

Consortium for Energy Efficiency Consumer Electronics Initiative

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Initiative Overview

The Consumer Electronics Initiative addresses the emerging consumer electronics product category and defines potential activities and areas of focus for CEE. Estimates of consumer electronics electricity use range from 11 percent to 13 percent, according to the Consumer Electronics Association (CEA) and the Environmental Protection Agency (EPA) respectively. EPA predicts this percentage is expected to increase to 18 by 2015. While consumer electronics represent an important savings opportunity for efficiency programs, the product category also presents a unique challenge due to its fast changing nature and the dispersion of end-uses in the home each representing an often small share of total electronics energy end-use.

The current Initiative serves as a framework for CEE's work in the consumer electronics product area. Through the Consumer Electronics Initiative, CEE is exploring five activities and six areas of focus, which are described in more detail below, along with specific Initiative goals and participation requirements. Over time, CEE expects to flesh out their content as needed. Initiative efforts will be supported by the Consumer Electronics Committee, which will serve as a forum for sharing lessons learned about energy-efficient consumer electronics promotion and for refining the Initiative and suggesting changes. The Consumer Electronics Initiative Description is the public face of the Initiative, allowing CEE and its members to communicate goals and objectives to industry and other stakeholders.

A market analysis is provided below in the Appendix.

Goals

The Consumer Electronics Initiative has two primary goals. They are:

1. To facilitate efficiency programs in their efforts to increase the sale and market share of energy-efficient consumer electronics; and,
2. To develop a consistent definition of and criteria for energy efficiency in the consumer electronics product area, and to identify products that meet these criteria, in an effort to increase the sale and market share of energy-efficient products. (As part of this effort, CEE plans to work with the ENERGY STAR program.)

To support the achievement of these goals, the Consumer Electronics Initiative incorporates a variety of activities and areas of focus, including particular product areas. These are outlined in the Activities and Areas of Focus sections below. As noted above, the Consumer Electronics Committee will serve as the primary forum at CEE for discussion and actions related to energy efficiency in consumer electronics. As CEE and its members explore the consumer electronics product category, CEE expects to refine these activities and focal areas in an effort to help its members find the most effective means to save energy with consumer electronics.

Activities

CEE is working on or exploring the following activities.

Working with ENERGY STAR

CEE encourages its members to support the ENERGY STAR home electronics program. CEE keeps members abreast of ENERGY STAR's home electronics program activities, including specification revisions. If there is Committee interest, CEE works with members to develop consensus comments, e.g., on specification revisions, to submit to ENERGY STAR to make sure that the specifications and other ENERGY STAR activities meet energy efficiency program needs. CEE also involves ENERGY STAR representatives on Committee calls and at meetings to keep members updated on their work, and when appropriate CEE collaborates with ENERGY STAR, e.g., on industry outreach, consumer education, etc.

By working closely and collaboratively with the ENERGY STAR program, and specifically by electing to use ENERGY STAR as a marketing platform and a basis for defining high-efficiency consumer electronics products, CEE expects to improve the relative value and meaning of ENERGY STAR in the consumer electronics market. With this, CEE hopes to increase the market penetration of ENERGY STAR-qualified products.

Consumer education

As noted in the Program Activity section in the Appendix, many CEE members try to educate their customers through different media about saving energy with consumer electronics, including program web sites or roundtable discussions. CEE aims to help members make these educational efforts as effective as possible, potentially by coordinating member efforts to help make them more consistent. Such coordination and consistency helps CEE members to have a stronger impact on the market for energy-efficient consumer electronics.

In the past, CEE has informed the Committee of ENERGY STAR and CEA efforts in consumer education, and CEE hopes to work with both these entities on this effort in the future. Such further coordination could serve to strength the impact of consumer education, and help move the market towards efficiency.

Program guidelines

One of CEE's first activities with the development of a formal CEE Consumer Electronics Initiative will be to develop program guideline documents that identify program opportunities in consumer electronics and help members identify good program approaches. These approaches may include upstream incentives and the development of product efficiency specifications above ENERGY STAR levels, two potential activities about which members have expressed interest. The program guidelines may also identify which ENERGY STAR efficiency specifications programs plan to support and which market actors programs plan to target (e.g., manufacturers, distributors, retailers, service providers, consumers, etc.), and how they hope to do these things.

These program guidelines would primarily serve to help members refine their programs to promote energy-efficient consumer electronics, including those based on the ENERGY STAR platform. Their development will allow for the sharing of ideas and experiences among members, which will allow members to learn from each other and will result in improved guidelines. The program guidelines will also serve to educate industry and other stakeholders on efficiency program priorities and approaches. This will help to foster an understanding of the energy efficiency program community, and ultimately a greater impact on the market.

