

2008 Appliance Efficiency Rulemaking - Phase I -

Proposed Regulations and Draft Environmental Impact Report for Lighting Efficiency Standards

**Energy Efficiency Committee Hearing
September 17, 2008**

Overview

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2008 Appliance Efficiency Rulemaking Phase I Topics

Topics were established by Committee Scoping Order and Committee Workshop Notice in April, 2008:

Part A

- General purpose lighting
- Portable lighting fixtures

Part B

- High intensity discharge metal halide fixtures
- Battery charger test method
- Residential pool pumps and portable electric spas
- Updates and revisions necessary for consistency with federal laws and other non-substantive changes



Phase I – Milestones and Schedule

- Rulemaking documents (NOPA, ISOR, Express Terms) published by Office of Administrative Law on August 29, 2008.
- 45-day public comment period ending October 13, 2008; comments will be accepted up to October 22.
- Possible adoption by Energy Commission at the October 22, 2008, Business Meeting.
- Modifications may be required; modified text will be made available at least 15 days prior to noticed Energy Commission adoption.



Draft Environmental Impact Analysis Lighting Efficiency Standards (Part A)

- Notice of Preparation and DEIR filed with State Clearinghouse August 14, 2008.
- 45-day comment period ending October 6, 2008.
- All public comments will be addressed in the final EIR.
- Possible adoption by Energy Commission at the October 22, 2008, Business Meeting.



Energy Commission Staff Reports and Proposed Regulations

Staff Reports provide:

- Feasibility, cost-effectiveness, energy use and projected savings on a statewide basis.
- Stakeholder proposals, comments and alternatives considered
- Proposed regulations for all topics

Changes with regulatory effect (“express terms” equivalent) found in 45-Day Language for Parts A and B.

Non-substantive changes (without regulatory effect) found in 45 Day Language for Part B.



General Purpose Lighting

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General Purpose Lighting – Proposed Regulations

- Adoption of Energy Independence and Security Act of 2007 (EISA) standards for general service incandescent (GSI) lamps – Tier I - one year prior to federal effective dates.
- Adoption of EISA standards for general service lamps backstop requirement - Tier II - two years prior to federal effective date.
- Incandescent lamps shall not contain GU-24 base.
 - Corresponds with proposed requirements for portable lighting fixtures, and
 - Is consistent with *Title 24 2008 Building Energy Efficiency Standards*, adopted April 30, 2008.



General Purpose Lighting – Proposed Regulations (cont.)

Proposed Table K-8: Standards for State-regulated General Services Incandescent Lamps -Tier I

Rated Lumens Range	Maximum rated Wattage	Minimum Rated Life Time	Proposed California Effective Date
1490-2600 Lumens	72 Watts	1,000 hours	Jan, 1, 2011
1050-1489 Lumens	53 Watts	1,000 hours	Jan 1, 2012
750-1049 Lumens	43 Watts	1,000 hours	Jan 1, 2013
310-749 Lumens	29 Watts	1,000 hours	Jan 1, 2013

Proposed Table K-9: Standards for State-regulated General Services Lamps -Tier II

Lumens Range	Maximum Lamp Efficacy	Minimum Rated Life Time	Proposed California Effective Date
All	45 lumens per watt	1,000 hours	Jan, 1, 2018



General Purpose Lighting – Proposed Regulations (cont.)

The proposed regulations are:

- Supported by the analysis and recommendations made by PG&E and Ecos Consulting.
- Intended to help meet the AB 1109 requirements for statewide lighting energy reduction by 2018.
- Consistent with federal appliance law that allows California to adopt the Tier I and Tier II lighting standards for general service lamps prior to federal effective dates.
- Meet the provisions of the Public Resources Code.



General Purpose Lighting Assessment

PG&E's assessment concluded that early adoption of the EISA standards:

- Will contribute to achieving significant reduction in residential lighting energy consumption as required by AB 1109 by 2018.
- Will result in approximately 28 percent decrease in GSI lamp wattage from 2007 levels.
- Will result in an additional 27 percent decrease in general service lamp wattage.
- California will realize substantial energy savings after all existing medium screw base general services incandescent lamps are replaced with energy efficient Tier II lamps.



