Appliance Standards Awareness Project
Alliance to Save Energy
American Council for an Energy-Efficient Economy
Consumer Federation of America
Northeast Energy Efficiency Partnerships
Northwest Energy Efficiency Alliance

May 29, 2012

Ms. Brenda Edwards
U.S. Department of Energy
Building Technologies Program
Mailstop EE-2J
1000 Independence Avenue, SW
Washington, DC 20585-0121

**RE: Docket Number EERE-2008-BT-STD-0005: Notice of Proposed Rulemaking for Battery Chargers and External Power Supplies**

Dear Ms. Edwards:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), Alliance to Save Energy (ASE), American Council for an Energy-Efficient Economy (ACEEE), Consumer Federation of America (CFA), Northeast Energy Efficiency Partnerships (NEEP), and Northwest Energy Efficiency Alliance (NEEA) in response to the Department of Energy (DOE) notice of proposed rulemaking (NOPR) for battery chargers and external power supplies. 77 Fed. Reg. 18478 (March 27, 2012). We appreciate the opportunity to provide input to the Department.

The California Energy Commission (CEC) set standards for battery chargers in January 2012, which the CEC found would achieve large energy savings and would be very cost-effective for consumers.[1] In these comments, we focus on the battery chargers which DOE has categorized into Product Classes 2-6 because the proposed standards for these categories fall significantly short of the CEC standards and chargers in these classes make up more than 75% of battery charger shipments. For these product classes, DOE failed to analyze the CEC levels. In an attempt to compare the DOE proposed levels to the CEC levels, DOE characterized certain DOE-evaluated levels as representative of the CEC levels. But, in some cases the levels DOE equates to the California levels are more stringent by a considerable margin. Furthermore, there are serious flaws in DOE's cost-effectiveness analysis, which we outline in these comments. We believe that a revised analysis which corrects these flaws and considers levels equivalent to those adopted by the CEC will find that standards at least as strong as those adopted by the CEC for Product Classes 2-6 are cost-effective for consumers.

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[1] The CEC found that after stock turnover, the standards for "small charger systems" would save more than 1,800 GWh annually in California and that the consumer benefit:cost ratio was greater than 7:1. http://energy.ca.gov/2011publications/CEC-400-2011-001/CEC-400-2011-001-SF.pdf. p. 12.

**DOE's proposal for battery chargers risks increasing national energy consumption.** DOE must evaluate whether the standards the Department ultimately adopts will actually save energy relative to the base case. Because the battery charger standards proposed by DOE in the NOPR are significantly weaker than the CEC standards for the major product classes, adoption of the standards in the NOPR may actually result in increased national energy consumption compared to no DOE action and reasonable compliance nationally with the CEC standards. If the California standards are not preempted by weaker federal standards, many manufacturers will simply choose to comply with the California standards on a national basis rather than incur the expense of separate product lines for California and the rest of the nation. Because the cost to manufacture products compliant with the California standards is low relative to the total finished product price for most products containing a battery charger, manufacturers cannot gain a significant cost advantage by maintaining inefficient product lines for sale outside of California. In addition, in the past, once California has established standards for other products, typically several others states adopt like standards within a few years. For example, after California adopted standards for automatic commercial ice makers, another five states adopted similar standards. After California adopted standards for bottle type water dispensers, another seven states adopted similar standards. Proliferation of California standards to other states has been borne out for about twenty product categories over the past decade as detailed at http://www.appliance-standards.org/sites/default/files/State_status_grid_MAR_2012_1.pdf. The strong likelihood of additional states copying the California standard would further increase the incentive for manufacturers to comply with the CEC standards on a national basis.

For the main analysis in the NOPR, DOE assumed 0% compliance with the CEC standards outside of California.[2] Such an extreme assumption has no basis in the record. We suggest that DOE examine scenarios of 100%, 75% and 50% incremental compliance with the CEC standards outside of California. The 100% scenario would represent one in which multiple states adopt the California standards and the 50% scenario represents a scenario in which manufacturers find that product cost savings in some categories outweigh the costs of maintaining separate product lines for some states. We believe these scenarios would effectively bound the likely outcomes and provide a reasonable basis for evaluating the potential impact of DOE standards on national energy savings. In its final decision-making, DOE must ensure with a very high degree of confidence that the final standard does not increase national energy consumption.