Industry outreach

CEE, acting as the de facto representative of the energy efficiency program community, can communicate program activities, priorities, goals, and needs to the consumer electronics industry. Opening the communication lines with industry is valuable in itself, and a positive and cooperative relationship with industry can help promote market transformation, as CEE and its members have learned through work in other product areas. Such a relationship is mutually beneficial, as well, as it allows industry to learn what CEE members value—like energy performance, demand reduction, and influence on consumer behavior—and how they can profit from participating in the CEE forum and working with CEE members.

Since June 2006, CEE has been developing a working relationship with the Consumer Electronics Association (CEA). The CEA has attended various CEE meetings and conference calls, and CEE has attended the Consumer Electronics Show (CES), the industry trade show, to participate in their efficiency panel. CEE's next goal is to broaden its relationship with industry to include individual consumer electronics manufacturers and other individual industry actors. The abovementioned program guidelines may prove an effective outreach tool.

Other Initiative support

In addition to these efforts, CEE will provide other Initiative support based on member needs. This may include further consumer electronics research, development of efficiency specifications, monitoring of developments related to consumer electronics in the U.S., Canada, and around the world, and Program Summaries and other market impact tracking. Program Summaries are synopses of CEE member program activity. CEE members can use these summaries to learn how their counterparts are promoting efficient consumer electronics and to help inform their own program design. Manufacturers and others can also use these summaries to stay up-to-date on efficiency program activity. Such support activities will allow CEE to keep members up to date about relevant changes in consumer electronics, and will help members make informed decisions about program development and implementation.

Areas of Focus

In addition to executing the activities listed above, CEE also plans to focus on particular areas, including specific products. These areas and the rationales for focusing on them are outlined below.

CEE recognizes that some products – including televisions, set-top boxes, and computers – may have constraints on their energy efficiency potential based on, for example, technological necessity or governmental policy requirements (e.g., emergency alert requirements fulfilled by systems such as Public Alert). These constraints will be taken into account in any future activities CEE undertakes in these product areas.

Products

Televisions

Televisions consume one of the largest shares of electricity of all consumer electronics products (see Table 1 in the Appendix). Several other trends in televisions have prompted CEE to address this specific product area, including:

- Larger screen size, flat screen, and high definition (HD) are becoming more popular options.
- Prices are dropping for all types of televisions currently available.
- The required transition from analog to digital broadcasts in 2009 may change energy requirements.
- Televisions are on for more hours a day, particularly given their use for cable, gaming, movie viewing, etc.
- More homes have multiple televisions than in the past. Today, the average home has 2.8 televisions, according to the CEA.
- Television technology is changing rapidly, which makes it difficult to assess opportunities.
- A convergence of television-related products is occurring, e.g. home entertainment centers that can include televisions, set-top boxes, DVD players, DVRs, home audio equipment, computers, etc.

By highlighting televisions, CEE hopes to educate its members on the various television technologies (e.g., CRT, LCD, plasma, etc.) and to help to develop appropriate program approaches to target the product area (which can be incorporated into the Program Guidelines mentioned in the Activities section above). These approaches could address the various trends mentioned in the list above, including the increase in television screen size and the changes in consumer behavior with regard to televisions. CEE will consider the development of efficiency specifications above ENERGY STAR, if appropriate.

Set-top boxes

Like televisions, set-top boxes (STBs) also are relatively large energy consumers in the consumer electronics product categories. Other trends that may impact STB energy efficiency, and that have inspired CEE to focus on this product, include:

- Set-top box energy use is growing due to the switch to digital and HDTV.
- Set-top boxes are increasing their functionality to include recording and storage, which increases energy use.
- The number of set-top boxes per home is increasing due to the increasing number of televisions.
- A subtype of set-top box, the digital television adapter (DTA), is poised for a growth spurt due to the transition from analog to digital transmission, though this will likely be short-lived.

- DVDs are reaching the mature portion of their growth curve but many new versions such as DVD-R will keep sales strong.
- Set-top boxes with recording and storage functionality may replace DVD players, as consumers will be able to download and then record movies.

With regard to set-top boxes, CEE expects to assist ENERGY STAR in defining the product category during the ENERGY STAR specification revision process. Once CEE and its members have a stronger understanding of the product category and the different technologies involved, and their implications, CEE will work to help members develop creative ways to promote energy efficiency in these products (which, as with televisions, can be incorporated into the Program Guidelines). Similarly, CEE will consider the development of efficiency specifications above ENERGY STAR, if appropriate.