Estimated Energy Savings & Reduced Costs for General Purpose Lighting - Tier I and Tier II

Incremental Cost of Improvement Per Unit

Tier I: \$1.00

Tier II: \$2.00

Reduced Total Cost over the Design Life

Tier I: \$2.27

Tier II: \$3.22

The proposed standard is cost effective

Current annual statewide energy use:

17,893 (million kWh) as of 2008



Modified Spectrum GSI Lamps

- For Tier I, EISA lighting efficiency standards include a table for modified spectrum GSI lamps in tandem with a table for standard GSI lamps, and using lumen bins that are 28% lower than those used in standard GSI lamps.
- Modified spectrum GSI lamps are likewise included in the scope and definition of Tier II.
- Both PG&E and Energy Commission staff assessments (energy use, cost and savings) include modified spectrum GSI lamps as a segment/subset of GSI lamps.
 - The estimated design life and incremental cost assumed for both types of lamps are the same.
 - The estimated average life cycle benefit per unit is fairly close for both types of lamps.



Modified Spectrum GSI Lamps - Correction

- For Tier I, the EISA table for modified spectrum GSI lamps was not included in the proposed regulations Express Terms.
- Staff proposes to correct the oversight in 15-Day Language with the inclusion of the EISA table and appropriate definitions in the Express Terms for Part A with 1 year accelerated effective dates in California.

Standards for State-regulated Modified General Services Incandescent Lamps -Tier I

Rated Lumens Range	Maximum rated Wattage	Minimum Rated Life Time	Proposed California Effective Date
1118-1950 Lumens	72 Watts	1,000 hours	Jan, 1, 2011
788-1117Lumens	53 Watts	1,000 hours	Jan 1, 2012
563-787 Lumens	43 Watts	1,000 hours	Jan 1, 2013
232-562Lumens	29 Watts	1,000 hours	Jan 1, 2013

- Modified spectrum GSI lamps are included in Part B Express Terms as a federally regulated lamp consistent with EISA specifications and effective dates.



QUESTIONS ?



Draft Environmental Impact Report for Lighting Efficiency Standards

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Draft Environmental Impact Report (DEIR) for Lighting Efficiency Standards - Scope

The DEIR addresses Part A of the 2008 Appliance Efficiency Rulemaking, Phase I, which includes:

- General Service Lighting
- Portable Lighting

The DEIR does not address any of the actions in Part B of this Rulemaking. Those actions are not known to have any potentially significant impacts and will be addressed by a separate Initial Study/Negative Declaration.



DEIR - Authority to Adopt Regulations

- Federal law pre-empts state law unless specific exemption exists
- EISA specifically allows California (and other states) to adopt lighting efficiency regulations ahead of the federal effective dates.
- The Energy Commission has the authority within California to adopt appliance efficiency standards.
- State Assembly Bill 1109 expressly requires the Energy Commission to adopt lighting standards by December 31, 2008.



DEIR - Proposed Regulations

For General Service Lighting, the Energy Commission is proposing to adopt regulations that would accelerate the effective dates of the federal regulations for general service lamps.

- Phased Tier I standards would be accelerated by one year.
- Tier II standards would be accelerated by two years.

Federal law will supersede California law on the original federal effective dates, meaning that California's regulations will only be in effect for one and two years, respectively.

For Portable Luminaires, California is proposing regulations that would encourage the use of energy efficient bulbs.



DEIR - Potential Impact

- The proposed regulations are considered a project under the California Environmental Quality Act (CEQA), and have the potential for a significant environmental impact.
- The proposed regulations are likely to encourage the use of energy efficient lighting options, which will include CFLs.
- CFLs contain a minute quantity of mercury, which is an M003 listed Universal Waste under Department of Toxic Substances Control (DTSC).
- Proper disposal of CFLs according to Universal Waste regulations would have a less-than-significant impact.



DEIR - Potential Impact (cont.)

- However, the Energy Commission does not have the authority to implement the Universal Waste regulations and thus cannot ensure that all CFLs will be properly disposed of. Therefore, there is a potential for significant environmental impact under CEQA as determined by DTSC.
- Mitigation is within the responsibility and jurisdiction of DTSC.



DEIR – Public Comments

Public comments can be made here, or can be submitted in writing by
October 6, 2008

The Energy Commission may consider adoption of the final EIR as early as
October 22, 2008

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Non-substantive Changes

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Non-substantive Changes in Part B

Non-substantive changes are shown in the Part B proposed regulations with text that is either ~~struck-out~~ or underlined. These reflect:

- Changes without regulatory effect, found in:
 - 10 Code of Federal Regulations (CFR) Section 430
 - 10 CFR Section 431
 - 16 CFR Section 305
 - Energy Independence and Security Act of 2007 (EISA 2007)
- Other clarifications



Non-substantive Changes (cont.)

