



# How to Use Midstream Incentives to Promote ENERGY STAR® Certified Consumer Electronics



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## CONTENTS

1. Executive Summary.....	1
2. Background: Evolution of the CE Market and the Emergence of Energy-Efficiency Programs Focused on CE Products.....	3
3. Midstream Consumer Electronics Programs.....	6
4. Four Keys to a Successful Midstream CE Program.....	7
4.1 Leverage ENERGY STAR as a Common Communication Platform and a Basis for Technical Specifications.....	7
4.2 Develop a Strategic Relationship with Retailers.....	8
4.3 Collaboration with Other Energy Efficiency Program Sponsors.....	11
4.4 Focus Early on Program Evaluation, Measurement and Verification.....	12
5. Expansion on Consumer Electronics Midstream Program Designs.....	14
5.1 Shared Incentives.....	14
5.2 Accelerated Incentive.....	14
5.3 Summary of CE Midstream Program Design Expansion Options.....	15
6. Closing.....	16
7. Appendices.....	17
7.1 Basics of Midstream Program Application to Consumer Electronics.....	17
7.2 ENERGY STAR Support for CE.....	18
7.3 Understanding the Consumer Electronics Market.....	18

## ACKNOWLEDGEMENTS

The authors of this document, Michael Lukasiewicz and Patrick Kilroy of Navitas, Steve Bassill of QDI Strategies, Inc., Mark Michalski and Robert Huang of Cadmus, and Una Song and Hewan Tomlinson of the U.S. Environmental Protection Agency, would like to thank the following organizations that provided insights to inform the development, or were instrumental in reviewing this guide:

- Consortium for Energy Efficiency
- Pacific Gas and Electric
- Northwest Energy Efficiency Alliance
- Sacramento Municipal Utility District
- Nevada Energy
- San Diego Gas and Electric
- Southern California Edison

## 1. EXECUTIVE SUMMARY

Across more than 100 million homes in America, there are billions of consumer electronics (CE) devices<sup>1</sup>—from televisions (TVs) and computers to cellphones and MP3 players—and each year, hundreds of millions of new electronic products are sold. As the market of electronics has grown, so has their energy use. Electronics now account for about 12% of residential electricity consumption and 50% of miscellaneous electric load.<sup>2</sup> While per-unit energy savings potential from these devices may be relatively small, their tremendous volume creates a potential opportunity for sponsors of energy efficiency programs. The challenge for program sponsors was the nature of the market and how best to intervene.

Incentive programs for energy efficient products are characterized as mid-stream, up-stream or down-stream depending on who receives the incentives. Upstream programs provide incentives for manufacturers to make more efficient products and down-stream programs provide rebates for consumers, encouraging them to purchase more efficient products. A midstream program provides incentives for retailers to stock and sell a higher percentage of highly efficient products than they would have otherwise. Consumer electronics are well suited to a midstream approach. Because of the relatively modest energy savings per device, traditional downstream/consumer incentives tend to be small,<sup>3</sup> relative to the products' purchase price, resulting in little impact on consumer choice. Upstream models, on the other hand, are generally impractical since CE manufacturers make product design decisions for the global market and program sponsors cannot command the required scale to impact decisions at this level. While the per unit incentive amount may be small in absolute terms, it may be more significant when compared to a retailer's profit margin on the CE product, and even more compelling given the volume of sales of CE products. These factors, taken together, may allow a midstream incentive to influence a retailer's product selection behavior.

Over the past twenty years, the U. S. Environmental Protection Agency (EPA) has successfully leveraged the ENERGY STAR program to remove barriers to energy efficient electronics purchases, transforming the market numerous times, setting and revising ENERGY STAR specifications. As this cycle continues, it has implications

for energy-efficiency programs' attribution and energy savings claims, and suggests that a program sponsor's primary opportunity in this category may lie in capturing savings associated with increased sales of top performing ENERGY STAR certified products. Program sponsors can establish an appropriate subset by various means including using the ENERGY STAR Most Efficient or Topten USA lists.

This document offers insights into the early lessons learned about midstream CE programs, which might be of use to other program sponsors when designing future programs. The document touches on some of the challenges and opportunities associated with designing and implementing effective energy-efficiency programs for CE as well as some of the methods and ideas partners have employed in these early efforts.

Four keys to a successful midstream CE program have emerged:

- **Leverage ENERGY STAR as a common communication platform and a basis for technical specifications.** Often cited as an important component to CE midstream program success, ENERGY STAR is an effective platform for connecting with consumers and national retailers, who have used the ENERGY STAR communication platform for years. In addition, products that have earned the ENERGY STAR have been third party certified, to ensure consumer confidence in the ENERGY STAR label. CE manufacturers are also longstanding ENERGY STAR partners. Since they use their short product development cycles to meet ENERGY STAR specifications much quicker than makers of other ENERGY STAR products, CE program sponsors often find themselves focused on increasing sales of a subset of ENERGY STAR certified CE products – those that are among the more efficient of the ENERGY STAR products available. In this way, they address some of the concerns on the part of evaluators and regulators, such as attribution and free ridership.<sup>4</sup>
- **Develop a strategic relationship with retailers.** In order for a midstream program to effectively influence retailer stocking behavior, program sponsors must make special consideration and effort to ensure the program mutually benefits them and the retailers. Program sponsors should be sensitive to retailers'

<sup>1</sup> A recent Consumer Electronics Association Survey revealed the average US home has 24 consumer electronic devices. Available online: [www.ce.org/News/News-Releases/Press-Releases/2012-Press-Releases/Smartphones,-HDTVs-Are-the-Most-Planned-CE-Purchases.aspx](http://www.ce.org/News/News-Releases/Press-Releases/2012-Press-Releases/Smartphones,-HDTVs-Are-the-Most-Planned-CE-Purchases.aspx)

<sup>2</sup> McKenney, Kurtis, M. Wiggins, D. King, and R. Fricke (Tiix LLC), "Efficiency Trends in Consumer Electronics." Paper presented at National Renewable Energy Lab Automated Home Energy Management Experts Meeting, October 1, 2009.

