

PRELIMINARY STAFF REPORT FOR

# APPLIANCE EFFICIENCY RULEMAKING

PHASE I, PARTS A & B

DOCKET # 07-AAER-3



**STAFF FINAL REPORT**

May 2008  
CEC-400-2008-015



Arnold Schwarzenegger, Governor

# CALIFORNIA ENERGY COMMISSION

Melinda Merritt  
**Program Manager**  
Appliance Efficiency

Bill Pennington  
**Office Manager**  
Buildings and Appliances Office

Valerie Hall  
**Deputy Director**  
Efficiency and Renewable Energy

Melissa Jones  
**Executive Director**

## **DISCLAIMER**

This draft report was prepared by a California Energy Commission staff person. It does not necessarily represent the views of the Energy Commission, its employees, or the State of California. The Energy Commission, the State of California, its employees, contractors and subcontractors make no warrant, express or implied, and assume no legal liability for the information in this report; nor does any party represent that the uses of this information will not infringe upon privately owned rights. This report has not been approved or disapproved by the California Energy Commission nor has the California Energy Commission passed upon the accuracy or adequacy of the information in this report.

## Preface

In its April 2, 2008 Scoping Order, the Energy Commission's Efficiency Committee (Committee) established the scope of Phase I of the 2008 Appliance Efficiency Rulemaking regarding possible amendments to the Appliance Efficiency Regulations (Title 20, California Code of Regulations, Section 1601 through Section 1608). Phase I was divided into two separate, concurrent rulemakings, Part A and Part B.

Part A includes General Purpose Lighting and Portable Lighting Fixtures, and addressed the Committee's priority to carry out the mandates established in Assembly Bill 1109, Huffman and Feuer, Chapter 534, Statutes of 2007 (AB 1109). AB 1109 requires the Energy Commission to adopt minimum energy efficiency standards for general purpose lighting that in combination with other programs and activities, reduce average statewide electrical energy consumption by not less than 50 percent from 2007 levels for indoor residential lighting and not less than 25 percent from the 2007 levels for indoor commercial and outdoor lighting over the next ten years. The Energy Commission is directed to adopt standards by December 31, 2008. Accelerated or new efficiency standards for general purpose lighting and portable lighting fixtures can provide significant indoor residential lighting energy savings.

Part B includes lighting efficiency standards for High Intensity Discharge (HID) Metal Halide Fixtures that can address the indoor commercial lighting energy efficiency reduction requirements of AB 1109. Part B also includes consideration of a comprehensive test procedure for battery charger systems, clarification of the current regulations for residential pool pumps, clarification of the current test method for portable electric spas, and necessary updates and revisions to the overall Appliance Efficiency Regulations for consistency with federal laws.

The Committee directed staff to coordinate the efforts of Pacific Gas & Electric (PG&E) and its technical consultants, affected industry representatives and other stakeholders, and to complete the analysis and review of proposed new standards and amendments to the Appliance Efficiency Regulations. The proposed draft standards will be discussed at a Committee workshop, scheduled for May 15, 2008. This preliminary report summarizes the staff review of the proposed draft standards for the topics identified in Parts A and B of Phase I of the 2008 Appliance Efficiency Rulemaking.

**PLEASE NOTE:** The reference document for proposed amendments relating to federally-regulated appliances discussed in Part A is the comprehensive *Draft Amendments to the Appliance Efficiency Regulations – Part B* that contains all current federal definitions, test methods and efficiency standards. Where applicable, Part A distinguishes proposed amendments relative to the updated federal regulations.



# TABLE OF CONTENTS

|  |    |
|--|----|
| ABSTRACT .....   | iv |
| KEYWORDS .....   | iv |
| CHAPTER 1: Preliminary Staff Report for 2008 Appliance Efficiency Rulemaking – Part A .....                            | 1  |
| Background.....  | 1  |
| General Purpose Lighting: Federal-Regulated General Service Incandescent Lamps.....                                    | 1  |
| Portable Lighting Fixtures .....   | 3  |
| CHAPTER 2: Preliminary Staff Report for 2008 Appliance Efficiency Rulemaking – Part B .....                            | 9  |
| Background.....  | 9  |
| High Intensity Discharge (HID) Metal Halide Fixtures.....  | 9  |
| Battery Charger Systems Test Method .....  | 11 |
| Residential Pool Pumps (Clarification) and Portable Electric Spa (Test Method Clarification)....                       | 13 |
| CHAPTER 3: Updates and Revisions Necessary for Consistency with Federal Laws and Other<br>Non-substantive Changes..... | 17 |
| APPENDIX A: Comparison of Proposed Portable Luminaire Definitions.....   | 19 |
| APPENDIX B: Draft Portable Luminaire Standards Proposed by PG&E & ALA.....   | 21 |

## **ABSTRACT**

This Preliminary Staff Report for the Appliance Efficiency Regulations (California Code of Regulations, Title 20, Sections 1601 through 1608) Rulemaking (Docket # 07-AAER-03, Phase 1) dated April 2008, provides details for draft amendments proposed to be considered as part of this Rulemaking. Phase 1 of this Rulemaking will be divided into two separate, concurrent rulemakings, Part A and Part B.

The areas identified for consideration in Part A include General Purpose Lighting and Portable Lighting Fixtures. Part B includes lighting efficiency standards for High Intensity Discharge (HID) Metal Halide Fixtures, a comprehensive test procedure for battery charger systems, clarification of the current regulations for residential pool pumps, clarification of the current test method for portable electric spas, and necessary updates and revisions to the overall Appliance Efficiency Regulations for consistency with federal laws.

