



May 31, 2011

California Energy Commission  
Dockets Office, MS-4  
Re: Docket No. 09-AAER-2  
1516 Ninth Street  
Sacramento, CA 95814-5512

**DOCKET**  
**09-AAER-2**

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|-------|-------------|
| DATE  | MAY 31 2011 |
| RECD. | MAY 31 2011 |

Subject: Comments Regarding the Draft Proposed Amendments to the Appliance Efficiency Regulations for Battery Chargers, California Code of Regulations Title 20, Sections 1601 through 1608

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

Dear Commissioners:

Lester Electrical is a leading industrial and commercial battery charger manufacturer. Since 1963, Lester Electrical has been designing and manufacturing battery chargers and other electrical power conversion and storage products in Lincoln, Nebraska. Our engineering/manufacturing expertise and flexibility have made us an OEM and ODM supplier to industry-leading companies in all major electric vehicle/machine and stationary/reserve power markets. We are also one of the industry's highest volume manufacturers.

Thank you for the opportunity to comment on the Draft Proposed Amendments to the California Energy Commission Appliance Efficiency Regulations for Battery Chargers posted on May 10, 2011 and discussed during the Efficiency Committee Workshop on May 19, 2011. We would also like to thank the CEC and their staff for working with us throughout this process and their interest in and concern for our stakeholder feedback. Specifically, we would like to thank them for the changes that they have made that are reflected in the current Draft Proposed Amendments, such as the elimination of the power factor requirement for small battery chargers and the extension of the effectiveness date for non-consumer products, which are critical to ensuring that end users in the state of California continue to have the option to purchase high efficiency, high reliability, U.S. made transformer-based battery chargers, such as silicon-controlled rectifier (SCR) and ferroresonant, that currently account for a significant market share in the industrial and commercial markets in California. That being said, the Draft Proposed Amendment still requires a few modifications in order to accomplish this goal and not reduce U.S. battery charger manufacturing. We respectfully submit that following requests.

**Request #1: Modify the 24 hour charge and maintenance energy requirement for small battery charging systems with Eb of 1,000 Wh or greater.**

It is explained in the Workshop Notice posted on May 6, 2011 and reiterated in our conversations with CEC staff that increasing the stringency of the 24 hour charge and maintenance energy requirements for small battery charging systems more closely aligns the proposed regulations with the DOE approach to golf car battery chargers and mitigates the discontinuity at the point of transition between large and small battery chargers. However, the 24 hour charge and maintenance energy requirement for small battery charging systems with battery energy (Eb) of

*Battery Chargers | Electrical Power Conversion and Storage*  
625 West A Street | Lincoln, NE 68522-1794 | LesterElectrical.com  
P: 402.477.8988 | F: 402.441.3727, 402.474.1769 (Sales)

1,000 Wh or greater of  $(122 + 1.4 * Eb)$  results in required battery charger efficiencies both (1) higher than the efficiency requirement of 89 percent for large battery chargers and (2) not technically feasible with transformer-based battery charger technologies. The following table presents efficiency percentage data for common small battery charger applications with battery energy of 1,000 Wh or greater.

| <i>Current Equation in Draft Proposed Amendments: <math>Eb / (122 + 1.40 * Eb)</math></i> |                         |        |       |        |                   |                                                           |                                         |
|-------------------------------------------------------------------------------------------|-------------------------|--------|-------|--------|-------------------|-----------------------------------------------------------|-----------------------------------------|
| Application                                                                               | Battery                 | Ah, C5 | Volts | Wh     | System Efficiency | Battery Efficiency<br><i>Assumed Based<br/>on Testing</i> | Charger Efficiency<br><i>Calculated</i> |
| Floor Care                                                                                | Trojan L16              | 303    | 36    | 10,908 | 70.86%            | 78.00%                                                    | 90.85%                                  |
| Industrial Vehicles                                                                       | Trojan T-145            | 215    | 48    | 10,320 | 70.83%            | 78.00%                                                    | 90.81%                                  |
| Industrial Vehicles                                                                       | Trojan T-105            | 185    | 48    | 8,880  | 70.73%            | 78.00%                                                    | 90.69%                                  |
| Fleet Golf                                                                                | Crown CR-165            | 140    | 48    | 6,720  | 70.51%            | 78.00%                                                    | 90.40%                                  |
| Floor Care                                                                                | Trojan T-105            | 185    | 24    | 4,440  | 70.05%            | 78.00%                                                    | 89.81%                                  |
| Floor Care                                                                                | Trojan 30XHS            | 105    | 24    | 2,520  | 69.04%            | 78.00%                                                    | 88.51%                                  |
| Wheelchair                                                                                | MK Battery M24 SLD G FT | 63     | 24    | 1,512  | 67.54%            | 78.00%                                                    | 86.58%                                  |