Such changes may include, but are not limited to:

1. renumbering, reordering, or relocating a regulatory provision;
2. revising structure, syntax, cross-reference, grammar, or punctuation;
3. making a regulatory provision consistent with required federal law;
4. deleting a regulatory provision for which a federal law has been repealed.



Federal Standards Updated or Added

Section 1605.1 includes updated or new federal standards for:

- Commercial Refrigerators
- Commercial Automatic Ice Makers
- Walk-in Coolers and Freezers
- Through the wall and small duct, high velocity Air Conditioners (AC) & Heat Pumps (HP)
- Commercial AC & HP
- Single package vertical AC & HP
- Ceiling Fans, Ceiling Fan Light Kits
- Dehumidifiers
- Residential Boilers



Federal Standards Updated or Added (cont.)

Section 1605.1 includes updated or new federal standards for:

- Duct Furnaces
- Commercial Pre-Rinse Spray Valves
- Fluorescent Lamp Ballasts, Lamps, Exit Signs, Traffic Signals
Torchieres, Metal-Halide Luminaires
- Residential Dishwashers
- Clothes Washers (residential and commercial)
- Electric Motors
- Distribution Transformers
- External Power Supplies



Other Clarifications

Where appropriate, standards in 1605.3 have either:

- Been removed, where federal standards are already in effect; or
- Have an end-date incorporated, where federal standards take effect in the future.
 - In some cases, standards recently pre-empted are kept in the document for reference and will be removed under the next general rulemaking.
- Both commercial pre-rinse spray valves and pedestrian traffic signals maintain California standards while also having federal standards.

Staff welcomes stakeholders review and comments.



QUESTIONS ?



Battery Charger Systems (BCS) Test Procedures

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BCS Test Procedures

- Battery chargers coupled with their batteries are referred to as battery charger systems (BCS).
- California's Appliance Efficiency Regulations do not currently include test procedures or efficiency standards for battery charger systems.
- The U.S. Department of Energy (DOE) current test procedure for BCS measure energy consumption in inactive mode only.
- DOE published a Notice of Proposed Rulemaking on August 15, 2008, proposing amendments to existing test procedures for battery chargers.
- DOE is required to determine by July 1, 2011, if energy conservation standards for battery chargers are technically feasible and economically justifiable.



PG&E/Ecos Consulting Proposal

PG&E with Ecos Consulting (Ecos) submitted a *Proposal Information Template for Battery Charger Systems* on April 7, 2008, recommending that Energy Commission adopt a battery charger system test procedure developed by Ecos and EPRI, funded by the Energy Commission's PIER Program and PG&E. The initial proposal:

- Examined the use of BCS in California, concluding that BCS efficiency could be improved dramatically, and would yield significant energy savings.
- Recommended adoption of the Ecos test procedure that identifies energy consumption in both active (charge) and inactive modes.
- Recommended that the Energy Commission request test data from manufacturers or other interested parties to help collect BCS data for future standards development.



BCS Stakeholder Comments

Energy Commission staff conducted meetings including:

- Battery charger stakeholders (AHAM, PTI, Motorola, CEA, other industry representatives)
- U.S. Department of Energy
- Natural Resources Canada
- Southern California Edison Co.
- San Diego Gas & Electric Co,

Comments and suggestions received from stakeholders have been incorporated into the test procedure.

Part B was added following consensus among large battery charger stakeholders to include testing of large battery chargers system in the Ecos test method.

Stakeholder process culminated in Version 2.1.4.



BCS Stakeholder Comments (Cont.)

Comments submitted by Consumer Electronics Association (CEA) and Motorola expressed concern regarding overlap of the proposed BCS test procedures and regulations, and federal external power supply (EPS) regulations.

- Federal law states that an energy conservation standard for external power supplies shall not constitute an energy conservation standard for the separate end-use product to which the external power supply is connected.
- It is clear from the federal law that the battery charger systems that are built into separate end-use products are not considered EPS and testing them for energy efficiency standards does not constitute double testing.
- There are no provisions in the proposed test procedure to test an EPS or internal power supply.



Proposed Regulations

1. Staff recommends adoption of a voluntary BCS test procedure and believes the PG&E/Ecos test procedure is comprehensive, measuring energy consumption in active, maintenance, and standby modes, and applicable to a wide range of BCS applications.
2. Staff recommends adoption of the *Energy Efficient Battery Charger System Test Procedure, Version 2.1.4*, developed by Ecos, PG&E, SCE and SDG&E, as refined through this rulemaking process.
3. Staff recommends that the Energy Commission's Efficiency Committee issue a call for submittal of BCS test data from manufacturers and interested parties.