<sup>3</sup> For example, a \$7 incentive on a computer would not likely influence a consumer's decision, but could strongly influence retailers' buying habits, given the narrow profit margins.

<sup>4</sup> See Section 4.4.2.3 for a detailed discussion of free-ridership

need for program consistency and planning lead times, as defined by buying schedules, which allow the retailers to fully integrate programs. Further, if program sponsors understand retailers' individual interests, they can adjust the programs to fit a range of different retailers' operations and make participation as easy as possible. Retailers, to help the program sponsor demonstrate energy savings and program impact, need to stock efficient products, share sales data with program sponsors to help in program evaluation, and to collaborate on sales associate training and consumer communications.

- **Collaborate with other program sponsors to design and implement programs.** National retailers make buying decisions for their entire market, and no one program sponsor has a customer base large enough to influence these decisions. Economic incentives must be sufficient to justify the commitment of resources necessary to successfully implement these promotions. If program sponsors align their programs, in effect aggregating their customer bases and providing much larger incentive pools, they will have a greater chance of attracting retailer participation and impacting stocking decisions and sales practices.
- **Focus early on program evaluation, measurement, and verification (EM&V).** The nature of midstream programs, especially when employed to promote CE, requires that program sponsors work with evaluators and regulators early, so they can address EM&V challenges before a program begins. A recent Northwest Energy Efficiency

Alliance (NEEA) evaluation of their midstream TV program identified challenges with quantifying local savings and with attribution due to rapid technology innovation, quick-product cycle refreshes, and the success of the ENERGY STAR program in transforming the market to more efficient products. Other significant factors affecting cost-effectiveness calculations and evaluations include: treatment of incentive payments; treatment of incremental measure costs; and net-to-gross factors, such as interpretation of free-ridership.<sup>5</sup>

As outlined above, consumer electronics offer a significant opportunity for energy savings, but capturing these savings requires creative, collaborative efforts. This document closes with a discussion on two possible expansions on the traditional midstream program model, which may help address potential evaluation hurdles for CE programs. These include:

- **Shared incentives:** This model blends features of a midstream program design with elements of a consumer-facing downstream program to positively impact a program's net-to-gross and cost-benefit ratios and lessen concerns about impacting behavior outside the service territory.
- **Accelerated incentives:** This model provides higher incentive payments at the beginning of the program year to avoid paying incentives later in the year when market penetration of efficient products in this fast changing market is often very high.

## 2. BACKGROUND: EVOLUTION OF THE CE MARKET AND THE EMERGENCE OF ENERGY-EFFICIENCY PROGRAMS FOCUSED ON CE PRODUCTS

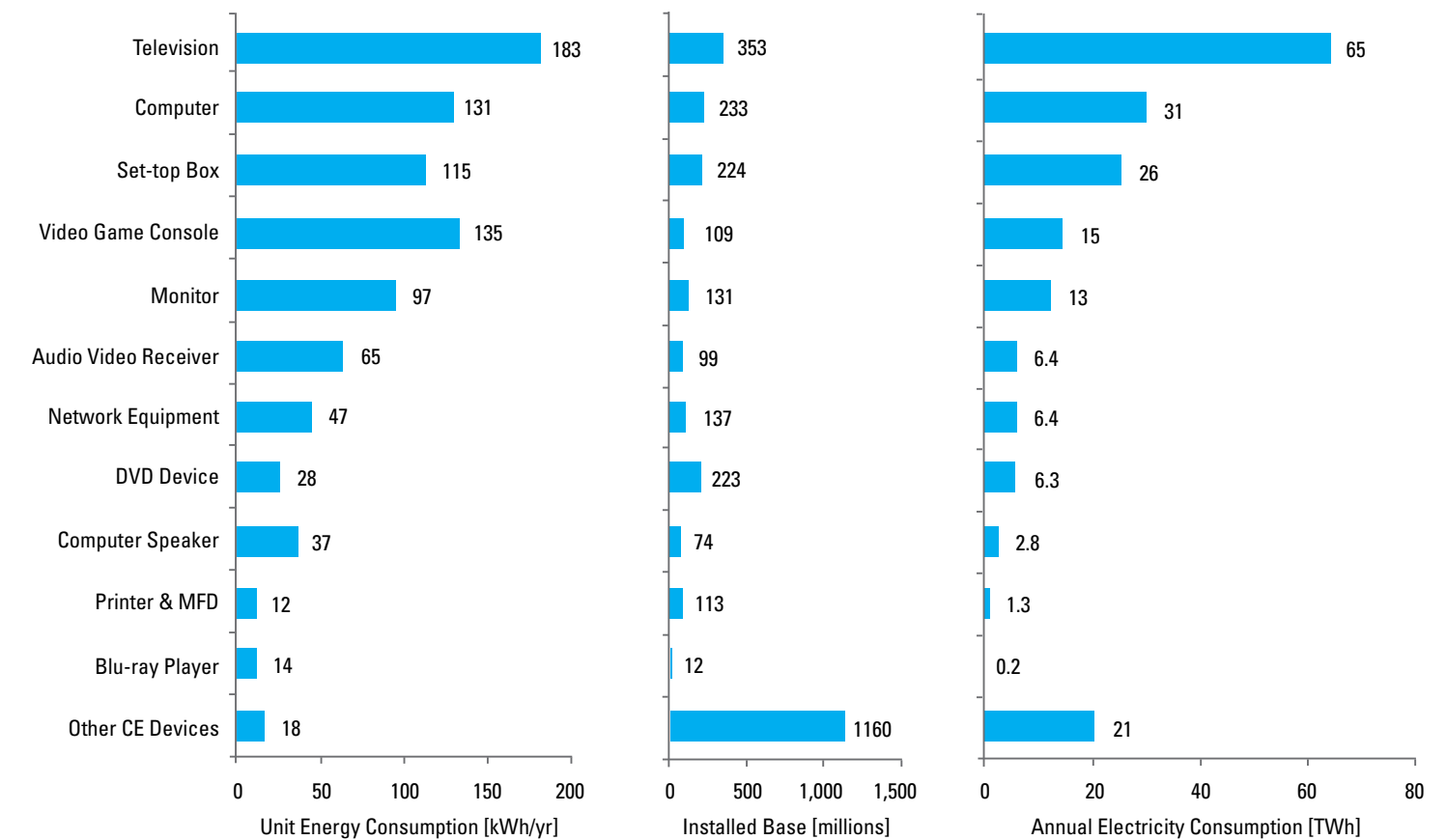
Over the past 30 years, most households in the United States have reduced their energy use by installing energy-efficient heating systems and major appliances. However, a typical home now includes many more electronic devices than during the 1970s. In 1978, most households had one TV. Personal computers were expensive, and ownership rare. People played video games more often at the arcades than in their homes. In 2010, consumer electronic products had an installed base in the billions, with the average household having 24 products (including three TVs, two game consoles, and three computers).<sup>6</sup> The Energy Information Administration (EIA) notes this "increased use of CE has partly offset the efficiency gains of major appliances."<sup>7</sup>

