



Information Technology Industry Council
Leading Policy for the Innovation Economy

DOCKET

09-AAER-2

DATE July 11 2011

RECD. July 11 2011

July 11, 2011

California Energy Commission
Dockets Office, MS-4
Re: Docket No. 09-AAER-2
1516 9th Street
Sacramento, CA 95814-5512

To Whom It May Concern:

On behalf of the members of the Information Technology Industry Council, ITI, a non-profit industry association located in Washington, DC, I am submitting the enclosed comments and recommendations for consideration relative to the rulemaking referenced above. These comments were originally submitted via email to Mr. Ken Rider on June 20, 2011. A subsequent electronic copy was sent to the Docket Unit via email.

We recognize and acknowledge that this submission is beyond the comment deadline. Nevertheless, we are sending this in the hope that the Commission will take it into consideration in developing appliance efficiency standards for battery charging systems.

ITI would welcome the opportunity to respond to any questions that the Commission may have, as well as to provide additional details, if that would prove useful.

Thanks and regards,

Ken J. Salaets
Director, Global Policy
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202-626-5752

ATTACHMENT

Battery Charging Specifications and Computing Devices

Recommendations of the
**Information Technology
Industry Council**

June 16, 2011

Battery Charger Specification Proposal

Problem statement

CA CEC and US DOE have introduced test methods and limits which do not fully account for non-battery charging losses

Issues

- Penalizes integrated products which have non-battery off-mode losses
 - Computer Off-WOL (worst case 0.7W adder to off, enterprise SKUs use to load OS images)
 - Expect other industries have similar issues (this is a horizontal regulation)
 - E.g. cell phones have non-battery-charging functions powered in the “off” condition
- Current testing methodology for “no battery mode” does not provide a consistent measurement across products which will impact the measurement outcome
 - Measures EPS “No load power” for some devices
 - Measures a true “off power” for other devices

Proposal

- Modify testing, equation, limit methodology to subtract out “off-mode” losses
 - Greatly simplifies testing methodology across products
 - Eliminates errors due to non-battery charging losses for integrated battery charger systems
- Remove modal limits for “no_battery” and maintenance mode (redundant or out of scope)
 - If CEC/DOE proceeds, then they should base limits on existing horizontal regulations the industry is already design to (worst case across manufacturing distributions and SKUs)

California Energy Commission Ruling/Specification Update

- *Amendment to the specification is a proposal to be closed before July'11.*
- *Computing devices are part of “small” battery chargers*
- *Typical mobile computing devices are <<100 Wh*
- *2 limits:*
 - *24hr charge/maintenance*
 - *Sum of maintenance power and no battery power*

- (2) Small Battery Chargers that are consumer products and are manufactured on or after July 1, 2012 shall meet the applicable performance values in Table W-2.
Small battery chargers that are not consumer products and are manufactured on or after July 1, 2013 shall meet the applicable performance values in Table W-2.

EXCEPTION to Section 1605.3(w)(2): A small battery charger that is made available by a manufacturer directly to a consumer or to a service or repair facility, after and separate from the original sale of the product, that requires the battery charger as a service part or spare part, shall not be required to meet the standards in Tables W-2 until July 1, 2017

