

Frequently asked questions about the California Energy Commission's new Energy Efficiency Regulations

Q1: *What is this all about anyway?*

A1: On September 10, 2004, the California Energy Commission (CEC) opened a Rulemaking Proceeding to consider amendments to its current Appliance Efficiency Regulations. On December 15, the amended regulations were put into effect. These regulations govern items as diverse as refrigerators, room air conditioners, Gas and Oil space heaters, clothes washers and dryers, water heaters, plumbing fixtures, fluorescent and incandescent lighting, boilers and furnaces, exit signs, traffic signals, external power supplies, and consumer audio and video equipment.

Q2: *What is the name of the regulation that was revised, and where can I find it?*

A2: The California code of regulation, Title 20, sections 1601 through 1608. A copy of the new regulation can be found, on the Internet, at <http://www.energy.ca.gov/appliances/index.html>

Q3: *What kind of external power supplies are covered in the new regulation?*

A3: Single voltage, external AC-DC power supplies. These supplies typically have an input voltage range of 100-240 VAC, and output voltages that range from 1.5 VDC to 48 VDC. The supplies are called "external" because they are in a separate (usually sealed) enclosure that resides outside the product that consumes the power they produce.

Q4: *Do the new regulations apply to all consumer audio and video (AV) equipment?*

A4: Yes. However, the main performance parameter specified for AV equipment, with the exception of television set top boxes, is the standby consumption of the equipment. A table that contains the consumer AV equipment specs can be found at the end of this FAQ.

Q5: *Why do all of the external power supplies (EPS) have to meet or exceed different efficiency levels at more than one load value in this new regulation?*

A5: The efficiency of any given type of external power supply is commonly lower at partial load than it is at full load; and by varying amounts. Therefore, verification of efficiency across a range of load conditions is a must to ensure compliance.

Q6: *At what points of operation will all EPS have to meet or exceed the new standards of this regulation, to be in compliance?*

A6: There are five operational points that all EPS will have to meet or exceed efficiency or consumption specifications at, in order to be in compliance with the new regulations: no-load, 25% load, 50% load, 75% load, and 100% load.

Q7: *When will the new efficiency standards go into effect?*

A7: There are two classes or categories of EPS affected by these new standards. Those in the first set must comply with the standard as of July 1, 2006. Those in the second set must comply with the standard as of January 1, 2008. The effective dates for Consumer AV equipment are January 1, 2007, for compact audio products and Digital TV set top boxes, and January 1, 2006, for television sets and DVD players and recorders (see the last table, at the end of this FAQ).

Q8: *What is the name of the test procedure that all EPS must pass, and where can I get a copy of it?*

A8: The test procedure that all EPS must pass is called the “Test Method for Calculating the Energy Efficiency of Single-Voltage External AC-DC Power Supplies,” and a copy of it can be found at <http://www.efficientpowersupplies.org>.

Q9: *How does this test procedure compare with that in the EU’s Code of Conduct?*

A9: The testing procedure used in the European Union’s Code of Conduct currently uses part of this test procedure. There seems to be a strong international drive for a standard specification and test procedure, since all regions of the world face similar energy shortage issues, and need to ensure that unnecessary energy waste is reduced.

Q10: *How were the new efficiency standards set for the three power level groups?*

A10: The EPS were divided into groups (≤ 1 W, 1.1 W to 60 W, and > 60 W) according to their maximum rated output power, using data taken from sample supplies. Efficiency levels were then set so that some of the tested supplies from each group met the new standard. Although efficiencies of $> 90\%$ are achievable using the most advanced technology, the new levels were set so that they could be met by the best power supplies in each group.

