Revisions
2007  CEE™ Consumer Electronics Initiative instituted
2016  CEE™ Consumer Electronics Initiative revision

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1 Introduction
The residential electricity consumption attributable to consumer electronics in the United States is estimated to be approximately 12 percent.\footnote{Fraunhofer USA Center for Sustainable Energy Systems. "Energy Consumption of Consumer Electronics in US Homes in 2013, June 2014. https://www.cta.tech/CTA/media/policyImages/Energy-Consumption-of-Consumer-Electronics.pdf} While consumer electronics represent an important source of potential savings for efficiency programs, the product category also presents certain unique challenges due to its fast changing nature and the dispersion of end uses in the home, each representing a small share of total electronics energy end use. The CEE Consumer Electronics Initiative seeks to describe leverage points and associated activities that can help in transforming the consumer electronics market in the United States and Canada.

Among these is addressing key barriers to the increased sale and efficient use of energy efficient consumer electronics products. The Initiative leverages the existing ENERGY STAR\textsuperscript{®} program and brand as an important symbol to help consumers identify efficient products in the market, and defines the present areas of focus for CEE member efforts to work with market actors as well as influence consumer choices and behaviors. This Initiative allows program administrators, through their participation in CEE, to publicly communicate their goals and objectives to industry and other stakeholders.

2 Background
The CEE Consumer Electronics Initiative was launched in 2007 to serve as a framework for CEE work in the consumer electronics product area. The Consumer Electronics Committee serves as the Initiative forum for sharing lessons learned about promoting energy efficient consumer electronics and for refining the Initiative and suggesting changes.

2.1 Scope
Given the proliferation of consumer electronics products, with more than 100 product categories identified by the Consumer Technology Association\textsuperscript{™} (CTA), formerly the Consumer Electronics Association\textsuperscript{®} (CEA), CEE members have identified a number of priority focus areas, which include products and components
with an identified potential for energy savings. As CEE and its members continue to explore opportunities among the consumer electronics product categories, CEE continues to refine these activities and focal areas in an effort to help its members find the most effective means to save energy associated with consumer electronics use. See the Areas of Focus section for discussion of the priority products covered by this Initiative.

3 Initiative Goals

The CEE Consumer Electronics Initiative has three 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 thereby to reduce energy use attributable to consumer electronics.

2. To support the development of consistent definitions of and criteria for energy efficiency in the consumer electronics product area and approaches that help consumers and others 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 works closely with EPA and the ENERGY STAR program.

3. To build opportunities for program savings from plug load control strategies (for example, HEM, APS) that can deliver measurable, verifiable savings from consumer electronics and other plug loads, independent of their native efficiency.

To support the achievement of these goals, the CEE Consumer Electronics Initiative incorporates a variety of activities and areas of focus, including particular product areas. These are outlined in the Initiative Areas of Focus below.

4 Market Overview

Consumer electronics as a product category account for 12 percent of residential electricity use and just over eight percent of residential primary energy consumption.² On average, it is estimated that the average number of consumer electronics products owned per US household is 28 devices, a quantity that has increased over time.³

The market structure for consumer electronics is similar to other appliance and plug load products. The Initiative targets opportunities with players all along the consumer electronics value chain, including manufacturers, distributors, retailers, service providers, and residential consumers.

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• **Manufacturers** Depending on the product type, manufacturer production cycles are generally between six and 24 months, however the development cycles affecting efficiency in product design do not always match with production.

• **Retailers** Consumer electronics retailers operate either through brick and mortar stores or online channels. The majority of consumer electronics business "is still done through multiregional big-box specialty chains and national discount stores, which together controlled close to half of all volume in 2013." According to the *Annual Household CE Ownership and Market Potential Study*, "despite the continued growth of online retail sales, 85 percent of US households purchasing CE products in the last year did so at brick-and-mortar retail stores."