## **KEYWORDS**

Appliance Efficiency Regulations, appliance standards, portable lighting fixtures, torchieres, luminaires, lamps, general purpose lighting, AB 1109, EISA, pool pumps, metal halide luminaires, high intensity discharge fixtures, HID fixtures, battery charging systems, battery chargers, dehumidifiers, ceiling fans, ceiling fan light kits, transformers.

# **CHAPTER 1: Preliminary Staff Report for 2008 Appliance Efficiency Rulemaking – Part A**

## **Background**

The areas identified for consideration in Phase I, Part A of the 2008 Appliance Efficiency Rulemaking include General Purpose Lighting and Portable Lighting Fixtures, and address the Committee's priority to carry out the mandates established in Assembly Bill 1109, Huffman and Feuer, Chapter 534, Statutes of 2007 (AB 1109). AB 1109 requires the Energy Commission to adopt minimum energy efficiency standards for general purpose lighting that in combination with other programs and activities, reduce average statewide electrical energy consumption by not less than 50 percent from 2007 levels for indoor residential lighting and not less than 25 percent from the 2007 levels for indoor commercial and outdoor lighting over the next ten years. Accelerated or new efficiency standards for general purpose lighting and portable lighting fixtures can provide significant indoor residential lighting energy savings. AB 1109 directs the Energy Commission to adopt lighting efficiency standards by December 31, 2008.

Comprehensive revisions and updates are contained in the *Draft Amendments to the Appliance Efficiency Regulations (Draft Amendments)* contained in Part B. Where appropriate, these *Draft Amendments* also include revisions and updates that affect Part A, particularly as they relate to definitions and future standards applicable to federally regulated appliances.

## **General Purpose Lighting: Federal-Regulated General Service Incandescent Lamps**

Following the passage of AB 1109 in California, the federal U. S. Energy Independence and Security Act of 2007 (EISA 2007) was signed into law in December of 2007 and included provisions for future lighting and appliance efficiency standards. In particular, EISA 2007 includes new efficiency standards for general services lamps – Tier I and Tier II - with provisions for California to accelerate the effective date of the federal standards in California. The Tier I standards may be advanced one year, to be effective beginning January 1, 2011, and the Tier II standards may be advanced two years, to be effective beginning January 1, 2018.

Pacific Gas & Electric Company (PG&E), with ECOS Consulting, submitted a Proposal Information Template that supports the Energy Commission's early adoption of the new federal lighting standards for Tier I and Tier II. Based on PG&E's preliminary analysis, staff estimates there would be a potential first year savings of 1,124.4 gigawatt-hours (GWh) for Tier I, and a potential first year savings of 929.75 GWh for Tier II. The Tier I regulations will be phased in over a three year period, and staff has combined for simplicity the total first year savings for each of these three respective years.

Using PG&E's preliminary analysis, staff believes that once the Federal Tier I standards go into effect, this would provide potential cumulative energy savings between 2,142 and 2,522 GWh

annually. For Tier II, once the federal standards go into effect, the estimated cumulative energy savings are approximately 3,733 GWh per year. The proposed standards would also provide corresponding peak demand reduction in each year between 61.14 and 78.71 megawatts (MW) for Tier I and 65.71 MW for Tier II.

Staff reviewed PG&E's initial proposal, including the market analysis, methodology and assumptions used to estimate energy savings, and concludes that PG&E's assessment is reasonable. The proposal can be expected to produce significant lighting energy savings and contribute toward achieving the lighting energy consumption reductions required by AB 1109. In March 2008, Energy Commission staff met with lighting industry representatives, including the National Electric Manufacturers Association (NEMA) and American Lighting Association (ALA), to discuss proposed lighting efficiency standards. Early adoption of the federal standards was discussed and no significant issues were raised by any of the parties.

All of the standards proposed for portable fixtures (luminaires) include a provision requiring GU-24 sockets to accept only compact fluorescent or higher efficiency lamps. All lamps currently available with GU-24 bases are compact fluorescent lamps. Because GU-24 sockets are relatively new in the market there has been no demand for introducing incandescent lamps with GU-24 bases. However, there are no national or state regulations preventing lamp manufacturers from introducing incandescent lamps with GU-24 bases into the market. Because GU-24 sockets are directly connected to the line voltage, there are no limits to the maximum rated wattage for which a portable luminaire with a GU-24 socket could be made available in the market. To assure that the GU-24 sockets do not accommodate incandescent lamps, a requirement has been added to Section 1605.3 that requires that general service incandescent lamps not contain a GU-24 base.

### *Draft Regulations*

Section 1602 – Definitions: Staff has added definitions for general purpose lighting terms consistent with EISA 2007. These have been incorporated in the language changes proposed in Part B – Updates and Revisions Necessary for consistency with Federal Laws and Other Non-substantive Changes.

Section 1605.3 – State Standards for Non- Federally-Regulated Appliances, staff has added the following language: "Incandescent lamps shall not contain a GU-24 base," and two new tables (Table K-8 and Table K-9) [to follow existing Table K-4 (Table K-7 in revised Part B)].