**Significant additional national energy savings and consumer savings are at stake.** The table below shows the difference in national energy savings over 30 years and annual electricity bill savings in 2020 between DOE's proposed standards for battery chargers and the levels that are closest to the CEC standards for Product Classes 2-6. For these five product classes, the additional national energy savings that would be achieved from adopting standards similar in stringency to the CEC standards compared to DOE's proposed standards are almost 1 quad.[3] By 2020, the additional annual electricity bill savings for consumers and businesses are $300 million.[4] While significant additional analysis may be necessary to correct the flaws in DOE's

[2] 77 Fed. Reg. 18545.
[3] National energy savings from the CEC standards come from Table V-84 of the NOPR, which shows national energy savings from the CSLs that best approximate the CEC standards. 77 Fed. Reg. 18609.
[4] U.S. DOE. 2012. National Impact Analysis Workbook. http://www1.eere.energy.gov/buildings/appliance_standards/docs/bceps_nia_nopr.xlsm.

analysis, we believe that this additional analysis is warranted given the large national energy savings and consumer savings at stake.

| Battery Charger Product Classes 2-6 | | | | | | |
|---|---|---|---|---|---|---|
| Product Class | National Energy Savings Over 30 Years (quads) | | | Annual Electricity Bill Savings in 2020 ($million) | | |
| | DOE NOPR | CEC Standard | Difference | DOE NOPR | CEC Standard | Difference |
| 2 | 0.14 | 0.59 | 0.45 | $44.3 | $191.8 | $147.5 |
| 3 | 0.05 | 0.17 | 0.12 | $17.5 | $56.7 | $39.2 |
| 4 | 0.12 | 0.30 | 0.18 | $39.0 | $96.3 | $57.3 |
| 5 | 0.52 | 0.67 | 0.15 | $165.4 | $214.4 | $49.0 |
| 6 | 0.08 | 0.11 | 0.03 | $25.0 | $34.9 | $9.9 |
| **Total** | **0.91** | **1.84** | **0.93** | **$291** | **$594** | **$303** |

**DOE did not evaluate the California standard levels for battery chargers.** DOE typically includes candidate standard levels based upon existing efficiency programs, such as Energy Star or the levels established by the Consortium for Energy Efficiency. It is unusual for DOE to have a rulemaking for which existing state standards are in place, but we believe that DOE must consider a package of CSLs that closely approximate the CEC standards. Although DOE describes various CSLs as similar to the California standards, the actual levels are very different in some cases. The table below shows the annual energy consumption at each CSL level and the CEC standard expressed in terms of annual energy consumption for Product Classes 2-6 based on battery energies that correspond to DOE's representative units in each product class.[5] The CSLs that are closest to the CEC standards are highlighted.[6] As shown in the table, for Product Classes 2-6, the absolute percentage difference between the CEC standard and the CSL that most closely represents the CEC standard ranges from 16% to 52%. For the final rule, DOE must evaluate standard levels that better approximate the California standards.

| Product Class | Battery Energy (Wh) | Annual Energy Consumption (kWh/yr) | | | | | % Difference Between CEC Standard and Closest CSL |
|---|---|---|---|---|---|---|---|
| | | CSL 0 | CSL 1 | CSL 2 | CSL 3 | CEC Standard | |
| 2 | 2.8 | 8.6 | 6.5 | **3.0** | 1.0 | 2.2 | **-35%** |
| 3 | 9.5 | 11.9 | 4.7 | **0.8** | 0.8 | 1.8 | **52%** |
| 4 | 16.5 | 37.8 | 10.7 | **4.3** | 3.2 | 5.2 | **16%** |
| 5 | 800 | 82.5 | 58.2 | 29.8 | **15.4** | 19.7 | **22%** |
| 6 | 400 | 120.6 | 81.7 | 38.3 | **16.8** | 33.1 | **49%** |

[5] Annual energy consumption at each CSL level was calculated based on the compliance formulas for unit energy consumption as shown in tables 5-72 – 5-76 of the TSD. pp. 5-154 – 5-155. Annual energy consumption for the CEC standards was calculated based on the unit energy consumption (UEC) equation for determining compliance. 77 Fed. Reg. 18648. E24, Pm, and Psb for the UEC equation were calculated based on the CEC standards assuming that 2/3 of the combined maintenance and no-battery mode power is allocated to maintenance mode and the remaining 1/3 is allocated to standby mode. The CEC standards are shown in Table W-2 at http://energy.ca.gov/2011publications/CEC-400-2011-005/CEC-400-2011-005-15-DAY.pdf.

