



1111 19th Street NW > Suite 402 > Washington, DC 20036
t 202.872.5955 f 202.872.9354 www.aham.org

November 21, 2011

Via E-mail and Hand Delivery

Mr. Harinder Singh
Mr. Michael Leao
Dockets Office, MS-4
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512
docket@energy.state.ca.us

DOCKET 11-AAER-2
DATE 11-21-11
RECD. 11-21-11

Re: Docket No. 11-AAER-2; 2010 Rulemaking Proceeding Phase II on Appliance Efficiency Regulations

Dear Mr. Singh and Mr. Leao:

On behalf of the Association of Home Appliance Manufacturers (AHAM), I would like to provide our comments on the California Energy Commission's (CEC) Proposed Amendments to Appliance Efficiency Regulations (October 2011) which propose amendments to Sections 1601 – 1608 of Title 20 of the California Code of Regulations (CCR), the Efficiency Standards for Battery Chargers and Lighting Controls, Staff Analysis of Battery Charger Standards (Staff Report), Docket No. 09-AAER-02; 2010 Rulemaking Proceeding Phase II on Appliance Efficiency Regulations (March 2011).

The Association of Home Appliance Manufacturers (AHAM) represents manufacturers of major, portable and floor care home appliances, and suppliers to the industry. AHAM's membership includes over 150 companies throughout the world. In the U.S., AHAM members employ tens of thousands of people and produce more than 95% of the household appliances shipped for sale. The factory shipment value of these products is more than \$30 billion annually. Last year, nearly 5 million major appliances were shipped to California alone. The home appliance industry, through its products and innovation, is essential to U.S. consumer lifestyle, health, safety and convenience. Through its technology, employees and productivity, the industry contributes significantly to U.S. jobs and economic security. Home appliances also are a success story in terms of energy efficiency and environmental protection. New appliances often represent the most effective choice a consumer can make to reduce home energy use and costs.

AHAM has been active in working with the CEC on both the test procedures for External Power Supplies (EPS) and Battery Charger Systems (BCS).¹ AHAM efforts were aimed at improving

¹ As we have stated in the past, battery charger systems are not external power supplies. External Power Supplies may be designed and sold as an end product by their component manufacturers. But battery chargers are designed uniquely to each application. It is not possible to completely redesign all models of battery chargers for a wide

the test procedure to make it more representative of the way the product is used by consumers, and to represent an accurate measurement of the energy savings potential. AHAM appreciates that CEC has attempted to address some stakeholder comments through changes in the proposed rule. AHAM agrees with some of the changes, as discussed below. But we continue to have concerns that the proposed standards levels will ban nickel based battery chemistries for some products. And the proposed standards may also have unintended consequences for products that have moderate watt-hour (Wh) usage (2.5 to 100 Wh).

In addition, please also find attached to our comments an analysis of the CEC Staff Report and Ecos Codes and Standards Enhancement (CASE) study. At this juncture –being in the official 45-day comment period, we feel it is important not only to provide comments in response to the proposed rule and its support documents, but also to analyze the data, assertions and conclusions therein. To that end AHAM, along with other industry stakeholders, commissioned the Berkeley Research Group (BRG) to conduct an analysis of the rule’s underlying documents. BRG’s report we submit as part of our written comments finds significant fault with both methodologies and conclusions found by the CEC and Ecos. Errors range from math miscalculations to CEC savings conclusions that get completely undone because of incorrect assumptions. As one example, CEC regulations on AHAM products such as personal care and portable electronics will result in approximately 5 GWh of energy loss and cost industry and consumers money. Not only are such results contrary to CEC’s stated aims with this rulemaking, they run contrary to requirements under the CEC’s legal requirements under California’s Warren-Alquist Act.

More on these and other concerns and observations are more fully described below.

Comments on the Draft Proposed Amendments

I. CEC’s Attempt to Pursue and Adopt the Battery Charger Regulation is Flawed in Many Ways.

A. The CEC Rulemaking Will Soon Be Largely Preempted by DOE.

We reiterate, yet again, that the U.S. Department of Energy (DOE) is engaged in a rulemaking that includes all of the same household appliances found within the scope of CEC’s proposed energy efficiency standards for battery chargers. Under the terms of the Energy Independence and Security Act (EISA) of 2007, DOE was to complete a rulemaking on Battery Chargers by July 2011. While the Department did not meet that deadline, it did finalize and issue its battery charger test procedure and the White House’s Office of Management and Budget is expected to conclude its review of DOE’s proposed final rule soon, which will clear the way for the DOE rule to become final soon after.

As we have previously stated, CEC should only consider a rulemaking on battery charges for those classes of products not being regulated by DOE. Neither CEC nor Ecos Consulting has presented accurate information to show that there would be additional (or any) benefits in CEC issuing its own rulemaking on battery chargers so close in time to final DOE standards,

variety of consumer products and have all these products tested by outside third-party energy and safety testing organizations in the amount of time suggested by the Draft Staff Report.

especially across the wide variety of consumer battery charger products used by many personal, kitchen, and floor care appliances. We are mindful of the need to save energy in California and other states, and we would argue there are a few ways to accomplish that aim that are already underway.

For one, industry does take advantage of DOE's ENERGY STAR program, creating high efficiency products for the marketplace. But second and more broadly, we support the more thorough approach of a DOE rulemaking which will impact the entire country and not through two parallel rulemakings at the state and federal level on essentially the same timeline for the same products. For example, CEC erroneously concludes that product redesign will only impact manufacturers once as, between the CEC and DOE standards (once the DOE final rule is published), manufacturers will choose to comply with the more stringent one (*See Staff Report, page 10*). What this assertion does not contemplate is how manufacturers will comply with a California standard for the time period *prior* to the effective date of the DOE rule. At that juncture (January 2013, as currently proposed), manufacturers will have to consider whether to retool to the CEC standard to continue to offer products there, or weigh the impact of suspending product offerings in California until the DOE effective date which will likely be only months later. This circumstance will burden manufacturers to be sure, but also California workers and consumers, who would consequently face reduced job and consumer choices.

At bottom, we believe the Staff Report does not seriously enough consider the ramifications of forcing manufacturers to contemplate needlessly retooling multiple times based on distinct rulemakings. **Dedicating limited monetary and other resources - especially as manufacturers already struggle to get through a weak economy - to a regulation that will soon be superseded by DOE is not a prudent use of CEC's (or anyone's) resources.** CEC should not, therefore, continue with this rulemaking process for battery chargers that are the subject of the DOE rulemaking.

B. The Proposed Effective Date Is Unreasonable and Unattainable.

The CASE report, which is dated October 2010, states that “the recommended compliance year for small standards is 2012, allowing manufacturers approximately two years to source components and adjust designs. Electronic product design cycles typically run anywhere from one to two years . . . , allowing ample time for small standard criteria to be built into product specifications.” (CASE report at 47, paragraph 8.1). The CEC's proposed January 2013 effective date reflects a serious mistake based on a narrow consideration of manufacturer's time needs for product redesign and retooling. The CASE report, the very report upon which CEC relies to justify the battery charger rulemaking, recommended two years for compliance—the date of 2012 in the report was based on a report dated and published in 2010. The CEC, however, has failed to adjust its effective date based on the CASE report recommendation.

Instead, the confluence of DOE's pending final rule and the CASE report's two-year recommendation should lead the CEC to (1) exercise an abundance of diligence to consider stakeholder input and integrity of the science supporting the Proposed Amendments; and (2) recognize that adequate time spent doing so requires a significant delay from November 30 proposed adoption hearing date. If CEC proceeds with its current course, it should further re-

consider the timeline based on the above comments, and the following elements. As we have repeatedly stated over the last year, we believe a more accurate and realistic timeline for change would include the following elements, at a minimum:

Organizational Impact Study (Parts, Costs and Vendor Analysis)	1 month
Engineering Concept Review (Includes engineering of new technology, and contact with potential suppliers)	4 months
Prototyping and Engineering Build (Includes evaluation of new battery technology)	3 months
Design and Drawings	1-2 months
Testing First Prototypes	1 month
Modify Design	2-3 months
Second Engineering Build and Test	2 months
Development of Molds and Fixtures	Concurrent 6 months
Pilot Lot Build	2 months
De-bug and Quality Assessment	2 months
Performance Testing of Pilot Lot units	6 months
Procurement of Parts	Concurrent 4 months
Safety Agency approvals (Includes safety and energy testing of all existing models as well as new)	4-6 months
Packaging and Shipping Evaluation	Concurrent 3 months
Final Review and production Planning	1 month
Production	***

Accordingly, if CEC proceeds with a battery charger energy efficiency standard, AHAM would suggest that, properly done, it would go into effect 30 months from the adoption date, which could not precede May 2014.

C. The Proposed Adoption Date is Evidence of CEC's Failure to Thoroughly Review, Analyze and Respond to Stakeholder Comments Directly or through Changes to the Proposed Rule's Provisions.

In light of current events contrary to the outcome in the last paragraph, we further argue that, by rushing forward with a November 30, 2011, adoption hearing date, the CEC is acting prematurely – both in consideration of DOE's pending rulemaking as discussed above, and also because it is highly unlikely that the CEC can adequately review and consider stakeholder input that should influence the final rule. Today's deadline for written comments is just 9 calendar days before the CEC purports to adopt a final rule. More interestingly, 4 of those 9 calendar days encompass not only a weekend but our national Thanksgiving holiday. While we at AHAM are very aware of the CEC staff's dedication to their work on this issue, for the Commission to assert that submitted written comments will be thoroughly digested, Commissioners informed, and adoption executed (in addition to 14 other hearing agenda items) over this 9-day national holiday period casts serious strains on credibility.²

We also note that the January 31, 2011, Data Request, asked for stakeholder data to be delivered by Friday, February 18. The request stated that "Energy Commission staff plans to release a Staff Report containing proposed battery chargers standards by mid-February of 2011." How could CEC request data by February 18, 2011, and then diligently use and digest the information when it stated an intent to publish a report with proposed battery charger standards by "mid-February;" and then in fact published that report on February 22? And all - again - *immediately following a three-day national holiday weekend?*

Taken together, these instances illustrate that the CEC should have allowed sufficient time to do a meaningful review of the data it received through workshop comments and the Data Request, including stakeholder meetings to discuss the data. And that the reviews could occur at times on the calendar other than nationally-celebrated holiday that limit the CEC's ability to consider the information it receives.

AHAM requested that CEC not prejudge the rulemaking and act before it was truly informed and prepared. This would include not issuing the Proposed Amendments or Staff Report; or waiting to hold a Staff Workshop until it has thoroughly reviewed all the stakeholder input it received. Instead, CEC has repeatedly scheduled workshops, published reports, proposed standards, and stated that it would at some point analyze the data submitted, and "if appropriate, make changes to the proposed regulations." Such behavior belies the open and transparent process called for under the Warren-Alquist Act and the California administrative procedure laws, and that which California constituents should expect and receive.

² We might add that this is not the first instance of the CEC's use of national holidays as part of a rulemaking process. Your October 2010 workshop was, in fact, held on what is another nationally-recognized government holiday – Columbus Day. So, without additional information, it could be a reasonable assumption that the CEC's habit is not to take very seriously its responsibility to receive and review stakeholder comments on pending proceedings.

II. The Standard for Small Battery Chargers, if Pursued, Should Be Based on a Single Requirement That Includes a Usage Factor.

CEC proposes to remove usage factor from the standard and to combine maintenance and no battery modes into one metric. AHAM strongly supports both proposals. AHAM continues to believe, however, that CEC's standard should be based on only one metric, which would combine 24 hour charge and maintenance energy with maintenance and no battery modes, and, importantly, include a usage factor. That is the approach DOE takes based on its Technical Support Document in Docket No. EERE-2008-BT-STD-0005 (TSD) and the final battery charger test procedure that becomes effective on November 28, 2011. Such an approach will give manufacturers more flexibility in deciding how best to meet the standard given their specific products, which will lead to increased innovation. And it will not decrease the energy savings for California because the total annual energy use is what is important. This integrated approach is consistent with many other appliance standards, and is the approach widely supported by various stakeholders.

The Warren-Alquist Act requires a usage factor—section 25402 (c) (1) states that the regulations shall be “based on a reasonable use pattern.” The Proposed Amendments only consider differences among different types of battery chargers by distinguishing between “large” and “small” products. To aggregate dozens of types of products into only two categories and average all information on usage is to negate the directive of the Act.

Accordingly, we strongly disagree with the CASE report determination carried over into the Staff Report (and not changed in the Proposed Amendments) that the issue of usage patterns is too complicated and should not be used to set energy standards. The CEC stated in its Draft Staff Report that “staff have concluded that the duty cycles, closely tied to consumer behavior, are likely to evolve with time and that standards based on specific duty cycles are not appropriate.” (See Staff Report, at page 10). In contrast, DOE has been able to recommend that usage patterns be used to set energy standards on Battery Chargers. And Appendix 7a of the DOE TSD has much of the information on the usage patterns of EPS and Battery Chargers that CEC information source Ecos claims cannot be obtained. We believe it is important to develop energy profiles and standards levels that are representative of the way that the product is actually used. There is considerable information in the DOE TSD on usage patterns, and we continue to encourage CEC to use this information, especially the Unit Energy Consumption (UEC) calculations and usage patterns in Appendix 7a, which has data on 67 External Power Supplies and 57 Battery Chargers.

AHAM continues to support using usage patterns for determination of the energy use of each product. We believe, however, that there still is work to be done to understand the percentage of time in each of the Active/Maintenance, No Battery, and Unplugged states. It may be necessary to update some of the usage patterns shown in the DOE Appendix. In addition, the time estimations for the time in the “unplugged” state need to be adjusted. Notwithstanding these observations, we note that it appears that CEC based its estimates of the percentage of time a product is unplugged on a study done in 2006, and in many cases appears to have metered only

one unit. That is hardly a sufficient sample size from which to draw solid conclusions impacting California's tens of millions of residents.³ We would be pleased, as we have previously indicated, to work with the staff of the Commission in order to obtain the necessary information.

Furthermore, CEC should adopt and use a system of usage patterns in order to properly justify the estimated energy savings in the Staff Report. To be meaningful and accurate, energy savings estimates inherently must consider consumer usage, and so it seems a serious error and lack of effort to assert that there is no data to support usage patterns and for CEC Staff to then use such limited data in their energy savings justifications.