Computers and peripherals

Computers—particularly when combined with the various devices operating in conjunction with them like monitors, routers, modems, printers, and fax machines—consume a similar amount of energy to televisions and STBs. CEE is addressing this particular product category for a variety of reasons, including:

- There is a shift in consumer purchasing from desktops to laptops, where more efficient chips allow for more efficient computing.
- Despite this change to more efficient chips, desktops and laptops both have more features, such as graphics capability, and increased processing capability, so energy use is not necessarily decreasing.

CEE expects to work with its members to promote the ENERGY STAR computer specification, which goes into effect on July 20, 2007. Once the ENERGY STAR specification is launched, CEE can work with its members to determine other ways to promote energy efficiency in computers, possibly through consumer education and/or the development of efficiency specifications above ENERGY STAR, with the ultimate goal of increased market penetration of energy-efficient computer products and more energy-efficient consumer behavior. As with televisions and set-top boxes, the program approaches developed can be incorporated into the Program Guidelines.

Components

Many consumer electronics products share components. CEE has chosen two components to focus on initially.

Internal power supplies

Internal power supplies, commonly found in desktop computers, have been a target for efficiency programs for some time, primarily through the 80PLUS program (mentioned in the Program Activity section above). CEE expects to see efficiency improvements in this product area with the inclusion of internal power supplies in the ENERGY STAR computer specification, effective July 20, 2007, a decision that CEE supported through its comments. CEE will continue to monitor internal power supplies for developments and opportunities, with the goal of continuing to increase the efficiency of internal power supplies.

External Power Supplies

Due to an increase in the price of copper, linear power supplies are becoming more expensive and more efficient switching power supplies are become a more cost-effective option. In addition, the sleeker-looking and lighter-weight power supplies with greater efficiency were more attractive from product marketing and product shipping perspectives, and this helped to drive market transformation, as well. CEE will continue to monitor external power supplies for any other developments, and for opportunities for member programs to effect further efficiency improvements. Increased efficiency in external power supplies could have a positive impact on the energy efficiency of a wide range of consumer electronics products, giving it great potential for efficiency programs.

In particular, CEE is exploring the idea of a single external power supply for multiple devices. Though these products are not yet on the market they could prove to be effective energy-saving tools for a similarly wide range of products.

Standby Power

In addition to consumer electronics, standby power use also plays a role in appliance energy efficiency, another CEE program area. CEE will continue to monitor standby power across consumer electronics, and will look for opportunities to improve its efficiency across products. In particular, CEE is monitoring Natural Resources Canada's (NRCan) efforts to address standby power through both regulations and consumer education in the near future. CEE will work with NRCan and other Canadian members on the voluntary components of this effort. In Canada, for existing standards and standards in development, standby will be measured as part of Energy Efficiency Test Procedures and included in Minimum Energy Performance Standards.

Networking

Homes are becoming increasingly networked, with computers plugging into home entertainment centers, which have many different components. CEE is exploring what impacts such networking has on energy-efficiency, and will investigate ways to address these impacts.

Power Management

CEE is also exploring the concept of how best to assist consumers in managing their power. This could include facilitating roundtable discussions regarding power management among members or a concerted consumer education campaign. CEE is also considering the idea of managing the power consumed by consumer electronics from a central location or device, a concept that is in a relatively early stage of development.

Recycling

CEE members have expressed interest in exploring the idea of consumer electronics recycling as a possible component to incorporate into efficiency programs. CEE has begun researching opportunities in this area.

Initiative Participation

Initiative participation is open to all energy efficiency programs. Other Initiative stakeholders have a variety of other opportunities to get involved with Initiative activities and to influence Initiative focus.

To be considered an Initiative participant, an energy efficiency program must:

1. Deploy a significant and focused educational/promotional program which identifies and promotes ENERGY STAR home electronics (including any or all ENERGY STAR-covered products) and/or energy-efficient consumer electronic products and practices in general;

OR

Provide incentives (e.g., rebates) for home electronics meeting at least ENERGY STAR requirements (including any or all ENERGY STAR-covered products);

OR

Implement both of the above.

AND

2. Report specific program details to CEE for compilation in the annual CEE Consumer Electronics Program Summary, published each fall and intended for communication to key market players

Participant Benefits

Participation in the Initiative provides a number of benefits to efficiency programs, including:

- Participate with other efficiency programs in the CEE forum: CEE provides a forum for efficiency programs to come together, discuss, and come to consensus on a number of issues, including comments to ENERGY STAR and other groups.
- Save program resources: An efficiency program participating in the CEE forum saves labor resources that otherwise would be required for product and program research and planning.
- Encourage manufacturers to produce and market energy-efficient consumer electronics, and effect market change: Though one program may represent a small fraction of the national market, the same program together with other participating programs represent a much larger percentage of the national market. Program administrators offering programs with consistent messages regarding energy efficiency and consumer electronics provide manufacturers with a uniform target, making it easier for them to respond to consumer and program needs.