[6] DOE shows the CSLs that best approximate the CEC standards in Table V-84 of the NOPR. 77 Fed. Reg. 18609.

**The general approach that DOE took for the engineering analysis for battery chargers is flawed.** For the battery charger analysis, DOE relied solely on teardowns to conduct the engineering analysis.[7] In order for this approach to be valid, at least the following two conditions must be met: (1) there must be minimal differences in the features of the evaluated products at different efficiency levels that are unrelated to efficiency (or,DOE must be able to accurately separate out costs due to improved efficiency from costs due to non-efficiency features); and (2) the higher-efficiency evaluated products must represent the lowest-cost ways to achieve those efficiency levels. For battery chargers, it does not appear that these two conditions have been met. Two battery chargers with different efficiency levels may also be of different size and weight and offer different features and functionality, which can have a significant impact on cost unrelated to efficiency. In addition, because battery chargers are components of end-use products and generally represent a small portion of the total cost of the product, design changes that improve efficiency are generally not conducted for the sole purpose of improving efficiency and therefore often do not represent the least-cost way to achieve a given efficiency level.

DOE routinely conducts teardowns as part of the engineering analysis for standards rulemakings, but only relies solely on teardowns for certain products where such an approach is valid. DOE relied on teardowns to develop the cost-efficiency relationship in the recent rulemaking on residential central air conditioners and heat pumps. In the case of central air conditioners and heat pumps, it is possible to reasonably identify models that only differ in terms of efficiency and are otherwise virtually identical. DOE noted in the Technical Support Document (TSD) for central air conditioners and heat pumps that "the selected products have minimal product features or options that add cost without affecting product efficiency."[8] In addition, given the significant contribution of space cooling energy use to total home energy use, efficiency is a key product feature of central air conditioners and heat pumps and product efficiency is clearly differentiated in the market. Therefore, to compete in the market, manufacturers must strive for the lowest-cost ways to achieve higher efficiency levels. In contrast, battery charger efficiency is not clearly differentiated in the market, and efficiency is generally a by-product of other performance-related features.

For the recent rulemaking on residential clothes washers, DOE conducted teardowns to identify technology options for improving efficiency, but did not rely solely on teardowns to develop the cost-efficiency relationship but rather used the teardowns to inform inputs to a cost model. DOE started with a baseline unit and added in the observed changes associated with improving efficiency at each higher efficiency level. DOE noted that "by doing this, DOE excluded the costs of any non-efficiency related components from the more efficient units. The more efficient units are generally sold at a higher price point, and sometimes include more complex displays or

[7] There are two exceptions—Product Classes 1 and 10—where DOE relied on manufacturer interviews to develop the cost vs. efficiency relationship. Technical Support Document. p. 5-86.

[8] U.S. DOE. 2011. Technical Support Document: Energy Efficiency Program for Consumer Products: Residential Central Air Conditioners, Heat Pumps, and Furnaces. http://www1.eere.energy.gov/buildings/appliance_standards/residential/residential_furnaces_central_ac_hp_direct_final_rule_tsd.html. p. 5-16.

other user interface features that are not necessarily efficiency-related."[9] For the battery charger analysis, DOE relied solely on the bill of materials (BOM) data to develop the cost-efficiency relationship, which meant that non-efficiency related costs could not be accurately excluded from the cost to improve efficiency.

For the clothes washer analysis, DOE also solicited cost-efficiency information from manufacturers. DOE found that the manufacturer estimates of incremental costs were actually significantly lower (in some cases as much as a factor of 3-5 lower) than the costs from DOE's reverse-engineering analysis. In attempting to explain this result, DOE noted that "manufacturers may be aware of additional methods to increase efficiency at a lower cost than the technology options observed in the reverse engineering analysis."[10] This result illustrates the limitations of teardown analyses as a modeling tool. Even though clothes washer efficiency is differentiated in the market and clothes washers have been subject to efficiency standards for many years, teardowns did not provide DOE with the necessary information to identify the lowest-cost ways of reaching higher efficiency levels. We would expect the limitations of teardown analyses to be greatly exacerbated for battery chargers since battery chargers are components of end-use products and efficiency is not a feature that is marketed to consumers.