Accordingly, AHAM urges CEC to work to further understand usage patterns and to adopt a system of usage patterns in order to properly justify a standard that consists of one metric. A one-metric standard cannot be pursued without a usage factor.

III. If CEC Proceeds With Multi-Metric Standards, the Levels for Small Battery Chargers Should Be Revised.

A. CEC's Proposal, Even With the Proposed Amendments, Is Not Technically Feasible:

Per the Warren-Alquist Act, section 25402, minimum levels of efficiency shall be "based on feasible and attainable efficiencies or feasible improved efficiencies that will reduce the energy or water consumption growth rates." CEC has not demonstrated that the proposed energy efficiency standards are feasible in California. Many products will be required to shift to lithium ion battery chemistries to meet the proposed standard, even with the latest of changes made by the CEC. Nickel based systems above a low watt/hour level will not be able to comply.

For many products, the proposed standards levels are likely only attainable by battery operated products with Lithium Ion chemistry batteries which would essentially require a Level V efficiency. The CEC is pre-empted by federal standard from requiring anything above Level IV efficiency. If these are the only battery chargers that will be acceptable for many end products, this would cause a major shift in our industry for several products from nickel-based battery chemistries, which have provided tremendous value and quality to consumers in the last 25 years, to a relatively new chemistry which has a significantly different cost and performance structure. The CASE report underlying the Proposed Amendments' Staff Report did not assume the cost of this shift of battery chemistry in its cost or payback analysis, despite the fact that all of the report's analysis assumes that it must happen.

The shift to Lithium battery chemistries for many products also must factor in two important changes. In the near future, the UL standards (UL 2575) will mandate additional testing of the battery packs that go into the products. This will mean that there will be additional testing and certification time to the schedule. In addition, we are expecting the Final Rule from the U.S. Department of Transportation on the shipment specifications for products with Lithium Ion batteries (*See Docket # PHMSA-2009-0095*). The cost of these additional shipping requirements must be analyzed and included in any realistic cost or payback analysis.

³ See Draft Staff Report, at 7, response to comment 10, citing http://www.efficientproducts.org/reports/plugload/Plug_Loads_CA_Field_Research_Report_Ecos_2006.pdf.

Even CEC's own data, as presented at the March 3, 2011, workshop, based on the data in the CASE report, shows that for many products a shift to Lithium Ion chemistry will be required by the new standards—no nickel based systems were compliant with the then-proposed 24 hour efficiency level above about 10 Wh;

1. No nickel based systems were compliant with the proposed 24 hour efficiency level above about 10 Wh;
2. No nickel based systems were compliant with the originally proposed Maintenance Power level above about 20 Wh; and
3. No nickel based systems were compliant with the originally proposed No-Battery Power level above about 20 Wh.

The proposed amended standard levels do not differ significantly from the original proposal—the levels will still create the same results. There are many medium-sized appliances that have batteries that exceed 20 Wh, and for these, CEC has not demonstrated the feasibility through its survey of the population of existing designs.

The CEC's proposed amendments neglect a requirement of nickel-based chemistry that is due to the secondary recombination reaction that occurs in these sealed cells. The analysis provided by CEC staff at the May 2011, workshop and carried through in the Proposed Amendments arrives at the standard based upon an estimate of the self-discharge rate of these cells and the conversion efficiency. The power required to provide for the current needed to compensate for self discharge is not significant compared to the power required to provide the current required for the recombination reaction. This recombination reaction is necessary for these types of cells and this current is required to maintain the cells, not the just the current calculated on the basis of self discharge alone. Typical required values are between C/20 to C/50. The proposal allows just the requisite maintenance current at a moderately high efficiency. It would eliminate, almost entirely, continuous rate nickel based chargers (those that do not terminate).

In a similar way, the 24 hour charge and maintenance energy measurement reflects time both restoring the charge and maintaining the charge. The standards CEC proposes account only for the conversion efficiency of the charger and the control overhead and fail to consider the charge acceptance of nickel based chemistry cells over the entire charge cycle and the minimum current required for the maintenance portion of the measurement.

CEC's Proposed Amendments would still outlaw nickel based chemistry chargers for battery energies above about 20Wh, something that the CEC stated was contrary to its objectives. AHAM and its members acknowledge that many products containing nickel based chemistries will need to be changed in order to make them more efficient and help California achieve its energy savings goals. But an energy efficiency standard should not be a means for effectively banning a particular technology that still has consumer demand in the market. Nickel cadmium and nickel metal-hydride systems are in a large number of appliance systems and have proven to be extremely safe, durable, and effective over decades of application. There is no reason why these systems would not live on in the market for years to come.

B. If CEC Proceeds With its Current Approach, It Should Amend the Equations for 24 Hour Charge and Maintenance Energy and Maintenance Mode and No Battery Mode.

The amended standards levels for 24 hour charge and maintenance energy and maintenance mode and no battery mode for products between 2.5Wh and 100 Wh may not be achievable for products without increasing the size of the battery. Increasing the size of the battery in order to meet a standard level is contrary to CEC’s goals because it does not achieve any energy savings—no changes have been made to the efficiency of the battery charger. Accordingly, we propose a floor to allow these products to meet the standard. There are little to no energy savings to be found in that range of levels, and so we encourage CEC to make these changes prior to adoption.

In addition, because the proposed levels for both 24 hour charge and maintenance energy and maintenance mode and no battery mode are infeasible for many nickel based chemistries, AHAM once again suggests revised equations that would allow more efficient products with nickel based chemistries to meet the standard. We propose:

24 hour charge and maintenance energy (Wh) (“E24”)	For E_b of 100 Wh or less, E24 shall be less than or equal to the greater of either: 1. $(12 + 3.5E_b) \times N$; or 2. 20 Wh Where N is the number of ports.
Maintenance Mode and No Battery Mode	For E_b of 100 Wh or less, $P_m + P_{nb}$ shall be less than or equal to the greater of either: 1. $(0.7 + 0.07E_b) \times N$ Watts; or 2. 1W Where N is the number of ports.

The AHAM proposed changes not only will achieve energy savings, but will also permit the continued use of nickel based chemistries for mid-powered appliances. Without these changes, many products will require a switch to Lithium Ion chemistries, which will take considerably more time than CEC allows with a January 2013 effective date.

IV. The Labeling Requirement Is Superfluous and Should Be Removed.

CEC proposes to require that each battery charger be marked with a “BC” inside a circle.

AHAM opposes the proposed labeling requirement. A product label typically serves three purposes: 1) to inform consumers who can then make educated choices; 2) to differentiate products in instances where there are two standards (e.g., UL/CSA); and/or 3) to differentiate products that use a voluntary standard.

None of these purposes are served in this case.

The CEC standard will be mandatory in California. And compliance with that standard will be adequately demonstrated both to CEC and the public through the certification/reporting requirements in the amended proposal. Accordingly, there is no need for a label—it will only serve to add significant additional cost and burden to manufacturers with no corresponding benefit to consumers or CEC and not provide useful information.

In addition, it will be superfluous and confusing once DOE preempts California's standard with its final rule. Thus, in that eventuality, the CEC proposal begs the following questions:

1. If a battery charger is an external power supply (and already subject to CA labeling requirements) would the product need to carry the additional "BC" label?
2. If DOE requires products to be labeled to its standard, what will CEC do about enforcing its labeling requirement?

These questions represent some of the unintended consequences of this requirement, and another reason why the provision should be abandoned, if not the proposed rule stopped altogether.

V. Test Procedure Changes

During the May 19, 2011, workshop, CEC raised the issue of turning off additional functions during testing. DOE has subsequently determined how additional functions must be treated during testing in its final test procedure for battery chargers. We urge the CEC to adopt DOE's testing approach, as the law requires it to do. But the DOE testing approach will discourage some features, such as LED charge status indicators – apart from that of "no battery" mode – that encourage energy saving consumer behavior.

In order for regulated parties to comply with any future CEC energy efficiency standard on battery charger energy, CEC must use DOE's test procedure because, as of November 28, 2011, regulated parties may only make energy representations based on DOE's test procedure: "[a]s of November 28, 2011, manufacturers may not make any representation regarding battery charger . . . energy consumption or efficiency unless such battery charger . . . has been tested in accordance with the final rule provisions in appendix Y . . ." 76 Fed. Reg. at 31750.

The Proposed Amendments' Staff Report provides that "no additional allowance is needed for the additional functionalities such as LED indicator lights" (*See Staff Report, page 26*). However, we continue to urge CEC to provide a credit to products that provide features that promote energy saving behavior in its proposed battery charger energy efficiency standard. Not doing so will create an unintended consequence of lost energy savings because consumers would have no way of knowing when charging is complete and could, thus, leave products plugged in and charging longer than necessary. We will encourage DOE to take a similar approach as it works to finalize its battery charger energy efficiency standards rulemaking.

VI. Definitions

A. Definition of Consumer Product

The proposed regulations do not contain a definition of consumer product. AHAM suggests that CEC adopt DOE's definition (10 C.F.R. 430.2):

Consumer product means any article (other than an automobile, as defined in Section 501(1) of the Motor Vehicle Information and Cost Savings Act):

(1) Of a type—

(i) Which in operation consumes, or is designed to consume, energy or, with respect to showerheads, faucets, water closets, and urinals, water; and

(ii) Which, to any significant extent, is distributed in commerce for personal use or consumption by individuals;

(2) Without regard to whether such article of such type is in fact distributed in commerce for personal use or consumption by an individual, except that such term includes fluorescent lamp ballasts, general service fluorescent lamps, incandescent reflector lamps, showerheads, faucets, water closets, and urinals distributed in commerce for personal or commercial use or consumption.

Comments on the Proposed Amendments and Staff Report Generally

VII. AHAM Reiterates Its Previous Concerns Regarding the Proposed Amendments and Staff Report.

AHAM recognizes that the main focus of the comments CEC is seeking is to respond to the Proposed Amendments, but we must also highlight some of the concerns with process that we have had throughout the course of this proceeding. We had previously urged CEC to review these concerns and address and resolve them in Proposed Amendments; with no changes manifest in response, we reiterate these observations and concerns again below.

A. Active Stakeholder Participation Has Met with Less than Fulsome Responsiveness.

AHAM has on numerous occasions offered concrete data on several issues related to this proceeding, yet we have received minimal response – and no direct written responses - to our written comments. We have provided written comments to the CEC in response to the Commission's call for comments, data and open public comment periods dated on: November 4, 2010; February 11, 2011; March 15, 2011; May 31, 2011; and July 6, 2011. While all of these submissions have been included in the collection of stakeholder comments posted on the Commission's website, none has been responded to directly, in writing, by the CEC. Additionally, since October 2010, AHAM has provided a substantial amount of data and other specific and technical information during workshops and public hearings in hopes of improving the integrity of data on which the CEC is relying. Yet, the substance of the Proposed Amendments and Staff Report reflects little in the way of evidence that our or other stakeholder input was used over the erroneous assertions founded on CEC consultant Ecos' information. There is little or no recognition or discussion of our submissions, which goes to the heart of a meaningful, bold administrative process.

B. Energy Savings Estimates Do Not Take Into Account Infrequently Charged Products.

The Staff Report overstates the energy savings from most of the categories of consumer battery chargers, especially those of inductive chargers and small residential battery chargers for motor operated appliances. For example, Ecos in the CASE report failed completely to consider the large numbers of people with personal care products who do not leave chargers plugged in constantly. On Page 15 of the CASE report, Ecos estimates that personal care products are unplugged nine percent of the time. Ecos even estimates that power tools are left unplugged 37 percent of the time. The Ecos data is highly misleading and not representative of the current usage. This data seems to have come from the Ecos Plug Load Analysis which is taken over a 7-day period and is flawed because *many personal care products are not charged during a week*. That study grossly overestimates the time in use by the basic construct of the study. After a far more extensive analysis, DOE estimates that many of these products are unplugged 23 hours a day. Thus, the data used by Ecos Consulting for analysis of infrequently charged products should be removed and new analysis undertaken based on DOE's data on usage, charge times, and infrequent charging.

DOE's TSD, Appendix 7a, shows numerous products charged less than one hour a day. Indeed, we mention that shavers, beard/mustache trimmers, hair clippers and rechargeable toothbrushes are shown to be charging from 0.14 to 0.26 times per day, and submit that the percentage of charging time for such products is likely significantly less than the figures shown. Furthermore, consideration of "infrequently charged" products has been acknowledged in hearings before CEC by statements from former Commissioner Art Rosenfeld and has been mentioned by AHAM and its members for over five years. For example, AHAM commented on "infrequently charged" products in our comments addressed to CEC Chair Jacqueline Pfannenstiel on January 30, 2008. Still, Ecos has refused to acknowledge the presence of this fact of use and continues to estimate that all chargers are left plugged in all the time. The Staff Report unfortunately relies on this misleading information.

We, therefore, believe the "infrequently charged" products should be treated differently than other products with battery chargers. In order to adequately measure the energy savings potential over the UEC, year, or lifespan of the product, CEC needs to separate these infrequently charged products into a unique class. In this way, the energy measurements will be representative of the way that the products are used. If CEC continues with the rulemaking on battery chargers, CEC staff should further evaluate the issue of products that are infrequently charged and adjust the energy savings and applicable standards levels accordingly.

C. CEC Should Ensure the Proposed Regulations Do Not Duplicate Other Regulations.

Currently CEC regulates the wall-adaptors of battery chargers as external power supplies. No indication has been given as to whether this would continue after the promulgation of CEC the proposed regulations on battery chargers. As noted earlier in these comments, AHAM has always maintained that the wall-adaptor of a battery charger is a special device. The wall-adaptor is but one integral item within the complete structure of the battery charger system. Wall-adaptors for battery chargers are unique items that are designed specifically for their application and not purchased “off the shelf.”

If CEC pursues a regulation for battery chargers, it should also adjust the definition of a State Regulated External Power Supply so that it does not include the wall-adaptor portion of a battery charger. It is critical that there not be different but overlapping regulations covering the same device. AHAM spoke to the CEC about this issue when the EPS regulations were first developed. There seemed to be an acceptance of the AHAM position at that time and we would ask CEC to carry this through.

