Codes and Standards Enhancement (CASE) Initiative For PY2011: Title 20 Standards Development

Title:

Comment Letter in Response
To December 14, 2011 15-day language
For Battery Charger System Energy Efficiency Standards
(Docket No. 11-AAER-2)

Prepared for:

Pat Eilert Ed Elliott	Lance DeLaura Ron Gorman		Randall Higa
Pacific Gas and Electric Company	Southern California Gas Company, A Sempra Energy utility	SDGE, A Sempra Energy utility	Southern California Edison, An Edison International Company

Prepared by:

Ecova
Suzanne Foster Porter and Dave Denkenberger, PhD

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California Energy Commission
Dockets Office, MS-4
1516 Ninth Street, MS-25
Sacramento, CA 95814-5512

January 3, 2012

RE: Battery Charger System Energy Efficiency Standards (Docket No. 11-AAER-2)

Dear Commissioners:

California's investor-owned utilities (IOUs) strongly encourage the California Energy Commission (CEC) to adopt the battery charger systems standards proposed in the 15-day language. Final adoption of this standard would make many battery-using plug loads more efficient, saving Californians more than 2 billion kWh per year and reducing electricity bills by $300 million per year once the measure is fully implemented.[1]

The 15 day language is the result of more than a year of stakeholder input, and substantial changes have been made to the standards to address stakeholder concern with the original IOUs Codes and Standards Enhancement (CASE) Report proposal. In support of the adoption, we respond below to previously unaddressed stakeholder concerns expressed in the written comments on 45-day language and at the 45-day language hearing on October 24, 2011.

STAKEHOLDER CONCERN: The duty cycle of auto chargers used by the CEC is inappropriate, especially those auto chargers for use at home.

IOU RESPONSE: Updated duty cycle information for Auto/Marine/RV duty cycles continues to demonstrate that this category of products is cost effective. We recommend no changes to the proposed 15-day language.

The IOU technical team updated the duty cycles of the Auto/Marine/RV chargers with information from two sources: 1) stakeholder information submitted to the 45 day language docket and 2) other previously unavailable sources.[2] The Auto/Marine/RV lead acid charger category is comprised of a number of user profiles. We represented the primary profiles with five user categories:

[1] Annual savings for consumer products are subject to change after compliance date of DOE battery charger regulations. If DOE adopts a standard with a similar level of stringency to the CEC, this level of annual savings would be retained.

[2] Such as: O'Brien, Sharon, "Baby Boomers Create RV Travel Boom" About.com, Senior Living. http://seniorliving.about.com/od/travelsmart/a/rvtravelgrowth_2.htm, accessed 6 December 2011. And:

1) *Marine residential*: charge batteries fairly infrequently, and plugged in at the dock much of the time to ensure batteries are ready when vessel is used.
2) *Marine commercial*: used to charge batteries fairly frequently, and plugged in much of the time when at the dock. Commercial vessels are assumed to be used more than residential vessels, and would also need to be charged when at the dock so that they are ready when the vessel is used.
3) *Auto residential*: used very infrequently and unplugged most of the time. This product is used very occasionally recharge a dead battery of a vehicle, and spends most of the time unplugged on the shelf of the garage.
4) *Auto commercial*: used at auto service centers and used to charge auto batteries very frequently. These products are used to charge batteries that come into the center, as well as to cycle batteries and maintain them.
5) *RV*: charge RV batteries fairly infrequently, but plugged in a significant amount of time. RVs are used an average of 30 days a year, but the batteries within them need to be recharged regularly to ensure they last the full lifetime. Some users would likely plug them in occasionally and a smaller percentage of users would leave them plugged in all the time (for convenience).

Using new stock information and the revised duty cycle assumptions, we took a market-weighted average of the duty cycle for this product group. The table below shows the stock in California and duty cycles of the category as a whole. Although the residential devices make up the majority of the stock, the more intensive duty cycles of the commercial profiles above increase the average duty cycle of the product category as a whole.

Type	Stock	Charge (active) % of time	Maintenance % of time	No battery % of time	Unplugged % of time
Total estimate	1,700,000	2%	30%	2%	66%

Using this revised duty cycle and the incremental cost cited in the 45-day hearing, we updated the payback period for the Auto/Marine/RV category (table below). With an incremental bill of materials cost of $10, Department of Energy[3] markups of 2 from bill of materials to manufacture selling price and 1.22 to retail (including tax), this is a retail incremental cost of approximately $24. With the duty cycle above, a compliant product with reduced energy to charge and significantly lower maintenance and no-battery power saves 130 kWh per year. The incremental cost of compliance would be returned to ratepayers in 1.4 years through reduced energy costs. All energy savings over the remainder of the typical 10 year life would further reduce total cost of ownership for this products in this category after the standard is passed.

Category	Incremental retail cost	Energy savings/yr (kWh)	Payback (yr)	Benefit to cost ratio
Auto/Marine/RV	$24	130	1.4	6

Clark, Jane, **"**RVs beckon baby boomers despite fuel costs" USA TODAY, 20 March 2008. http://www.usatoday.com/travel/news/2008-03-20-rv-boomers_N.htm accessed 6 December 2011.