DOE's engineering analysis for battery chargers, which relied solely on teardowns for the key product classes, has not uncovered the actual incremental cost of improving efficiency. While the teardown analysis has identified a range of efficiency levels available in the market for each product class, the analysis has not identified the <u>lowest-cost</u> ways of achieving those efficiency levels. We believe that there are at least two examples of how DOE's flawed approach has overestimated the incremental cost to improve efficiency:

1. This rulemaking also covers new standards for external power supplies (EPSs). EPSs are a component of battery charger systems as well as other products. DOE's analysis for EPSs showed that levels represented by "best-in-market" units are cost-effective for consumers, and DOE has proposed to adopt those levels as the new minimum EPS standards. However, because EPSs at these efficiency levels only represent a tiny fraction of the current market, it is unlikely that the EPSs that are part of the battery chargers that DOE tore down are "best-in-market" EPSs. Therefore, DOE's analysis has likely failed to capture the impact of high-efficiency EPSs as a low-cost option for improving efficiency.
2. One option for improving efficiency is to switch from a nickel-chemistry battery charger to a lithium-ion charger. However, the motivation in the current market for this switch is mostly unrelated to efficiency and instead due to the additional benefits that lithium chargers provide including reduced size and weight. Therefore, while switching from nickel to lithium-ion batteries represents a technology option to improve battery charger efficiency, this does not necessarily represent the <u>lowest-cost</u> option for improving efficiency. For example, we would expect manufacturers seeking a low-cost compliance route to apply more-efficient power supplies and improved charge control to nickel chemistry batteries before considering the more expensive lithium-ion option.

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[9] U.S. DOE. 2012. Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Residential Clothes Washers. http://www1.eere.energy.gov/buildings/appliance_standards/residential/rcw_direct_final_rule_tsd.html.. p.5-56.
[10] *Ibid*. p.5-57.

In sum, the market delivers improved efficiency as a by-product of battery charger designs valued by consumers because they are smaller and lighter weight and/or provide additional functionality. Efficiency delivered as a by-product of other valued features is not likely to represent the lowest-cost method of efficiency improvement.

**There are serious flaws in DOE's analysis for Product Classes 2-6.** Below we describe the flaws in DOE's analysis for individual product classes and our recommendations for how DOE's analysis should be revised.

<u>Product Class 2 (e.g. cell phones, cordless phones, digital cameras)</u>

For Product Class 2, DOE is proposing to adopt CSL 1 while the DOE level closest to the CEC standard is CSL 2.[11] DOE notes in the TSD that the majority of products tested in Product Class 2 have a battery energy less than 5 Wh.[12] Active mode battery charger efficiency tends to increase with battery energy. The representative unit for CSL 0 in Product Class 2 has a low battery energy (3.0 Wh) and also a very low 24-hour efficiency (6%).

Ecova (formerly Ecos), on behalf of the California IOUs, conducted a teardown and redesign of a battery charger for a beard trimmer with a battery energy of about 1.5 Wh, which falls in Product Class 2. As shipped, the charger exceeded CSL 2 and had a 24-hour efficiency of 13%. Simply by replacing the charger's Level IV EPS with a Level V EPS, the 24-hour efficiency increased to 18%.[13] The units that DOE analyzed for CSL 2, which also have a battery energy of 1.5 Wh, have an active mode efficiency of only 8%.[14] Due to the low battery energy of the units in Product Class 2, the 2.5 W EPS unit in Product Class B analyzed for the EPS analysis is the best representation of EPSs for battery chargers in Product Class 2. The difference in EPS active mode efficiency between the current DOE standard and the best-in-market unit is especially significant for these low-output-power EPSs as the current standard is much lower for low-output-power EPSs compared to higher-output-power units. The table below shows the active mode efficiency levels analyzed for the EPS analysis for the 2.5 W unit.[15] DOE has proposed to adopt CSL 3, which has an active mode efficiency that is 15 percentage points higher than that of the current DOE standard. It appears that simply applying the EPS which DOE has determined to be cost-effective in the EPS analysis would achieve CSL 2 for this product class.