D. The Cost Analysis Is Flawed.

The Staff Report states that, “the cost to comply is more than offset by the energy savings over the life of the product.” (*See* Staff Report at 12). It seems staff reached this conclusion by relying on DOE’s final rule being published before the CEC rulemaking was complete (*See* Staff Report at 10.) They surmise – even without knowing what standards DOE would set – that, despite any “potential that [the DOE and CEC] standards will vary in stringency, these differences will not require manufacturers to go through two separate redesign and production change processes.” (*ibid*). This conclusion is flawed for several reasons. First, as already argued, the DOE rule is not yet complete but expected in the near term.

Second, as we have also previously stated, the CEC standard imposes technology prejudice. For several products, the proposed standards levels are only attainable by using Lithium Ion chemistry batteries, which will require redesign by appliance manufacturers. Switching from nickel-based battery chemistries to Lithium Ion battery chemistries adds significant cost to products in the appliance industry. The cost analysis in the Staff Report was not altered even in light of changes to the battery charger standard made since the May 19, 2011, workshop; nor were updated numbers or substantive underlying data for the numbers presented at the May workshop. Thus, we must reiterate our questions and concerns.

We further question the data on which the Staff Report relies. We earlier cite the analysis conducted by the Berkeley Research Group that reveals critical flaws in the underpinnings of data, methodology and conclusions reached by CEC consultant Ecos and relied on by the CEC for this rulemaking. In addition, there are other compelling questions that beg for a response. What source did CEC/Ecos use for its conclusions? Where did the data originate and how was it collected? Were a variety of appliances with multiple charge levels and voltages evaluated? Without this information, it is impossible for any stakeholder to provide effective feedback. DOE’s TSD does contain cost information that was carefully collected—much of it came from manufacturers, and it was reported in a transparent way. Based on comments from all stakeholders, DOE may be revising its cost and payback assumptions, so herein is yet another reason we urge CEC to refrain from further action until DOE releases its notice of proposed

rulemaking and accompanying technical support document. CEC should rely on DOE's data, which has gone through an open and transparent collection and review process. Failing such prudence, we urge CEC to update its cost calculations and to provide all stakeholders with the data underlying those updated (and the original) calculations.

E. The Cost of Solutions for Compliance Is Understated.

The Staff Report states that the “proposed battery chargers regulations are based on the premise that, after the battery has been recharged, the battery charger should shut off the flow of electricity. . . . There are battery charger systems currently on the market, across a wide variety of product categories and price levels, which have already addressed the problem by including relatively inexpensive charge sensors and/or switches in their product designs. This capability can be implemented with inexpensive off-the-shelf technology that will not require extensive redesign of regulated products.” (See Staff Report at 13).

This somewhat confusing assertion – while somewhat clarified during the March 3, 2011, workshop, illustrates shortcomings of Ecos' poor analysis, and thus any other analysis on battery charger cost issues must necessarily be suspect.

To further explain, Ecos' March 3 presentation successfully demonstrated the following about their analysis:

1. The Bill of Material (BOM) cost analysis for a battery charger switch itself was faulty because it did not account for the cost difference of more expensive PCB materials. Rather it used the same cost difference for the 14.4 V level V power supply as in the earlier 1.2 V example, and it uses a 0.1% tolerance resistor in the schematic but that price is not reflected in the BOM cost.
2. The price impact at retail as a result of material changes on the PCB are not correctly reflected by the mark-up factor that Ecos selected. Multiple tiers encountered in the supply chain from BOM change in the charger to the retail price of the end-product results in a compounding effect not correctly reflected in Ecos's choice of mark-up.
3. Ecos's calculation of the energy benefit should be limited to that achieved through the proposed standard alone, Since CEC has elected not to use a comprehensive measure of energy savings and instead insisted on four independent limits, savings in already compliant metrics cannot be credited against the cost of compliance to fulfill a non-compliant metric. Additionally, the CEC should not include savings that would occur after the DOE's rulemaking becomes final.

Again, on these and similar points the attached independent analysis from BRG offers a critical look at failings in the CEC-reliant Ecos CASE study.

F. The Proposed Standards Will Likely Result in Significant Market Disruption and Product Supply.

A rule by the CEC on battery chargers will be greatly disruptive to the marketplace, even as amended from prior versions. Manufacturers would have to shift precious resources to designing an entire series of battery charger products to meet a CEC set of standards only to potentially redesign these same products months later to meet DOE standards. As our consumer products industry is just beginning to recover from one of the most serious recessions in American history, this unnecessary change in government mandates could make it very difficult especially for Small and Medium Sized Enterprises (SMEs) to meet these requirements and still be able to provide products. The result in several companies could be reducing their product line, thereby potentially affecting consumer choice and competition. This unnecessary rulemaking does nothing to prevent such an outcome, much less provide for the health of an industry or to increase innovation.

G. Proprietary Technology May Be Required to Meet the Proposed Standards.

This is a serious concern—companies either would be barred from manufacturing or would need to license technology to comply with the standard, subject to royalties and other terms of a provider. It has long been a CEC policy that California regulations should not be set that favor or require a particular proprietary technology. Any other approach would be anticompetitive and add considerable burden on the regulated parties, which here include many smaller companies. It does not appear that the CASE report for inductively charged and smaller battery chargers has taken this into account.

The CEC needs to study this issue more to determine if any potential energy standards and classes of products would require proprietary technology in order to meet the suggested requirements.

H. The “Data” Underlying the Draft Staff Report Are Seriously Flawed.

First, we again comment that the CASE report seems to be based on data that are not publicly available, whereas DOE, in its TSD, has produced all the raw and analyzed data. The Ecos data used as a basis for the CASE report should either be produced in whole and made publicly available or it should be stricken from the record.

It is unfortunate that Ecos Consulting and PG&E decided to release the CASE report after the DOE released a significantly more detailed TSD. DOE has studied all of the same elements for residential battery chargers as Ecos Consulting (and much more). It is further a mystery that the CEC opted instead to default to what would now be outdated information from Ecos because of the TSD. The “softness” of the data quality for the Staff Report has been an issue we have raised in comments as far back as the October 11, 2010, CEC Staff Workshop, to say that Ecos—

- *did not consider* all the possible types of battery chargers;
- *did not consider* the economic analysis;
- *did not consider* the full cost increase methodologies;

- *did not consider* Life Cycle Cost Analysis;
- *did not consider* manufacturer's impact;
- *did not test* current products in the marketplace; and
- *did not even review* the candidate standards levels that were suggested by DOE.

The testing data submitted by Ecos on all its charts are from battery chargers taken in the market from 2006 - 5 years ago, far before the Tier 1 and Tier 2 CEC EPS regulations and, therefore, are totally inappropriate for consideration.

We were disappointed in the technical assessment conducted by Ecos Consulting for the California Utilities and had hoped that the Commission would disregard it in favor of DOE's much more thorough TSD. The CASE report is a totally insufficient basis for a rulemaking on standards for battery chargers.

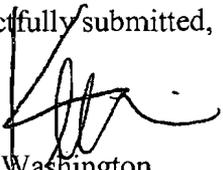
I. The Proposal Does Not Properly Categorize Products for Regulation.

The proposed energy efficiency standards are grouped in three categories—this is profoundly insufficient. To suggest that the battery chargers for a small personal care appliance battery charger using 3-5 Watts (example: small hair trimmer, electric shaver or small cordless vacuum) should be in the same product class as an 80-125 Watt battery charger for a laptop computer is a serious technical error. Although DOE's TSD does not present a perfect set of product classes, as we have commented in that proceeding, it at least shows that DOE has attempted to address the differences in products by establishing nine product classes.

The technical assessment in the CASE report assumes that all chargers will become "fast chargers" when such a feature is not necessary, nor would this provide the value to the consumer for most consumer products applications. The assumption seems to be that "somehow, somewhere, someone will invent a product"—it is not a technical assessment. The Commission standards, should CEC continue with its proposed standards, should be set based on what is available in each product class today, and not based on what Ecos Consulting speculates will be available in the future.

AHAM appreciates the opportunity to comment on the California Energy Commission's Proposed Amendments to Appliance Efficiency Regulations (October 2011), and would be glad to further discuss these matters with CEC.

Respectfully submitted,


Kevin Washington
Director, Government Affairs

cc: Ken Rider, California Energy Commission

A Critique of the Regulations on Battery Charging Systems
Proposed by the California Energy Commission

C. Paul Wazzan, Ph.D.*

Dawn Eash, M.S.

Abstract

The California Energy Commission (“CEC”) seeks to amend its Appliance Efficiency Regulations to adopt efficiency standards, certification and marking requirements for large and small battery charger systems. The CEC has put forth a model for estimating the energy savings attributable to these proposed regulations. We have reviewed this model and found fault in the calculations as well as the methodology proposed. As such, we have corrected these errors and have additionally created a new model to reflect a more realistic picture of the effects of the proposed regulations on energy savings realized by California consumers. The corrected CEC approach and our new model both show that a majority of battery charger product categories have a consumer net negative impact as a result of the proposed regulations.

November 18, 2011

* This report was commissioned by the Association of Home Appliance Manufacturers, the Consumer Electronics Association, CTIA – The Wireless Association, and TechAmerica. The authors are with Berkeley Research Group in Los Angeles, CA. Corresponding author is Wazzan who can be reached at 310-499-4919 or pwazzan@brg-expert.com.

TABLE OF CONTENTS

I. INTRODUCTION	3
II. CORRECTING FOR CALCULATION ERRORS	4
III. ACCOUNTING FOR THE COST OF COMPLIANCE	4
IV. INCORPORATING DOE REGULATIONS.....	5
V. INCORPORATING TECHNOLOGICAL INNOVATION DUE TO COMPETITION.....	5
VI. INCORPORATING MANUFACTURER INPUT ON COSTS OF COMPLIANCE	5
VII. BRG APPROACH TO ESTIMATING POTENTIAL SAVINGS FROM PROPOSED CEC REGULATIONS.....	6

I. INTRODUCTION

The CEC filed its Staff Report containing its staff analysis of battery chargers and self-contained lighting controls in October 2011. This analysis was largely dependent on the CASE report prepared by Ecos Consulting last modified October 1, 2010. According to the Staff Report, the CEC's proposed regulations, once fully implemented, will save California ratepayers approximately \$306 million per year.¹ The calculations required to estimate these savings are contained in the Appendices to the Staff Report (specifically A-7). While the CEC purports to calculate cumulative savings "up to the point where compliant products begin replacing noncompliant products", their model calculations actually estimate first year savings attributable to the regulation after a complete turnover of the current stock.² We find this simplistic approach to be fundamentally flawed and logically unsound as it fails to account for: 1) turnover (i.e., it takes new sales to turn over the existing stock – one could assume that design life equates to total stock turnover); 2) the time value of money; 3) the potential impact of pending U.S. Department of Energy ("DOE") regulations; 4) the incremental cost of compliance; and 5) technological improvements due to competition.

Moreover, the CEC calculations contain arithmetic errors and are based on outdated data which overstate product savings and understate the incremental costs of compliance.

This paper is organized as follows. First, we replicate the CEC model (see Exhibit 1) and then apply a series of corrections including math and logic. Second, we develop an economic model which more accurately reflects the expected first year costs and savings from the proposed regulations and which incorporates the shortcomings of the CEC approach as discussed above.

¹ See "Energy Efficiency Standards for Battery Chargers: Frequently Asked Questions"

² See CEC Staff Report. Amendment to Appliance Efficiency Regulations. Docket # 11-AAER-2. <http://www.energy.ca.gov/2011publications/CEC-400-2011-009/CEC-400-2011-009.pdf>

It is important to note that our analysis in Exhibit 3 simply corrects for math errors made by the CEC and incorporates the costs of compliance. As such, if the CEC believes that their model is correct, then the CEC cannot dispute the results contained in Exhibit 3.

II. CORRECTING FOR CALCULATION ERRORS

We were unable to replicate the results contained in A-7 of the Staff Report. Using the model provided to us by the CEC and using the data figures contained in the Staff Report, we generate Exhibit 2 which shows corrected first-year savings.

III. ACCOUNTING FOR THE COST OF COMPLIANCE

The CEC analysis provides estimates for the cost of complying with the proposed regulations. Unfortunately the CEC estimate of annual savings never incorporates these costs. The CEC effectively ignores its own estimated costs. Exhibit 3 incorporates these incremental costs. It should be noted that the estimates given in Exhibit 3 are wholly predicated on CEC's data, model and assumptions.

It is important to note that the Staff Report presents its findings as a summary of savings from all the affected products. Exhibit 3 clearly indicates that even under the CEC methodology, certain product categories will fail to be consumer net neutral (e.g., Emergency Systems, Personal Care, and Portable Electronics).

IV. INCORPORATING DOE REGULATIONS

We assume that the DOE regulations take effect in 2014 and are identical to the CEC regulations which take effect one year prior in 2013. Consequently, any savings occurring in and beyond 2014 are attributable to the DOE regulations and are not included as part of the CEC savings. Exhibit 4 presents this analysis.

V. INCORPORATING TECHNOLOGICAL INNOVATION DUE TO COMPETITION

We assume that compliance rates (with the proposed CEC regulation) will linearly increase by 10% annually (e.g., a product assumed to have 0% compliance in 2009 will have 40% compliance by 2013 due to natural competition and will continue to increase 10% annually). In assuming a 10% year by year technological improvement, we rely on information collected informally from industry sources and Energy Star historical compliance increases.³ Note that the dispersion of the answers provided by industry at this time was significant. Our analysis is presented in Exhibit 5. Note that additional product categories have become consumer net negative (e.g., Handheld Barcode Scanners, Two-Way Radios and Three Phase Lift-Trucks).

VI. INCORPORATING MANUFACTURER INPUT ON COSTS OF COMPLIANCE

Starting with Exhibit 5 as our current base, we now incorporate current cost and/or energy savings provided directly from industry. Our analysis is presented in Exhibit 6.

³ Battery charger compliance with Energy Star has increased from 15% in 2008, 27% in 2009 to an estimated 34% in 2010. See http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives.

At this point, it is readily apparent that most products are consumer net negative as a result of the proposed regulations using CEC's approach/model (e.g., Power tools and Laptops).