• **Service Providers** Particular types of consumer electronics such as set-top boxes or small network equipment tend to enter consumer homes by way of a pay-TV or Internet service provider. In many such cases, there may be little customer choice in terms of specifying the efficiency of the device received, nor may there be much opportunity for the end use consumer to gain knowledge about the energy consumption of the device or exercise choice based on an improved awareness of alternatives. The universe of service providers accessible to homeowners continues to expand, and includes a variety of players for whom energy or energy management may not be a primary service offering, but which may include elements of energy management services. This Initiative seeks to recognize this ongoing evolution and to account for some of the implications it is likely to have for consumers and efficiency program administrators alike.

### 4.1 Trends
CEE has noted a number of trends since the Initiative first launched in 2007.

• Technologies are converging as consumers move toward a fully networked home and manufacturers continue to introduce devices that perform multiple functions.

• 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, which tend to have lower energy consumption. From 2010 to 2013, the installed base of consumer electronics in US homes increased from 2.9 billion to 3.8 billion devices.

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• It is not uncommon for older, unused products to be kept plugged in within the house, for example, an older TV in a spare bedroom.

• Customers’ demands and expectations are continually evolving as technological capabilities redefine how consumer electronics are used in a home.

There have also been improvements in product efficiency over the lifetime of the CEE Consumer Electronics Initiative. Based on reports by the Fraunhofer Center for Sustainable Energy Systems for the Consumer Technology Association in 2010 and 2013, consumer electronics accounted for 193 TWh in 2010, roughly 13.2 percent of residential energy consumption, decreasing to 169 TWh in 2013, or roughly 12 percent of residential energy consumption. Broadly speaking, the unit energy consumption for many consumer electronics products, including large energy consumers such as televisions\(^7\) and desktop computers, also decreased over this period, as shown in the charts below.

**Figure 1. Consumer electronics unit electricity consumption, 2010\(^8\)**

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\(^7\) We note that the emergence of ultra high definition television has suggested that the potential exists to reverse or at least attenuate the overall trend of decreasing energy use for televisions. Likewise, connected televisions that offer services that go well beyond the unidirectional delivery of video content have the potential to increase the run hours of televisions as a platform for delivery of other services.

4.1.1 Connectivity
Connectivity is a key product feature in many consumer electronics, and even products that previously were not connected, such as televisions, increasingly include “smart” functionality. As more products are network connected, it is increasingly likely that incremental energy consumption can be attributed to that product’s ability to maintain a connection in its different operating modes. Product connectivity also adds new considerations to the role that consumer electronics may play in the integrated home, for example by enabling or enhancing consumer engagement with other connected products. CEE is continuing to develop its understanding of how different connected devices will and should interact in the framework of a connected home to enable value to consumers and programs.

See also the sections on Small Network Equipment and Standby Power for further discussion of connectivity.

4.2 Barriers to Efficiency
Consumer electronic products generally exhibit low per unit savings potential, so it can be difficult to motivate consumers to change their behavior when the individual impact of a given product on their personal energy consumption may not be perceived as significant. Additionally, in a space where new capabilities and features tend to drive product marketing approaches, efficiency may be less highly valued by consumers, whose purchasing decisions are influenced by other factors.

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In some cases, initial purchase price can also be a barrier in the event that a more efficient product exhibits higher cost than a comparable, but more consumptive, product.

Adding to the list of potential barriers is the fact that the benefits of efficiency may not be sufficiently well understood by either consumers or retail sales staff, which reduces the prospects for consumers to purchase—or retailers to sell—efficiency as an attribute that offers a measurable benefit. Additionally, the positioning, availability, or stocking of efficient products may be a limiting factor in the retail setting.

Efficiency programs may face additional barriers in this space because product manufacturing and purchasing cycles may not align well with program cycles. Rapid technology advances can make it difficult for programs to engage consumers on specific products when that the potential exists for the next generation of products to be released before a program can ramp up to achieve its intended market impact. Lastly, many manufacturers and retailers have national or even global reach, which can make it difficult for programs to achieve the necessary level of influence when working primarily through a locally run efficiency program.

Through the CEE Consumer Electronics Initiative, efficiency program administrators seek to pool their experiences and influence to shape and impact the market for efficient consumer electronics products. Some tools and possible interventions to overcome the above barriers include: customer education, targeted incentives, retail training, marketing, and promotion of the ENERGY STAR program. A list of program approaches for engaging with various market stakeholders is included in the CEE Consumer Electronics Program Guide.