Q11: *What are the new no-load consumption limits for the three power level groups?*

A11: The maximum no-load consumption limits for the three power level groups varies, depending on the date by which they must comply. Of those EPS that must be in compliance by July 1, 2006, there are two specification levels. EPS that deliver 0-10 watts must consume 0.5 watts or less when unloaded. EPS that deliver more than 10 watts have a maximum no-load consumption of 0.75 watts. Of those EPS that must be in compliance by January 1, 2007, all units have a maximum no-load consumption of 0.5 watts. Tables that contain the specifications for all EPS can be found at the end of this FAQ.

Q12: *How much energy could the state of California save, if all external power supplies were replaced with compliant ones, based on these new standards?*

A12: Based on data from Ecos Consulting¹, about 187 million kilowatt hours (the output of one small power plant) could be saved, per year, if all EPS in use in California were replaced with units that met the new efficiency standards.

The following text and bulleted items were excerpted from a CEC staff report, a copy of which can be found in the regulation, on the Internet, at

<http://www.energy.ca.gov/appliances/documents/index.html>

External power supplies convert alternating current at line voltage to low-voltage alternating current or direct current within an enclosure external to the current-using product itself. The main types of external power supplies are termed linear power supplies (which use transformers) and switching power supplies (which use solidstate electronics). Switching power supplies are inherently more efficient than linear power supplies, and thus fewer of them are affected by the proposed standards.

- We estimate there are approximately 145 million external power supplies in service throughout California.
- Approximately 12.7 million linear and 14.8 million switching external power supplies are sold each year throughout California.
- Approximately 20.6 million units sold each year will be affected by the proposed standards.
- The statewide energy use of this product is 5,548 million kWh.
- The proposed efficiency standards apply to both the active mode and the no-load mode of external power supplies.
- The annual reduction in per-unit energy use based on the proposed standards is approximately 4.66 kWh for the July 1, 2006 efficiency requirements and 4.44 kWh for the January 1, 2008 efficiency requirements.
- The first-year statewide energy savings are 96 million kWh for the July 1, 2006 standards and 91.5 million kWh for the January 1, 2007 standards.

The following was excerpted from the new regulation, a copy of which can be found on the Internet, at <http://www.energy.ca.gov/appliances/documents/index.html>

1605.3

Page 133

(u) **Power Supplies and Consumer Audio and Video Equipment.**

(1) **Power Supplies.** The efficiency in the active mode of power supplies manufactured on or after the effective dates shall be not less than the applicable values shown (expressed as the decimal equivalent of a percentage); and the energy consumption in the no-load mode of power supplies manufactured on or after the effective dates shown shall be not greater than the applicable values shown in Table U-1 or Table U-2.

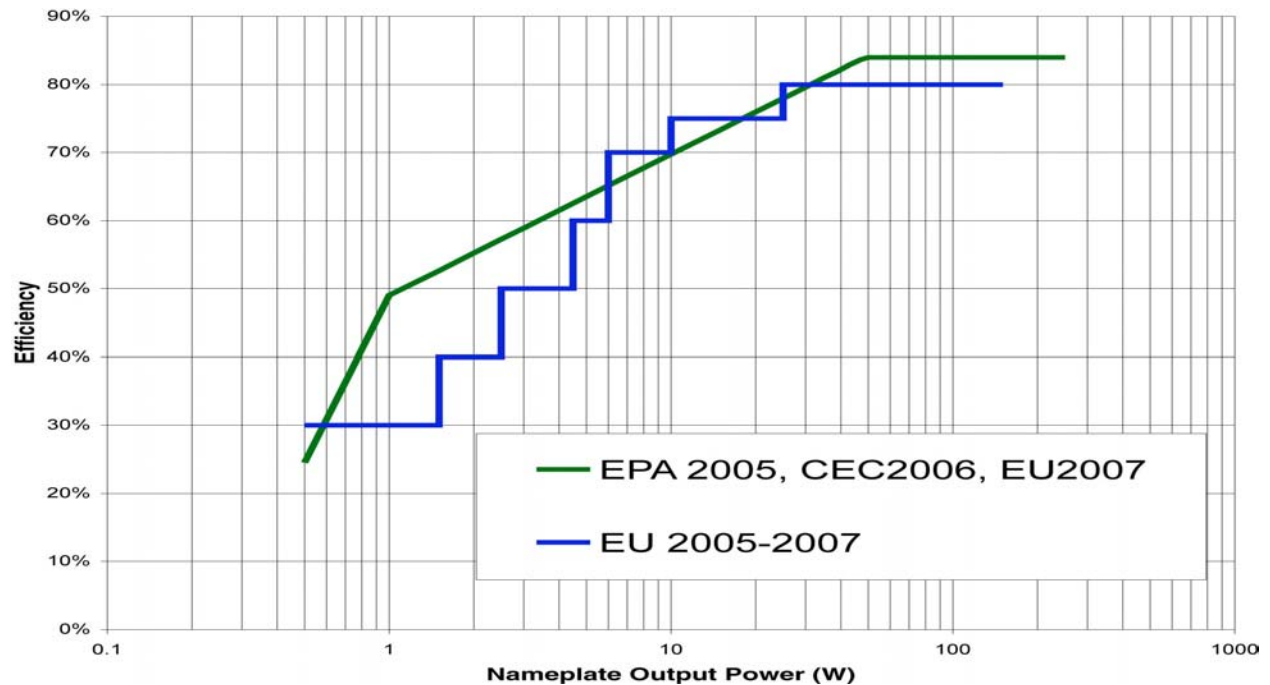
Table U-1
Standards for Power Supplies Effective July 1, 2006