VII. BRG APPROACH TO ESTIMATING POTENTIAL SAVINGS FROM PROPOSED CEC REGULATIONS

As discussed above, we believe the CEC model is fundamentally flawed. We propose a substitute model which more accurately reflects economic realities (e.g., turnover, design life, time value of money). We estimate a schedule of each product's conversion to compliance over time due to natural innovation in battery charging technology and compare the savings that could be yielded by regulating 100% compliance beginning in 2013. Our assumptions are as follows: 1) annual product turnover equals 1 divided by the design life (e.g., if a product has a design life of 10 years then 10% of the current stock will turnover each year); 2) cost and savings are equal to those reported in the CASE and Staff Reports, except where industry manufacturers have provided revised estimates⁴; and, 3) if the regulations are not enacted then the incremental cost of compliance is assumed to be zero since compliance would occur as part of the natural R&D process.

The "first year savings" using this more realistic approach eliminates savings over most product categories and leaves positive savings possible only for: 1) Auto/Marine/RV; 2) Personal Electric Vehicles; and 3) Portable Lighting. Our summary results are presented in Exhibit 7. Supporting product schedules are attached thereto.

⁴ Specifically, these revised estimates are for products in the cordless phone, laptop and power tool product categories and the estimates are shown in the support for Exhibit 7.

As a final point it is interesting to note that under both the CEC's flawed model as well as our more realistic approach a majority of products become consumer net negative as a result of the proposed regulations.

Exhibit 1
Savings From Table A-7 in the CEC's Staff Report

Product Category	Compliance	Discounted Design Life (Years)	Unit Incremental Cost Increase (\$)	Unit Energy Savings (Kwh/yr)	Unit Cost Savings (\$)	Net Unit Savings (\$)	Stock Energy Savings (Gwh/yr)	Stock Energy Savings (\$M)	Energy Savings of First Year Sales (Gwh)	Benefit / Cost
Auto/Marine/RV	0%	8.75	\$ 10.00	313.9	\$ 384.65	\$ 374.65	656.1	\$ 91.85	63.6	38.5
Cell Phones	90%	1.97	\$ -	0.5	\$ 0.12	\$ 0.12	2.7	\$ 0.37	1.9	0.0
Cordless Phones	0%	4.71	\$ 0.40	13.4	\$ 8.84	\$ 8.44	178.3	\$ 24.96	28.9	22.1
Personal Audio Electronics	90%	2.91	\$ -	0.5	\$ 0.20	\$ 0.20	1.6	\$ 0.22	0.7	0.0
Emergency Systems	10%	6.40	\$ 3.00	15.9	\$ 14.22	\$ 11.22	77.1	\$ 10.80	18.6	4.7
Laptops	10%	3.82	\$ 0.50	16.8	\$ 9.00	\$ 8.50	369.4	\$ 51.71	144.4	18.0
Personal Care	0%	4.71	\$ 0.40	1.8	\$ 1.19	\$ 0.79	17.5	\$ 2.46	3.8	3.0
Personal Electric Vehicles	10%	8.75	\$ 12.00	536.8	\$ 657.81	\$ 645.81	106.3	\$ 14.88	41.4	54.8
Portable Electronics	10%	4.71	\$ 0.40	1.7	\$ 1.13	\$ 0.73	28.2	\$ 3.95	5.1	2.8
Portable Lighting	0%	8.75	\$ 0.40	8.6	\$ 10.56	\$ 10.16	10.3	\$ 1.45	1.0	26.4
Power Tools	10%	5.57	\$ 0.55	15.0	\$ 11.65	\$ 11.10	250.3	\$ 35.04	46.9	21.2
Universal Battery Charger	50%	7.21	\$ 0.40	3.9	\$ 3.96	\$ 3.56	2.0	\$ 0.27	0.2	9.9
Golf Cart / Electric Carts	50%	8.75	\$ 200.00	807.6	\$ 989.61	\$ 789.61	100.1	\$ 14.02	13.4	4.9
Emergency Backup Lighting	50%	8.75	\$ 3.00	8.6	\$ 10.48	\$ 7.48	33.6	\$ 4.70	8.6	3.5
Handheld Barcode Scanners	50%	7.21	\$ 0.50	19.7	\$ 19.86	\$ 19.36	3.2	\$ 0.44	0.3	39.7
Two-Way Radios	50%	7.21	\$ 0.50	8.9	\$ 8.94	\$ 8.44	2.7	\$ 0.37	0.3	17.9
Single Phase Lift-Trucks	0%	12.22	\$ 200.00	1,032.5	\$ 1,767.36	\$ 1,567.36	30.8	\$ 4.31	2.4	8.8
Three Phase Lift-Trucks	0%	12.22	\$ 400.00	4,198.5	\$ 7,185.73	\$ 6,785.73	316.6	\$ 44.32	24.5	18.0
Totals							2,186.6	\$ 306.12		

Exhibit 2

Savings From Table A-7 in the CEC's Staff Report When Calculations Are Corrected

Product Category	2009 Stock (millions)	2010 Sales (millions)	Compliance	Discounted Design Life (Years)	Unit Incremental Cost Increase (\$)	Unit Energy Savings (Kwh/yr)	Unit Cost Savings (\$)	Net Unit Savings (\$)	Stock Energy Savings (Gwh/yr)	Stock Energy Savings (\$M)	Energy Savings of First Year Sales (Gwh)	Benefit / Cost
Source	CEC	CEC	CEC	CEC	CEC	CEC	CEC	CEC	1	2	3	CEC
Calculation	a	b	c	d	e	f	g	h	i	j	k	l
							= f * d * \$0.14	= g - e	= a * f * (1 - c)	= i * \$0.14	= b * f * (1 - c)	= g / e
Auto/Marine/RV	1.80	0.19	0%	8.75	\$ 10.00	313.9	\$ 384.64	\$ 374.64	565.0	\$ 79.10	58.2	38.5
Cell Phones	47.90	33.64	90%	1.97	\$ -	0.5	\$ 0.12	\$ 0.12	2.2	\$ 0.30	1.5	N/A
Cordless Phones	20.50	2.89	0%	4.71	\$ 0.40	13.4	\$ 8.83	\$ 8.43	274.7	\$ 38.46	38.7	22.1
Personal Audio Electronics	29.80	11.78	90%	2.91	\$ -	0.5	\$ 0.20	\$ 0.20	1.5	\$ 0.20	0.6	N/A
Emergency Systems	5.30	1.30	10%	6.40	\$ 3.00	15.9	\$ 14.22	\$ 11.22	75.7	\$ 10.60	18.6	4.7
Laptops	16.00	5.90	10%	3.82	\$ 0.50	16.8	\$ 9.00	\$ 8.50	242.2	\$ 33.91	89.2	18.0
Personal Care	8.70	1.91	0%	4.71	\$ 0.40	1.8	\$ 1.19	\$ 0.79	15.7	\$ 2.20	3.5	3.0
Personal Electric Vehicles	0.10	0.05	10%	8.75	\$ 12.00	536.8	\$ 657.82	\$ 645.82	48.3	\$ 6.76	22.8	54.8
Portable Electronics	10.30	2.18	10%	4.71	\$ 0.40	1.7	\$ 1.13	\$ 0.73	15.9	\$ 2.22	3.4	2.8
Portable Lighting	1.20	0.01	0%	8.75	\$ 0.40	8.6	\$ 10.56	\$ 10.16	10.3	\$ 1.45	0.1	26.4
Power Tools	15.30	3.01	10%	5.57	\$ 0.55	15.0	\$ 11.65	\$ 11.10	205.9	\$ 28.82	40.5	21.2
Universal Battery Charger	0.90	0.11	50%	7.21	\$ 0.40	3.9	\$ 3.97	\$ 3.57	1.8	\$ 0.25	0.2	9.9
Golf Cart / Electric Carts	0.18	0.02	50%	8.75	\$ 200.00	807.6	\$ 989.62	\$ 789.62	70.7	\$ 9.89	8.0	4.9
Emergency Backup Lighting	7.90	2.00	50%	8.75	\$ 3.00	8.6	\$ 10.48	\$ 7.48	33.8	\$ 4.73	8.6	3.5
Handheld Barcode Scanners	0.26	0.02	50%	7.21	\$ 0.50	19.7	\$ 19.85	\$ 19.35	2.6	\$ 0.36	0.2	39.7
Two-Way Radios	0.60	0.03	50%	7.21	\$ 0.50	8.9	\$ 8.94	\$ 8.44	2.7	\$ 0.37	0.1	17.9
Single Phase Lift-Trucks	0.03	0.00	0%	12.22	\$ 200.00	1,032.5	\$ 1,767.07	\$ 1,567.07	29.9	\$ 4.19	2.2	8.8
Three Phase Lift-Trucks	0.07	0.01	0%	12.22	\$ 400.00	4,198.5	\$ 7,185.68	\$ 6,785.68	310.7	\$ 43.50	22.5	18.0
Totals									1,909.4	\$ 267.32		

Notes and Sources:

- 1 This figure is incorrectly calculated in the CEC Staff report and is recalculated using the formula provided in the CEC's Staff Report: $B_{stock} = B_{energy_savings} \times N_{2009_stock} \times (1 - R_{compliance})$.
- 2 This figure is multiplied by the cost of energy per kilowatt to calculate the dollar value of the energy savings.
- 3 This figure is incorrectly calculated in the CEC Staff report and is recalculated using the formula provided in the CEC's Staff Report: $B_{stock} = B_{energy_savings} \times N_{2010_sales} \times (1 - R_{compliance})$.

Exhibit 3
Net Savings From Table A-7 in the CEC's Staff Report When Calculations Are Corrected

Product Category	2009 Stock	Compliance	Discounted Design Life (Years)	Unit	Unit Energy Savings (Kwh/yr)	Stock Energy Savings (Gwh/yr)	Stock Energy Savings (\$M)	Incremental Costs (\$M)	Net Savings (\$M)	Benefit / Cost Ratio
	(millions)			Incremental Cost Increase (\$)						
Source	CEC	CEC	CEC	CEC	CEC	1	2	3	4	5
Calculation	a	b	c	d	e	f	g	h	i	j
						= a * e * (1 - b)	= f * \$0.14	= a * d	= g - h	= g / h
Auto/Marine/RV	1.80	0%	8.75	\$ 10.00	313.9	565.0	\$ 79.10	\$ 18.00	\$ 61.10	4.39
Cell Phones	47.90	90%	1.97	\$ -	0.5	2.2	\$ 0.30	\$ -	\$ 0.30	N/A
Cordless Phones	20.50	0%	4.71	\$ 0.40	13.4	274.7	\$ 38.46	\$ 8.20	\$ 30.26	4.69
Personal Audio Electronics	29.80	90%	2.91	\$ -	0.5	1.5	\$ 0.20	\$ -	\$ 0.20	N/A
Emergency Systems	5.30	10%	6.40	\$ 3.00	15.9	75.7	\$ 10.60	\$ 15.90	\$ (5.30)	0.67
Laptops	16.00	10%	3.82	\$ 0.50	16.8	242.2	\$ 33.91	\$ 8.00	\$ 25.91	4.24
Personal Care	8.70	0%	4.71	\$ 0.40	1.8	15.7	\$ 2.20	\$ 3.48	\$ (1.28)	0.63
Personal Electric Vehicles	0.10	10%	8.75	\$ 12.00	536.8	48.3	\$ 6.76	\$ 1.20	\$ 5.56	5.64
Portable Electronics	10.30	10%	4.71	\$ 0.40	1.7	15.9	\$ 2.22	\$ 4.12	\$ (1.90)	0.54
Portable Lighting	1.20	0%	8.75	\$ 0.40	8.6	10.3	\$ 1.45	\$ 0.48	\$ 0.97	3.02
Power Tools	15.30	10%	5.57	\$ 0.55	15.0	205.9	\$ 28.82	\$ 8.42	\$ 20.41	3.42
Universal Battery Charger	0.90	50%	7.21	\$ 0.40	3.9	1.8	\$ 0.25	\$ 0.36	\$ (0.11)	0.69
Golf Cart / Electric Carts	0.18	50%	8.75	\$ 200.00	807.6	70.7	\$ 9.89	\$ 35.00	\$ (25.11)	0.28
Emergency Backup Lighting	7.90	50%	8.75	\$ 3.00	8.6	33.8	\$ 4.73	\$ 23.70	\$ (18.97)	0.20
Handheld Barcode Scanners	0.26	50%	7.21	\$ 0.50	19.7	2.6	\$ 0.36	\$ 0.13	\$ 0.23	2.75
Two-Way Radios	0.60	50%	7.21	\$ 0.50	8.9	2.7	\$ 0.37	\$ 0.30	\$ 0.07	1.24
Single Phase Lift-Trucks	0.03	0%	12.22	\$ 200.00	1,032.5	29.9	\$ 4.19	\$ 5.80	\$ (1.61)	0.72
Three Phase Lift-Trucks	0.07	0%	12.22	\$ 400.00	4,198.5	310.7	\$ 43.50	\$ 29.60	\$ 13.90	1.47
Totals						1,909.4	\$ 267.32	\$ 162.69	\$ 104.63	

Notes and Sources:

- 1 This figure is incorrectly calculated in the CEC Staff report and is recalculated using the formula provided in the CEC's Staff Report:

$$B_{stock} = B_{energy_savings} \times N_{2009_stock} \times (1 - R_{compliance})$$
- 2 This figure is multiplied by the cost of energy per kilowatt to calculate the dollar value of the energy savings.
- 3 This figure is incorrectly calculated in the CEC Staff report and is recalculated using the formula provided in the CEC's Staff Report:

$$B_{stock} = B_{energy_savings} \times N_{2010_sales} \times (1 - R_{compliance})$$
- 4 Net savings are the dollar energy savings less the incremental costs.
- 5 Benefit / cost ratio is the ratio of energy savings to incremental costs. A ratio of less than 1 indicates that savings are less than total costs.