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[11] 77 Fed. Reg. 18609.
[12] Technical Support Document. p. 5-97.
[13] http://energy.ca.gov/appliances/battery_chargers/documents/2011-03-03_workshop/presentations/Proposed_Standards_for_Battery_Chargers-Suzanne_Foster_Porter_and_Philip_Walters.pdf. Slides 22-23.
[14] Technical Support Document. p. 5-98.
[15] 77 Fed. Reg. 18518.

| EPS Product Class B- 2.5 W Unit | |
|---|---|
| **CSL** | **Active Mode Efficiency (%)** |
| 0 | 58.3 |
| 1 | 67.9 |
| 2 | 71.0 |
| 3 | 73.5 |
| 4 | 74.8 |

In addition, as the California IOUs show in their comments, the output power of an EPS that is part of a battery charger in Product Class 2 is likely to be even lower than 2.5 W and closer to 0.1 W or 0.3 W. At these levels, a best-in-market EPS is 2-4 times more efficient in active mode than an EPS that just meets the current standard.

By relying solely on teardowns of existing products in the market to conduct the engineering analysis, DOE appears to have missed improved EPS efficiency as a low-cost way to reach higher battery charger efficiency levels for Product Class 2. This is not surprising given that in 2009, 84% of EPS shipments in Product Class B in the 0-10.25 W range were at the baseline efficiency level (CSL 0) and only 3% met CSL 3 (best-in-market).[16] DOE may have also missed other low-cost options to improve efficiency such as simple improved charge termination strategies. **Therefore, we urge DOE to revise the analysis for Product Class 2 to evaluate the lowest-cost ways to achieve higher efficiency levels, which will likely include improved EPS efficiency and simple improved charge termination strategies.**

In addition, for battery charger systems that include direct operation EPSs (e.g. most cell phones), DOE must assume that the baseline unit includes an EPS with an efficiency equivalent to the level that DOE ultimately adopts since at the time that the battery charger standards go into effect, direct operation EPSs that do not meet the new EPS standards will not be able to be sold. DOE must also evaluate best-in-market EPSs as a technology option to improve the efficiency of battery chargers that employ indirect operation EPSs (e.g. many digital cameras).

We also note that as the California IOUs explain in their comments in response to the NOPR, there appear to be significant errors in the bill of materials (BOM) data used to represent manufacturer selling price (MSP) which erroneously increased the MSP for CSL2. Finally, as shown above, the CEC standard for Product Class 2 falls in between CSL 2 and CSL 3. **We urge DOE to evaluate an intermediate level between CSL 2 and CSL 3 that is closer to the CEC standard.**

Product Class 3 (e.g. power tools, camcorders, portable DVD players)

For Product Class 3, DOE is proposing to adopt CSL 1 while the DOE level closest to the CEC standard is CSL 2.[17] (We note, however, that CSL 2 is considerably more demanding: it allows less than half the annual energy as the CEC level). DOE's description of the units analyzed for Product Class 3 notes that the CSL 0 unit was designed to charge nickel-cadmium batteries while

[16] Technical Support Document. p. 3-30.
[17] 77 Fed. Reg. 18609.

the CSL 2 unit operates with lithium ion batteries.[18] Battery chargers for lithium-ion batteries are typically more efficient than chargers for nickel chemistry batteries since lithium batteries cannot tolerate overcharging, which means that chargers for lithium batteries must limit the power flowing to the battery once the battery is fully charged. There is currently no market driver to encourage high-efficiency chargers for nickel batteries, while sales of high-efficiency lithium-based chargers are increasing significantly because of the benefits other than efficiency that lithium chargers provide—in particular the ability to provide the same service with a much smaller and lighter battery charger system. Therefore, it is not surprising that the high-efficiency battery charger systems identified by DOE use lithium batteries. However, it is important to recognize that while switching from nickel to lithium-ion batteries represents a technology option to improve battery charger efficiency, this does not necessarily represent the lowest-cost option for improving efficiency. **We urge DOE to revise the analysis for Product Class 3 by evaluating the lowest-cost ways to achieve higher efficiency levels, which will likely include improved EPS efficiency and simple improved charge termination strategies with a nickel chemistry battery.**