Electronics now account for about 12% of residential electricity consumption and 50% of miscellaneous electric

load.<sup>8</sup> Demand for CE will likely continue to increase as new products and features appear on the market. EIA's Annual Energy Outlook projects TVs, PCs, and miscellaneous CE will dominate growth in electricity demand.<sup>9</sup> Figure 1 summarizes recent energy consumption patterns for the CE market.

EPA has placed increasing emphasis on CE products as the market for CE products expanded, starting with the very first ENERGY STAR qualified product – the computer – in 1992. Responding to the speed with which the CE industry can refresh products lines and deploy more efficient components, EPA regularly updates ENERGY STAR specifications for CE products, delivering more and more savings. For example, the most recent ENERGY STAR computer specification issued in 2009 required a 30% reduction in active power draw compared to the previous

Figure 1: 2010 Energy Consumption and Installed Base of Consumer Electronics in US Homes<sup>10</sup>



<sup>6</sup> "13th Annual Consumer Electronics Ownership and Market Potential study." Consumer Electronics Association. May, 2011.

<sup>7</sup> Residential Energy Consumption Survey, <http://www.eia.gov/consumption/residential/reports/electronics.cfm>, US Energy Information Administration. March 28, 2011.

<sup>8</sup> McKenney, Kurtis, M. Wiggins, D. King, and R. Fricke (TiAx LLC), "Efficiency Trends in Consumer Electronics." Paper presented at National Renewable Energy Lab Automated Home Energy Management Experts Meeting, October 1, 2009.

<sup>9</sup> "Annual Energy Outlook 2011 with Projections to 2035", Energy Information Office, Report # DOE/DIA-383 (2011), March 2011.

<sup>10</sup> Urban, Bryan, V. Tiefenbeck, and K. Roth. "Energy Consumption of Consumer Electronics in US Homes in 2010." Final report prepared for the Consumer Electronics Association, Fraunhofer Center for Sustainable Energy Systems. December 2011.

<sup>5</sup> See Section 4.4.2.3 for a detailed discussion of free-ridership

specification issued just two years earlier. In response to high market shares of products meeting ENERGY STAR requirements, EPA has updated the ENERGY STAR TV specification three times since November 2008 – when Version 3.0 went into effect. As shown in Figure 2, for a 42-inch television, the maximum on mode power draw has dropped from 208 watts on November 1, 2008 (Version 3.0) to 66 watts on June 1, 2013 (Version 6.0).

The success of the ENERGY STAR program in transforming the consumer electronics market to more efficient baselines provides an opportunity for program sponsors to increase the market for even higher efficiency products within a given product category.

Starting in 2007, energy-efficiency program planners began to focus increasingly on home electronics and computers. The Consortium for Energy Efficiency (CEE) facilitated members' efforts to develop and implement CE programs. In 2008, coordinating efforts with EPA, CEE members adopted super-efficient performance criteria for TVs.<sup>11</sup>

Table 1 summarizes electronics measures, program delivery channels, and active participants submitted by CEE members through November, 2012.<sup>12</sup> These efforts largely focus on TVs and advanced power strips. All of the TV programs are midstream programs.

Figure 2: ENERGY STAR Maximum on Mode Power Draw for a 42-inch TV Over Time

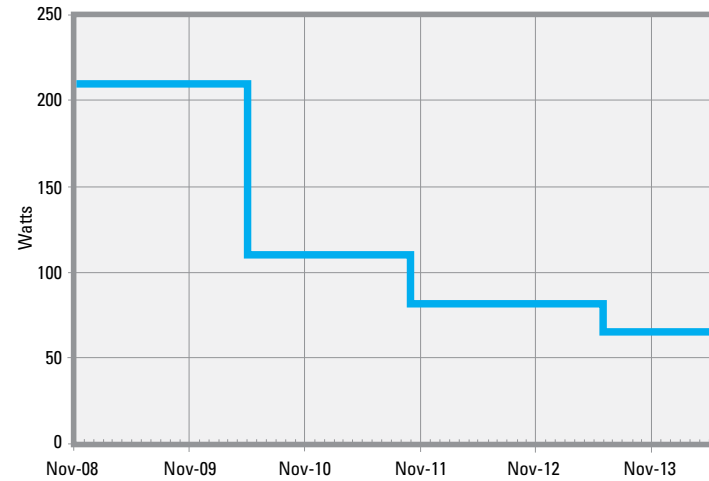


Table 1: Consortium of Energy Efficiency Member Consumer Electronics Programs (November 2012)