Exhibit 4
Energy Savings Prior to Implementation of DOE Regulations in 2014

Product Category	2013 Sales (millions)	Compliance 2009	Discounted Design Life (Years)	Unit Incremental Cost Increase (\$)	Unit Energy Savings (Kwh/yr)	Energy Savings	Dollar Savings	Incremental	Net Savings (\$M)	Benefit / Cost Ratio
						Prior to DOE Regulations (Gwh)	Prior to DOE Regulations (\$M)	Costs (\$M)		
Source	CEC	CEC	CEC	CEC	CEC	1	2	3	4	5
Calculation	a	b	c	d	e	f	g	h	i	j
						= a * e * (1 - b)	= f * \$0.14	= d * a	= g - h	= g / h
Auto/Marine/RV	0.20	0%	8.75	\$ 10.00	313.9	63.6	\$ 8.90	\$ 2.03	\$ 6.88	4.39
Cell Phones	41.65	90%	1.97	\$ -	0.5	1.9	\$ 0.26	\$ -	\$ 0.26	N/A
Cordless Phones	2.15	0%	4.71	\$ 0.40	13.4	28.9	\$ 4.04	\$ 0.86	\$ 3.18	4.69
Personal Audio Electronics	13.73	90%	2.91	\$ -	0.5	0.7	\$ 0.09	\$ -	\$ 0.09	N/A
Emergency Systems	1.30	10%	6.40	\$ 3.00	15.9	18.6	\$ 2.60	\$ 3.90	\$ (1.30)	0.67
Laptops	9.54	10%	3.82	\$ 0.50	16.8	144.4	\$ 20.22	\$ 4.77	\$ 15.45	4.24
Personal Care	2.11	0%	4.71	\$ 0.40	1.8	3.8	\$ 0.54	\$ 0.84	\$ (0.31)	0.63
Personal Electric Vehicles	0.09	10%	8.75	\$ 12.00	536.8	41.4	\$ 5.79	\$ 1.03	\$ 4.77	5.64
Portable Electronics	3.31	10%	4.71	\$ 0.40	1.7	5.1	\$ 0.71	\$ 1.32	\$ (0.61)	0.54
Portable Lighting	0.01	0%	8.75	\$ 0.40	8.6	0.1	\$ 0.01	\$ 0.00	\$ 0.01	3.02
Power Tools	3.49	10%	5.57	\$ 0.55	15.0	46.9	\$ 6.57	\$ 1.92	\$ 4.65	3.42
Universal Battery Charger	0.12	50%	7.21	\$ 0.40	3.9	0.2	\$ 0.03	\$ 0.05	\$ (0.02)	0.69
Golf Cart / Electric Carts	0.03	50%	8.75	\$ 200.00	807.6	11.4	\$ 1.59	\$ 5.64	\$ (4.04)	0.28
Emergency Backup Lighting	2.00	50%	8.75	\$ 3.00	8.6	8.6	\$ 1.20	\$ 6.00	\$ (4.80)	0.20
Handheld Barcode Scanners	0.03	50%	7.21	\$ 0.50	19.7	0.3	\$ 0.04	\$ 0.01	\$ 0.02	2.75
Two-Way Radios	0.03	50%	7.21	\$ 0.50	8.9	0.1	\$ 0.02	\$ 0.01	\$ 0.00	1.24
Single Phase Lift-Trucks	0.00	0%	12.22	\$ 200.00	1,032.5	2.4	\$ 0.34	\$ 0.47	\$ (0.13)	0.72
Three Phase Lift-Trucks	0.01	0%	12.22	\$ 400.00	4,198.5	24.5	\$ 3.43	\$ 2.34	\$ 1.10	1.47
Totals						402.8	\$ 56.39	\$ 31.19	\$ 25.20	

Notes and Sources:

- 1 Energy savings assuming DOE regulations go into effect in 2014 and only 2013 energy savings can be attributed to CEC regulations.
- 2 This figure is multiplied by the cost of energy per kilowatt to calculate the dollar value of the energy savings.
- 3 Net costs are per unit incremental costs multiplied by the first year sales.
- 4 Net savings are the dollar energy savings less the incremental costs.
- 5 Benefit / cost ratio is the ratio of energy savings to incremental costs. A ratio of less than 1 indicates that savings are less than total costs.

Exhibit 5
Energy Savings Prior to Implementation of DOE Regulations and Increased Compliance Rates Due to Technological Innovation

Product Category	2013 Sales (millions)	Compliance 2009	Discounted Design Life (Years)	Unit Incremental Cost Increase (\$)	Unit Energy Savings (Kwh/yr)	Compliance 2013	Energy Savings Prior to DOE	Dollar Savings Prior to DOE	Incremental Costs (\$M)	Net Savings (\$M)	Benefit / Cost Ratio
							Regulations With Increased Compliance (Gwh)	Regulations With Increased Compliance (\$M)			
Source	CEC	CEC	CEC	CEC	CEC	1	2	3	4	5	6
Calculation	a	b	c	d	e	f	g = a * e * (1 - f)	h = g * \$0.14	i = d * a	j = h - i	k = h / i
Auto/Marine/RV	0.20	0%	8.75	\$ 10.00	313.9	40%	38.2	\$ 5.34	\$ 2.03	\$ 3.32	2.64
Cell Phones	41.65	90%	1.97	\$ -	0.5	100%	0.0	\$ -	\$ -	\$ -	N/A
Cordless Phones	2.15	0%	4.71	\$ 0.40	13.4	40%	17.3	\$ 2.42	\$ 0.86	\$ 1.56	2.81
Personal Audio Electronics	13.73	90%	2.91	\$ -	0.5	100%	0.0	\$ -	\$ -	\$ -	N/A
Emergency Systems	1.30	10%	6.40	\$ 3.00	15.9	50%	10.3	\$ 1.44	\$ 3.90	\$ (2.46)	0.37
Laptops	9.54	10%	3.82	\$ 0.50	16.8	50%	80.2	\$ 11.23	\$ 4.77	\$ 6.46	2.35
Personal Care	2.11	0%	4.71	\$ 0.40	1.8	40%	2.3	\$ 0.32	\$ 0.84	\$ (0.52)	0.38
Personal Electric Vehicles	0.09	10%	8.75	\$ 12.00	536.8	50%	23.0	\$ 3.22	\$ 1.03	\$ 2.19	3.13
Portable Electronics	3.31	10%	4.71	\$ 0.40	1.7	50%	2.8	\$ 0.40	\$ 1.32	\$ (0.93)	0.30
Portable Lighting	0.01	0%	8.75	\$ 0.40	8.6	40%	0.1	\$ 0.01	\$ 0.00	\$ 0.00	1.81
Power Tools	3.49	10%	5.57	\$ 0.55	15.0	50%	26.1	\$ 3.65	\$ 1.92	\$ 1.73	1.90
Universal Battery Charger	0.12	50%	7.21	\$ 0.40	3.9	90%	0.0	\$ 0.01	\$ 0.05	\$ (0.04)	0.14
Golf Cart / Electric Carts	0.03	50%	8.75	\$ 200.00	807.6	90%	2.3	\$ 0.32	\$ 5.64	\$ (5.32)	0.06
Emergency Backup Lighting	2.00	50%	8.75	\$ 3.00	8.6	90%	1.7	\$ 0.24	\$ 6.00	\$ (5.76)	0.04
Handheld Barcode Scanners	0.03	50%	7.21	\$ 0.50	19.7	90%	0.1	\$ 0.01	\$ 0.01	\$ (0.01)	0.55
Two-Way Radios	0.03	50%	7.21	\$ 0.50	8.9	90%	0.0	\$ 0.00	\$ 0.01	\$ (0.01)	0.25
Single Phase Lift-Trucks	0.00	0%	12.22	\$ 200.00	1,032.5	40%	1.4	\$ 0.20	\$ 0.47	\$ (0.26)	0.43
Three Phase Lift-Trucks	0.01	0%	12.22	\$ 400.00	4,198.5	40%	14.7	\$ 2.06	\$ 2.34	\$ (0.28)	0.88
Totals							220.5	\$ 30.87	\$ 31.19	\$ (0.32)	

Notes and Sources:

- Compliance increases by 10% annually due to natural technological innovation each year from year 2009 to 2013. This estimate is based on historical Energy Star data. Battery charger compliance with Energy Star has increased from 15% in 2008, 27% in 2009 and an estimated 24% in 2010. See http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives.
- Energy savings assuming DOE regulations go into effect in 2014 and only 2013 energy savings can be attributed to CEC regulations. This figure also includes the increased compliance figures due to technological innovations.
- This figure is multiplied by the cost of energy per kilowatt to calculate the dollar value of the energy savings.
- This figure is the unit incremental cost increase multiplied by the sales.
- Net savings are the dollar energy savings less the incremental costs.
- Benefit / cost ratio is the ratio of energy savings to incremental costs. A ratio of less than 1 indicates that savings are less than total costs.

Exhibit 6
Energy Savings Prior to Implementation of DOE Regulations, Increased Compliance Rates Due to Technological Innovation, and Modified Costs and Energy Savings Based on Industry Input

Product Category	2013 Sales (millions)	Compliance 2009	Discounted Design Life (Years)	Unit Incremental Cost Increase (\$)	Unit Energy Savings (Kwh/yr)	Compliance 2013	Energy Savings Prior to DOE	Dollar Savings Prior to DOE	Incremental Costs (\$M)	Net Savings (\$M)	Benefit / Cost Ratio
							Regulations With Increased Compliance (Gwh)	Regulations With Increased Compliance (\$M)			
Source	CEC	CEC	CEC	CEC/Industry	CEC/Industry	1	2	3	4	5	6
Calculation	a	b	c	d	e	f	g = a * e * (1 - f)	h = g * \$0.14	i = d * a	j = h - i	k = h / i
Auto/Marine/RV	0.20	0%	8.75	\$ 10.00	313.9	40%	38.2	\$ 5.34	\$ 2.03	\$ 3.32	2.64
Cell Phones	41.65	90%	1.97	\$ -	0.5	100%	0.0	\$ -	\$ -	\$ -	N/A
⁷ Cordless Phones	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$ -	N/A
Personal Audio Electronics	13.73	90%	2.91	\$ -	0.5	100%	0.0	\$ -	\$ -	\$ -	N/A
Emergency Systems	1.30	10%	6.40	\$ 3.00	15.9	50%	10.3	\$ 1.44	\$ 3.90	\$ (2.46)	0.37
⁸ Laptops	9.54	10%	3.82	\$ 0.03	0.0	50%	0.0	\$ -	\$ 0.29	\$ (0.29)	0.00
Personal Care	2.11	0%	4.71	\$ 0.40	1.8	40%	2.3	\$ 0.32	\$ 0.84	\$ (0.52)	0.38
Personal Electric Vehicles	0.09	10%	8.75	\$ 12.00	536.8	50%	23.0	\$ 3.22	\$ 1.03	\$ 2.19	3.13
Portable Electronics	3.31	10%	4.71	\$ 0.40	1.7	50%	2.8	\$ 0.40	\$ 1.32	\$ (0.93)	0.30
Portable Lighting	0.01	0%	8.75	\$ 0.40	8.6	40%	0.1	\$ 0.01	\$ 0.00	\$ 0.00	1.81
⁹ Power Tools	3.49	10%	5.57	\$ 3.76	11.3	50%	19.7	\$ 2.76	\$ 13.12	\$ (10.35)	0.21
Universal Battery Charger	0.12	50%	7.21	\$ 0.40	3.9	90%	0.0	\$ 0.01	\$ 0.05	\$ (0.04)	0.14
Golf Cart / Electric Carts	0.03	50%	8.75	\$ 200.00	807.6	90%	2.3	\$ 0.32	\$ 5.64	\$ (5.32)	0.06
Emergency Backup Lighting	2.00	50%	8.75	\$ 3.00	8.6	90%	1.7	\$ 0.24	\$ 6.00	\$ (5.76)	0.04
Handheld Barcode Scanners	0.03	50%	7.21	\$ 0.50	19.7	90%	0.1	\$ 0.01	\$ 0.01	\$ (0.01)	0.55
Two-Way Radios	0.03	50%	7.21	\$ 0.50	8.9	90%	0.0	\$ 0.00	\$ 0.01	\$ (0.01)	0.25
Single Phase Lift-Trucks	0.00	0%	12.22	\$ 200.00	1,032.5	40%	1.4	\$ 0.20	\$ 0.47	\$ (0.26)	0.43
Three Phase Lift-Trucks	0.01	0%	12.22	\$ 400.00	4,198.5	40%	14.7	\$ 2.06	\$ 2.34	\$ (0.28)	0.88
Totals							116.6	\$ 16.33	\$ 37.04	\$ (20.71)	

Notes and Sources:

- Compliance increases by 10% annually due to natural technological innovation each year from year 2009 to 2013. This estimate is based on historical Energy Star data. Battery charger compliance with Energy Star has increased from 15% in 2008, 27% in 2009 and an estimated 24% in 2010. See http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives.
- Energy savings assuming DOE regulations go into effect in 2014 and only 2013 energy savings can be attributed to CEC regulations. This figure also includes the increased compliance figures due to technological innovations.
- This figure is multiplied by the cost of energy per kilowatt to calculate the dollar value of the energy savings.
- This figure is the unit incremental cost increase multiplied by the sales.
- Net savings are the dollar energy savings less the incremental costs.
- Benefit / cost ratio is the ratio of energy savings to incremental costs. A ratio of less than 1 indicates that savings are less than total costs.
- Based on industry input, attributing power consumption to battery functions versus other telephony functions is impossible given the nature of cordless phone design. As such, this product category should be excluded as it would require radical product design or could facilitate a manufacturer's complete exit from the California market.
- Based on industry input, the vast majority of laptops already meet the CEC's proposed standards, thus the energy savings earned with the proposed regulations will be negligible. While most believe there will be no cost to comply with the regulations, manufacturers will incur a cost to prove compliance and for mandatory marking.
- Based on industry input regarding the retail impact to consumers and the internal testing of compliant regulations.