4.3 Role of ENERGY STAR

According to the 2015 CEE Consumer Electronics Program Summary, efficiency programs across the US and Canada continue to leverage the ENERGY STAR marketing platform in the promotion of energy efficiency consumer electronics. The ENERGY STAR label is one of the most visible brands in the US consumer markets, with 88 percent of US households recognizing the ENERGY STAR label in 2015 when shown the label.\(^{10}\)

In 2015, EPA maintained ENERGY STAR specifications for numerous product categories, including the following consumer electronics products of interest to efficiency programs:

- **Audio/Video** According to EPA, "ENERGY STAR certified audio/video equipment is up to 60 percent more efficient than conventional models. Blu-ray

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players that meet ENERGY STAR qualifications are, on average, 45 percent more efficient than conventional models.”

- **Computers** If all computers sold in the United States were ENERGY STAR certified, the savings would grow to more than $1 billion in annual energy costs per year and approximately 15 billion pounds of annual greenhouse gas emissions, equivalent to the emissions from more than 1.4 million vehicles.

- **Displays** "On average, displays that have earned the ENERGY STAR are 25 percent more energy efficient than standard options.”

- **Set-top Boxes** According to EPA, "ENERGY STAR qualified set-top boxes are on average 45 percent more efficient than conventional models".

- **Small-Network Equipment** ENERGY STAR certified small network equipment (SNE), which includes cable and DSM modems, optical network devices, cable and DSL integrated access devices, routers, switches, and access points, use on average 20 percent less energy than conventional models.

- **Tablets** Slates and tablets are more efficient than desktop or notebook computers for simple tasks such as browsing the Internet or streaming content.

- **Televisions** According to EPA, ENERGY STAR certified televisions are on average over 25 percent more energy efficient than conventional alternative models.

Due to the rapid innovation in the electronics products area, EPA has found that market penetration increases quite quickly after a final specification is made public. For this reason, ENERGY STAR product specifications are revised regularly to take into account market penetration and technology advances. In terms of the market penetration of efficient ENERGY STAR labeled equipment in 2015, 53 percent of shipments of audio/video equipment, 70 percent of computer products, 52 percent of set-top box products, and 89 percent of televisions were ENERGY STAR certified. Additional details about the market penetration of efficient electronics can be found in the annual ENERGY STAR Unit Shipment Data Summary Report.

17 US Environmental Protection Agency. ENERGY STAR Unit Shipment Data. [https://www.energystar.gov/index.cfm?c=partners.unit_shipment_data](https://www.energystar.gov/index.cfm?c=partners.unit_shipment_data)
4.3.1 ENERGY STAR Most Efficient

Another tool, the ENERGY STAR Most Efficient designation, was launched in 2011 to identify the most efficient models among ENERGY STAR certified products in specific product categories.\(^{18}\) The ENERGY STAR Most Efficient recognition criteria are reviewed on an annual basis to ensure that the designation continues to represent the top performers. As of 2016, ENERGY STAR Most Efficient was available for televisions and computer monitors. Savings for an ENERGY STAR Most Efficient television as compared to a conventional non-ENERGY STAR model are estimated at 62 percent, while ENERGY STAR Most Efficient monitors have estimated savings of 35 percent.\(^{19}\)

5 Initiative Areas of Focus

Based on energy savings potential, CEE members have identified specific products and components to focus on through the CEE Consumer Electronics Initiative and Committee. Given that product functionality is converging in many cases, these areas of focus have been grouped into home entertainment, home office, and cross-cutting categories. Trends driving program interest in these product categories are described below. While CEE does not presently maintain efficiency specifications for consumer electronics as it does in other product categories, CEE may consider the future development of performance specifications if a clear and credible opportunity exists to enhance the impact of efficiency programs.