Following the stated intent to align the proposed regulations with the DOE approach to golf car battery chargers, we recommend using the documented 24 hour charge energy efficiencies for golf cars (DOE Product Class 7) and wheelchairs (DOE Scaled Product Class 6), which is another high-volume application that both the CEC and DOE will regulate, to solve for “x” and “y” in the CEC 24 hour charge and maintenance energy equation of  $(x + y * Eb)$ . As it is explained in the CEC Workshop Notice posted on May 6, 2011, small battery chargers designed to charge high capacity batteries are already more efficient. For this reason, our recommendation is that DOE Candidate Standard Level (CSL) 0 be used as the target for the CEC 24 hour charge and maintenance energy requirement for small battery charging systems with battery energy of 1,000 Wh or greater.

For the reasons stated above, we request that the 24 hour charge and maintenance energy requirement for small battery charging systems with battery energy of 1,000 Wh or greater be modified such that the required battery charger efficiencies both (1) fall below the efficiency requirement for large battery chargers and (2) are achievable, both technically and practically, with transformer-based battery charger technologies.

**Request #2: Extend the effectiveness date for golf car battery charging systems to the date for non-consumer products of July 1, 2013.**

It is our understanding that golf car battery charging systems are being classified by the CEC as consumer products, and, as such, the effectiveness date for these systems will be July 1, 2012, instead of the extended effectiveness date of July 1, 2013 for non-consumer applications. Since the majority of new golf cars are sold to commercial or industrial businesses, primarily golf courses, we disagree with the classification of golf car battery charging systems as consumer products. Regardless, the design, testing, qualification, and deployment projects and schedules for golf car battery charging systems are significantly more extensive than most non-consumer OEM applications. The typical golf car manufacturer qualification program is over 2 years, which includes extensive field testing. Moreover, the battery charging systems are often integrated with other vehicle systems and components, which adds complexity.

Extending the effectiveness date for non-consumer applications was a critical change that is reflected in the current Draft Proposed Amendments. We request that the effectiveness date for

golf car battery charging systems be extended to the date for non-consumer products of July 1, 2013.

**Request #3: Exempt railroad applications from the proposed regulations.**

The battery charging systems used for railroad applications are specifically designed for these unique use cases, which, among other things, require durability; ruggedness; longevity; wide-ranging operating temperatures; lightning protection; and the flexibility to be used with multiple battery voltages, capacities, and chemistries. Railroad battery chargers are permanently connected to batteries and continuously float these batteries at a constant voltage in order both to ensure that they are fully charged when needed and to ensure that they achieve their rated life spans. Moreover, railroad battery chargers almost always serve as the primary DC power source in the system to operate public safety related equipment such as crossings and signals, and the batteries are only used in emergencies when AC power is lost. Therefore, any design change that could result in a loss of reliability is a concern.

The unique requirements for railroad battery chargers have resulted in very specific designs. These designs have been extensively tested in order to be qualified for railroad applications. Many railroad projects are deployed over the course of numerous years. For example, Positive Train Control (PTC) is a 2008 Federal Railroad Administration law requiring the deployment of collision-avoidance systems throughout the U.S. rail network, much of which resides in the state of California. The PTC law requires deployment by the end of 2015. In order to meet this deadline, most of the specific equipment required for PTC, including battery chargers, has already been specified. Deployment will take place through 2015, and a California requirement to test and qualify new battery chargers during this period would cause significant issues to the railroads operating in California and is a public safety concern.

Finally, a dual power supply architecture for railroad applications was proposed to us during a meeting with the CEC on March 3, 2011 as a potential solution to the maintenance power issues associated with battery chargers that are designed both to charge large battery sets after they have been discharged during a period of time when AC power is not available and to continuously float charge these same battery sets at low DC current levels. We completed and submitted our analysis of this proposed architecture, which identified both technical and practical issues.

For these reasons, we request that railroad applications be exempted from the proposed regulations.

Again, thank you for the opportunity to comment on the Draft Proposed Amendments. Please let us know if you have any questions regarding our comments or if we can be of any further assistance.

Best Regards,

Spencer Stock  
Product Marketing Manager  
Lester Electrical