Exhibit 7
Net Energy Savings Attributable to CEC Regulations Over the
Design Life and Prior to DOE Regulations

Market Segment	Product Category	Net Savings Over Design Life (\$M)¹	First Year Net Savings (\$M)²
Small Consumer	Auto/Marine/RV	\$ 0.01	\$ 3.32
	Cell Phones	\$ -	\$ -
	Cordless Phones ³	\$ -	\$ -
	Personal Audio Electronics	\$ -	\$ -
	Emergency Systems	\$ (12.02)	\$ (1.41)
	Laptops	\$ (0.68)	\$ (0.18)
	Personal Care	\$ (2.63)	\$ (0.47)
	Personal Electric Vehicles	\$ 0.13	\$ 0.56
	Portable Electronics	\$ (5.57)	\$ (0.97)
	Portable Lighting	\$ (0.13)	\$ 0.04
	Power Tools	\$ (56.37)	\$ (8.24)
	Universal Battery Charger	\$ (0.34)	\$ (0.04)
	Golf Cart / Electric Carts	\$ (42.04)	\$ (4.54)
	Small Non-Consumer	Emergency Backup Lighting	\$ (20.00)
Handheld Barcode Scanners		\$ (0.13)	\$ (0.01)
Two-Way Radios		\$ (0.25)	\$ (0.03)
Large Non-Consumer	Single Phase Lift-Trucks	\$ (4.19)	\$ (0.22)
	Three Phase Lift-Trucks	\$ (18.26)	\$ (0.23)

Notes and Sources:

- 1 These figures include savings over the entire design life of the product category beginning in 2013. This model assumes that beginning in 2013, all sales will be compliant and that sales are just the uniform turnover of the 2013 stock on a yearly basis over the design life of each of the product groups. These savings and costs estimates are then discounted to get the present value of the net savings in 2012.
- 2 This figure includes only the first year savings from the CEC regulations prior to the implementation of the DOE regulations, the increased compliance rates due to technological innovation, and also includes revised costs and energy savings estimates based on input from industry. This model assumes increased compliance from 2009 estimates of 10% per year (i.e. from 10% in 2013 to 20% in 2014, etc.). These savings and costs estimates are then discounted to get the present value of the net savings in 2012.
- 3 Based on input from industry, the regulations surrounding cordless phones are incompatible with current cordless phone design. The only recourse for manufacturers would be to completely redesign the product architecture or to exit the California market completely. As such, meeting the CEC's proposed regulations is currently treated as 'technologically infeasible.'

Auto / Marine / RV

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Auto/Marine/RV	10.0	0%	\$10.00	313.90	\$43.95	1.8	0.18	3%	3%	0.19	0.2	2.09

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate	3%
---------------	----

Net Savings Assuming Regulation											Net Savings Assuming No Regulation						
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * 50.14	= h / (1.03) ^a	= j * Unit Cost of Regulation	= k / (1.03) ^a	= l - k	= Compliance + 4(10% + 10% * (n - 1))	= c * d * m	= b * n	= o * 50.14	= p / (1.03) ^a	
1	313.90	2.09	10%	100%	0.21	65.61	\$ 9.18	\$ 8.92	\$ 2.09	\$ 2.03	\$ 6.89	40%	0.08	26.24	\$ 3.67	\$ 3.57	
2	313.90	2.09	10%	100%	0.21	65.61	\$ 9.18	\$ 8.66	\$ 2.09	\$ 1.97	\$ 6.69	50%	0.10	32.80	\$ 4.59	\$ 4.33	
3	313.90	2.09	10%	100%	0.21	65.61	\$ 9.18	\$ 8.41	\$ 2.09	\$ 1.91	\$ 6.49	60%	0.13	39.36	\$ 5.51	\$ 5.04	
4	313.90	2.09	10%	100%	0.21	65.61	\$ 9.18	\$ 8.16	\$ 2.09	\$ 1.86	\$ 6.30	70%	0.15	45.92	\$ 6.43	\$ 5.71	
5	313.90	2.09	10%	100%	0.21	65.61	\$ 9.18	\$ 7.92	\$ 2.09	\$ 1.80	\$ 6.12	80%	0.17	52.48	\$ 7.35	\$ 6.34	
6	313.90	2.09	10%	100%	0.21	65.61	\$ 9.18	\$ 7.69	\$ 2.09	\$ 1.75	\$ 5.94	90%	0.19	59.04	\$ 8.27	\$ 6.92	
7	313.90	2.09	10%	100%	0.21	65.61	\$ 9.18	\$ 7.47	\$ 2.09	\$ 1.70	\$ 5.77	100%	0.21	65.61	\$ 9.18	\$ 7.47	
8	313.90	2.09	10%	100%	0.21	65.61	\$ 9.18	\$ 7.25	\$ 2.09	\$ 1.65	\$ 5.60	100%	0.21	65.61	\$ 9.18	\$ 7.25	
9	313.90	2.09	10%	100%	0.21	65.61	\$ 9.18	\$ 7.04	\$ 2.09	\$ 1.60	\$ 5.44	100%	0.21	65.61	\$ 9.18	\$ 7.04	
10	313.90	2.09	10%	100%	0.21	65.61	\$ 9.18	\$ 6.83	\$ 2.09	\$ 1.56	\$ 5.28	100%	0.21	65.61	\$ 9.18	\$ 6.83	
Total											\$ 60.52	Total					\$ 60.50

Notes and Sources:

- 100% compliance because the regulations will take effect in year 1.
- Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year.
http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Cell Phones

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Cell Phones	2.0	90%	\$0.00	0.45	\$0.06	47.9	28.27	19%	2%	33.64	41.65	59.1

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate	3%
---------------	----

Net Savings Assuming Regulation											Net Savings Assuming No Regulation						
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	
			= 1 / Design Life	= 100%	= c * d * e	= h * f	= g * \$0.14	= h / (1.03) ^a	= f * Unit Cost of Regulation	= j / (1.03) ^a	= i - k	= Compliance + 4(10% + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03) ^a	
1	0.45	59.10	50%	100%	29.55	13.30	\$ 1.86	\$ 1.81	\$ -	\$ -	\$ 1.81	100%	29.55	13.30	\$ 1.86	\$ 1.81	
2	0.45	59.10	50%	100%	29.55	13.30	\$ 1.86	\$ 1.75	\$ -	\$ -	\$ 1.75	100%	29.55	13.30	\$ 1.86	\$ 1.75	
Total											\$ 3.56	Total					\$ 3.56

Notes and Sources:

- 100% compliance because the regulations will take effect in year 1.
- Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year. http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Cordless Phones

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Cordless Phones	5.0	0%	\$0.00	0.00	\$0.00	20.5	3.21	-10%	-9%	2.89	2.15	13.3

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate 3%

Net Savings Assuming Regulation											Net Savings Assuming No Regulation						
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= h / (1.03)^a	= f * Unit Cost of Regulation	= j / (1.03)^a	= i - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03)^a	
1	0.00	13.30	20%	100%	2.66	-	\$ -	\$ -	\$ -	\$ -	\$ -	40%	1.06	-	\$ -	\$ -	
2	0.00	13.30	20%	100%	2.66	-	\$ -	\$ -	\$ -	\$ -	\$ -	50%	1.33	-	\$ -	\$ -	
3	0.00	13.30	20%	100%	2.66	-	\$ -	\$ -	\$ -	\$ -	\$ -	60%	1.60	-	\$ -	\$ -	
4	0.00	13.30	20%	100%	2.66	-	\$ -	\$ -	\$ -	\$ -	\$ -	70%	1.86	-	\$ -	\$ -	
5	0.00	13.30	20%	100%	2.66	-	\$ -	\$ -	\$ -	\$ -	\$ -	80%	2.13	-	\$ -	\$ -	
Total											\$ -	Total					\$ -

Notes and Sources:

1 100% compliance because the regulations will take effect in year 1.

2 Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year.
http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Personal Audio Electronics

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Personal Audio Electronics	3.0	90%	\$0.00	0.49	\$0.07	29.8	10.52	12%	2%	11.78	13.73	31.6

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate	3%
---------------	----

Net Savings Assuming Regulation											Net Savings Assuming No Regulation						
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= h / (1.03) ^a	= j * Unit Cost of Regulation	= k / (1.03) ^a	= l - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03) ^a	
1	0.49	31.60	33%	100%	10.53	5.16	\$ 0.72	\$ 0.70	\$ -	\$ -	\$ 0.70	100%	10.53	5.16	\$ 0.72	\$ 0.70	
2	0.49	31.60	33%	100%	10.53	5.16	\$ 0.72	\$ 0.68	\$ -	\$ -	\$ 0.68	100%	10.53	5.16	\$ 0.72	\$ 0.68	
3	0.49	31.60	33%	100%	10.53	5.16	\$ 0.72	\$ 0.66	\$ -	\$ -	\$ 0.66	100%	10.53	5.16	\$ 0.72	\$ 0.66	
Total											\$ 2.04	Total					\$ 2.04

Notes and Sources:

- 100% compliance because the regulations will take effect in year 1.
- Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year.
http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Emergency Systems

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Emergency Systems	7.0	10%	\$3.00	15.87	\$2.22	5.3	1.3	0%	0%	1.3	1.3	5.4

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate	3%
---------------	----

Net Savings Assuming Regulation											Net Savings Assuming No Regulation						
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= i / (1.03)^a	= j * Unit Cost of Regulation	= k / (1.03)^a	= l - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03)^a	
1	15.87	5.40	14%	100%	0.77	12.24	\$ 1.71	\$ 1.66	\$ 2.31	\$ 2.25	\$ (0.58)	50%	0.39	6.12	\$ 0.86	\$ 0.83	
2	15.87	5.40	14%	100%	0.77	12.24	\$ 1.71	\$ 1.62	\$ 2.31	\$ 2.18	\$ (0.57)	60%	0.46	7.35	\$ 1.03	\$ 0.97	
3	15.87	5.40	14%	100%	0.77	12.24	\$ 1.71	\$ 1.57	\$ 2.31	\$ 2.12	\$ (0.55)	70%	0.54	8.57	\$ 1.20	\$ 1.10	
4	15.87	5.40	14%	100%	0.77	12.24	\$ 1.71	\$ 1.52	\$ 2.31	\$ 2.06	\$ (0.53)	80%	0.62	9.79	\$ 1.37	\$ 1.22	
5	15.87	5.40	14%	100%	0.77	12.24	\$ 1.71	\$ 1.48	\$ 2.31	\$ 2.00	\$ (0.52)	90%	0.69	11.02	\$ 1.54	\$ 1.33	
6	15.87	5.40	14%	100%	0.77	12.24	\$ 1.71	\$ 1.44	\$ 2.31	\$ 1.94	\$ (0.50)	100%	0.77	12.24	\$ 1.71	\$ 1.44	
7	15.87	5.40	14%	100%	0.77	12.24	\$ 1.71	\$ 1.39	\$ 2.31	\$ 1.88	\$ (0.49)	100%	0.77	12.24	\$ 1.71	\$ 1.39	
Total											\$ (3.74)	Total					\$ 8.28

Notes and Sources:

- 1 100% compliance because the regulations will take effect in year 1.
- 2 Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year.
http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Laptops

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Laptops	4.0	10%	\$0.03	0.00	\$0.00	16	4.57	29%	12%	5.9	9.54	24.4

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate	3%
---------------	----

Net Savings Assuming Regulation													Net Savings Assuming No Regulation					
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)		
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q		
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= h / (1.03)^a	= f * Unit Cost of Regulation	= j / (1.03)^a	= i - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03)^a		
1	0.00	24.40	25%	100%	6.10	-	\$ -	\$ -	\$ 0.18	\$ 0.18	\$ (0.18)	50%	3.05	-	\$ -	\$ -		
2	0.00	24.40	25%	100%	6.10	-	\$ -	\$ -	\$ 0.18	\$ 0.17	\$ (0.17)	60%	3.66	-	\$ -	\$ -		
3	0.00	24.40	25%	100%	6.10	-	\$ -	\$ -	\$ 0.18	\$ 0.17	\$ (0.17)	70%	4.27	-	\$ -	\$ -		
4	0.00	24.40	25%	100%	6.10	-	\$ -	\$ -	\$ 0.18	\$ 0.16	\$ (0.16)	80%	4.88	-	\$ -	\$ -		
Total												\$ (0.68)	Total					\$ -

Notes and Sources:

- 100% compliance because the regulations will take effect in year 1.
- Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year. http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Personal Care

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Personal Care	5.0	0%	\$0.40	1.81	\$0.25	8.7	1.84	4%	3%	1.91	2.11	9.68

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate	3%
---------------	----

Net Savings Assuming Regulation											Net Savings Assuming No Regulation							
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)		
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q		
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= h / (1.03) ^a	= f * Unit Cost of Regulation	= j / (1.03) ^a	= i - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03) ^a		
1	1.81	9.68	20%	100%	1.94	3.50	\$ 0.49	\$ 0.48	\$ 0.77	\$ 0.75	\$ (0.28)	40%	0.77	1.40	\$ 0.20	\$ 0.19		
2	1.81	9.68	20%	100%	1.94	3.50	\$ 0.49	\$ 0.46	\$ 0.77	\$ 0.73	\$ (0.27)	50%	0.97	1.75	\$ 0.25	\$ 0.23		
3	1.81	9.68	20%	100%	1.94	3.50	\$ 0.49	\$ 0.45	\$ 0.77	\$ 0.71	\$ (0.26)	60%	1.16	2.10	\$ 0.29	\$ 0.27		
4	1.81	9.68	20%	100%	1.94	3.50	\$ 0.49	\$ 0.44	\$ 0.77	\$ 0.69	\$ (0.25)	70%	1.36	2.45	\$ 0.34	\$ 0.31		
5	1.81	9.68	20%	100%	1.94	3.50	\$ 0.49	\$ 0.42	\$ 0.77	\$ 0.67	\$ (0.24)	80%	1.55	2.80	\$ 0.39	\$ 0.34		
Total											\$ (1.30)	Total						\$ 1.33

Notes and Sources:

- 1 100% compliance because the regulations will take effect in year 1.
- 2 Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year.
http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Personal Electric Vehicles

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Personal Electric Vehicles	9.7	10%	\$12.00	536.84	\$75.16	0.1	0.04	18%	24%	0.05	0.09	0.22