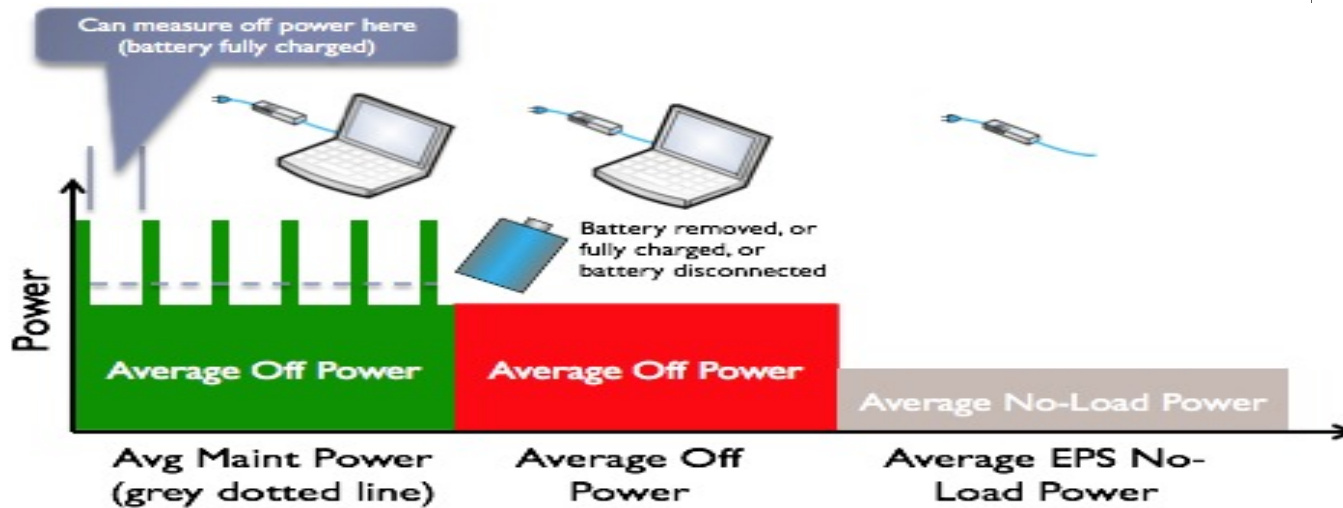
Table W-2
Standards for Small Battery Chargers

<u>Performance Parameter</u>	<u>Standard</u>
<u>24 hour charge and maintenance energy (Wh)</u>	For E_b of 100 Wh or less $(12 + 1.6E_b) \times N$
<u>(E_b = average battery capacity of all batteries in ports and N = number of ports)</u>	For E_b of between 100 and 1000 Wh $(22 + 1.5E_b) \times N$
	For E_b of 1000 Wh or greater $(122 + 1.4E_b)$
<u>Maintenance Mode and No Battery Mode.</u>	<u>The sum of maintenance power and no battery power must be less than or equal to:</u> <u>$(1 + 0.0021 \times E_b) \times N$ Watts (N = number of ports)</u>

Reference: Draft proposed Amendments to Appliance Efficiency Appliances, California Code of Regulations Title 20, Section 1601 Through 1608. 2011 Appliance Efficiency Rulemaking, Phase II Battery Chargers and Lighting Controls. May 2011, CEC-400-2011-005-SD

CEC Specifies 2 Limits: 24hr Charge/maintenance and the Sum of Maintenance and No_Battery Power

