emissions equivalent to the electricity used by 157,000 California households for 1 year. This is enough electricity to power the city of Sacramento for 1 year. The California battery charger standard could come into effect 18 months earlier than the federal standard. Given that battery chargers have an average life between 2 and 10 years depending on the type of product, 18 months worth of battery charger sales would commit California to 3,690 GWh of electricity use over the lifetime of these products, which would result in 1.2 million tons of CO2 emissions, or the equivalent of the electricity used by 157,000 California households for 1 year.

Battery chargers use a significant portion of their energy in all three main usage modes: Charging, Maintenance, and No Battery (when the charger is plugged in but the product is not connected to the charger). NRDC's analysis of duty cycle numbers in the CASE report shows that battery chargers spend a significant portion of their energy in all three main operating modes:



This indicates that an effective standard must focus on all three modes to capture the main efficiency opportunities in battery chargers. NRDC cautions against using some specific products, such as beard trimmers which may spend the majority of their time unplugged, to illustrate battery charger energy use. Beard trimmers are not representative of the majority of the energy used by battery chargers: NRDC's analysis of DOE's Technical Support Document on battery chargers shows that beard trimmers represent less than 0.1% of battery charger stock energy use, and that their duty cycle is not representative of the majority of battery charger energy use.

A standard based on duty cycle cannot effectively capture the energy efficiency opportunity for battery chargers. NRDC supports the "efficiency per mode" metrics proposed by the CASE report.

Battery chargers have very different duty cycles depending on product type:

- Cordless phones, power tools, and personal care products spend most of their energy in Maintenance mode.
- Cell phones, personal electric vehicles, and lift trucks spend most of their energy in Charge mode.
- Auto/Marine/RV chargers spend most of their energy in No Battery mode.

Moreover battery charger usage patterns vary considerably not just across product types but also depending on user behavior: for example some users will leave their power tools in maintenance mode most of the time while others will remove them from the charger when fully charged, and yet others will unplug the charger.

NRDC therefore strongly supports PG&E's proposed approach that sets efficiency requirements in the 3 major operating modes: Charge, Maintenance and No Battery.

NRDC recommends that CEC requires battery chargers to bear an efficiency verification mark. As evidenced by the External Power Supplies efficiency marking protocol, an efficiency mark can be instrumental in facilitating the implementation of a standard and reducing its cost to industry. NRDC thinks it makes sense to consider verification marking issues at the same time as the standard setting process because verification marking will:

- Create a simple vocabulary for all stakeholders, turning complex metrics and difficult to remember thresholds into a simple "I-N" scale,
- Facilitate enforcement, even if it does not guarantee it: verification testing will still be required but the mark will make it much easier to check if products have the mark and if the mark meets mandatory or voluntary levels,
- Lower cost of compliance for industry by facilitating international adoption,
- Encourage voluntary adoption of higher efficiency levels.

NRDC presents a proposal for an efficiency marking protocol for battery chargers in Appendix A.

Conclusion

NRDC thanks the CEC for the opportunity to provide comments on the PG&E CASE proposal before the release of a CEC staff proposal. We strongly support the establishment of an ambitious and effective standard to capture the cost effective energy efficiency opportunities in battery chargers in California, and look forward to continuing to participate in this rulemaking process.

Thank you for considering NRDC's comments.

Respectfully Submitted,

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Appendix A

NRDC Proposal for an Efficiency Marking Protocol for Battery Charger Systems

On behalf of the Natural Resources Defense Council and our more than 250,000 members and online activists in California, we respectfully submit this proposal for a Battery Charger Efficiency Marking Protocol.

The External Power Supply International Efficiency Marking Protocol proposed by NRDC and endorsed in 2005 by the California Energy Commission, the US EPA, the China Certification Center for Energy Conservation Products and the Australian Greenhouse Office, was instrumental in transforming the external power supply (EPS) market towards high efficiency.

NRDC believes there is a similar opportunity for a marking scheme to help transform the market for battery charger (BC) systems in California and globally towards high efficiency, and would like CEC to consider this marking scheme concept. By creating an ok/better/best scheme, a marking protocol will provide a mechanism for easily identifying how efficient a battery charger system is, facilitating requirements definition by manufacturers to their suppliers, and regulation development by regulatory agencies around the world. Given the global nature of the BC market, international adoption will facilitate and accelerate market transformation in California.

CEC is currently engaging in a rulemaking process to set energy efficiency standards for battery chargers in California. NRDC thinks it makes sense to consider verification marking issues at the same time as the standard setting process because verification marking will:

- Create a simple vocabulary for all stakeholders, turning complex metrics and difficult to remember thresholds into a simple "I-N" scale,
- Facilitate enforcement, even if it does not guarantee it: verification testing will still be required but the mark will make it much easier to check if products have the mark and if the mark meets mandatory or voluntary levels,
- Lower cost of compliance for industry by facilitating international adoption,
- Encourage voluntary adoption of higher efficiency levels.

The success of a verification mark depends in part on how easy it is to understand and enforce. This depends on design considerations of the standard, such as the number of product categories and the efficiency metrics.

NRDC believes The Warren-Alquist Act, Sec. 25402 (c)(1) gives CEC clear authority to prescribe other cost-effective measures not preempted by federal labeling law, including labeling programs. NRDC therefore recommends that CEC amend 20 CCR 1607 to include a requirement for marking battery chargers.