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate 3%

Net Savings Assuming Regulation											Net Savings Assuming No Regulation						
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= h / (1.03) ^a	= j * Unit Cost of Regulation	= k / (1.03) ^a	= l - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03) ^a	
1	536.84	0.22	10%	100%	0.02	12.18	\$ 1.70	\$ 1.65	\$ 0.27	\$ 0.26	\$ 1.39	50%	0.01	6.09	\$ 0.85	\$ 0.83	
2	536.84	0.22	10%	100%	0.02	12.18	\$ 1.70	\$ 1.61	\$ 0.27	\$ 0.26	\$ 1.35	60%	0.01	7.31	\$ 1.02	\$ 0.96	
3	536.84	0.22	10%	100%	0.02	12.18	\$ 1.70	\$ 1.56	\$ 0.27	\$ 0.25	\$ 1.31	70%	0.02	8.52	\$ 1.19	\$ 1.09	
4	536.84	0.22	10%	100%	0.02	12.18	\$ 1.70	\$ 1.51	\$ 0.27	\$ 0.24	\$ 1.27	80%	0.02	9.74	\$ 1.36	\$ 1.21	
5	536.84	0.22	10%	100%	0.02	12.18	\$ 1.70	\$ 1.47	\$ 0.27	\$ 0.23	\$ 1.24	90%	0.02	10.96	\$ 1.53	\$ 1.32	
6	536.84	0.22	10%	100%	0.02	12.18	\$ 1.70	\$ 1.43	\$ 0.27	\$ 0.23	\$ 1.20	100%	0.02	12.18	\$ 1.70	\$ 1.43	
7	536.84	0.22	10%	100%	0.02	12.18	\$ 1.70	\$ 1.39	\$ 0.27	\$ 0.22	\$ 1.16	100%	0.02	12.18	\$ 1.70	\$ 1.39	
8	536.84	0.22	10%	100%	0.02	12.18	\$ 1.70	\$ 1.35	\$ 0.27	\$ 0.21	\$ 1.13	100%	0.02	12.18	\$ 1.70	\$ 1.35	
9	536.84	0.22	10%	100%	0.02	12.18	\$ 1.70	\$ 1.31	\$ 0.27	\$ 0.21	\$ 1.10	100%	0.02	12.18	\$ 1.70	\$ 1.31	
9.7	536.84	0.22	10%	100%	0.02	8.52	\$ 1.19	\$ 0.90	\$ 0.19	\$ 0.14	\$ 0.75	100%	0.02	8.52	\$ 1.19	\$ 0.90	
Total											\$ 11.91	Total					\$ 11.78

Notes and Sources:

- 1 100% compliance because the regulations will take effect in year 1.
- 2 Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year. http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Portable Electronics

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Portable Electronics	5.2	10%	\$0.40	1.71	\$0.24	10.3	2	9%	18%	2.18	3.31	18.5

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate 3%

Net Savings Assuming Regulation													Net Savings Assuming No Regulation				
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	
a	h	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= h / (1.03)^a	= f * Unit Cost of Regulation	= j / (1.03)^a	= i - k	= Compliance + 4(10% + 10% * (a - 1))	= c * d * m	= b * n	= o * \$0.14	= p / (1.03)^a	
1	1.71	18.50	19%	100%	3.56	6.08	\$ 0.85	\$ 0.83	\$ 1.42	\$ 1.38	\$ (0.55)	50%	1.78	3.04	\$ 0.43	\$ 0.41	
2	1.71	18.50	19%	100%	3.56	6.08	\$ 0.85	\$ 0.80	\$ 1.42	\$ 1.34	\$ (0.54)	60%	2.13	3.65	\$ 0.51	\$ 0.48	
3	1.71	18.50	19%	100%	3.56	6.08	\$ 0.85	\$ 0.78	\$ 1.42	\$ 1.30	\$ (0.52)	70%	2.49	4.26	\$ 0.60	\$ 0.55	
4	1.71	18.50	19%	100%	3.56	6.08	\$ 0.85	\$ 0.76	\$ 1.42	\$ 1.26	\$ (0.51)	80%	2.85	4.87	\$ 0.68	\$ 0.61	
5	1.71	18.50	19%	100%	3.56	6.08	\$ 0.85	\$ 0.73	\$ 1.42	\$ 1.23	\$ (0.49)	90%	3.20	5.48	\$ 0.77	\$ 0.66	
5.2	1.71	18.50	19%	100%	0.71	1.22	\$ 0.17	\$ 0.15	\$ 0.28	\$ 0.24	\$ (0.10)	100%	0.71	1.22	\$ 0.17	\$ 0.15	
Total											\$ (2.71)	Total					\$ 2.85

Notes and Sources:

- 100% compliance because the regulations will take effect in year 1.
- Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year. http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Portable Lighting

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Portable Lighting	10.0	0%	\$0.40	8.62	\$1.21	1.2	0.01	1%	1%	0.01	0.01	1.2

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate	3%
---------------	----

Net Savings Assuming Regulation													Net Savings Assuming No Regulation				
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= h / (1.03) ^a	= f * Unit Cost of Regulation	= j / (1.03) ^a	= i - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03) ^a	
1	8.62	1.20	10%	100%	0.12	1.03	\$ 0.14	\$ 0.14	\$ 0.05	\$ 0.05	\$ 0.09	40%	0.05	0.41	\$ 0.06	\$ 0.06	
2	8.62	1.20	10%	100%	0.12	1.03	\$ 0.14	\$ 0.14	\$ 0.05	\$ 0.05	\$ 0.09	50%	0.06	0.52	\$ 0.07	\$ 0.07	
3	8.62	1.20	10%	100%	0.12	1.03	\$ 0.14	\$ 0.13	\$ 0.05	\$ 0.04	\$ 0.09	60%	0.07	0.62	\$ 0.09	\$ 0.08	
4	8.62	1.20	10%	100%	0.12	1.03	\$ 0.14	\$ 0.13	\$ 0.05	\$ 0.04	\$ 0.09	70%	0.08	0.72	\$ 0.10	\$ 0.09	
5	8.62	1.20	10%	100%	0.12	1.03	\$ 0.14	\$ 0.12	\$ 0.05	\$ 0.04	\$ 0.08	80%	0.10	0.83	\$ 0.12	\$ 0.10	
6	8.62	1.20	10%	100%	0.12	1.03	\$ 0.14	\$ 0.12	\$ 0.05	\$ 0.04	\$ 0.08	90%	0.11	0.93	\$ 0.13	\$ 0.11	
7	8.62	1.20	10%	100%	0.12	1.03	\$ 0.14	\$ 0.12	\$ 0.05	\$ 0.04	\$ 0.08	100%	0.12	1.03	\$ 0.14	\$ 0.12	
8	8.62	1.20	10%	100%	0.12	1.03	\$ 0.14	\$ 0.11	\$ 0.05	\$ 0.04	\$ 0.08	100%	0.12	1.03	\$ 0.14	\$ 0.11	
9	8.62	1.20	10%	100%	0.12	1.03	\$ 0.14	\$ 0.11	\$ 0.05	\$ 0.04	\$ 0.07	100%	0.12	1.03	\$ 0.14	\$ 0.11	
10	8.62	1.20	10%	100%	0.12	1.03	\$ 0.14	\$ 0.11	\$ 0.05	\$ 0.04	\$ 0.07	100%	0.12	1.03	\$ 0.14	\$ 0.11	
Total											\$ 0.83	Total					\$ 0.95

Notes and Sources:

- 100% compliance because the regulations will take effect in year 1.
- Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year.
http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Power Tools

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Power Tools	6.5	10%	\$3.76	11.32	\$1.58	15.3	2.87	5%	5%	3.01	3.49	18.6

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate	3%
---------------	----

Net Savings Assuming Regulation												Net Savings Assuming No Regulation						
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)		
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q		
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= h / (1.03)^a	= f * Unit Cost of Regulation	= j / (1.03)^a	= i - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03)^a		
1	11.32	18.60	15%	100%	2.86	32.39	\$ 4.53	\$ 4.40	\$ 10.76	\$ 10.45	\$ (6.04)	50%	1.43	16.20	\$ 2.27	\$ 2.20		
2	11.32	18.60	15%	100%	2.86	32.39	\$ 4.53	\$ 4.27	\$ 10.76	\$ 10.14	\$ (5.87)	60%	1.72	19.44	\$ 2.72	\$ 2.56		
3	11.32	18.60	15%	100%	2.86	32.39	\$ 4.53	\$ 4.15	\$ 10.76	\$ 9.85	\$ (5.70)	70%	2.00	22.67	\$ 3.17	\$ 2.91		
4	11.32	18.60	15%	100%	2.86	32.39	\$ 4.53	\$ 4.03	\$ 10.76	\$ 9.56	\$ (5.53)	80%	2.29	25.91	\$ 3.63	\$ 3.22		
5	11.32	18.60	15%	100%	2.86	32.39	\$ 4.53	\$ 3.91	\$ 10.76	\$ 9.28	\$ (5.37)	90%	2.58	29.15	\$ 4.08	\$ 3.52		
6	11.32	18.60	15%	100%	2.86	32.39	\$ 4.53	\$ 3.80	\$ 10.76	\$ 9.01	\$ (5.21)	100%	2.86	32.39	\$ 4.53	\$ 3.80		
6.5	11.32	18.60	15%	100%	1.43	16.20	\$ 2.27	\$ 1.87	\$ 5.38	\$ 4.44	\$ (2.57)	100%	1.43	16.20	\$ 2.27	\$ 1.87		
Total												\$ (36.29)	Total					\$ 20.08

Notes and Sources:

1 100% compliance because the regulations will take effect in year 1.

2 Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year.
http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Universal Battery Charger

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Universal Battery Charger	8.0	50%	\$0.40	3.93	\$0.55	0.9	0.11	3%	3%	0.11	0.12	1

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate	3%
---------------	----

Net Savings Assuming Regulation											Net Savings Assuming No Regulation						
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	
			= 1 / Design Life	= 100%	= c * d * c	= b * f	= g * \$0.14	= h / (1.03) ^a	= f * Unit Cost of Regulation	= j / (1.03) ^a	= l - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03) ^a	
1	3.93	1.00	13%	100%	0.13	0.49	\$ 0.07	\$ 0.07	\$ 0.05	\$ 0.05	\$ 0.02	90%	0.11	0.44	\$ 0.06	\$ 0.06	
2	3.93	1.00	13%	100%	0.13	0.49	\$ 0.07	\$ 0.06	\$ 0.05	\$ 0.05	\$ 0.02	100%	0.13	0.49	\$ 0.07	\$ 0.06	
3	3.93	1.00	13%	100%	0.13	0.49	\$ 0.07	\$ 0.06	\$ 0.05	\$ 0.05	\$ 0.02	100%	0.13	0.49	\$ 0.07	\$ 0.06	
4	3.93	1.00	13%	100%	0.13	0.49	\$ 0.07	\$ 0.06	\$ 0.05	\$ 0.04	\$ 0.02	100%	0.13	0.49	\$ 0.07	\$ 0.06	
5	3.93	1.00	13%	100%	0.13	0.49	\$ 0.07	\$ 0.06	\$ 0.05	\$ 0.04	\$ 0.02	100%	0.13	0.49	\$ 0.07	\$ 0.06	
6	3.93	1.00	13%	100%	0.13	0.49	\$ 0.07	\$ 0.06	\$ 0.05	\$ 0.04	\$ 0.02	100%	0.13	0.49	\$ 0.07	\$ 0.06	
7	3.93	1.00	13%	100%	0.13	0.49	\$ 0.07	\$ 0.06	\$ 0.05	\$ 0.04	\$ 0.02	100%	0.13	0.49	\$ 0.07	\$ 0.06	
8	3.93	1.00	13%	100%	0.13	0.49	\$ 0.07	\$ 0.05	\$ 0.05	\$ 0.04	\$ 0.01	100%	0.13	0.49	\$ 0.07	\$ 0.05	
Total											\$ 0.13	Total					\$ 0.48

Notes and Sources:

- 100% compliance because the regulations will take effect in year 1.
- Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year.
http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Golf Cart / Electric Carts

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Golf Cart / Electric Carts	10.0	50%	\$200.00	807.62	\$113.07	0.175	0.017	16%	11%	0.02	0.03	0.248

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate 3%

Net Savings Assuming Regulation											Net Savings Assuming No Regulation						
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= b / (1.03) ^a	= f * Unit Cost of Regulation	= j / (1.03) ^a	= i - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03) ^a	
1	807.62	0.25	10%	100%	0.02	20.03	\$ 2.80	\$ 2.72	\$ 4.96	\$ 4.82	\$ (2.09)	90%	0.02	18.03	\$ 2.52	\$ 2.45	
2	807.62	0.25	10%	100%	0.02	20.03	\$ 2.80	\$ 2.64	\$ 4.96	\$ 4.68	\$ (2.03)	100%	0.02	20.03	\$ 2.80	\$ 2.64	
3	807.62	0.25	10%	100%	0.02	20.03	\$ 2.80	\$ 2.57	\$ 4.96	\$ 4.54	\$ (1.97)	100%	0.02	20.03	\$ 2.80	\$ 2.57	
4	807.62	0.25	10%	100%	0.02	20.03	\$ 2.80	\$ 2.49	\$ 4.96	\$ 4.41	\$ (1.92)	100%	0.02	20.03	\$ 2.80	\$ 2.49	
5	807.62	0.25	10%	100%	0.02	20.03	\$ 2.80	\$ 2.42	\$ 4.96	\$ 4.28	\$ (1.86)	100%	0.02	20.03	\$ 2.80	\$ 2.42	
6	807.62	0.25	10%	100%	0.02	20.03	\$ 2.80	\$ 2.35	\$ 4.96	\$ 4.15	\$ (1.81)	100%	0.02	20.03	\$ 2.80	\$ 2.35	
7	807.62	0.25	10%	100%	0.02	20.03	\$ 2.80	\$ 2.28	\$ 4.96	\$ 4.03	\$ (1.75)	100%	0.02	20.03	\$ 2.80	\$ 2.28	
8	807.62	0.25	10%	100%	0.02	20.03	\$ 2.80	\$ 2.21	\$ 4.96	\$ 3.92	\$ (1.70)	100%	0.02	20.03	\$ 2.80	\$ 2.21	
9	807.62	0.25	10%	100%	0.02	20.03	\$ 2.80	\$ 2.15	\$ 4.96	\$ 3.80	\$ (1.65)	100%	0.02	20.03	\$ 2.80	\$ 2.15	
10	807.62	0.25	10%	100%	0.02	20.03	\$ 2.80	\$ 2.09	\$ 4.96	\$ 3.69	\$ (1.60)	100%	0.02	20.03	\$ 2.80	\$ 2.09	
Total											\$ (18.39)	Total					\$ 23.65

Notes and Sources:

- 1 100% compliance because the regulations will take effect in year 1.
- 2 Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year. http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Emergency Backup Lighting

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Emergency Backup Lighting	10.0	50%	\$3.00	8.55	\$1.20	7.9	2	0%	0%	2	2	7.85