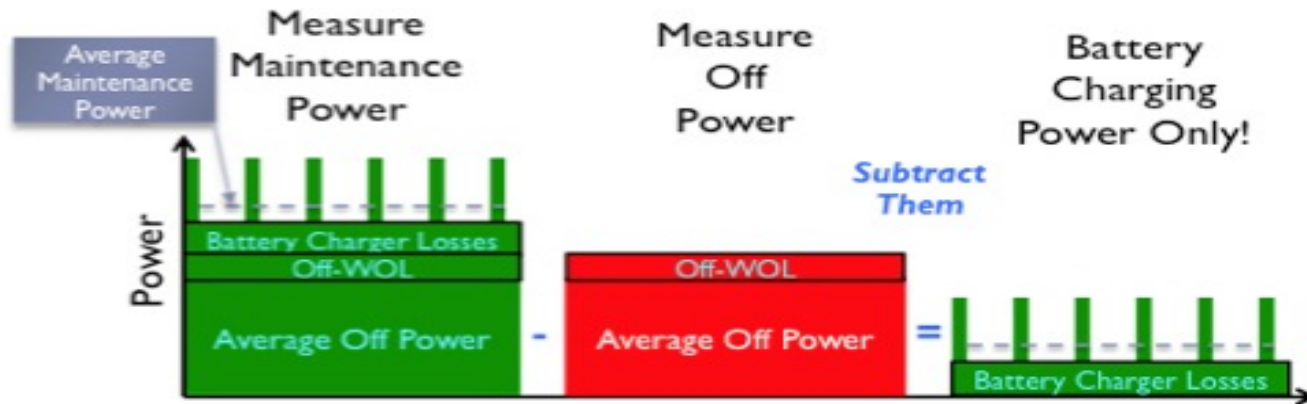
Power Definitions



- Current Testing Methodology is not consistent in its measurement of “no battery mode”
 - Spec measures “Off mode” (notebooks) or “EPS No-load mode” (other devices) depending on the device
 - Intent is to distinguish the various power modes needed to measure compliance
 - Green represents Maintenance power over time (dashed line represents the avg. maintenance power)
 - Want to measure this
 - Red representing the average off mode power of the device
 - Want to measure this
 - Grey representing the no-load power of the AC brick
 - Has nothing to do with the efficiency of battery charging system and is already included in the “off power”

Test Method Needs to Isolate Off Power

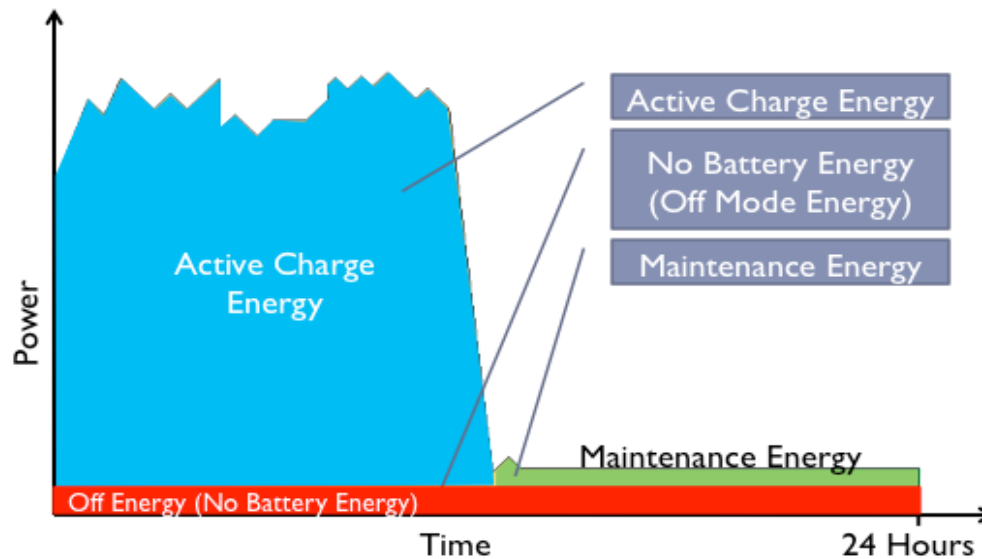
Why is this important?



- If you measure the Maintenance Power (green)
 - Includes non-battery related off mode losses due to anything (e.g. Off-WOL, ...)
 - Includes “battery charger losses”
 - Losses due to charging
 - Losses due to maintaining battery
- If you measure the “true” off power
 - Includes non-battery related off mode losses due to anything (e.g. Off-WOL, ...)
 - Does not include “battery charger losses”
- If you subtract the two, then only **the battery related power** is left (**what the CEC/DOE wanted !**)
 - Does not work with “no-load” power (this is not off power)
 - Allows you to totally ignore impact of non-battery charger related off mode losses
 - Versus complicating with “limit adders” or “energy subtract’ers” for special cases (e.g. WoL for computers)

Subtracting System Off Power Isolates Battery Charging Power

Change 24 hour Energy Calculation



- Calculating 24 hour Battery Charging Energy
 - Measure the 24 hour energy
 - Measure the “off power” (or the “true” no battery mode power)
 - Subtract the “off energy” ($24\text{hr} \times [\text{off power}]$, the red block)
- This value should be less than the established 24 hour battery charging limit