- Produce positive publicity: CEE undertakes ongoing communication efforts on behalf of the Initiative and its participants, and regularly updates the list of participating programs. Efficiency programs receive positive publicity for voluntarily helping customers reduce energy consumption, thus cutting air pollution and greenhouse gas emissions without sacrificing consumer electronic product performance and amenities important to the consumer.

Roles of Key Initiative Players

Efficiency programs in the U.S. and Canada participating in the Consumer Electronics Initiative are responsible for carrying out the Initiative's objectives on the ground. In addition to energy efficiency programs, CEE as an organization (including the CEE Board), EPA and the ENERGY STAR program, and CEE's industry partners, including the CEA, have roles in making the Consumer Electronics Initiative successful. The primary aspects of efficiency programs', CEE's, EPA's, and CEE's industry partners' roles are outlined below.

Energy Efficiency Programs

- Implement local strategies to deal with the heterogeneous nature of the market players (i.e., customize the national concept to fit the needs of the local efficiency program territory)
- Establish local market intelligence
- Identify local retail and distribution partners and support their ongoing cooperation
- Develop core messages to consumer segments
- Identify appropriate vehicles to convey messages
- Develop sales and other promotional materials

CEE

- Secure support for the Initiative by efficiency programs, manufacturers, distributors, retailers, and other stakeholders
- Reach out to industry, potentially including the provision of program guidelines, Program Summaries and updates to industry partners regarding initiative activity participation
- Participate in the ENERGY STAR specification development and review processes
- Provide a forum for the exchange of information between initiative participants, industry, and EPA and the ENERGY STAR program, including national and international developments relating to consumer electronics
- Coordinate with EPA and the ENERGY STAR program
- Work with efficiency programs, industry, and EPA and the ENERGY STAR program, to develop consumer education materials for program use
- Assist in Initiative promotion
- Develop and distribute program summaries to interested stakeholders
- Execute additional research, as needed

EPA and ENERGY STAR

- Help to secure corporate support for the ENERGY STAR program by national retailers, distributors, and manufacturers
- Establish and maintain ENERGY STAR specifications and disseminate qualifying product lists at ENERGY STAR levels
- Build and license the use of the ENERGY STAR brand, including the logo and name
- Secure efficiency program partnerships
- Support the local delivery of the ENERGY STAR name and logo, which includes supporting energy efficiency program sponsors (EEPS)
- Provide national sales data to track impact
- Implement a national public service/education campaign

Industry: Manufacturers, Distributors, Retailers, and Industry Associations

- Provide input to CEE on Initiative Description and activity
- Share with CEE appropriate product data and market research
- Participate in the ENERGY STAR home electronics program
- Interface with CEE to learn about efficiency program activity and partnership opportunities
- Partner with efficiency programs at the local and regional levels to the extent possible

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Appendix

Background Information

Until 2006 CEE had been monitoring standby power and power supplies (external and internal) for several years. Due to increased member interest, CEE began research on a broader range of consumer electronics in early 2006, focusing on residential consumer electronics. CEE staff reviewed existing research and explored efficiency program activities on electronics. CEE also worked closely with EPA staff to learn as much as possible from the ENERGY STAR program. The CEE Board reviewed staff research in June 2006 and supported the formation of a Consumer Electronics Committee.

In addition to regular Committee calls and meetings, CEE maintains cooperative working relationship with the ENERGY STAR program. CEE has also been building a relationship with the consumer electronics industry through discussions and collaboration with the Consumer Electronics Association (CEA). CEA is a particularly important ally as it is a source of information on market and technical information. In coming years, CEE hopes to expand its industry relationship to include individual manufacturers as well.

Market Analysis

The information in this section is compiled from the research CEE undertook in 2006 and from several other studies have been released in 2006 and 2007, including energy use studies from the [CEA](#) and [Pacific Gas & Electric](#) (PG&E).

CEE explored the following common consumer electronics products in its research:

Home Entertainment

- Televisions
- Video Playback
- Set-Top Boxes
- Home Audio Equipment

Home Office

- Telephony
- Computers
- Monitors
- Printers
- Fax Machines
- Scanners

Components

- Internal Power Supplies
- External Power Supplies
- Battery Charging Systems

While per unit energy use estimates can be small, experts estimate that electronics accounts for 11-13 percent of residential electricity use when reviewed as a category. A broad overview of CEE research on energy use and other topics is provided below in Table 1. Data from the CEA and PG&E has been integrated where appropriate. The 'Degree of Complexity' column is a subjective judgment by CEE based on product research.