**Table K-8: Standards for State-Regulated General Services Incandescent Lamp - Tier I**

| Rated Lumen Range | Maximum Rated Wattage | Minimum Rated Life Time | Proposed California Effective Date | Federal Effective Date |
|-------------------|-----------------------|-------------------------|------------------------------------|------------------------|
| 1490-2600         | 72                    | 1,000                   | Jan. 1, 2011                       | Jan. 1, 2012           |
| 1050-1489         | 53                    | 1,000                   | Jan. 1, 2012                       | Jan. 1, 2013           |
| 750-1049          | 43                    | 1,000                   | Jan. 1, 2013                       | Jan. 1, 2014           |
| 310-749           | 29                    | 1,000                   | Jan. 1, 2013                       | Jan. 1, 2014           |

**Table K-9: Standards for State-Regulated General Services Incandescent Lamp – Tier II**

| Lumen Range | Minimum Lamp Efficacy | Minimum Rated Life Time | Proposed California Effective Date | Federal Effective Date |
|-------------|-----------------------|-------------------------|------------------------------------|------------------------|
| All         | 45 lumens per watt    | 1,000                   | Jan. 1, 2018                       | Jan. 1, 2020           |

## Portable Lighting Fixtures

Portable lighting fixtures include plug-in table and floor lamps with varying lamp/socket configurations. Portable lighting fixtures are not listed as “covered products” in federal law, with the exception of torchiere fixtures. Other than torchieres, no other portable lighting fixtures are covered by federal or California (Title 20) regulations. There are voluntary ENERGY STAR® labeling specifications for portable lighting fixtures. Currently, there are California and federal regulations for general service incandescent lamps, and for general service lamps. Federally-regulated general service lamps include compact fluorescent lamps (CFL) and light-emitting diode (LED) lamps that are screw-based. Most portable lighting fixtures are designed to accept lamps that are federally regulated.

The Committee has received two proposals for standards for portable lighting fixtures. The initial proposal was submitted by PG&E with the American Council for an Energy-Efficient Economy (ACEEE) in January 2008 and revised April 3, 2008. An alternative proposal was submitted by the American Lighting Association (ALA) on April 7, 2008. PG&E submitted comments in response to the ALA proposal on April 15, 2008.

After review of the proposals, comments and discussion with PG&E and lighting industry representatives, the Energy Commission staff recommended draft standards for consideration at the May 15, 2008 Committee workshop. The PG&E and ALA proposals and staff's recommendations are discussed below. A comparison of PG&E's and ALA's proposed and staff's recommended definitions are shown in Appendix A. Draft regulations proposed by PG&E and ALA are shown in Appendix B.

### *PG&E/ACEEE Standards Proposal*

PG&E's proposal would require either a power limiter integrated into portable lighting fixtures to limit power consumption to a maximum of 35 watts for screw based lamps and a maximum of 40 watts for non screw based low-voltage halogen lamps, or be designed only for high efficacy lamps as specified by ENERGY STAR®. The PG&E definition of portable lighting fixtures is broadly applied to all plug-in table and floor lamps, except federally-regulated torchieres, regardless of lamp/socket configuration.

### *ALA Standards Proposal*

The ALA proposal would limit the maximum relamping rated wattage to 150 watts, and require a dimmer be installed on all portable lighting fixtures. The ALA definition of portable fixtures is limited to residential plug-in medium screw-based (E-26) floor lamps, table lamps, task lamps and other portable and decorative lighting fixtures. Torchieres are not included in the ALA proposal.

### *Discussion*

There have been a series of meetings and conference calls between Energy Commission staff, PG&E/Energy Solutions/ACEEE, and the ALA regarding the two proposals.

ALA claims that consumers will not be satisfied with portable luminaires meeting the proposed PG&E requirements, and will be driven to internet sales to obtain non-compliant luminaires. They believe these internet sales would be difficult for the state to track, and this market shift would be devastating to privately-owned lighting retail stores.

The PG&E response to the ALA proposal points out that virtually all compact fluorescent lamps sold in retail stores today are not compatible with dimmers. Thus, the ALA proposal may actually increase portable luminaire energy use because consumers who are inclined to use screw-in compact fluorescent lamps will not be able to do so in a portable luminaire equipped with a dimmer.

Staff has concerns with both the PG&E and the ALA proposals. Staff agrees with ALA that higher wattage is needed for portable floor luminaires as compared to other portable luminaires. Staff also agrees with ALA that portable luminaires with more than two sockets require more wattage than proposed by PG&E.

Staff finds the energy savings from the ALA proposal to be dramatically less than the PG&E proposal. According to PG&E's "Comments in Response to the American Lighting Association: Proposal Information Template – Portable Lighting Fixtures – ALA," the 150 watt cap proposed by ALA means that the ALA proposal will affect less than 25 percent of portable luminaires.

PG&E also states that even though dimming proposed by ALA might save some energy for portable luminaires using incandescent lamps, using dimmers will likely cause consumers to reduce using screw-based compact fluorescent lamps, or cause premature compact fluorescent lamp failures, since almost all compact fluorescent lamps currently available through retail outlets are not compatible with dimmers. At this time, it is speculative, to assume that dimmable screw-based compact fluorescent lamps will be readily available in the near future. The incompatibility of most screw-based compact fluorescent lamps with dimmers will undoubtedly become a more significant issue as EISA 2007 is expected to significantly increase the percentage of screw-based compact fluorescent lamps in use. Finally, the portable luminaire definition proposed by ALA will limit the regulations to a small subset of portable luminaires currently available.

The ALA proposal also recommended a number of voluntary retrofit programs, (outside the scope of Title 20 Appliance Efficiency Standards) to achieve desired lighting energy reduction goals. These recommendations include voluntary programs for existing portable luminaires, including trade in programs, energy efficiency conversions, and screw-in adaptors intended to convert existing portable luminaires to allow only high efficacy lamps to be used. Staff recommends that these proposals be further explored separately from Title 20.