Below we provide details on our battery charger efficiency marking protocol concept. Further details, including metrics and levels, will need to be defined as DOE's proposed standard for battery charger systems develops.

I. Background

Battery chargers are becoming increasingly common in consumer and commercial products. PG&E and Ecos estimate that there are approximately 170 million products that contain battery chargers are in use in California's homes, offices, retail stores, medical facilities, and warehouses. Cell phones, cordless tools, bar code scanners, electric forklifts, and electric baggage carts are all products that rely on battery charger systems. These products use an estimated 7,700 GWh annually, representing nearly 3 percent of California's total electricity use and equivalent to the entire production of 2 medium-sized 500MW power plants.

Many manufacturers have redesigned corded or gas powered products to include rechargeable batteries. Rechargeable consumer products offer substantial economic and environmental advantages over those with disposable batteries and are more convenient than corded consumer products. Battery powered lift-trucks and golf carts are generally less expensive to operate than fossil fuel based alternatives. However, of all the energy consumed by battery chargers, only 40% of it is eventually delivered from the battery to power rechargeable products. Technology exists today to double this system efficiency.

California and US DOE are working on mandatory energy performance standards for BCS, and other countries are likely to follow suit in the coming years. CEC has developed and DOE is in the process of developing standard test methods to measure the efficiency of BCS. However, to date no labeling scheme has been created to identify a battery charger system's energy efficiency. To fill this void, the marking scheme protocol described below was developed. This mark, or efficiency indicator, is not intended to serve as a consumer information label, but to indicate the performance of the battery charger system when tested to the specific test method. This system is sufficiently flexible so that regulators across the world retain the ability to adopt the stringency level that is most appropriate for their voluntary and/or mandatory program.

II. Benefits of Adopting This Approach

The marking protocol will provide an easily implemented system for battery charger manufacturers, finished product manufacturers, and regulators to determine the minimum efficiency performance of a battery charger system. The benefits of this system include:

- The marking system will be increasingly adopted and recognized around the world. Countries interested in promoting battery charger efficiency would be encouraged to use this protocol rather than developing a new framework. Battery charger manufacturers will not have to use different labels or marks for each market into which they sell their product.
- Regulators can quickly assess the efficiency level of a battery charger simply by looking for the level shown on the battery charger. This will be useful for program evaluation, compliance verification, and program administration that might include incentives or other special consideration.
- The marking protocol will not interfere with other energy efficiency labeling programs that are underway in various parts of the world.
- The performance mark requires little space and was intentionally selected to avoid confusion with other markings such as the external power supplies mark.
- The marking protocol is flexible and can accommodate potential future changes in the stringency of various regulatory levels. In addition, this system eliminates the question faced by many labeling programs – "How can I tell if the product meets the old or revised specification requirements?" When a specification is revised, the regulator simply chooses to move to a higher performance level and the corresponding mark.

III. The Marking Protocol

a. Mark

The efficiency mark consists of a the "BC" characters followed by a Roman numeral (I-V) as illustrated below, and is to be printed on the battery charger nameplate.

The scale is designed with I being the least stringent (least efficient) level and V being the highest (most efficient) level. To date, levels I – II and in some cases level III have been set, higher levels are reserved for future use as more stringent levels are established. The use of Roman numerals avoids any potential conflict with consumer efficiency labeling schemes. The text "EFFICIENCY LEVEL:" is optional.

b. Metrics

Metrics below are illustrative and need to be defined when CEC's standard proposal develops.

Level	Description	Metrics
BC I	Least efficient	Less than level II
BC II	Efficient	To be defined, based on CEC's upcoming proposal for a battery charger systems efficiency standard
BC III	Most efficient	For possible adoption by Energy Star and utility incentives
BC IV BC V	Future use	

c. Mark Location

All battery charger systems have three functional components: power supply (PS), charge control (CC) and battery. These three electrical components can be housed in four different battery charger configurations:

Table 1: Form factor configurations of battery chargers

Form Factor 1

The power supply, the charge control circuitry and the battery are contained in separate housings.

Form Factor 2

Power Supply and Charge Control Circuitry

Battery

The power supply and the battery charge control circuitry is contained in a single housing. The battery is contained in a separate housing.

Form Factor 3

The charge control circuitry and battery are inside of the cell phone. The power supply is contained in a separate housing.

Form Factor 4

The power supply, the charge control circuitry and the battery are contained in a single housing.

Power supplies are already subject to efficiency marking if they fall into the Class A external power supply category, per EISA 2007.

Table 2 shows how to position the battery charger efficiency mark so that it does not cause confusion with the existing EPS mark:

Table 2: Mark location in different form factors

Form Factor	EPS Mark	BCS Mark
1. 3 separate housings	EPS (if class A)	Charge control component
2. Power supply and charge control together, battery separate	None	Power supply & charge control component
3. Charge control and battery together, power supply separate	EPS (if class A)	Charge control & battery component
4. All 3 elements in single housing	None	Single housing

IV. Conclusion

NRDC believes an efficiency marking protocol is an important element of a comprehensive approach to the process of setting a standard and establishing an appropriate regulatory and enforcement program for battery charger systems. It will reduce the cost of implementation, accelerate global adoption, and encourage further voluntary initiatives.

We would like the opportunity to meet with CEC and the other interested stakeholders to discuss how to implement this marking proposal at the state and potentially federal level in a way that coordinates with the current standards setting processes.