<u>Nameplate Output (W)</u>	<u>Minimum Efficiency in Active Mode of Operation</u>
< 1 Watt	0.49 * Nameplate output (value in Watts)
$\geq 1 (W) \leq 49$ Watts	0.09 * Ln(Nameplate output) + 0.49
> 49 Watts	0.84
	<u>Maximum Energy Consumption in No-Load Mode</u>
0 to < 10 Watts	0.50 Watts
≥ 10 to < 250 Watts	0.75 Watts
Where Ln (Nameplate output) = Natural Logarithm of the nameplate output expressed in Watts	

Table U-2
Standards for Power Supplies Effective January 1, 2008

<u>Nameplate Output (W)</u>	<u>Minimum Efficiency in Active Mode of Operation</u>
< 1 Watt	0.50 * Nameplate output (value in Watts)
$\geq 1 (W) \leq 51$ Watts	0.09 * Ln(Nameplate output) + 0.50
> 51 Watts	0.85
	<u>Maximum Energy Consumption in No-Load Mode</u>
Any output	0.50
	Watts
Where Ln (Nameplate output) = Natural Logarithm of the nameplate output expressed in Watts	

The following is a graphical representation of the active mode of operation efficiency specifications, taken from Table U-1. It also shows the current EU specifications.



This graph may be used, with or without attribution to its source. A 300 DPI JPG copy of it may be downloaded from http://www.powerint.com/images/CECvsEU_efficiency.jpg

(2) **Consumer Audio and Video Equipment.** The power usage of consumer audio and video equipment manufactured on or after the effective dates shown shall be not greater than the applicable values shown in Table U-3. For equipment that consists of more than one individually powered product, each with a separate main plug, the individually powered products shall each have a power usage not greater than the applicable values shown in Table U-3.

Table U-3
Standards for Consumer Audio and Video Equipment

<u>Appliance Type</u>	<u>Effective Date</u>	<u>Maximum Power Usage Watts</u>
Compact Audio Products	January 1, 2007	2 W in Audio standby-passive mode for those without a permanently illuminated clock display 4 W in Audio standby-passive mode for those with a permanently illuminated clock display
Televisions	January 1, 2006	3 W in TV standby-passive mode
Digital Versatile Disc Players and Digital Versatile Disc Recorders	January 1, 2006	3 W in Video standby-passive mode
Digital Television Adapters	January 1, 2007	1 W in STB standby-passive mode, 8 W in STB on mode