Staff notes that there are no test procedures for determining what would qualify an adaptor to be classified as permanent.

### *Energy Commission Staff Recommendations*

The Energy Commission staff recommends regulations that provide the following three options for portable luminaires:

#### **Option 1 – Watt Limits Dependent on the Number of Lamps and Type of Fixture.**

Staff recommends a 150 watt cap per luminaire consistent with the ALA proposal.

ALA made a convincing argument that portable floor luminaires require higher wattage than other portable luminaires. Portable floor luminaires are used more often than other portable luminaires to provide both task lighting and general illumination. Therefore, staff recommends allowing higher wattage for portable floor luminaires than for other portable luminaires.

For single socket portable floor luminaires, and for all other portable luminaires with single and double sockets, staff recommends the PG&E proposed value of 35 watts, which is based on one larger wattage compact fluorescent lamp, or two 16 watt compact fluorescent lamps. Using compact fluorescent lamps, this wattage would provide comparable illumination to 120 watts of light from general service incandescent lamps.

For portable floor lamps, staff recommends 23 watts as an incremental adder for each additional socket to encourage using compact fluorescent lamps for high illumination applications. A 23 watt compact fluorescent lamp provides comparable illumination and is the common replacement lamp for a 100 watt general service incandescent lamp.

For all other portable luminaires, staff believes 16 watts per additional socket beyond the first two is appropriate to encourage the use of compact fluorescent lamps for high illumination

applications. A 16 watt compact fluorescent lamp provides comparable illumination and is the common replacement lamp for a 60 watt general service incandescent lamp. Because two compact fluorescent lamps, at 16 watts each, fall under the 35 watt level, staff recommends the maximum of 35 watts be maintained for two sockets for table lamps.

For low voltage halogen luminaires staff recommends a maximum of 40 watts instead of 35 watts, to accommodate low-voltage MR-16 lamps. This additional low voltage halogen power allowance (40 versus 35 watts) would be available only for single socket portable floor luminaires, and single and double sockets for all other portable luminaires.

### **Option 2 – Using GU-24 Line-Voltage Sockets Only.**

The option of GU-24 line-voltage sockets is consistent with the ALA proposal. ALA claims that GU-24 sockets will be used only with energy efficient compact fluorescent lamps and light emitting diode sources. Staff agrees with ALA that GU-24 based lamps that are currently available use only energy efficient lamps. However, because there are no national or state regulations preventing lamp manufacturers from introducing incandescent lamps with GU-24 bases, staff also recommends disallowing incandescent lamps to have GU-24 bases.

Staff recommends that portable luminaires with GU-24 sockets not be rated for use with incandescent lamps of any type, including low-voltage and line-voltage.

Staff also recommends that GU-24 adaptors not be allowed to adapt a GU-24 socket to any other line-voltage socket.

### **Option 3 – ENERGY STAR<sup>®</sup> Luminaires.**

The option for ENERGY STAR<sup>®</sup> luminaires is consistent with the PG&E proposal. Given that there is no lumen cap in staff's proposal, the need for high light applications can still be met with the ENERGY STAR<sup>®</sup> option.

## ***Draft Regulations***

### **Section 1602 - Definitions (n) Luminaires.**

The following are the regulatory definitions for portable luminaires recommended by the Energy Commission staff. Note that the Energy Commission staff proposal shares PG&E's definition of Portable Luminaires, ALA's definition of a GU-24 socket configuration, and both PG&E's and ALA's definition of Luminaire and proposed additional definitions for Portable Floor Luminaires and Portable Table Luminaires.

"GU-24" is the designation of a lamp holder and socket configuration, based on a coding system by the International Energy Consortium, where "G" indicates the broad type of two or more projecting contacts, such as pins or posts, "U" distinguishes between lamp and holder designs of similar type but that are not interchangeable due to electrical or mechanical requirements; and "24" indicates 24 millimeters center to center spacing of the electrical contact posts.

"Luminaire" is a complete lighting unit consisting of a lamp(s) and the parts designed to distribute the light, to position and protect the lamp(s), and to connect the lamp(s) to the power supply. Luminaire is also commonly referred to as a "lighting fixture."

“Portable Floor Luminaires” are portable luminaires designed to be located on the floor and not located on a table, desk, or other structure above the floor; and which are a minimum of 48 inches tall.

“Portable Luminaires” are luminaires that incorporate a power cord and outlet plug allowing the user to relocate the luminaire without any rewiring, are typically controlled with a switch located on the luminaire itself, and typically include floor, table, and desk lamps, but may also include wall or ceiling mounted luminaires.

“Portable Table Luminaires” are portable luminaires designed to be located on a table, desk, or other structure above the floor, regardless of the height of the luminaire.

**Section 1605.3 - State Standards for Non-Federally-Regulated Appliances**

(n) Luminaires

(4) Energy Efficiency Standards for Portable Luminaires. Portable luminaires manufactured on or after January 1, 2010 shall meet one the following requirements:

**Table N-3  
Standards for Portable Luminaires**

| Luminaire Type  | Number of Sockets per Luminaire |      |  |
|---|---------------------------------|------|--|
|   | 1                               | 2    | greater than 2                               |
| Portable Floor Luminaire using other than low voltage halogen lamps   | 35 W                            | 58 W | 23 W per additional socket up to 150 W total |
| Portable Floor Luminaire using low voltage halogen lamps  | 40 W                            | 63 W |  |
| All other Portable Luminaires, including portable table luminaires using other than low voltage halogen lamps | 35 W                            |      | 16 W per additional socket up to 150 W total |
| All other Portable Luminaires using low voltage halogen lamps   | 40 W                            |      |  |

- A. Shall have a total maximum wattage per portable luminaire as shown in Table N-3:
- B. Be equipped with only GU-24 line-voltage sockets, or
- C. Be certified to meet ENERGY STAR® *Program Requirements for Residential Light Fixtures*, Version 4.1 or later.