5.1 Home Entertainment Products

5.1.1 Televisions

Televisions are among the most ubiquitous consumer electronics devices in the United States, with 97 to 98 percent household penetration in 2013.\(^{20}\) In addition to being one of the largest electricity consumers among consumer electronics products, a number of other trends have influenced CEE engagement with this specific product category:

- Screen sizes are increasing, with the average screen size increasing from 26 inches in 2006 to 29 inches in 2010 to 34 inches in 2014.\(^{21}\)

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• New features, such as Ultra HD™ and network connectivity can contribute to the shape of these products energy profiles.
• Retail prices tend to drop over time, even for newer technologies such as ultra high definition, which tends to increase the market penetration of these models.
• Television technology can undergo rapid evolution, which can make it difficult for programs to assess savings opportunities.
• Convergence of home entertainment products continues, for example home entertainment centers that include televisions, set-top boxes, DVD players, DVRs, home audio equipment, computers, etc.
• Simultaneous "second screen" activities are increasingly common, which may call upon computers, tablets, smart phones or other devices in addition to the primary screen.

Efficiency programs have been able to promote more efficient television models based on the ENERGY STAR or ENERGY STAR Most Efficient criteria. Incentives can be paid to retailers to increase shelf space for efficient options or in the form of spiffs to sales staff, but rebates can also go to customers. For more information on current CEE member promotion of efficient televisions, view the 2015 CEE Consumer Electronics Program Summary.

5.1.2 Set-top Boxes

Like televisions, set-top boxes (STBs) also are relatively large energy consumers. The following market and product trends have shaped CEE member interest in this product category in recent years:

• The features and functionality of set-top boxes are increasing in variety and complexity, which can contribute to increased energy use.
• It is unclear how product-feature convergence or alternative technologies, such as streaming digital media players or game consoles, will ultimately impact the market for set-top boxes.
• Deployments of multiroom set-top boxes and thin clients are increasing in popularity.22
• Consumers have limited choice in which set-top box they receive, with most set-top boxes being provisioned by the service provider rather than procured by the consumer.
• Content service providers represent new midstream partnership opportunities for efficiency programs, but due to the national operations of many providers, efficiency programs may face difficulties engaging on a local level.

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• There is interest in investigating a deep sleep mode so that devices do not consume as much energy when they are off and not actively in use, provided consumer satisfaction is not negatively impacted by longer wake times or associated concerns.

• In lieu of federal regulation, a voluntary agreement was developed by industry stakeholders and efficiency advocates in the United States to set minimum efficiency requirements for pay-TV providers’ new set-top boxes.23 As of 2015, a similar effort was under consideration in Canada.

In 2012, CEE launched a Set-top Box Working Group to support members in developing creative ways to promote energy efficiency in these products and to foster engagement with market stakeholders. See the CEE Consumer Electronics Program Guide for more details.

5.2 Home Office Equipment

5.2.1 Computers and Peripherals

Computers—particularly when combined with the various devices operating in conjunction with them like monitors, modems, routers, and printers—can consume significant amounts of energy. CEE seeks to address this particular product category for a variety of reasons, including:

• There is a shift in consumer purchasing from desktops to laptops and other mobile devices including tablets, where more efficient chips are combining with manufacturer desire to manage power consumption for the benefit of the consumer, leading to more efficient computing.

• Despite the benefits of more efficient chips and better power management, desktops and laptops tend to incorporate more features, such as more sophisticated graphics capability and increased processing capability, such that energy use is not always necessarily decreasing.

• The introduction and ongoing proliferation of tablets and other mobile platforms is expected to further impact the overall energy consumption profile of this product category.

A number of CEE members promote the ENERGY STAR specifications for computers and displays. CEE works with these members to determine other ways to promote energy efficiency in computers, such as through consumer education, with the ultimate goal of increased market penetration of energy efficient computer products and more energy efficient consumer behavior.