Table 1: Research Summary

Electronics Product	Degree of Complexity	Annual Energy (kWh/unit)	Number in US (millions)	% Home Energy	Efficiency Presence
Television*	Medium	108 – 281	250 – 300	3 – 4	E*
Set-Top Box*	High	36 – 270	210	0.5 – 1	E*
Computer*	Medium	27 – 270	100 – 150	0.1 – 1.5	E*
Other Office Equipment ¹	Low	21-145	N/A	< 1	E*
Video Playback	Low	34 - 47	225	< 1	E*
Home Audio	Medium	19 - 150	200 – 250	< 1	E*
Telephony	Low	20 – 40	200 – 250	< 0.5	E*
Internal Power Supply*	Low	N/A	1400 – 1600	5 – 6 ²	80+
External Power Supply*	Low	N/A	1000 – 1300		E*
Battery Charging Systems	Low	N/A	N/A	N/A	E*

* CEE has identified these products as focal areas. More detail on them is included in the [Initiative Description](#).

¹ Other office equipment includes: computer monitors (CRT and LCD), printers, fax machines, and scanners.

² 5 – 6% of energy in a home *passes through* an internal or external power supply.

Trends

Generally, through its research and conversations with members, industry, and other experts, CEE has observed a few major trends in consumer electronics. First, technologies are converging as consumers move towards a fully networked home and manufacturers continue to introduce devices that perform multiple functions. Second, consumer electronics are proliferating in the home, and are increasing in variety and in market penetration, though some of these products are portable, battery-operated devices. Often older products are kept plugged in the house, e.g., an older TV/VCR in a spare bedroom. Finally, all of this change is occurring rapidly.

Depending on the product type, CEE understands that manufacturer production cycles are between six to 24 months; however the development cycles affecting efficiency design can be one to two years long. In terms of how consumers use consumer electronics in the home, a recent survey of the American Institute of Architects showed that media rooms and home offices are growing in popularity. These spaces have a higher penetration of consumer electronics than other rooms in a home.

For more detail on trends in televisions, computers, and set-top boxes, see the main body of the Initiative Description above.

Test Procedures

The lack of standardized, industry-accepted test procedures for all modes of operation within the consumer electronics category is a challenge. Many groups including EPA, the

CEA, the Natural Resources Defense Council (NRDC), and others are currently working to develop procedures. These groups are coordinating with others internationally such as the Australian Greenhouse Office and the European Union. A summary of test procedure availability is provided below in Table 2. CEE has not made assessments of the efficacies of these procedures.

Table 2: Test Procedure Summary (as of June 2007)

Electronics Product	Type of Procedure				Type of Power Tested		
	E* or 80PLUS	Industry (CEA)	Federal (DOE)	Internat'l (IEC)	Standby	Active (inc. idle)	Both
Television	In Development		Soon to be revised	✓ ²	DOE		IEC, E* (revised)
Video Playback	✓			✓	E*, IEC		
Set-Top Box	In Development	✓		✓ ³	IEC		CEA
Home Audio	✓			✓	IEC, E*		
Telephony	✓				E*		
Computer	✓			✓	IEC		E* (revised)
Other Office Equipment ¹	✓				E* ⁴ , IEC		E* ⁵
Internal Power Supply	✓						80+
External Power Supply	✓		In Development ⁶				E*, DOE
Battery Charging System	In Development		In Development	✓			E*, DOE, IEC

- ¹ Other office equipment includes: computer monitors (CRT and LCD), printers, fax machines, and scanners.
- ² The IEC television test procedure is currently in final draft form. Various countries, including Australia, Japan, and the European Union, also have television test procedures.
- ³ Various countries, including the European Union (through the European Code of Conduct – ECoC), China, Australia and New Zealand, also have set-top box test procedures. In addition, Canada (through the Canadian Standards Association – CSA) has test procedure currently in development.
- ⁴ The ENERGY STAR test procedure tests standby power for scanners, inkjet and/or non-standard sized copiers, fax, mfd's, and printers
- ⁵ The ENERGY STAR test procedure tests both standby and active power for monitors and standard size/non-inkjet printers, fax, copiers, mfd's, and digital duplicators
- ⁶ The EU (through the European Code of Conduct – ECoC) has a test procedure for external power supplies as well.

ENERGY STAR

Over the years, ENERGY STAR has been increasingly thorough in its coverage of consumer electronics, which has contributed to the overall success of the ENERGY STAR brand. At the same time, ENERGY STAR is consistently working to improve its home electronics program to ensure it stays relevant and that its criteria remain appropriate. ENERGY STAR currently has specifications for many of the main energy users within the consumer electronics category, including televisions, computers, video playback, home audio, telephony, home office, and external power supplies. EPA is working on developing a specification for battery charging systems. EPA previously had

a specification for set-top boxes, but this was suspended in 2005 due to lack of traction in the market; EPA is currently developing a new set-top box specification. Current ENERGY STAR specifications are outlined in Table 3 below.