- (5) **Energy Efficiency Standards for Luminaires with GU-24 Sockets.** Luminaires with GU-24 sockets manufactured on or after January 1, 2010 shall not be rated for use with incandescent lamps of any type, including line-voltage or low voltage.
- (6) **Energy Efficiency Standards for GU-24 Adaptors.** GU-24 adaptors manufactured on or after January 1, 2010 shall not adapt a GU-24 socket to any other line voltage socket.

**Section 1606(a)(3)(E) – Data Submittal Requirements**

Data collection submittal requirements for the proposed draft standard will be determined later and included in subsequent draft amendments.

# **CHAPTER 2: Preliminary Staff Report for 2008 Appliance Efficiency Rulemaking – Part B**

## **Background**

Part B of Phase I of the 2008 Appliance Efficiency Rulemaking includes lighting efficiency standards for high intensity discharge (HID) Metal Halide (MH) Fixtures to further address the Committee's expressed priority to carry out the mandates established in Assembly Bill 1109, Huffman and Feuer, Chapter 534, Statutes of 2007 (AB 1109). Part B also includes consideration of a comprehensive test procedure for battery charger systems, clarification of the current regulations for residential pool pumps, clarification of the current test method for portable electric spas, and necessary updates and revisions to the overall Appliance Efficiency Regulations for consistency with federal laws.

Comprehensive revisions and updates are in the Draft Amendments to the *Appliance Efficiency Regulations (Draft Amendments)* contained in Part B. In some cases revisions and updates to definitions and future standards applicable to federally regulated appliances also apply to proposals for Part A Draft Standards.

## **High Intensity Discharge Metal Halide Fixtures**

In 2004, the Energy Commission adopted efficiency standards for 150 watt to 500 watt Metal Halide (MH) fixtures, which prohibit the use of probe-start lamps and require a minimum ballast efficiency of 88 percent. These standards became effective January 1, 2008. The U. S. EISA 2007, signed into law in December 2007, established federal standards for MH fixtures that take effect January 1, 2009. The federal standard also applies to fixtures for 150 watt to 500 watt MH lamps. The federal standard sets minimum pulse-start MH ballast efficiencies based upon the type of ballasts used.

Unlike California's MH fixture standard, the federal standard does not prohibit the use of probe-start ballasts. Instead, magnetic probe-start ballasts must meet a stringent efficiency requirement of 94 percent. Non-pulse start electronic ballasts must meet a minimum efficiency of 92 percent for wattages greater than 250 watts, or 90 percent for wattages less than or equal to 250 watts. The federal law explicitly excludes California's MH fixture standards from preemption and provides the opportunity for the Energy Commission to adopt revised standards by January 1, 2011. Additional information about the California and federal standards is shown in Table 1.

**Table 1: California and Federal Standards**

| Ballast Type               | CA 2008     |     | Federal 2009           |         |     | Proposed CA 2010 |               |     |
|----------------------------|-------------|-----|------------------------|---------|-----|------------------|---------------|-----|
| Probe Start                | Not Allowed |     | Allowed                |         |     | Not Allowed      |               |     |
| Pulse Start                | Allowed     |     | Allowed                |         |     | Allowed          |               |     |
| Minimum Ballast Efficiency | All Types   | 88% | Pulse-Start            | 88%     |     | Pulse Start      | > 275 – 500 W | 92% |
|                            |             |     |                        |         |     |                  | 150 – ≤ 275 W | 90% |
|                            |             |     | Magnetic Probe-Start   | 94%     |     | All Probe Start  | Not Allowed   |     |
|                            |             |     | Electronic Probe-Start | > 250 W | 92% |                  |               |     |
| ≤ 250 W                    | 90%         |     |                        |         |     |                  |               |     |

***PG&E/ACEEE Proposal***

The Analysis of Standards Options for High-Intensity Discharge Lighting Fixtures submitted by PG&E with ACEEE (last modified April 3, 2008) recommends that the Energy Commission revise the current ballast efficiency requirement for MH fixtures and require ballast efficiencies equivalent to electronic ballasts. Specifically, PG&E recommends a minimum ballast efficiency of 90 percent for 150 watt to 274 watt fixtures, and 92 percent for fixtures of 275 watts to 500 watts. The proposed standards would affect new fixtures in commercial applications. Based on PG&E’s analysis, the majority of new fixtures do not use the electronic ballasts proposed here and, thus, this proposed standard will save a significant amount of energy. The energy savings would help meet the AB 1109 requirement for indoor commercial lighting energy reduction.

Adopting PG&E’s proposed standard would provide potential energy savings between 19- 59 GWh and corresponding peak demand reduction between 3- 11 MW for the first-year sales and 173 - 538 GWh annual electric saving and 31 – 96 MW peak demand reduction after the complete stock turnover. The PG&E analysis uses 88 percent efficient pulse-start ballasts, consistent with the California 2008 regulations, to determine current California baseline energy use.