Consortium for Energy Efficiency Consumer Electronics Efficiency Program Summary November 2012							
CEE MEMBER	STATE/ PROV	TELEVISIONS	COMPUTERS	MONITORS	ADVANCED POWER STRIPS		SET-TOP BOXES
		ENERGY STAR 5.3 ENERGY STAR 5 +10-35% Top 10	ENERGY STAR 5.0	ENERGY STAR 5.0 ENERGY STAR 5.0 +10%	Varies		ENERGY STAR 4 and software upgrades
AEP Ohio	OH	\$25	—	—	\$9.00		—
BC Hydro	BC	\$15.00 + bonus	—	—	Up to \$10.00, with manufacturer or retailer matching to further reduce consumer price		Varies
DTE Energy	MI	\$7.50 - \$25.00	\$5.00	\$10.00	—		—
Efficiency Maine	ME	—	—	—	\$15.00		—
Efficiency Vermont	VT	\$6.00 - \$30.00	\$7.00	\$5.00	\$7.00 - \$10.00		—
Long Island Power Authority	NY	\$10.00	—	—	\$10.00		—
<b>MA ENERGY STAR Consumer Products Initiative:</b>							
Cape Light Compact National Grid NSTAR Unitil Western Mass Electric Company	MA	\$20.00	\$10 Mail-in Rebate	\$20 Mail-in Rebate	\$10.00		—
National Grid (Rhode Island)	RI	\$10.00	\$10 Mail-in Rebate	\$20 Mail-in Rebate	\$10.00		—
<b>New Hampshire Programs:</b>							
Public Service of New Hampshire New Hampshire Electric Co-op Unitil National Grid	NH	—	—	—	\$10 Mail-in Rebate		—
New York State Energy Research and Development Authority	NY	—	—	—	Retail promotions as needed	\$80,000 for manufacturers	—
Northwest Energy Efficiency Alliance	ID, MT, OR, WA	NEEA does not publish	—	—	—		—
NV Energy	NV	\$4.00 - \$12.50	—	—	—		—
Ontario Power Authority	ON	—	—	—	\$5.00		—
Pacific Gas & Electric	CA	\$4.50 - \$29.00	—	—	—		—
Sacramento Municipal Utility District	CA	\$4.50 - \$29.00	—	—	—		—
San Diego Gas & Electric	CA	TBD	—	—	—		—
Southern California Edison	CA	\$6.00 - \$30.00	—	—	—		—

Financial Incentive Recipient: Consumer Retailer or Direct-to-Consumer Manufacturer Manufacturer

<sup>11</sup> Lynch, Margie, S. Wylie, and K. Kaplan. "Maintaining the Value of Voluntary Performance Specifications for Consumer Electronics: Successful Elements for Addressing a Nimble and Prolific Market." ACEEE Summer Study on Energy Efficiency in Buildings, August 15-20, 2010.

<sup>12</sup> This document can be found at: <http://library.cee1.org/content/cee-consumer-electronics-program-summary-november-2012>

### 3. MIDSTREAM CONSUMER ELECTRONICS PROGRAMS

In 2006, in search of energy savings from nontraditional sources, Pacific Gas & Electric (PG&E) investigated the impacts of a growing electronics load on their service territory by estimating annual energy consumption for a suite of electronics used by PG&E's residential and small business customers.<sup>13</sup> They also identified trends in electronics sales and technology, and projected energy savings. After analyzing the findings, PG&E decided to develop a midstream CE program, given that their analysis indicated:

- Per-unit incentive amounts justified by product energy savings were relatively small and not sufficient to motivate consumers through downstream rebates.
- The potential volume of sales and total incentives were significant and could motivate retailers to adjust stocking and sales practices to promote the most energy-efficient products available.

PG&E began considering a midstream program model to deliver incentives on targeted CE products directly to retailers in their service territory, overcoming the limitations presented by downstream consumer rebates and upstream manufacturer incentives for this product category. This approach would allow PG&E to focus on as few as 10 national retailers and, at the same time, capture

more than 75% of the market for targeted products in their service territory.<sup>14</sup> These retailers' purchasing decisions impacted not only the mix of products ultimately offered to consumers shopping in their stores, but also the products offered by manufacturers.

From 2006 to 2007, PG&E and Southern California Edison tested the midstream concept by offering retailers a \$10 per-unit incentive for qualifying computer monitors. Based on the ENERGY STAR platform, this pilot confirmed that retailers would be interested in supporting midstream incentive efforts, but that a larger product mix and pool of incentives would be required for this to be a value proposition that would attract active participation by retailers.

Beginning in 2008, PG&E, Sacramento Municipal Utility District, and NEEA built on these earlier efforts to launch the Business and Consumer Electronics (BCE) program, which offered midstream incentives on a subset of the more efficient ENERGY STAR products currently available. The BCE program focused on incentivizing retailer stocking and sales practices, and targeted the CE devices consuming the most energy<sup>15</sup>—TVs, computers, and monitors—and recorded energy savings of more than 40 giga-watt hours in their inaugural year in 2009.

<sup>13</sup> Blanc, Steve, S. Boughen, A. Chase, R. Ramos, and T. Pope. "Consumer Electronics: Market Trends, Energy Consumption, and Program Recommendations 2005-2010." Emerging Technologies Program Application Assessment Report #0513. Prepared for Pacific Gas and Electric Company. December 2006.

<sup>14</sup> "Top 100 CE Retailers, A to Z." This Week in Consumer Electronics. May 23, 2011.

<sup>15</sup> "Annual Energy Outlook 2011 with Projections to 2035", Energy Information Office, Report # DOE/EIA-383 (2011), March 2011.

### 4. FOUR KEYS TO A SUCCESSFUL MIDSTREAM CE PROGRAM

Midstream CE programs have helped raise the visibility of energy-efficient CE among retailers and manufacturers, as major retailers are now participating in energy-efficient electronics programs, stocking the most energy-efficient products that manufacturers can supply, and promoting the energy-efficient features of these products in their stores.