Table 3: Current ENERGY STAR Specifications (as of May 2007)

Electronics Subcategory	Basis for ENERGY STAR Spec	Status
Televisions	Standby power	Revision in process – the revised specification is expected to include standby and active power
Set-Top Boxes	STB Program – In development... DTA spec – Sleep, active power, and power management	Suspended in 2005, revised program in development. Expected to include requirements for both products and service providers Specification for DTAs went into effect on 1/31/07
Computers	Sleep, standby, and active (idle) power, power management (for computer and monitor) 80% efficient power supplies	Revised computer specification goes into effect on 7/20/07
Video Playback	Standby	-
Home Audio	Standby	-
Telephony	Standby	-
Imaging Equipment	For standard sized, non-ink jet products – requirements based on typical energy use, power management For non-standard sized and/or inkjet products – sleep and standby requirements Power management and duplexing requirements for all	Revised in 2006, new spec took effect on 4/2/2007
External Power Supplies	Active and No-Load Use	Revised in 2005, higher level expected to take effect in 2008 based on stakeholder input.
Monitors	Active and low power requirements with power management	The Tier II specification became effective on January 1, 2006. Planned revision to launch in 2007.

Market Penetration of ENERGY STAR

In the past, the ENERGY STAR label within the home electronics category was not seen as a differentiator, though this is changing in some subcategories. Market penetrations of many types of ENERGY STAR-qualified products in 2004 and 2005 tended towards extremes, from 0% for battery chargers to nearly 100% for desktop computers. Based on EPA estimates below, few products have come near to the 25% market penetration level for which ENERGY STAR traditionally strives. According to EPA, one major consideration in setting ENERGY STAR levels is to have labeled products represent 25 percent of available models, but due to the rapid innovation in the electronics products area, EPA has found that market penetration increases quite quickly after the final

specification is made public. Based on EPA assumptions, however, this wide range of market penetrations will continue through 2015.

Table 4: Estimated Market Penetration of ENERGY STAR Products (based on Model Availability)

Electronics Product	2004	2005	2006*	2007*	2008*	2009*	2010*	2015*
Televisions	81%	62%	64%	66%	68%	71%	71%	69%
VCR	70%	70%	70%	70%	70%	70%	70%	70%
DVD Products	23%	24%	25%	26%	27%	28%	29%	37%
Audio	8%	15%	25%	26%	27%	28%	30%	36%
Telephony	8%	9%	4%	10%	12%	15%	17%	26%
Desktop Computers**	98%	98%	98%	98%***	98%	98%	98%	98%
CRT Monitors	95%	19%	4%	6%	8%	10%	12%	22%
LCD Monitors	95%	71%	29%	50%	70%	70%	70%	70%
Printers	13%	12%	11%	6%***	25%	45%	55%	54%
Scanners	75%	80%	85%	50%***	70%	90%	90%	90%
External Power Supplies	0%	4%	5%	6%	6%	7%	8%	13%
Battery Charging Systems	0%	0%	1%	3%	5%	7%	9%	19%

* Market penetrations for these years are projected estimates.

Source: LBNL

** Though ENERGY STAR desktop computers show high market penetrations, EPA estimates that the Sleep Mode is enabled in only ~5% of computers, though savings are accrued in other modes.

*** EPA expects significant drops in market penetration in these product areas once new ENERGY STAR specifications go into effect in 2007.

Efficiency Program Activity

Several CEE members currently offer guidance and information regarding consumer electronics on their Web sites or in customer brochures. They typically provide tips for saving energy with consumer electronics like encouraging customers to purchase ENERGY STAR-qualified electronics or to turn off and unplug consumer electronics that are not in use. As of May 2007, these members include:

Alliant Energy	MN Dept. of Commerce	SMUD
BC Hydro	National Grid	Southern California Gas
Com Ed	NW Alliance	Unitil
Entergy	NYPA	Utah Power/PacifiCorp
Hawaiian Electric	NYSERDA	WE Energies
Idaho Power	PG&E	WI Division of Energy
LIPA	Puget Sound Energy	Xcel Energy
Madison Gas & Electric	SDG&E	

Based on CEE's member queries, PG&E and SCE are currently the only CEE members executing an incentive program. Both will offer a rebate for the purchase of super-efficient (25 percent more efficient than ENERGY STAR) LCD computer monitors as of June 2007 (expected). In the near future, PG&E plans to focus their program efforts on televisions and computers based on their energy use research.