In addition, for Product Class 3 there is no CSL that is very close to the CEC standard. As shown above, the annual energy consumption for the representative unit at CSL 2 is about 0.8 kWh while the annual energy consumption that reflects the CEC standard is closer to 1.8 kWh (i.e. more than double CSL 2's allowance). In addition, there is a very large gap between the annual energy consumption for CSL 1 and CSL 2 for the Product Class 3 representative unit—the annual energy consumption at CSL 1 is more than five times greater than the annual energy consumption at CSL 2. **We urge DOE to evaluate an intermediate level that is closer to the CEC standard.**

Product Class 4 (e.g. notebook computers, professional power tools)

For Product Class 4, DOE is proposing to adopt CSL 1 while the CEC standard is best represented by CSL 2.[19] DOE shows an incremental manufacturing selling price (MSP) of about $6 to go from CSL 1 to CSL 2. As the California IOUs explain in their comments, this large incremental cost seems to be a result of averaging the costs of three separate units for CSL 2, one of which (a handheld vacuum) has a cost that is about three times the cost of the other two units (a notebook computer and a power tool). We did not find any explanation in either the NOPR or TSD as to why the cost of the battery charger for the handheld vacuum was so much higher than that of the chargers for the other two units or why it made sense to average the costs of these three units to represent the lowest-cost way to improve efficiency. **At a minimum, DOE should exclude the handheld vacuum unit from the calculation of the cost to achieve CSL 2 for Product Class 4 as the cost of the battery charger for this vacuum unit clearly does not reflect the lowest-cost design to improve efficiency.**

Ecova, on behalf of the California IOUs, conducted a teardown and redesign of a battery charger for a power tool which falls in Product Class 4. As shipped, the charger met CSL 1. Ecova then improved the charge control and replaced the EPS with a Level V EPS. With these relatively simple changes, which are described in more detail in the California IOU comments, the

[18] Technical Support Document pp. 5-107, 5-109.
[19] 77 Fed. Reg. 18609.

efficiency improved from CSL 1 to CSL 2 with an estimated increase in MSP of less than $1—far less than DOE's estimate of $6. **We urge DOE to revise the analysis for Product Class 4 based on efficiency improvements similar to those implemented by Ecova to better reflect the actual cost to improve efficiency.**

<u>Product Classes 5-6 (e.g. marine/automotive/RV chargers, toy ride-on vehicles, electric scooters)</u>

For Product Classes 5 and 6, DOE is proposing to adopt CSL 2 while CSL 3 is closest to the CEC standard.[20] (As with PC 3, we note that the DOE level closest to the CEC levels is actually considerably more demanding than the CEC levels). DOE assumed the same incremental costs for Product Class 6 as for Product Class 5.[21] CSL 2 represents the best-in-market unit for these product classes while CSL 3 represents the max-tech unit. Since there are no products currently on the market with efficiencies equivalent to CSL 3, the cost data for CSL 3 is based on manufacturer interviews. The MSPs for CSLs 0-2 are all between $15 and $22 while the MSP for CSL 3 is $127.[22] DOE's description of the engineering changes to achieve CSL 3 include "incremental improvements to a SCR and switched-mode topology," "a relay," and "reductions in resistive losses."[23] It is not clear why these incremental changes would increase the cost of the battery charger by more than $100. **We urge DOE to reevaluate the incremental cost to achieve CSL 3 for Product Classes 5 and 6 and to clearly justify the incremental cost based on the associated engineering changes.**

Product Classes 5 and 6 are also cases where the CEC standard falls in between two CSLs—in these cases in between CSL 2 and CSL 3. As the CEC comments in response to the NOPR explain, while the 24-hour efficiency for CSL 3 for the Product Class 5 representative unit is similar to the CEC standard, CSL 3 assumes 0 W of maintenance mode power and 0 W of no-battery mode power[24] while the CEC standard allows for a combined maintenance mode and no-battery mode power of about 2.7 W.[25] (CSL 2 for the representative unit for Product Class 5 has a combined maintenance mode and no-battery mode power of 12.2 W, so the CEC standard still provides significant savings in maintenance and no-battery modes compared to CSL 2). Similarly, CSL 3 for Product Class 6 also assumes 0 W of maintenance mode power and 0 W of no-battery mode power. **For product classes 5 and 6, we urge DOE to evaluate intermediate levels that are closer to the CEC standard.**

**We support DOE's proposed standards for battery charger Product Classes 1, 7, 8, and 10.** For these four product classes, DOE found standard levels equivalent to or more stringent than the CEC standards to be cost-effective. For Product Class 8, as NRDC's comments point out, it may be appropriate for the standard to scale with battery capacity for larger-capacity chargers.