Four keys to a successful midstream CE program are:

- **Leverage ENERGY STAR as a common communication platform and a basis for technical specifications.** Midstream CE program sponsors cited the ENERGY STAR brand as key to connecting with consumers and national retailers, who have leveraged the ENERGY STAR platform for years. Given short CE product development cycles and the industry's rapid response to changes in ENERGY STAR specifications, program sponsors may wish to consider focusing their programs on increasing sales of a subset of ENERGY STAR certified CE products that are more efficient. The appropriate subset can be determined to meet the needs of the individual program and its regulators. Existing tools such as ENERGY STAR Most Efficient or TopTen USA, which develops its lists using the ENERGY STAR qualified product lists might also be leveraged.
- **Develop a strategic relationship with retailers.** Midstream CE programs require special consideration and effort to mutually benefit program sponsors and retailers.
- **Collaborate with other program sponsors to design and implement programs.** National retailers make buying decisions for their entire market, and no one program sponsor has a customer base large enough to influence these decisions. If program sponsors align their programs, in effect aggregating their customer bases and providing much larger incentive pools, they will have a greater chance of attracting retailer participation and impacting stocking decisions and sales practices. (See the "Basics of Midstream Program Application to Consumer Electronics" in the Appendix.)
- **Focus early on program evaluation, measurement, and verification.** CE programs face unique challenges in defining their impact on the consumer and the market and in program administration due to small per unit savings; rapid evolution of technology and frequent product changes, distribution channel which influences national market – which necessitate working with

evaluators and regulators early to address program EM&V issues before a program's launch. In addition, the success of the ENERGY STAR program in transforming the market complicates evaluation.

#### 4.1 LEVERAGE ENERGY STAR AS A COMMON COMMUNICATION PLATFORM AND A BASIS FOR TECHNICAL SPECIFICATIONS.

The ENERGY STAR brand was cited as one of the keys to the success of a midstream CE program. It serves as an appealing platform for retailers and customer outreach and provides a foundation for efficiency requirements. In addition, products that have earned the ENERGY STAR have been third party certified, to ensure consumer confidence in the ENERGY STAR label.

##### 4.1.1. Reach Consumers through ENERGY STAR

Although lacking consumer incentives, midstream CE programs ultimately have greater market transformation potential if they also strive to educate consumers. Consumers are increasingly concerned about the amount of energy their CE products use. A recent CEA article<sup>16</sup> reported that:

- One in three consumers expects to purchase an energy-efficient CE device within the next year.
- Nearly two in three consumers look for energy-efficient CE while shopping.

By leveraging the ENERGY STAR label, program sponsors can conduct consumer outreach through a brand that commands a powerful and growing standing in American households.<sup>17</sup>

- 85% of surveyed households had a high or general understanding of the ENERGY STAR label's purpose.
- About 82 % report they are likely to recommend products that have earned the ENERGY STAR to friends.

##### 4.1.2. Take Advantage of Retailer Investment in ENERGY STAR

In addition to its broad consumer appeal, the ENERGY STAR symbol has long been a familiar element of national retailers' product promotions. Retailer comfort and familiarity with ENERGY STAR has been reflected in assessments of midstream CE programs. For example:

- PG&E recognized the value of branding to communicate the energy-efficiency message because "benefits

<sup>16</sup> Consumer Electronics Association: Powering Intelligent Electricity Use, May 2011.

<sup>17</sup> EPA Office of Air and Radiation, Climate Protection Partnerships Division. National Awareness of ENERGY STAR® for 2012: Analysis of 2012 CEE Household Survey. U.S. EPA, 2013..

accrue from the synergy of bringing together the strong [Program Sponsor Name], ENERGY STAR, and retailer's brands."<sup>18</sup> During program implementation, BCE members coordinated development of point-of-purchase (POP) signage with EPA.

- A key marketing lesson documented from NEEA's successful BCE program was: "Leverage the power of the ENERGY STAR brand, while steering consumers toward the top models within the ENERGY STAR family."<sup>19</sup>
- A NEEA sponsored study<sup>20</sup> concluded that POP material explicitly referencing ENERGY STAR proved significantly more persuasive than those that did not.

#### 4.1.3 Keep Pace with Technological Advances

CE products have short life cycles, with significant performance changes occurring annually or more frequently. Continuous monitoring of ENERGY STAR certified product lists and sales trends allows program sponsors to ensure that the product mix they promote continues to deliver the programmatic savings originally projected by regulators. As market penetration of incented models increases, program sponsors should work with retailers to adjust incentive levels periodically to ensure that they continue to promote a highly efficient subset of ENERGY STAR certified products. Program sponsors and retailers can establish an appropriate subset by various means:

- ENERGY STAR Most Efficient recognizes specific models in particular product categories that go well beyond their ENERGY STAR specification.
- A percentage better than the ENERGY STAR specification (e.g., ENERGY STAR +30%).

Table 2: Northwest Energy Efficiency Alliance's ENERGY STAR-Based TV Specification (2009 - 2012)<sup>23</sup>

Time Period NEEA Incentive Criteria Applied	NEEA Incentive Criteria (Based on ENERGY STAR TV Specifications)	Effective Date of ENERGY STAR TV Specifications
Q4 CY 2009	ENERGY STAR 3.0 + 30%	November 1, 2008
CY 2010 – lower tier	ENERGY STAR 4.0	May 1, 2010
– higher tier	ENERGY STAR 5.0	September 30, 2011
CY 2011 – lower tier	ENERGY STAR 5.0	September 30, 2011
– higher tier	ENERGY STAR 5.0 + 20%	N/A
CY 2012 – lower tier	ENERGY STAR 5.0 + 20%	N/A
– higher tier	ENERGY STAR 5.0 + 35%	N/A

<sup>18</sup>Krill, Wayne, D. Canny, S. Bassill, and M. Lukasiewicz. "Strategic Options for Energy-Efficient Electronics in Pacific Gas and Electric Service Territory: Marketing Delivery Systems for Electronics Measures." Application Assessment Report # 0702 prepared for Pacific Gas and Electric Company Emerging Technologies Program. April 2008.

<sup>19</sup>Yates, Becca. "Understanding Consumer Motivations." 2011 ENERGY STAR Products Partner Meeting, Charlotte, November 7, 2011.

<sup>20</sup>"Report of Findings from Creative Development Focus Groups and One-on-One Interviews", slide presentation by Egg Strategy for the Northwest Energy Efficiency Alliance, June 28th, 2010.