In March 2008, Commission staff met with lighting industry representatives, including the National Electrical Manufacturers Association (NEMA) and the American Lighting Association (ALA), hosted by the California Lighting Technology Center in Davis, to discuss this and other lighting efficiency proposals. At that time, no substantive issues were raised related to the PG&E proposal for HID metal halide fixtures.

*Draft Regulations:*

**Section 1605.3(n) – State Standards for Non- Federally-Regulated Appliances: add the following:**

Metal halide luminaires manufactured on or after January 1, 2010 shall meet the minimum ballast efficiency percent shown in Table N-2.

**Table N-2: Standards for Metal Halide Luminaires  
(Manufactured On or After January 1, 2010)**

| Lamp Rating    | Minimum Ballast Efficiency (%) |
|----------------|--------------------------------|
| 150-274 watts  | 90                             |
| 275- 500 watts | 92                             |

Exceptions to Table N-2:

1. Luminaires that use electronic ballasts that operate at 480 volts; or
2. Luminaires that meet all of the following criteria:
  - a. rated only for 150 watt lamps; and
  - b. rated for use in wet locations as specified by the National Electrical Code 2002, Section 410.4(A); and
  - c. contain a ballast that is rated to operate at ambient air temperatures above 500°C as specified by UL 1029-2001.

## **Battery Charger Systems Test Method**

In its April 2, 2008 Scoping Notice, the Committee noted the Energy Commission developed a test method for battery charging systems through the Public Interest Energy Research (PIER) Program. Ecos Consulting and the Electric Power Research Institute (EPRI) funded by PIER and PG&E, completed this comprehensive test method for California late 2007, after four years research, drafting, stakeholder meetings, and public comments. The Committee also noted federal activities related to battery chargers – the current U.S. Environmental Protection Agency (EPA) test method that measures only standby and maintenance energy use, and the U.S. Department of Energy’s (DOE) intent to consider adding charging energy use to the test procedure at a future date. Currently, California’s Appliance Efficiency Regulations do not include test procedures or efficiency standards for battery charger systems.

Battery chargers coupled with their batteries are referred to as battery charger systems (BCS). BCS are used in a wide range of products and differ mostly in size and battery chemistry. Four battery chemistries currently dominate the market: nickel-cadmium (NiCd), nickel-metal hydride (NiMH), lithium-ion (Li-Ion), and sealed lead acid. PG&E’s study estimates that there

are more than 130 million BCS in California and concludes BCS efficiency could be improved dramatically, yielding significant energy savings.

To improve the efficiency of BCS, a comprehensive test procedure is required to identify energy consumption in active (charge) and inactive modes. Different organizations have developed slightly different procedures for defining and measuring efficiency in battery chargers, particularly when it comes to charge mode. EPA's ENERGY STAR® program has developed a test procedure that focuses on power tools, lawn care products, hygiene products, and kitchen tools. DOE has adopted a Uniform Test Method for Measuring the Energy Consumption of Battery Chargers beginning December 8, 2006. DOE's test procedure does not measure energy consumed by BCS in active charge mode. Ecos Consulting and EPRI developed a separate and more comprehensive test procedure for all types of residential and commercial battery charger systems including measurement of energy consumption by BCS in active, maintenance, and no battery mode.

### *PG&E/Ecos Consulting Proposal*

The Proposal Information Template submitted by PG&E (last modified April 7, 2008) recommended that the Energy Commission adopt the Energy Efficiency Battery Charger System Test Procedure, Version 1.1, March 5, 2008 (Ecos's test method). The PG&E proposal also recommended the Energy Commission issue a call for test data from manufacturers or other interested parties ("Draft Call for Battery Charger Test Data") to help in collecting test data for analyzing how BCS use energy, how energy relates to battery chemistries and battery capacity, and how energy relates to specific products and charging technologies. Comprehensive testing would be helpful in forming the basis to develop future standards for BCS. Staff supports the recommended "Draft Call for Battery Charger Test Data" referenced in PG&E's Proposal Information Template.

### *Stakeholder Input*

The Energy Commission staff has engaged a wide-ranging stakeholders group to identify any further refinements needed to finalize the proposed BCS test procedure for California as part of Phase I of the 2008 Appliance Efficiency Rulemaking. Following the January 15, 2008, Committee workshop, staff facilitated meetings with BCS stakeholders on April 8 and April 17 to receive input and comments on the Ecos test method. DOE representatives participated in the initial meeting, providing an update and schedule of federal BCS activities and noting that DOE is evaluating the incorporation of an active mode test in the BCS test procedure within the 2009 federal rulemaking. The Association of Home Appliance Manufacturers (AHAM) and the Power Tools Institute (PTI) have participated throughout the stakeholder process, ultimately requesting specific clarifying and substantive changes to the Ecos test method language in comments submitted on April 18, 2008. PG&E and Ecos Consulting has responded to all comments received and made selected revisions to the test procedure, resulting in the Energy Efficiency Battery Charger System Test Procedure, Version 1.2, submitted on April 22, 2008.

Additional staff and stakeholder meetings are planned to broaden the stakeholder group and include large battery charger stakeholders and other industry representatives that may not have participated in the proceedings, and to consider additional comments received.

## *Draft Regulations*

Staff proposes the following changes, adopting the “Energy Efficiency Battery Charger System Test Procedure, Version 1.2,” April 22, 2008, as submitted by PG&E/Ecos Consulting (see Part B Draft Amendments to the Appliance Efficiency Regulations).

**Section 1601(u) -- Scope:** Add battery charger systems.

**Section 1602(u) – Definitions:** Add definitions from “Energy Efficiency Battery Charger System Test Procedure, Version 1.2.”