Change 24hr Energy Calculations to Focus on Battery Charging

Change the No-Battery Mode Test Method

- Devices with integrated battery have many options to measure off or “no battery” mode
 - Remove the battery (90% of notebooks have removable batteries)
 - Removes the possibility of the charging circuit from kicking in
 - OR
 - Measure the off power with a fully charged battery
 - The self-discharge of batteries is very slow, so making a 5 minute measurement of a fully charged battery will come very close to the off mode power

Additionally,

- Create special test cases for battery chemistries which have fast discharge rates (where the charge might kick-in within the 5 minute measurement period)
- EPS No-load power is ***not*** representative of system off power

Change No-Battery Mode Test to “Off” Power Test

UPS Systems

- UPS Systems represent IT Equipment that does not charge and discharge daily.
- UPS Systems are powered on constantly where energy consumption is to support features and maintain battery charge
- Recharge of UPS batteries are infrequent and only after power outages.
- Charger power in UPS systems (especially for >100Wh systems) are not easily or safely measured directly
- For systems >100Wh, we recommend focusing on the incremental maintenance power in lieu of 24hr operating limits. (see “Calculating 24 Hour BCS Energy and Setting Limits”)

Calculating 24 Hour BCS Energy and Setting Limits

Without Non-BCS Off mode Losses

Calculating Device's 24 hour BCS Energy

- Subtract out the “No battery mode” (off) energy

$$[24 \text{ hour BCS energy}] = [\text{Measured 24 hour energy}] - [\text{No battery power}] * 24\text{hr}$$

Calculating Device's 24 hour BCS Energy Limit

- For devices $\leq 100\text{Wh}$ (all mobile computers), use the maintenance power above “No Battery Mode Power” (or off mode power) of 300mW:

$$[24 \text{ hour BCS energy}] \leq [0.3 * 24 + 1.6 * E_b] * N = [7.2\text{Whr} + 1.6 * E_b] * N$$

- For devices with chargers $> 100\text{Wh}$ (e.g. UPS), the incremental maintenance power (P_{mincr}) allocation should scale with charging capacity (P_{cc})
- Devices with chargers $> 100\text{Wh}$ are systems where the 24hr energy is spent in maintenance only. In addition, testing the re-charge of such systems may not be practical. The specification of such systems should just focus on P_{mincr}

$$[24 \text{ hour BCS energy}] \leq [P_{\text{mincr}} * 24 + 1.6 * E_b] * N; \text{ where } P_{\text{mincr}} \leq a + \% * P_{\text{cc}}$$

Reset 24hr BCS Calculations and Limits Without Off Energy

Maintenance and Off Power Mode Limits

- **Don't think these are needed!!**
 - Maintenance power is what it is, and efficiency is already covered in the 24 hour BCS Energy equation and Limits.
- However, if CEC/DOE feels they **MUST** add these limits, then
 - Base them on existing Off mode limits the industry is already **designing** to (can meet across a manufacturing distribution)
 - (EC) No 1275/2008 is a horizontal off mode (i.e. not including battery functions) regulation
 - Pre 2013 $\leq 1W$
 - Post 2013 $\leq 0.5W$
 - If we limit maintenance power to 300mW above “No Battery Mode” (off) Power
 - Pre 2013 Limits:
 - No Battery power $\leq 1W + WoL$
 - Maintenance power $\leq 1W + 0.3W \leq 1.3W + WoL$
 - No Battery + Maintenance Limit $\leq 1W + 1.3W + 2*WoL \leq 2.3W + 2*WoL$
 - Post 2013:
 - No Battery power $\leq 0.5W + WoL$
 - Maintenance power $\leq 0.5W + 0.3W + WoL \leq 0.8W + WoL$
 - No Battery + Maintenance Limit $\leq 0.5W + 0.8W + WoL \leq 1.3W + 2*WoL$

Maintenance and Off Power Limits Are Unnecessary and Complex

Summary

- Fix the power definitions and how to test “no-battery mode” such that measurements are consistent across devices
- Subtract out “No Battery Mode” (Off mode) power from 24hr limits. This eliminates non-battery charging off mode issues, and simplifies the testing and limits
- Eliminate modal power limits for “No Battery Mode” (Off mode) and “Maintenance Mode” power. These are unnecessary and redundant.

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