5.3 Cross-cutting Products and Components

5.3.1 Advanced Power Strips

CEE members remain interested in opportunities afforded by advanced power strips (APS). Although there is not presently an ENERGY STAR specification for advanced power strips, CEE members have identified this product category as one that could provide significant energy savings by addressing phantom load and standby power losses. In general, the level of energy savings depends on the number and type of devices plugged into the APS. Newer "tier 2" products are also capable of active power management, using occupancy or infrared sensors. Both trends and barriers have influenced CEE member engagement on advanced power strips to date:

- Based on data from Lawrence Berkeley National Laboratory, "in a typical home with 40 plug loads, standby or 'idle' loads can account for nearly 10 percent of household electricity use".24
- Complications in assessing savings potential are due to variety of factors:
  - Savings depend on the type of device (Tier 1 standby power management vs. Tier 2 active power management)
  - Savings depend on the type and combination of devices plugged in to the advanced power strip
  - Concerns about behavioral persistence—when changing the devices plugged into the advanced power strip over a period of time, consumers may not consistently maintain the configuration that maximizes savings, for example which device is connected to the control vs. controlled outlets.
  - Lack of an ENERGY STAR test procedure or common product specifications.
  - Savings potential and proper use can be difficult to communicate to consumers and retail staff.

CEE members are pursuing a variety of approaches for working with advanced power strips, including customer rebates, midstream engagement, and direct installations. Concurrently, advanced power strip manufacturers are working to develop APS models that incorporate wireless communications technologies that can help guide proper installation, improve the persistence of energy savings and support measurement and verification.25 At present, the DOE Uniform Methods Protocol (UMP) identifies pre- and post measurement as the best practice for energy efficiency testing for this category.26 Regulatory approval of alternative test methods, such as those that measure the energy reduction percentage of each device,

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25 Personal Communication, D. Gelonese, Embertec USA, LLC, 1/1/16
26 APS manufacturers point out that test procedures, such as UL ECVP 108 3rd Edition from Underwriters Laboratories, have been developed to help determine energy savings potential from Tier 1 and Tier 2 APS. Personal Communication, T. Carlson, TrickleStar LLC, 12/31/15
may also occur on a state-by-state basis. As newer generations of advanced power strips with active power management capabilities and communicating functionalities come to market, CEE members will continue to exchange knowledge and best practices about the savings potential resident in this product category. Please see the latest CEE Consumer Electronics Program Summary for additional detail regarding program activity.

5.3.2 Power Supplies

- **Internal power supplies**, commonly found in desktop computers, have been a target for efficiency programs, primarily through the 80PLUS program mentioned in the Program Activity section above. The inclusion of internal power supplies in the ENERGY STAR computers specification helped shape significant efficiency improvements in this product area. Although not an active area for CEE at present, monitoring internal power supplies for new developments and opportunities, with the goal of continuing to increase the efficiency of internal power supplies, remains an objective.

- **External Power Supplies** Due to an increase in the price of copper, linear power supplies are becoming more expensive making 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, helping to drive market transformation. CEE will continue to monitor external power supplies for any other developments and for opportunities for member programs to help support 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, preserving further potential for efficiency programs.

5.3.3 Small Network Equipment

Small network equipment consists of devices that enable Internet connections, primarily modems and routers. Since these devices tend to always be on, CEE is interested in the potential applicability of technologies such as power scaling that would allow these devices to modulate their energy consumption relative to the amount of network traffic they are processing at any given point. EPA released the first ENERGY STAR specification for small network equipment in 2013, and CEE plans to participate in subsequent revisions of the specification.

5.3.4 Home Energy Management Systems

Home energy management systems (HEMS) is an emerging growth business in North America with multiple entrants offering services to homeowners based on a variety of delivery platforms that include both hardware and software. Broadly speaking, HEMS can encompass any product or service that monitors, controls, or analyses energy in the residential setting. Defining HEMS in this way places energy

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27 Personal Communication, D. Geloneese, Embertec USA, LLC, 1/1/16
management, home automation, data display, and analysis in scope, and may extend to include utility demand response and real time auditing as well as other non-energy services such as home security. The delivery of HEMS services may also include subscriptions that can be supported by electric or gas utilities or by other third-party service providers, including those whose primary service offerings may be non-energy, such as home entertainment or home security.