Call for Test Data

1. Staff agrees that the receipt of additional data will be critical in analyzing
 - how battery charger systems use energy,
 - how energy use relates to battery chemistry/capacity, and
 - what role technologies and product types play in energy consumption.
2. Current and comprehensive test data will be helpful and necessary in forming the basis to develop appropriate future energy efficiency standards for BCS.
3. A draft template for collection of test data has been reviewed by stakeholders and expected to be finalized soon.



QUESTIONS ?



Residential Pool Pumps And Portable Electric Spas

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Portable Electric Spas - Test Method Clarification

There are a few inconsistencies in the current test method.

Current test method specifies:

- minimum water temperature, but not maximum
- maximum ambient air temperature, but not minimum
- reporting of insulation R-values, which are not needed to determine energy efficiency

Proposed regulatory language will:

- Insert two-sided temperature tolerances
- Remove the spa insulation R-value and spa cover R-value from data reporting requirements



Residential Pool Pumps - Background

The Energy Commission adopted standards for residential pool pumps in 2004 that became effective January 1, 2006.

- The existing standards were adopted as cost-effective measures and are current law.
- The standard required use of multi-speed motors and controls for pool pumps of greater than 1 horse power (HP).
- Current scope of the standard does not include replacement pool pump motors installed in existing residential pool pumps.
- The intent of the standards adopted in 2004 was to include both pool pump and motor combinations, and replacement pool pump motors.



Residential Pool Pumps – Proposed Regulations

The proposed regulations require:

- All replacement motors with a capacity of 1 HP or more to have at least two speeds, clarify the definitions, and correct the current standard to explicitly include replacement pool pump motors in the scope.
- Testing and data certification for Curve “C” to facilitate compliance with Title 24.
- Data collection for compliance with pump controls.
- Labeling to inform installers and inspectors of the two-speed controller requirements of Title 20.

The proposed regulations are feasible and cost-effective:

- The proposed amendments do not increase or decrease the required efficiency of the existing standard.
- The cost-benefit analysis has been updated to better represent the market conditions of 2008.



Estimated Energy Savings & Reduced Costs for Residential Pool Pumps

Incremental Cost of Improvement Per Unit (\$)

\$420

Reduced Total Cost over the Design Life (\$)

\$1,223

The proposed standard is cost effective

Current annual statewide energy use:

1,760 (million kWh) as of 2008



QUESTIONS ?



Metal Halide Luminaires

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Existing Metal Halide Luminaire Regulations

- In 2004, Energy Commission adopted regulations for 150 to 500 watt metal halide luminaires.
 - Effective January 1, 2008
 - Prohibits use of probe-start lamps
 - Requires $\geq 88\%$ efficient ballasts
- EISA 2007 established federal standards.
 - Effective January 1, 2009
 - Allows some use of probe-start lamps
 - Requires 88% to 94% efficient ballasts
 - Allows California to adopt revised standards by December 31, 2011.



PG&E Proposal

Analysis of Standards Options for High-Intensity Discharge Lighting Fixtures prepared for PG&E by ACEEE (last modified April 3, 2008).

- Proposed revising current T20 regulations to require ballast efficiencies that would be equivalent to electronic ballasts.
- Energy savings will help meet AB 1109 indoor commercial and outdoor lighting requirements.



Stakeholder Comments

In addition to requiring compliance through minimum ballast efficiencies, allow alternate compliance options through the use of technically feasible and available:

- Integral controls (indoor and outdoor), or
- Non-conventional wattage lamps



Proposed Regulations

Metal halide luminaires rated for 150 to 500 watts, manufactured on or after 1/1/10

- Shall not have probe-start ballasts, and
- Shall comply either with Option A or B

Option A - Shall have minimum ballast efficiency as follows:

1. $\geq 90\%$ ballast efficiency for 150 to 250 watt lamps
2. $\geq 92\%$ ballast efficiency for 251 to 500 watt lamps

Option B - Shall have $\geq 88\%$ ballast efficiency and shall comply with 1, 2, or 3 as follows:

1. Integral occupant sensor, as defined
2. Integral automatic daylight control, as defined
3. Manufactured 1/1/10 to 12/31/13 and ballast able to operate only 150-160 watt, 185-225 watt, or 280-350 watt lamps



Proposed Regulations

Exceptions to ballast efficiency regulations are metal halide luminaires that:

- Use regulated lag ballasts; or
- Use electronic ballast operating at 480 volts; or
- Meet all three of the following:
 1. Rated for use only with 150 watt lamps, and
 2. Rated for use in wet locations as specified
 3. Ballast rated to operate at ≥ 50 degrees C as specified.