<sup>21</sup>ENERGY STAR 3.0 was effective as of November 1, 2008.

<sup>22</sup>ENERGY STAR 3.0 +30% requires energy use in active power mode to be 30% less than the ENERGY STAR 3.0 specification

<sup>23</sup>Energy Market Innovations, Inc., "Consumer Electronics Television Initiative Market Progress Evaluation Report", prepared for Northwest Energy Efficiency Alliance, November 22, 2011, p. 2.

- An upcoming ENERGY STAR specification (e.g., ENERGY STAR 5.0 before it becomes effective).
- Topten USA, which draws from the ENERGY STAR qualified product lists

Regardless of what subset of ENERGY STAR certified products program sponsors choose to promote, they should rely on the ENERGY STAR platform to deliver a clear, consistent message to consumers about the benefits of energy efficiency. Doing so will help ensure that program communications align with those employed by the retailers.

As an example of this concept, Table 2 below shows how NEEA went beyond the applicable ENERGY STAR TV specification to maximize saving in their midstream TV program by:

- Offering two tiers of incentives in order to provide a higher incentive for products with the higher efficiency.
- Using more stringent criteria than the effective ENERGY STAR specification (e.g., the ENERGY STAR 3.0<sup>21</sup> + 30%<sup>22</sup>)
- Applying an ENERGY STAR specification before it was effective (e.g., ENERGY STAR 5.0 was effective on September 30, 2011, but NEEA applied it in CY 2010).

#### 4.2 DEVELOP A STRATEGIC RELATIONSHIP WITH RETAILERS.

In order for a midstream program to effectively influence retailer stocking behavior, program sponsors must give special consideration and make an effort to ensure the program mutually benefits the Program Sponsor and the retailer.

According to the manager of Nevada Energy's electronics program, unlike downstream programs, a midstream program "pushes selling of the product versus pushing buying of the product." Midstream programs focus on educating retailers about program objectives, requirements, and values to retailers. Such educational efforts are designed to inform and motivate retail buyers and encourage behavior change to support the promotion and sale of more energy-efficient products (in this case, searching for and selecting more energy-efficient TVs).

#### 4.2.1 Understand Retailer Structure

When reaching out to retailers, it is often effective to start by reaching out to the manager of the "green group" if such a group exists within the retailer's organization (e.g., utility program manager, energy-efficiency program manager, corporate sustainability coordinator). Retailer commitment to the environment and sustainability varies a great deal—some retailers have program management groups dedicated to energy-efficiency programs while others lack formal structure or dedicated personnel.

Program sponsors, like product suppliers, are granted limited time to make their pitch to retailers regarding midstream CE programs. Therefore, when recruiting a retailer, program sponsors should be prepared to explain

the following in less than 30 minutes:

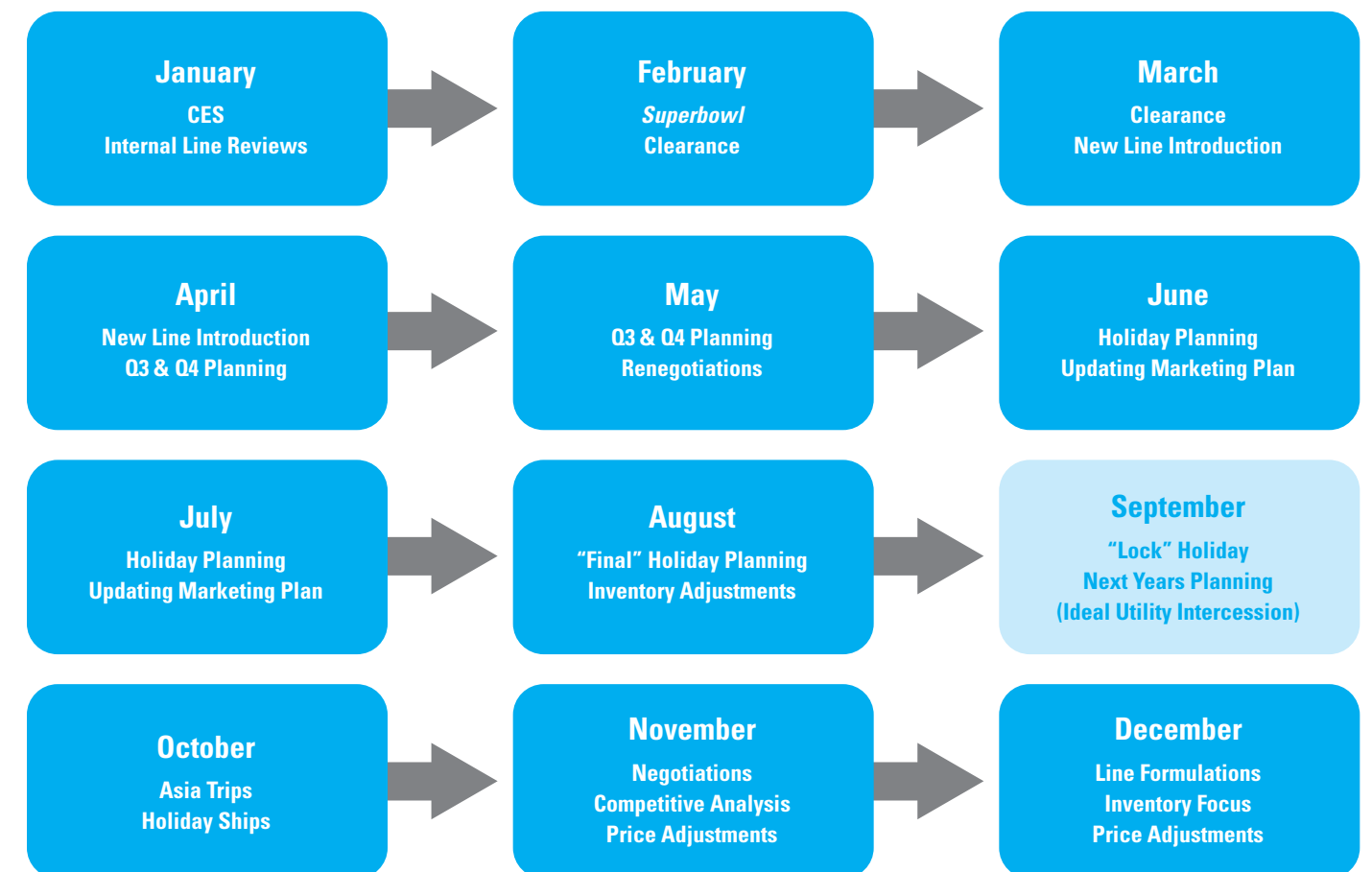
- The basics of midstream CE program operations;
- The benefits of a midstream CE program to the retailer; and
- The key role the retailer will play (e.g., development of baseline assessments and program tracking) to ensure successful midstream program implementation.