HEMS potential spans across the whole house including the systems and equipment within a home, of which consumer electronics are one piece. The primary value proposition of HEMS from an efficiency program perspective is the system’s ability to monitor, control, measure and report on management of other loads in the home. This is largely due to the fact that the energy savings associated with HEMS are not currently well defined, are variable due to customer behavior, and are dependant on the application.

However, that does not mean that the native efficiency of HEMS equipment should not be a concern for the program community, as it will be important to understand how much power is being drawn by HEMS in order to deliver savings from other end uses. For this reason, it is suggested that comprehensive analysis of net energy benefits from HEMS installations should play an important role in the decisions consumers make about which equipment and systems to deploy, given the mix of loads present in the home and other relevant factors such as the lifestyles of the home’s primary occupants. Lastly, in cases where a HEMS platform originates with a non-energy service provider, power consumption by the HEMS itself may constitute a greater opportunity, because the native efficiency of the HEMS system may be overshadowed by the desire to offer services or functionalities that are most responsive to what customers demand. It is suggested that HEMS with these characteristics have the potential to result in increasing energy consumption by the HEMS itself, which may then lead to opportunities for intervention by efficiency interests.

HEMS offer a promising array of benefits for the customer, beyond just energy savings. They enable homeowners to have an additional level of automotive, programming, and energy management that was not previously available. In this sense, HEMS can be seen as a platform for service delivery, control, monitoring, measurement and verification, and a host of other value added services that may be of interest and economic benefit to consumers, utilities and society.

5.4 Promotion of Efficient Use of Products

CEE members recognize that the standard efficiency of devices is just one piece of the efficiency puzzle for consumer electronics. Another key element that impacts the energy consumption of consumer electronics are the different modes available and used by consumers.
5.4.1 Standby Power

Standby power use is an important consideration in the energy profile of consumer electronics products, as many devices continue to draw power if they are off but still plugged in. The typical US home has approximately 40 plug load devices, including consumer electronics, which draw power even when not in use, and that can add up to ten percent of a home’s electricity usage.\(^{28}\)\(^{29}\) These idle loads can add up to about $200 in annual energy costs for the average home.\(^{30}\) A recent study by NRDC estimated the average annual cost impact of home idle load at $165 per US household, with consumer electronics accounting for 51 percent of always-on electricity consumption in residences involved in the study.\(^{31}\)

Products such as advanced power strips have been identified as a potential approach for addressing losses attributed to standby power. CEE continues to examine standby power across consumer electronics and look for opportunities to improve its efficiency across products. Standby power is also addressed in several ENERGY STAR specifications, and consumer education efforts have been undertaken by several CEE members to raise awareness of phantom loads.

As more consumer electronics devices are connected, there is the potential for energy consumption to increase, particularly if connectivity is maintained during standby to allow devices to respond instantaneously to external commands. It is estimated that there will be more than 50 billion network-enabled devices in homes and offices by 2020.\(^{32}\) As one study notes, "up to 80 percent of their electricity consumption is used just to maintain a network connection."\(^{33}\) For these reasons, CEE maintains an interest in assessing opportunities to address networked standby.

6 Initiative Strategies

In order to harmonize the promotion and accelerate market acceptance of efficient consumer electronics products, this Initiative employs the following approaches.


\(^{29}\) We note that the data underlying the 2012 LBNL study was collected prior to a significant shift in the television market, which saw the relatively rapid displacement of CRT and rear projection models with flat panel (for example, plasma, LCD and LED) technologies. Therefore, we suggest that any reliance on this data to project power savings from TVs should take this market shift into consideration.


6.1 Working with ENERGY STAR
CEE encourages its members to support the ENERGY STAR program for consumer electronics covered under the platform. EPA maintains a number of specifications for efficient consumer electronics products, outlined above under the Role of ENERGY STAR, which many CEE members have used as a basis for incentive programs and consumer education and marketing efforts.

CEE keeps members abreast of ENERGY STAR program activities, including specification revisions for consumer electronics products. CEE works with members to develop consensus comments to ensure that the program’s specifications and other ENERGY STAR activities continue to support energy efficiency program needs. CEE also engages ENERGY STAR representatives on committee calls and at in-person meetings to keep members updated on their work. When appropriate, CEE fosters collaboration between its membership and ENERGY STAR, for example on jointly beneficial activities such as industry outreach and consumer education.