Estimated Energy Savings & Reduced Costs for Metal Halide Luminaires

Incremental Cost of Improvement Per Unit (\$)

\$75

Reduced Total Cost over the Design Life (\$)

\$200

The proposed standard is cost effective

**Current annual statewide energy use:
4,010 (million kWh) as of 2008**



QUESTIONS ?



GU-24 Sockets, Luminaires, and Adaptors

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GU-24

A 120 volt pin/twist socket recently developed by the lighting industry to be used only with high-efficacy light sources such as CLFs and LEDs

Some people in lighting industry anticipate GU-24 may eventually replace the common Edison screw base for CFLs and LEDs



Why GU-24 Regulations ?

GU-24 products are relatively new in market

- There has not yet been significant demand for introducing low efficacy LED products into the market.
- However, there are no existing national or state regulations preventing manufacturers from introducing low efficacy GU-24 products into the market.
- The proposed GU-24 regulations assure that the energy savings projected by the proposed regulations for general service incandescent lamps and for portable luminaires will be realized.



GU-24 Proposed Regulations

GU-24 regulations apply to general service incandescent lamps, portable luminaires, permanent luminaires, and GU-24 adaptors, as follows:

- Incandescent lamps shall not contain a GU-24 base.
- Permanently installed and portable luminaires with GU-24 sockets manufactured on or after 1/1/10 shall not be rated for use with incandescent lamps of any type (line or low-voltage).
- GU-24 adaptors manufactured on or after 1/1/10 shall not adapt a GU-24 socket to any other line voltage socket.



Portable Luminaires

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Portable Lighting Proposals

Energy Commission received two initial proposals:

- *Analysis of Standards Options for Portable Lighting Fixtures*, prepared for Pacific Gas & Electric Company (PG&E) by the American Council on an Energy Efficient Economy (ACEEE)
- *Proposal Information Template – Portable Lighting Fixtures*, submitted by American Lighting Association (ALA)

Energy Commission Preliminary Staff Report alternative proposal presented at May 15, 2008 Committee workshop.



Portable Lighting Proposals – Options Considered

PG&E's proposal evaluated but initially dismissed recommendation to require CFLs to be prepackaged for sale with screw-based portable luminaires.

- ALA asked that this option be reconsidered.

ALA proposal to regulate only the 20% most popular styles to influence 80% of sales.

Energy Commission staff proposal melded initial proposals, including limitation on maximum wattage per portable luminaire.

- ALA argued wattage limitation was not technically feasible



Portable Luminaires - Proposed Regulations

Staff worked with all stakeholders, considering elements from each proposal, options identified and stakeholder discussions.

- The proposed regulations consist of five compliance options for meeting energy efficiency requirements for portable luminaires that are technically feasible and supported by stakeholders.
- Two exceptions have been proposed.
- Requirements for reporting of sales data added.



Proposed Regulations (cont.)

Portable luminaires manufactured on or after January 1, 2010 shall meet one of the following requirements:

- 1) Be equipped with a dedicated fluorescent lamp socket; or
- 2) Be a LED luminaire, or a portable luminaire using LED lighting including their power supply; or
- 3) Be equipped with GU-24 sockets that can support only high-efficacy lamps; or
- 4) Be prepackaged and sold with high-efficacy CFLs based on 2008 Energy Star efficiency levels or with high-efficacy LED lamps; or
- 5) Be equipped with single-ended, non-screw-based halogen lamp sockets (line or low voltage), include a dimmer control or high/low control, and be rated for a maximum of 100 watts.



Proposed Regulations (cont.)

EXCEPTIONS. Portable luminaires with screw-based sockets that are not required to be prepackaged with CFL or LED lamps:

- Portable Wall Mount Adjustable Luminaires that meet all of the specified requirements
- Art Work Luminaires that meet all of the specified requirements

Additional Requirements:

- Portable luminaires that have internal power supplies shall have zero standby power when the luminaire is turned off.
- Beginning 1/1/2013, manufacturers selling products in California shall submit to the Energy Commission annual unit sales of portable non-screw based halogen luminaires sold in California, by major product class. Data for each calendar year to be submitted no later than May 1 of the following year.



Estimated Energy Savings & Reduced Costs for Portable Luminaires

Incremental Cost of Improvement Per Unit (\$)

\$2.50

Reduced Total Cost over the Design Life (\$)

\$26.99

The proposed standard is cost effective

Current annual statewide energy use:

3,063 (million kWh) as of 2008



QUESTIONS ?