Program sponsors should also research the retailer's business before recruiting them, so they can be sure their programs will work within the individual retailer's operational structure. Program sponsors can find basic information—store locations, revenues, product offerings, and sustainability policies—on retailers' websites.

#### 4.2.2 Be Aware of Retailer Buying Schedule

Program sponsors should have a general understanding of how CE programs might be coordinated with buying schedules before meeting with retailers. To have an impact on buying decisions, program sponsors must inform buyers about qualifying product specifications and incentive levels prior to their annual overseas buying trips. Figure 3 shows a typical TV Buying Schedule -- from the January Consumer Electronics Show (CES) to the line formulations

Figure 3: TV Buying Schedule (Provided by Navitas Partners)



Note: Simplified view; negotiations, inventory and price adjustments are made continually

and price adjustments of December.<sup>24</sup> For TVs, September proves to be the ideal time to influence retailers. In fact, NEEA adjusted their midstream TV program qualification criteria annually during the third quarter so retail buyers could have this information before making buying trips to Asia in the fourth quarter.<sup>25</sup>

#### 4.2.3 Align Efficiency Programs with Retailer's Sustainability Goals, Merchandising Philosophy, and Resources

Retailers employ broad sustainability strategies that encompass energy-efficient product selection and reducing store energy consumption. They promote their commitment to sustainability through various means including product fact tags which denote that a product is energy efficient; point of purchase material that include "green messages;" and circulars that include ENERGY STAR labels on certified products. Before meeting with retailers, program sponsors should research each retailer's sustainability objectives so they can be sure their CE programs:

- Are consistent with retailers' energy-efficiency sales targets and featured product categories.
- Use signage that is flexible enough to complement the look and feel of the retailers' marketing and in-store materials (for the incented product, other product categories, and sustainability programs, if relevant). See example in Figure 4.

Figure 4: Example of POP for Midstream CE Programs



<sup>24</sup> "Understanding the Retail Value Chain: Television Case Study." Presented by Navitas Partners, Inc. to the Environmental Protection Agency, October 7, 2011.

<sup>25</sup> "Consumer Electronics Television Initiative Market Progress Evaluation Report (#E11-230)." , Prepared by Energy Market Innovations. Prepared for the Northwest Energy Efficiency Alliance. November 22, 2011.

Retailers can support customer education through placement of program marketing, store associate training, and co-marketing efforts. In general, retailers will support program marketing and sales associate education efforts to the extent these efforts fit within their overall merchandising philosophy. For example, retailers such as Best Buy and Sears, who have sales staff on the retail floor, provide training programs designed in coordination with their program sponsor partners. Retailers who rely less on sales staff may employ alternative strategies, such as Costco's video walls, on which they ran PG&E and NEEA energy-efficiency messaging up to eight times per hour. These communication vehicles are also effective in informing store sales associates, as signage and video walls regularly reinforce program messages from the store associate training.

In addition, program sponsors and retailers must understand the limits of what is economically and organizationally feasible. For example, each BCE program sponsor participant determined its own degree of support for customer outreach. This ranged from monthly store visits by PG&E's field service representatives to place POP material on TVs and train store representatives, to quarterly visits by others. PG&E used its dedicated field services group, which supported all incented products in the store, where other BCE participants used third-party field service firms, focusing only on CE. Other than social media, BCE members did not rely on cooperative advertising by retailers. National retailers leverage national advertising, so creating regional or local versions of national newspaper inserts might not be economically viable for retailers, utilities, or program sponsors.

#### 4.2.4 Ensure Retailers Understand Their Role in Baseline Market Assessments

A baseline market assessment is essential to understanding the market penetration of energy-efficient equipment, and thus that product category's energy savings potential. In baseline market assessments, retailer data provides valuable insights informing program delivery methodologies and effective incentive levels. Market assessments are particularly important for midstream CE programs, as product mixes and product energy use profiles change at a much more rapid rate than for other residential energy-efficiency measures.

During program design or as they are recruiting retailers, program sponsors should let each retailer know they will need them to provide:

- The mix of products sold prior to program initiation.

- The retailer's assessment of their ability to change their product mix to include more energy-efficient models.
- Access to buyers so program sponsors can interview them to capture a baseline in terms of their awareness and purchasing behaviors relative to the product categories in question.
- A way to survey store sales associates to capture a baseline regarding their knowledge of the efficiency features of these products.
- A way to conduct store audits to capture existing signage and promotional efforts in regard to energy efficiency for the category.

#### 4.2.5 Ensure Retailers Understand Their Role in Program Tracking

Sound program tracking relies on participating retailers sharing sales data to help program sponsors determine and adjust rebate payments, inform future program impact evaluations, and measure market penetration.

During program design or as they recruit retailers, program sponsors should let each retailer know that they will need to provide sales data to help them with these critical activities. Retailers have legal obligations to protect their customers' information, and program sponsors must be prepared to sign each retailer's nondisclosure agreement, and develop systems and processes to maintain confidentiality of retailer data. To ensure confidentiality of customer specific information, program sponsors should share only aggregate retailer data during evaluations and in response to any data requests from other interested parties.