By working closely and collaboratively with the ENERGY STAR program, and specifically by electing to use ENERGY STAR as the principal marketing platform and basis for identifying high efficiency consumer electronics products, CEE efforts improve the relative value and meaning of ENERGY STAR in the consumer electronics market, thereby increasing market penetration of ENERGY STAR-qualified products.

6.2 Supporting Consumer Education
The Initiative seeks to help participants address a general lack of consumer understanding of how energy consumption in consumer electronics may relate to the different technology options, varying performance features, and benefits of energy efficient electronics. By sharing marketing and education research, materials, and efforts, CEE can support member work to improve how programs can more effectively communicate with consumers and better partner with retailers to highlight the essential performance characteristics of high efficiency electronics, and how consumers can more readily recognize those characteristics when they are in the market for a particular product. Consistent and effective messaging is a key component of both pointing consumers to the right products and enabling them to make informed purchasing decisions that deliver a satisfying customer experience.

Many CEE members work to educate their customers about saving energy with consumer electronics through a variety of media and communication channels. CEE aims to help members make these educational efforts as effective as possible, by providing a forum for sharing consumer research as well as messaging content and strategies. This sharing enables greater coordination across member approaches and greater consistency in the market. Such coordination and consistency helps CEE members have a stronger impact on the binational market for energy efficient consumer electronics.
In addition to providing a forum for sharing education and marketing research, materials, and efforts, CEE enables a platform for assessing the impact of external market trends that may relate to such factors as pricing, stocking, and sales. Programs have the opportunity to learn from fellow program administrators about which messages and avenues have been the most successful and may then transfer these lessons learned to help develop or enhance their own efforts related to consumer messaging, materials, and practices. CEE also engages industry stakeholders to help programs develop these core messages, identify the best avenues for outreach, and develop tools that exhibit credibility within the industry. Working together with other efficiency programs and industry partners enables increased consistency and enhances the overall impact of key messages and promotions aimed at consumers.

Certain key benefits of undertaking work at CEE related to consumer engagement are the ability to collaborate on the development of common materials and approaches that can support member efforts to educate consumers about the impact of electronics load on energy costs and how existing program designs might be leveraged to disseminate information to consumers about electronics and energy costs.

In the past, CEE has informed the Committee about ENERGY STAR and Consumer Technology Association efforts in consumer education, and CEE plans to continue working with both these entities on these efforts. Such further coordination could serve to strength the impact of consumer education, and help move the market towards efficiency.

To support these objectives, CEE provides teleconferences and in-person meetings, and a shared online work space.

6.3 Enabling Consensus of Successful Program Approaches
CEE developed a Consumer Electronics Program Guide in 2009 to identify potential program delivery approaches for the promotion of efficient consumer electronics. This resource, updated in 2015, captures program experience with different stakeholder partners: manufacturers, distributors, retailers, service providers, and consumers. The Program Guide was designed to support member programs at all stages as they refine their approaches to promote energy efficient consumer electronics, including those that leverage ENERGY STAR as a marketing platform. This resource also serves to educate industry and other stakeholders on efficiency program priorities and approaches, which helps to build increased understanding of the strategies employed by energy efficiency programs, with the overall goal being increased appreciation for the positive impacts achievable through the market adoption of higher efficiency electronics.

Future product specific program tools may be developed, which could include the definition of product efficiency specifications above ENERGY STAR levels. The development of future program guidelines and toolkits would be pursued with the
The intent of allowing members to benefit from the exchange of ideas and experiences that have proven capable of delivering the greatest cost-effective impacts in the market.

View the CEE website for the latest version of this CEE Consumer Electronics Program Guide resource.

In addition to the Program Guide, CEE compiles information regarding existing program approaches in an annual Program Summary. This document highlights the market intervention strategies being employed by CEE members and what market channels and partnerships are being leveraged to deliver effective messaging to key audiences. In this way the program summary serves to help members develop or refine the effectiveness of their own local programs.