Several CEE member participate in the 80PLUS program, which is an electric utility-funded incentive program that integrates power factor corrected energy-efficient power supplies into desktop computers and desktop-derived servers. Qualifying power supplies

must be 80% efficient at 20%, 50% and 100% operating load and have a Power Factor of .9 or better at full load. Efficiency levels for conventional power supplies range from 60%-70%.

Members participating in 80PLUS include:

BC Hydro	NW Alliance	SMUD
Efficiency Vermont	NSTAR	Southern California Edison
Hydro Quebec	NYSERDA	Xcel Energy
Midwest Energy Efficiency Alliance	PG&E	
National Grid	SDG&E	

MEEA and PG&E are the only members listed that actively promote 80PLUS on their websites, providing links and background information for a consumer audience. Once the new ENERGY STAR computer specification goes into effect, CEE anticipates that some of the member sponsors of 80PLUS are likely to offer an incentive for ENERGY STAR desktop computers.

Federal Activity

There are currently no U.S. federal minimum efficiency standards for any consumer electronics. However, the 2005 federal Energy Policy Act requires that test procedures for battery chargers and external power supplies be developed by February 2007, and that appropriate standards for these products be set by August 2008. In other federal activity, under Executive Order 13221, FEMP has been charged with organizing the testing and publication of standby power use for various products, including office equipment, telephones, televisions, VCRs, and audio equipment. A newer energy efficiency promotion bill (S. 1115) is currently under review in the Senate, and may contain further provisions for consumer electronics.

As part of the Federal Trade Commission (FTC) review of the federal EnergyGuide label, CEE and several others have consistently called for televisions to be included under the Appliance Labeling Rule and carry the EnergyGuide label. The EnergyGuide label is intended to help to inform consumer purchasing decisions, and in particular to provide information related to energy use and to allow consumers to compare energy use across models. Televisions are large energy users and their energy use has increased over recent years. Consumers are currently unable to tell how much energy a television consumes, however, even though these products are coming to represent an increasingly larger share of home energy. CEE's comments to the FTC argued that labeling television with the EnergyGuide label is necessary in order to help consumers to choose energy-efficient televisions and to manage energy use in their home.

The FTC cannot label a product unless it has a DOE test procedure, however, and therefore it is waiting until DOE has revised its current test procedure, a process that CEE expects to begin upon completion of the IEC test procedure for television. CEE is encouraging the FTC and DOE to work together to expedite this process.

In addition, federal purchasers are now required by Executive Order to purchase EPEAT-registered products and employ ENERGY STAR power management requirements 100% of the time. EPA funded the development of the Electronic Product Environmental Assessment Tool (EPEAT), a multi-attribute rating tool for computers and monitors that includes ENERGY STAR energy requirements. EPEAT is now run by the Green Electronics Council. There are more than 400 products from 16 manufacturers on the EPEAT registry, and manufacturers reported selling more than 37 million units worldwide in the first nine months of the program.

In other regulation, Congress passed a law in 2005 that will require all television broadcasting to be in a digital format (versus analog) as of February 2009. Households receiving analog broadcasts at that time (projected to be 7% of all households) will need to buy a digital-to-analog (DTA) converter box. The National Telecommunications and Information Administration (NTIA) will administer a federal subsidy coupon program that includes an energy efficiency requirement (CEE supported the proposal of this requirement).

State Activity

Several states—including Arizona, California, Massachusetts, New York, Oregon, Rhode Island, Vermont (pending) and Washington—have passed standards for external power supplies. All of these standards have varying effective dates, ranging from 2006 to 2009.

In New York, NYSERDA has implemented state purchasing standards that require the purchase of energy-efficient electronic products. NYSERDA is also beginning a rulemaking to set standards for DTAs, compact audio equipment, televisions, and DVD players. These products are among those listed in equipment standards legislation enacted in 2005.

California has set state standards for televisions and DVD players that require standby use of no more than 3W. These went into effect in 2006. California has also enacted standards for digital-to-analog set-top boxes (DTAs), which govern both active power and standby power use. These are scheduled to take effect in January 2008, but some industry stakeholders have expressed serious concerns about the justification and the national impact of the regulations and have asked that they be modified or withdrawn. The PG&E Codes and Standards team is studying all other set-top boxes for potential future standards. Additional California standards scheduled to take effect in 2007 include those for home audio. These standards regulate standby power use of compact stereos.

In addition, though California passed standards to regulate active and no-load modes of external power supplies at the same level as the ENERGY STAR specification, changes have recently been made as a result of industry feedback. The changes include a delay in effective date. Unlike ENERGY STAR, California does not exempt battery charging systems from the external power supply standard; all battery chargers with external power supplies are treated like all other external power supplies.