**Section 1604(u) – Test Method for Specific Appliances:** Insert “Energy Efficiency Battery Charger System Test Procedure Version 1.2” with appropriate contact information and links at the end of this section.

## **Residential Pool Pumps (Clarification) and Portable Electric Spa (Test Method Clarification)**

The California Energy Commission adopted standards for residential pool pumps that became effective January 1, 2006, with increased stringency effective January 1, 2008. The standards were drafted in such a way that the requirements only applied to new residential pool pumps, but not to the replacement residential pool pump motors installed in existing residential pool pumps. At the time the standards were originally proposed and adopted, the anticipated energy savings included replacing residential pool pump motors installed in existing residential pool pumps. Language changes amending the Appliance Efficiency Regulations will clarify the residential pool pump motor replacement requirements.

Related to the test method for residential pool pumps, pool pump stakeholders suggested adding the requirement for testing and certifying data for “Curve C,” which represents the system curve of a well designed pool pump that has a low-pressure drop. Testing and reporting “Curve C” data also will facilitate showing of compliance with the residential pool installation requirements in Section 150(p)1B of the 2008 Building Efficiency Standards (Title 24, Part 6), adopted on April 23, 2008.

Also, Residential Pool Pump data collection shown in Table V does not currently include mandatory data reporting to show compliance with the pump control requirements shown in Section 1605.3(g)(5)(B)(ii) of the existing Appliance Efficiency Regulations. An appropriate data collection point is being added to the regulations to correct this oversight.

Additionally, there has been a long-standing complication with the portable electric spa test method that parties have sought to correct. The current regulations specify the minimum water temperature and maximum ambient air temperature, without specifying either the maximum water temperature or minimum ambient air temperature. The proposed changes to the test method include two-sided temperature tolerances to correct this problem.

The Proposal Information Template for Pool and Spa Revisions submitted by PG&E with Davis Energy Group included language to correct the deficiencies with current standards for

residential pool pumps that are described above (except for the data collection related to existing Section 1605.3(g)(5)(B)(ii) that is independently proposed by staff). Energy Commission staff and PG&E staff have exchanged ideas and information in order to draft the specific language needed to clarify the standards in order to achieve the energy savings that was anticipated when standards for these products first took effect over two years ago.

Also, PG&E requested that the Appliance Efficiency Regulations clarify that “the permanent split capacitor, or cap-start, cap-run motor efficiency requirement, effective January 1, 2006, only apply to the high speed of 2-speed motors.” Staff requested that PG&E clarify this, since the standards are currently written to exclude split-phase or capacitor start – induction run types, rather than specify the more efficient motors. PG&E’s suggested clarification would add the following exception to Section 1605.3(g)(5)(A):

“EXCEPTION to Section 1605.3(g)(5)(A): This requirement does not apply to the low speed operation of two-speed motors.”

PG&E is also requesting that 48 frame motors designed for above-ground residential pool circulation or filtration pumps be excluded from the requirement to comply with the regulations. Currently these 48 frame pump motors may not be available in permanent split capacitor, cap-start, cap-run, 2-speed, or variable speed configurations. More research is necessary to determine if the regulations should be expanded to include these products. If such a decision is made in the future, adequate time will be required to allow industry to transition to the higher efficiency requirements.

For portable electric spas, PG&E has proposed removing the spa insulation R-value, and the R-value of the spa cover from the reporting requirements. PG&E states that the standby watts value (already tested and reported) provides the best indication of actual efficiency performance, while the two R-value figures can result in consumer confusion regarding which spas are actually the most efficient.

PG&E’s Proposal Information Template recommended many other changes to the regulations for residential pool pumps and portable electric spas, including many that are not yet ready for consideration in Phase I of this rulemaking. After consulting with staff, PG&E narrowed their proposal to address the most urgent of these issues.

### *Draft Regulations*

Staff proposes the following changes: (see Part B - Draft Amendments to the Appliance Efficiency Regulations for complete language changes).

**1601(g) – Scope.** Add “replacement pool pump motors”.

**1602(g) – Definitions.** Add definitions for “replacement residential pool pump motor,” “residential pool pump motor,” and “total horsepower,” and amend the definition for “residential pool pump.”

**1604(g) – Test Methods.** Amend the test method for residential pool pumps to specify the measurement for pump efficiency, and add “Curve C.” Amend the test method for portable electric spas to include the correct tolerances for both water temperature and ambient air

temperature, and remove the requirement for testing and reporting the R-value of the spa cover and the R-value of the spa insulation.

**1605.3(g) – Efficiency and Design Standards.** Make the requirements for coverage of replacement motors for existing residential pool pumps explicit. Clarify the requirements for pump controls, exclude both (1) the low-speed operation of two-speed motors and (2) 48 frame motors designed for use in above-ground filtration pumps from needing to comply with the motor efficiency requirements in Section 1605.3(g)(5)(A).

**1606 – Data Collection (Table V, subsection (g) “Residential Pool Pumps”).** Make the following changes to data collection requirements for residential pool pumps: (1) change “Pool Pump Motor Service Factor” to “Motor Service Factor;” (2) add a field for “Control Speed” in order to collect data to show compliance with the pump control requirements shown in Section 1605.3(g)(5)(B)(ii); (3) add all reporting requirements for “Curve C,” specifically (a) Flow (in gpm), (b) Power (in watts), and (c) Energy Factor (in gallons per watt hour).