6.4 Engaging with Industry Stakeholders

In connection with the approaches set forth in the Consumer Electronics Initiative, CEE has worked to build relationships with the electronics industry. Among the benefits of engaging industry through the Initiative are an enhanced ability to keep members apprised of market developments and access to improved knowledge of product development cycles, emerging technologies and trends that stand to influence market dynamics. Industry engagement also provides the ability for members to invite the collaboration of specific industries at various industry events, the opportunity to seek and benefit from industry input and feedback on the binational strategies that are developed by the Consortium, and to test individual program approaches for synchronicity with industry dynamics.

Thus far, CEE has focused its efforts on product manufacturers and the Consumer Technology Association, the US industry association. Two key opportunities for CEE to take advantage of industry relationships are its annual Industry Partners Meeting and through the process of revising Initiative strategies, where CEE is able to benefit from input and comments on components of its approach to electronics. For example, the Initiative characterization of market dynamics benefited from feedback on current or planned market intervention strategies. Through the activities of the Consumer Electronics Committee, CEE also hosts periodic interactions with manufacturers of particular product categories; among these are televisions, set-top boxes, advanced power strips, and home energy management systems. These industry touch points are leveraged in order to help support member program designs and strategies that are being explored, piloted or implemented in local markets.

CEE continually assesses how to increase the value of its relationships with industry, including electronics retailers. Though CEE has hosted discussions with retailers in the past, and individual members work with retailers at local and regional levels, to date CEE has not played a central, organizing role with retailers at a binational level. There is increasing member interest in market strategies that leverage national retailers. There is work ongoing in this space to address midstream opportunities
that seek to influence the buying, stocking and merchandising practices of retailers, leading to greater uptake of efficient electronics through these market transformation approaches. CEE is committed to assessing whether there is a role for the Consortium to interface with retailers to complement or enhance work now being done regionally, as well as that being done by DOE and ENERGY STAR at a national scale.

7 Initiative Participation
Initiative participation is open to individual efficiency organizations. Other Initiative stakeholders have a variety of opportunities to engage in Initiative activities and to influence Initiative focus.

To be considered an Initiative participant, individual efficiency organizations must fulfill the following requirements:

1. Deploy a significant and focused educational and promotional program that identifies and promotes ENERGY STAR consumer electronics, including any or all ENERGY STAR-covered product categories, and energy efficient consumer electronic products and practices in general

   OR

   Provide incentives, for example, 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 34

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

- Collaborate with other efficiency programs through CEE CEE provides a forum for efficiency programs to come together, discuss, and come to consensus on a variety of issues, including comments to ENERGY STAR and other groups.

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34 Annual summaries of CEE member Consumer Electronics Programs can be found on the CEE website at http://www.cee1.org/content/cee-program-resources. CEE members can use these summaries to learn how their counterparts are promoting super efficiency and to help inform their own program design. Manufacturers and others also use these summaries to stay up-to-date on efficiency program activity.
• **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 can represent a much larger percentage of the national market. Program industry efforts to deploy 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 product performance or other amenities that are important to the consumer.

### 8 CEE Role in Initiative Promotion

Since 2007, CEE has played a central role in providing a platform for efficiency program administrators working on consumer electronics to exchange best practices, identify shared needs and opportunities, and craft national strategies that generate tangible results. This coordination and consistency helps CEE members achieve a larger impact in the market.

CEE and its members work closely and collaboratively with the US Environmental Protection Agency on ENERGY STAR product specifications to ensure that the ENERGY STAR brand continues to serve the needs of efficiency program administrators and represents a trusted mark for consumers searching for quality efficient products and services. Another hallmark of CEE consumer electronics work is engagement with the consumer electronics industry. CEE, acting as the representative of the energy efficiency program community, regularly communicates and collaborates with industry on program administrator priorities, goals, and program design.

Additionally, CEE provides other supports for its initiatives, which may include undertaking further research, tracking market impacts, compiling program summaries, or monitoring and reporting on market developments related to consumer electronics in the United States and Canada.