In addition, the California Energy Commission (CEC) may consider several other product areas for possibly regulation, including:

- Set-top boxes
- Computer monitors and professional displays
- Battery chargers
- Home entertainment systems (TVs, DVDs, VCRs, sound systems)
- Home computer networking systems (DSL, cable modems, and wireless routers)

Activity Outside of the U.S.

There is significant international activity regarding the development of an internationally accepted test method for measuring television efficiency. The consumer electronics industry initiated a revision of the IEC television test procedure, and various stakeholders, including EPA, the CEA and NRDC have been actively involved in that process. A final draft of the new test procedure was issued in March 2007 and the revision process is projected by EPA to be completed soon after.

A non-exhaustive summary of some of the activity on consumer electronics occurring in various countries is below.

Canada

Natural Resources Canada (NRCan) has announced its intention to regulate the standby power of consumer electronics and will be adopting a tiered approach. The pre-publications for the regulations will occur in December 2008 for the first tier and December 2010 for the second, more stringent tier. The table below shows the proposed regulation levels. CEE is monitoring their progress.

Table 5: Canadian Standby Power Proposed Regulatory Targets

	2008	2010
Compact Audio Product	≤ 2 W ≤ 4 W for those w/ clock	≤ 1W in standby passive mode ≤ 2W for those w/ clock
Television	≤ 3 W in standby passive mode	≤ 1W in standby passive mode
DVD players/recorders	≤ 3 W in standby passive mode	≤ 1W in standby passive mode ≤ 2W for those w/ clock
Digital TV Adaptor	≤ 1 W in standby passive mode, ≤ 8 W in active (on) mode	
Telephony - answering machine and cordless phones		≤ 1W in standby passive mode ≤ 2W for those w/ specific auxiliary functions
External Power Supplies	≤ 0.5 W in no-load mode (output 0 to <10 W) ≤ 0.75 W in no-load mode (output ≥10 ≤ 250 W)	0.5 W in no-load mode
Battery Chargers, Cable and Satellite, Set-Top Boxes		Levels TBD

Other ENERGY STAR product categories		Under consideration
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European Union

In Europe, there are three initiatives for televisions. Two that endorse televisions based on their active mode efficiency are administered by the Group for Energy Efficient Appliances and the EU’s Eco Label Program. Additionally, there is a voluntary Code of Conduct that requires manufacturers to report active mode power consumption.

For set-top boxes, there is a voluntary EU Code of Conduct for Digital Service System Platforms. The EU Code contains a specification for energy use in standby passive mode, standby active mode, and on mode for various types of set-top boxes. Seven manufacturers participate in this program.

The EU promotes the ENERGY STAR label on office equipment (computers, monitors, printers, fax machines, copiers, scanners, mail machines, and multifunction devices). Through an agreement with EPA, the EU administers the labeling program in Europe. The program was first introduced in 2001 for an initial period of five years, and as renewed on December 20, 2006.

There is also a voluntary EU Code of Conduct for external power supplies. The goal of this voluntary program is to reduce energy use through the use of specifications, which vary by wattage and cover both no-load and active load conditions. This is a tiered specification; one level of specifications took effect in 2005 and a more stringent level takes effect in 2007. Twenty-one manufacturers have signed the Code of Conduct.

Australia

In Australia, there are both mandatory and voluntary programs to encourage energy efficiency in consumer electronics. Manufacturers selling televisions can receive an ENERGY STAR label if they meet the standby mode power levels. There is currently a proposal to add televisions to the list of products covered under a mandatory labeling program and to create a minimum energy performance standard.

Australia (through the Australian Greenhouse Office) recently undertook a rulemaking process to create minimum efficiency standards for set-top boxes, drawn from the CEC state standards and form the EU Code of Conduct. The proposed standards consider both standby and active power consumption.

East Asia – China, Japan, Korea

China has been promoting televisions that meet the ENERGY STAR specification since 2002. In addition, China recently announced that it intends to regulate active mode efficiency in Cathode Ray Tube (CRT) televisions only through both voluntary and regulatory approaches.

Japan maintains an energy saving standard based on the Top Runner program for televisions and computers. In addition, Japan has been implementing the ENERGY STAR program for office equipment (computer, monitor, printer, fax, copy, scanner, multi-function device, and digital duplicator) since 1995. Japanese industries have also engaged in voluntary efforts to reduce standby power of various home products, including televisions and audio equipments, to 1 W or less.

Korea administers a voluntary endorsement program to encourage lower standby power use in televisions and other consumer electronics. This program promotes levels that are similar to the ENERGY STAR Program.