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate	3%
---------------	----

Net Savings Assuming Regulation											Net Savings Assuming No Regulation						
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= h / (1.03)^a	= i * Unit Cost of Regulation	= j / (1.03)^a	= l - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03)^a	
1	8.55	7.85	10%	100%	0.79	6.71	\$ 0.94	\$ 0.91	\$ 2.36	\$ 2.29	\$ (1.37)	90%	0.71	6.04	\$ 0.85	\$ 0.82	
2	8.55	7.85	10%	100%	0.79	6.71	\$ 0.94	\$ 0.89	\$ 2.36	\$ 2.22	\$ (1.33)	100%	0.79	6.71	\$ 0.94	\$ 0.89	
3	8.55	7.85	10%	100%	0.79	6.71	\$ 0.94	\$ 0.86	\$ 2.36	\$ 2.16	\$ (1.30)	100%	0.79	6.71	\$ 0.94	\$ 0.86	
4	8.55	7.85	10%	100%	0.79	6.71	\$ 0.94	\$ 0.83	\$ 2.36	\$ 2.09	\$ (1.26)	100%	0.79	6.71	\$ 0.94	\$ 0.83	
5	8.55	7.85	10%	100%	0.79	6.71	\$ 0.94	\$ 0.81	\$ 2.36	\$ 2.03	\$ (1.22)	100%	0.79	6.71	\$ 0.94	\$ 0.81	
6	8.55	7.85	10%	100%	0.79	6.71	\$ 0.94	\$ 0.79	\$ 2.36	\$ 1.97	\$ (1.19)	100%	0.79	6.71	\$ 0.94	\$ 0.79	
7	8.55	7.85	10%	100%	0.79	6.71	\$ 0.94	\$ 0.76	\$ 2.36	\$ 1.91	\$ (1.15)	100%	0.79	6.71	\$ 0.94	\$ 0.76	
8	8.55	7.85	10%	100%	0.79	6.71	\$ 0.94	\$ 0.74	\$ 2.36	\$ 1.86	\$ (1.12)	100%	0.79	6.71	\$ 0.94	\$ 0.74	
9	8.55	7.85	10%	100%	0.79	6.71	\$ 0.94	\$ 0.72	\$ 2.36	\$ 1.80	\$ (1.08)	100%	0.79	6.71	\$ 0.94	\$ 0.72	
10	8.55	7.85	10%	100%	0.79	6.71	\$ 0.94	\$ 0.70	\$ 2.36	\$ 1.75	\$ (1.05)	100%	0.79	6.71	\$ 0.94	\$ 0.70	
Total											\$ (12.07)	Total					\$ 7.92

Notes and Sources:

1 100% compliance because the regulations will take effect in year 1.

2 Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year.

http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Handheld Barcode Scanners

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Handheld Barcode Scanners	8.0	50%	\$0.50	19.67	\$2.75	0.26	0.02	6%	7%	0.02	0.03	0.32

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate 3%

Net Savings Assuming Regulation												Net Savings Assuming No Regulation						
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)		
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q		
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= h / (1.03) ^a	= f * Unit Cost of Regulation	= j / (1.03) ^a	= i - k	= Compliance + 4(10%) + 10% * (a-1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03) ^a		
1	19.67	0.32	13%	100%	0.04	0.79	\$ 0.11	\$ 0.11	\$ 0.02	\$ 0.02	\$ 0.09	90%	0.04	0.71	\$ 0.10	\$ 0.10		
2	19.67	0.32	13%	100%	0.04	0.79	\$ 0.11	\$ 0.10	\$ 0.02	\$ 0.02	\$ 0.08	100%	0.04	0.79	\$ 0.11	\$ 0.10		
3	19.67	0.32	13%	100%	0.04	0.79	\$ 0.11	\$ 0.10	\$ 0.02	\$ 0.02	\$ 0.08	100%	0.04	0.79	\$ 0.11	\$ 0.10		
4	19.67	0.32	13%	100%	0.04	0.79	\$ 0.11	\$ 0.10	\$ 0.02	\$ 0.02	\$ 0.08	100%	0.04	0.79	\$ 0.11	\$ 0.10		
5	19.67	0.32	13%	100%	0.04	0.79	\$ 0.11	\$ 0.10	\$ 0.02	\$ 0.02	\$ 0.08	100%	0.04	0.79	\$ 0.11	\$ 0.10		
6	19.67	0.32	13%	100%	0.04	0.79	\$ 0.11	\$ 0.09	\$ 0.02	\$ 0.02	\$ 0.08	100%	0.04	0.79	\$ 0.11	\$ 0.09		
7	19.67	0.32	13%	100%	0.04	0.79	\$ 0.11	\$ 0.09	\$ 0.02	\$ 0.02	\$ 0.07	100%	0.04	0.79	\$ 0.11	\$ 0.09		
8	19.67	0.32	13%	100%	0.04	0.79	\$ 0.11	\$ 0.09	\$ 0.02	\$ 0.02	\$ 0.07	100%	0.04	0.79	\$ 0.11	\$ 0.09		
Total												\$ 0.63	Total					\$ 0.76

Notes and Sources:

- 1 100% compliance because the regulations will take effect in year 1.
- 2 Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year.
http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Two-Way Radios

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Small Charger	Two-Way Radios	8.0	50%	\$0.50	8.86	\$1.24	0.6	0.028	0%	0%	0.03	0.03	0.6

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate	3%
---------------	----

Net Savings Assuming Regulation											Net Savings Assuming No Regulation						
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= h / (1.03) ^a	= f * Unit Cost of Regulation	= j / (1.03) ^a	= i - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03) ^a	
1	8.86	0.60	13%	100%	0.08	0.66	\$ 0.09	\$ 0.09	\$ 0.04	\$ 0.04	\$ 0.05	90%	0.07	0.60	\$ 0.08	\$ 0.08	
2	8.86	0.60	13%	100%	0.08	0.66	\$ 0.09	\$ 0.09	\$ 0.04	\$ 0.04	\$ 0.05	100%	0.08	0.66	\$ 0.09	\$ 0.09	
3	8.86	0.60	13%	100%	0.08	0.66	\$ 0.09	\$ 0.09	\$ 0.04	\$ 0.03	\$ 0.05	100%	0.08	0.66	\$ 0.09	\$ 0.09	
4	8.86	0.60	13%	100%	0.08	0.66	\$ 0.09	\$ 0.08	\$ 0.04	\$ 0.03	\$ 0.05	100%	0.08	0.66	\$ 0.09	\$ 0.08	
5	8.86	0.60	13%	100%	0.08	0.66	\$ 0.09	\$ 0.08	\$ 0.04	\$ 0.03	\$ 0.05	100%	0.08	0.66	\$ 0.09	\$ 0.08	
6	8.86	0.60	13%	100%	0.08	0.66	\$ 0.09	\$ 0.08	\$ 0.04	\$ 0.03	\$ 0.05	100%	0.08	0.66	\$ 0.09	\$ 0.08	
7	8.86	0.60	13%	100%	0.08	0.66	\$ 0.09	\$ 0.08	\$ 0.04	\$ 0.03	\$ 0.05	100%	0.08	0.66	\$ 0.09	\$ 0.08	
8	8.86	0.60	13%	100%	0.08	0.66	\$ 0.09	\$ 0.07	\$ 0.04	\$ 0.03	\$ 0.04	100%	0.08	0.66	\$ 0.09	\$ 0.07	
Total											\$ 0.39	Total					\$ 0.64

Notes and Sources:

- 100% compliance because the regulations will take effect in year 1.
- Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year. http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Single Phase Lift-Trucks

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Large Charger	Single Phase Lift-Trucks	15.0	0%	\$200.00	1,032.47	\$144.55	0.029	0.002	7%	1%	0	0	0.0298

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate	3%
---------------	----

Net Savings Assuming Regulation											Net Savings Assuming No Regulation					
Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ²	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= h / (1.03) ^a	= f * Unit Cost of Regulation	= j / (1.03) ^a	= l - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03) ^a
1	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.28	\$ 0.40	\$ 0.39	\$ (0.11)	40%	0.00	0.82	\$ 0.11	\$ 0.11
2	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.27	\$ 0.40	\$ 0.37	\$ (0.10)	50%	0.00	1.03	\$ 0.14	\$ 0.14
3	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.26	\$ 0.40	\$ 0.36	\$ (0.10)	60%	0.00	1.23	\$ 0.17	\$ 0.16
4	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.26	\$ 0.40	\$ 0.35	\$ (0.10)	70%	0.00	1.44	\$ 0.20	\$ 0.18
5	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.25	\$ 0.40	\$ 0.34	\$ (0.10)	80%	0.00	1.64	\$ 0.23	\$ 0.20
6	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.24	\$ 0.40	\$ 0.33	\$ (0.09)	90%	0.00	1.85	\$ 0.26	\$ 0.22
7	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.23	\$ 0.40	\$ 0.32	\$ (0.09)	100%	0.00	2.05	\$ 0.29	\$ 0.23
8	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.23	\$ 0.40	\$ 0.31	\$ (0.09)	100%	0.00	2.05	\$ 0.29	\$ 0.23
9	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.22	\$ 0.40	\$ 0.30	\$ (0.08)	100%	0.00	2.05	\$ 0.29	\$ 0.22
10	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.21	\$ 0.40	\$ 0.30	\$ (0.08)	100%	0.00	2.05	\$ 0.29	\$ 0.21
11	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.21	\$ 0.40	\$ 0.29	\$ (0.08)	100%	0.00	2.05	\$ 0.29	\$ 0.21
12	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.20	\$ 0.40	\$ 0.28	\$ (0.08)	100%	0.00	2.05	\$ 0.29	\$ 0.20
13	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.20	\$ 0.40	\$ 0.27	\$ (0.08)	100%	0.00	2.05	\$ 0.29	\$ 0.20
14	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.19	\$ 0.40	\$ 0.26	\$ (0.07)	100%	0.00	2.05	\$ 0.29	\$ 0.19
15	1,032.47	0.03	7%	100%	0.00	2.05	\$ 0.29	\$ 0.18	\$ 0.40	\$ 0.26	\$ (0.07)	100%	0.00	2.05	\$ 0.29	\$ 0.18
Total																2.87

Notes and Sources:

- 100% compliance because the regulations will take effect in year 1.
- Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year. http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives

Three Phase Lift-Trucks

Market Segment	Product	Design Life (Years)	Compliance	Unit Cost of Regulation (\$)	Unit Energy Savings (Kwh/yr)	First Year Unit Energy Savings (\$)	Stock 2009 (million)	Sales 2009 (million)	CAGR Sales 2010	CAGR Sales 2013	Sales 2010 (million)	Sales 2013 (million)	Stock 2013 (million)
Large Charger	Three Phase Lift-Trucks	15.0	0%	\$400.00	4,198.48	\$587.79	0.074	0.005	7%	1%	0.01	0.01	0.0754

*These figures come from the CEC Report. See Appendices A-1 - A-7

Discount Rate	3%
---------------	----

Net Savings Assuming Regulation

Net Savings Assuming No Regulation

Year	Unit Energy Savings (Kwh/yr)	Stock Beginning of Year - 2013 (million)	Turnover	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)	Costs (\$M)	Present Value of Costs (\$M)	Net Savings With Regulations (\$M)	Compliance of New Sales ¹	Compliant Turnover Sales (million)	Energy Savings (Gwh/yr)	Energy Savings (\$M)	Present Value of Savings (\$M)							
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q							
			= 1 / Design Life	= 100%	= c * d * e	= b * f	= g * \$0.14	= h / (1.03) ^a	= f * Unit Cost of Regulation	= j / (1.03) ^a	= l - k	= Compliance + 4(10%) + 10% * (a - 1)	= c * d * m	= b * n	= o * \$0.14	= p / (1.03) ^a							
1	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 2.87	\$ 2.01	\$ 1.95	\$ 0.92	40%	0.00	8.44	\$ 1.18	\$ 1.15							
2	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 2.79	\$ 2.01	\$ 1.90	\$ 0.89	50%	0.00	10.55	\$ 1.48	\$ 1.39							
3	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 2.70	\$ 2.01	\$ 1.84	\$ 0.86	60%	0.00	12.66	\$ 1.77	\$ 1.62							
4	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 2.63	\$ 2.01	\$ 1.79	\$ 0.84	70%	0.00	14.77	\$ 2.07	\$ 1.84							
5	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 2.55	\$ 2.01	\$ 1.73	\$ 0.81	80%	0.00	16.88	\$ 2.36	\$ 2.04							
6	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 2.47	\$ 2.01	\$ 1.68	\$ 0.79	90%	0.00	18.99	\$ 2.66	\$ 2.23							
7	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 2.40	\$ 2.01	\$ 1.63	\$ 0.77	100%	0.01	21.10	\$ 2.95	\$ 2.40							
8	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 2.33	\$ 2.01	\$ 1.59	\$ 0.75	100%	0.01	21.10	\$ 2.95	\$ 2.33							
9	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 2.26	\$ 2.01	\$ 1.54	\$ 0.72	100%	0.01	21.10	\$ 2.95	\$ 2.26							
10	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 2.20	\$ 2.01	\$ 1.50	\$ 0.70	100%	0.01	21.10	\$ 2.95	\$ 2.20							
11	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 2.13	\$ 2.01	\$ 1.45	\$ 0.68	100%	0.01	21.10	\$ 2.95	\$ 2.13							
12	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 2.07	\$ 2.01	\$ 1.41	\$ 0.66	100%	0.01	21.10	\$ 2.95	\$ 2.07							
13	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 2.01	\$ 2.01	\$ 1.37	\$ 0.64	100%	0.01	21.10	\$ 2.95	\$ 2.01							
14	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 1.95	\$ 2.01	\$ 1.33	\$ 0.62	100%	0.01	21.10	\$ 2.95	\$ 1.95							
15	4,198.48	0.08	7%	100%	0.01	21.10	\$ 2.95	\$ 1.90	\$ 2.01	\$ 1.29	\$ 0.61	100%	0.01	21.10	\$ 2.95	\$ 1.90							
Total											\$ 11.27	Total											\$ 29.53

Notes and Sources:

- 1 100% compliance because the regulations will take effect in year 1.
- 2 Since year 1 represents 2013, and assuming a 10% growth rate based on a conservative estimate of Energy Star's market penetration growth, compliance in 2013 will assume a 40% increase in compliance from 2009, plus an additional 10% per year. http://www.energystar.gov/index.cfm?c=partners.unit_shipment_data_archives