[3] "Preliminary Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Battery Chargers and External Power Supplies." September 2010, U.S. Department of Energy.

STAKEHOLDER CONCERN: Emergency egress lighting and other battery backup lighting applications should be exempted from the standard because 15-day language requirements may conflict with UL 924 Standard for Emergency Lighting and Power Equipment.

IOU RESPONSE: UL 924 does not conflict with the 15-day standards language. Both small and large egress lighting systems can meet this standard cost-effectively and maintain performance specified in UL 924. We recommend no changes to the 15-day language.

Review of UL 924 Standard by the IOU technical team confirmed that there are no specific criteria in UL 924 that address the energy use or energy efficiency of the battery charger system used with egress lighting, nor does UL 924 contain any criteria (such as required trickle charge) that would conflict with the proposed 15-day language. The standard only specifies performance criteria for this important safety equipment. These performance criteria, including battery run-time, battery charge time, and battery voltage limits are similar in nature to performance criteria/constraints for other battery charger systems. The table below summarizes some of the relevant performance criteria in UL 924 mentioned by stakeholders.

UL 924/Industry Requirement	**IOU Discussion**
Immediate battery power to load (in this case lamps) for a minimum of 90 minutes and as long as 8 hours	All battery charger systems have expected run times when operating on battery power. These vary, depending on the intended application. The range of battery charger run times observed in the IOU analysis range from less than 60 minutes for some toys to 12 hours or more for slate/tablet products. The 15-day language does not limit run time, and focuses only on charging the battery efficiently before the system is disconnected from ac power.
The closed circuit battery voltage must not be less than 87.5% of the nominal rated after the load on the system (lamp(s)) is operated for a set period of time	All battery charger systems are designed with minimum battery voltage requirements. For example, integrated circuits, central processing units (CPUs), light emitting diodes (LEDs), and other key components in many portable consumer electronics will not operate satisfactorily on voltages that are too low. Also, discharging a battery to a very low voltage will shorten its life significantly. Product designers respond to these requirements by selecting an appropriate battery chemistry and ensuring that the battery size and cell configuration meets the performance requirements. Because efficiency requirements in the 15-day language adjust appropriately with battery capacity, this UL requirement does not conflict with the CEC proposal.

Cost-effective design changes can be made to emergency egress systems to meet both the 15-day standards proposal as well as UL 924. The 15-day language requires the battery charger systems used by emergency egress applications to be charged more efficiently, and does not limit how the battery is discharged when under load by the egress lamps. By using technologies readily available for other battery chargers such as switch mode power supplies and hysteresis charging, batteries can be maintained to full performance with significantly less energy use while also meeting specifications

required under UL 924. Larger emergency egress lighting systems, such as those that can light an entire hallway or that have to operate for more than the typical 90 minutes, require larger batteries. The maintenance power allowed for these systems scales with the battery size, so these systems can meet the proposed 15-day language cost-effectively as well.

The savings associated with this product is significant, estimated to be 37 GWh or $5 million per year in California. These products will be allowed 5 years to comply, giving manufacturers of these important life-safety devices significant time to redesign products.

STAKEHOLDER CONCERN: Some multifunctional devices (MFDs) that print/scan/fax/copy contain rechargeable batteries to maintain memory and a clock. This is a secondary function, so these products should be exempted from the standard.

IOU RESPONSE: Multifunction devices with battery charger systems should remain within the scope of the standard. Rechargeable battery systems within these devices can be made compliant or alternative design approaches could be employed to eliminate the need for a battery charger system.

IOU research demonstrates that at least two approaches would reduce fixed losses associated with battery charging in MFDs and enable these devices to comply.

- Technologies used to reduce overall energy use of a battery charger system are cost-effective, even for smaller capacity batteries (for example, IOU engineering analysis of cordless trimmer presented at public workshop March 3, 2011[4]). The DOE test procedure indicates that all extra functions should be turned off for the purposes of the test, so that battery charger energy would be isolated for the purposes of the test.

- The battery charger system could be replaced by a primary (non-rechargeable) battery to power the clock and limited volatile memory for periods when the device is disconnected from ac power. A primary battery could last the entire lifetime of the device, not increasing waste or embodied energy associated with the battery when compared to the rechargeable system. Employing non-volatile memory of the type used in USB “memory sticks” does not require a power source and could further reduce the needed size (capacity) of the primary battery.

Thank you for the opportunity to provide comment on this important rulemaking.

Sincerely,

Pacific Gas and Electric Company
San Diego Gas & Electric
Southern California Edison
Southern California Gas Company

[4] http://www.energy.ca.gov/appliances/battery_chargers/documents/2011-03-03_workshop/presentations/Proposed_Standards_for_Battery_Chargers-Suzanne_Foster_Porter_and_Philip_Walters.pdf