## CHAPTER 3: Updates and Revisions Necessary for Consistency with Federal Laws and Other Non-substantive Changes

The Energy Commission's Appliance Efficiency Regulations include standards, definitions, test methods, and other requirements for federally regulated appliances. Since California's regulations underwent a major update in 2005, federal standards, definitions, test methods, and other requirements have been added or changed and incorporated into 10 CFR 430 and 10 CFR 431. These changes include those in EISA 2007, and signed into law December 2007. To maintain consistency with federal standards and regulations, a thorough review of updated federal standards and regulations was necessary. Since these changes are already federal law, or will be on a specific date in the near future, corrections to California regulations are consistent with the federal law and have no regulatory effect. These changes in the draft regulations are highlighted in blue either with ~~strikeout~~ or underlined text. Additionally, other changes without regulatory effect are also highlighted. These are changes to the form of some sections that are proposed to make them internally consistent and correct with standard formatting of the Appliance Efficiency Regulations.

With few exceptions, the majority of the changes proposed for this category are the result of a thorough review of 10 CFR 430 (2008), 10 CFR 431 (2008), and the EISA 2007. The remaining changes are incorporated to make the Regulations internally consistent and correct. There has been, to date, no stakeholder input on these proposed changes. Staff welcomes stakeholders' review of these changes highlighted in blue in order to ensure their accuracy and completeness.

Changes to Table V (data reporting requirements) referenced as "to be completed" are necessary to conform the data collection requirements to include data for the newly added federally regulated appliances added to this draft. See Subsection (k) of Table V for the following federally regulated appliances:

- Medium-base compact fluorescent lamps;
- General service incandescent lamps;
- Candelabra base and intermediate base incandescent lamps.

These data collection parameters will be determined later and included in subsequent draft amendments.

### *Draft Regulations*

Please review the Part B - Draft Amendments to the Appliance Efficiency Regulations for complete language changes.

The changes in the draft regulations that are shown highlighted in blue with either ~~strikeout~~ or underlined text represent most changes without regulatory effect (either incorporating existing or future federal requirements or making the regulations internally consistent). Other changes,

highlighted in red either in ~~strikeout~~ or underlined text predominantly represent changes with regulatory effect, including but not limited to all changes for metal halide luminaires, battery charger systems, and residential pool pumps.

## APPENDIX A: Comparison of Proposed Portable Luminaire Definitions

| Section 1602 - Definitions (n) Luminaires  |  |  |
|--|--|--|
| PG&E Proposal  | Staff Recommendations  | ALA Proposal   |
| <p>“Portable Luminaires” are luminaires (also known as “lighting fixtures”) that incorporate a power cord and outlet plug allowing the user to relocate the luminaire without any rewiring, are typically controlled with a switch located on the luminaire itself, and typically include floor, table, and desk lamps, but may also include wall or ceiling mounted luminaires.</p> |  | <p>Portable Luminaires are luminaires (also known as “lighting fixtures,” “floor lamps,” “table lamps,” or “task lamps.”) which are functionally and decoratively portable, equipped with standard 120 volt electric cord and plug assemblies, and designed for residential use. Portable luminaires include floor lamps, table lamps, task lamps and other functionally and decoratively portable luminaires.</p> |
| (none)   | <p>“GU-24” is the designation of a lamp holder and socket configuration, based on a coding system by the International Energy Consortium, where “G” indicates the broad type of two or more projecting contacts, such as pins or posts, “U” distinguishes between lamp and holder designs of similar type but that are not interchangeable due to electrical or mechanical requirements, and “24” indicates 24 millimeters center to center spacing of the electrical contact posts.</p> |  |
| <p>“Luminaire” is a complete lighting unit consisting of a lamp(s) and the parts designed to distribute the light, to position and protect the lamp(s), and to connect the lamp(s) to the power supply; commonly referred to as a “lighting fixture.”</p>  |  |  |
| (none)   | <p>“Portable Floor Luminaires” are portable luminaires designed to be located on the floor and not located on a table, desk, or other structure above the floor; and which are a minimum of 48 inches tall.</p>  | (none)   |
| (none)   | <p>“Portable Table Luminaires” are portable luminaires designed to be located on a table, desk, or other structure above the floor, regardless of the height of the luminaire.</p>   | (none)   |



## **APPENDIX B: Draft Portable Luminaire Standards Proposed by PG&E & ALA**

### *Proposed by PG&E*

(n) Luminaires

(4) Energy Efficiency Standards for Portable Luminaires. Portable Luminaires manufactured on or after January 1, 2010 shall meet the following requirements:

- A. Certified to meet current ENERGY STAR® portable fixture specification, or
- B. Maximum operable wattage less than or equal to 35 watts.

EXCEPTION to Section 1605.3(n)(4)B: Non screw-based low-voltage halogen luminaires shall have a maximum operable wattage less than or equal to 40 watts.

### *Proposed by ALA*

(n) Luminaires

(4) Energy Efficiency Standards for Portable Luminaires. Portable Luminaires manufactured on or after January 1, 2010, with single and multiple sockets which are medium base (E26) sockets, and single-level (on/off) switch or non-controllable sockets shall be equipped with one of the following:

- A. Medium base (E26) adjustable, dimmer-controlled sockets rated for 150 watts maximum and marked for use with either incandescent or dimmable, integrally-ballasted compact fluorescent lamps, or
- B. GU-24 line-voltage sockets for use with GU-24 integral compact fluorescent lamps, or
- C. Dedicated 2- or 4-pin sockets wired to appropriate fluorescent ballasts.