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[20] *Ibid*.
[21] Technical Support Document. p. 5-129.
[22] *Ibid*. p. 5-127.
[23] *Ibid.* p. 5-126.
[24] *Ibid*. p. 5-121.
[25] California Energy Commission. 2011. Proposed Amendments to Appliance Efficiency Regulations. 15-Day Language. http://energy.ca.gov/2011publications/CEC-400-2011-005/CEC-400-2011-005-15-DAY.pdf. Assuming a battery energy of 800 Wh.

**DOE should incorporate declining costs of lithium batteries in the battery charger analysis.** As detailed in the California IOU comments in response to the NOPR, numerous research analysts and market experts have forecasted a significant increase in sales and a significant decrease in costs of lithium batteries over a short timeframe. DOE should incorporate the decline in lithium battery costs that has occurred in recent years and that is projected to occur in order to more accurately reflect the costs of lithium-ion battery chargers.

**DOE's proposed standards for external power supplies will achieve large national energy savings and monetary savings for consumers and businesses.** DOE estimates that the proposed standards for EPSs would save 0.99 quads of energy over 30 years and would save consumers and businesses $0.79-$1.87 billion on a net present value basis.[26] By 2020, consumers and businesses would save more than $300 million annually on their electricity bills.[27] While DOE has proposed strong cost-effective standards for EPSs, we encourage the Department to consider the following two issues raised in NRDC's comments in response to the NOPR.

1. According to a major power conversion integrated circuit manufacturer, DOE has significantly overestimated the cost to meet the proposed EPS standards for Product Class B for the 2.5 W, 18 W, and 60 W units. As NRDC's comments note, costs of high-efficiency EPSs are declining rapidly, and DOE's cost estimates may reflect costs from a few years ago that are not representative of today's market. **We urge DOE to reevaluate the incremental costs for more-efficient EPSs to more accurately reflect the costs and benefits of the proposed EPS standards.**
2. NRDC's comments note that there is a large gap in active mode efficiency between CSL 3, which represents "best-in-market" EPSs, and CSL 4, which is the max-tech level. For the 60 W and 120 W representative units, there is a greater gap between CSL 3 and CSL 4 than there is between the EISA standard level and CSL 3. For Product Classes B, C, D, and E, DOE estimates that the proposed standards (TSL 2) would save 0.92 quads of energy over 30 years, while the max-tech levels (TSL 3) would save 1.60 quads.[28] Because of the large incremental energy savings of CSL 4 relative to CSL 3, significant additional savings could be achieved from an intermediate level that is only slightly more stringent than CSL 3. **We urge DOE to evaluate an intermediate level for EPS Product Class B between CSL 3 and CSL 4.**

**Additional analysis is warranted even if this means further delay.** DOE was required by statute to issue a final rule for battery chargers and external power supplies by July 1, 2011. We are disappointed that DOE has now missed its statutory deadline by almost a year. However, the significant energy savings at stake warrant the additional analysis that we have outlined in these comments even if this means further delay. As explained above, we believe that standards similar to the CEC standards for battery chargers would achieve greater cost-effective energy savings than the proposed standards in the NOPR, and that higher levels for EPSs may also be cost effective. Greater energy savings will be achieved over the long run from these higher levels than could be achieved from implementing the standards in the NOPR with a slightly earlier effective

[26] 77 Fed. Reg. 18485.
[27] U.S. DOE. 2012. National Impact Analysis Workbook. http://www1.eere.energy.gov/buildings/appliance_standards/docs/bceps_nia_nopr.xlsm.
[28] 77 Fed. Reg. 18590.

date. Therefore, we strongly urge DOE to correct the flaws in the analysis outlined in these comments to allow the Department to determine the standard levels that represent the maximum levels that are technologically feasible and economically justified.

Thank you very much for considering these comments.

Sincerely,

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