In addition to sales data, program sponsors should document their interactions with retailers and other stakeholders, including communications with buyers, marketing activities, and training programs. These data provide information timelines that later help to show the program's impacts on retailer behavior with respect to the targeted products. For example, Martina Dimova-Martinez, former Manager of Business Development in Consumer Electronics at Sears, noted: "We stand by our commitment to these programs and have more than supported them through merchandising, marketing, and extensive reporting efforts—we have essentially changed the way we do business BECAUSE of these programs."

<sup>26</sup> As of 2012, the following organizations had joined the Business and Consumer Electronics program: Pacific Gas & Electric, Northwest Energy Efficiency Alliance, Sacramento Municipal Utility District, San Diego Gas and Electric, and Nevada Energy.

<sup>27</sup> Developed by engineers for program planners, work papers are formal public utility commission documents that define measure-level costs and benefits for efficiency measures under consideration.

<sup>28</sup> A midstream program can succeed by changing the behaviors of a few retail buyers. However, such buyers may be overwhelmed by calls from dozens of Program Sponsors and utilities. The best way to effectively communicate with buyers is to have the retailer's energy-efficiency program sponsor program manager (if the retailer has one) be the bridge to them. If the retailer does not have a program manager, then the coalition of energy-efficiency program sponsor collaboration should designate a single point of contact to handle communications with the buyer.

#### 4.3 COLLABORATION WITH OTHER ENERGY EFFICIENCY PROGRAM SPONSORS

Typically, a single program sponsor does not have a customer base large enough to capture the attention of a national retailer. Program sponsors must pool their resources<sup>26</sup> in order to offer their potential retail partners:

- **Larger Incentive Offerings.** No single program sponsor can offer a national retailer large enough incentives to significantly motivate stocking and sales changes. However, pooled incentives can be enough to justify a retail buyer's time and attention, in-store support, and sharing of customer data. In addition, the larger incentive pool can keep programs relevant as baseline energy-efficiency gains increase and product mixes change. For example, as TVs become more energy efficient, they deliver fewer energy savings and command lower individual incentives. Maintaining a pool of incentives helps to keep the potential aggregate incentive large enough to engage retailers.
- **Reduced Program Administration Costs.** Collaboration helps reduce individual program administration costs related to:
  - Work paper<sup>27</sup> development;
  - Account management outreach to retailers;
  - Data collection and data management;
  - Sales data tracking; and
  - EM&V planning.
- **Less Burdensome Program Administration Requirements.** To be successful, midstream CE programs must leverage retailers' existing sales reporting, forecasting, training, and marketing structures. By collaborating, program sponsors can provide:
  - Common product specifications;
  - Common data reporting structures;
  - Single contact points for program incentives/program information;<sup>28</sup>
  - Consistent information requests;
  - Alignment with retailer product planning, merchandising, and communication cycles; and
  - EM&V research to reduce strains on retailer resources.

#### 4.4 FOCUS EARLY ON PROGRAM EVALUATION, MEASUREMENT AND VERIFICATION

The evaluation, measurement, and verification (EM&V) process assesses markets during program design; monitors program performance during program implementation; validates program impacts; and justifies continued investments in a program. Until new evaluation models are accepted, EM&V presents a barrier to program sponsors implementing midstream CE programs. Education of program administrators, evaluators, and regulators, and development of new measurement tools to evaluate midstream models are necessary steps to overcome this barrier. The success of the ENERGY STAR program in transforming the market for energy-efficient consumer electronics further complicates EM&V.

##### 4.4.1 Attribution and Impact Issues with Evaluating Midstream Electronics Programs

EM&V is most often the key challenge for CE program sponsors to resolve. CE program managers emphasized that evaluation consultants and regulators, with little experience in evaluating midstream programs, need to learn about the attribution and measure impacts particular to CE midstream programs. Given the midstream model's retail focus, it is important that evaluators understand retailer and consumer product environments—such as buying processes and stocking patterns—and the rapid evolution of technology and frequent product changes. Evaluators should also consider secondary effects of midstream programs, such as in-store signage and training of sales staff that usually accompany program efforts. These efforts are designed to contribute additional program benefits. Finally, CE program administrators should provide evaluators with appropriate quantitative and qualitative information to demonstrate program impacts.

An April 2013 study of NEEA's Consumer Electronics Television Initiative<sup>29</sup> made the following observations and recommendations:

- The program led to increased prevalence of efficient televisions in the marketplace through activities targeting market players at the national level and resulting in national outcomes. It was recommended that the initiative be expanded with retailers in cooperation with other midstream incentive initiative sponsors.
- The program did not lead to increased promotion of qualified televisions in store, nor influence television design in the current model year. It was recommended that: 1) retailer contracts and incentives be adjusted to motivate additional efforts to increase sales of qualified

products, and 2) qualification criteria be released for the next calendar year in the previous spring to afford greater impact on product design.

- Increased program promotion at the store level will likely increase sales of qualified products. It was recommended that direct communication with store-level staff and in-store promotion should be increased.
- Insufficient activities with solely regional impact and current program metrics both limited attribution. It was recommended that: 1) data collection be improved to aid in the quantification of impact; 2) regional and local activities be designed to allow for a quasi-experimental approach to assessing impact; and 3) measureable program metrics be established to better signal program success.

The report also found that NEEA contributed to more stringent ENERGY STAR specifications. EPA staff reported that NEEA was one of the few stakeholders advocating more stringent standards. This involvement helped EPA balance arguments of other stakeholders that more stringent specifications would result in too narrow a selection of qualified products. The program also motivated a major chain retailer to encourage manufacturers to qualify models for ENERGY STAR and submit other ENERGY STAR models earlier in the year.

##### 4.4.2 Three Other Factors to Consider When Examining CE Programs

Three other significant factors impact cost-effectiveness calculations and the resulting decisions on whether or not to develop CE programs: 1) incentive payments; 2) treatment of incremental measure costs; and 3) interpretation of free-ridership.

###### 4.4.2.1 Incentive Payments

Retailer payments should be treated as incentives rather than administrative costs. Retailer payments are often justified as incentives because they ultimately lead to lower prices, greater availability, and/or access to additional product information. This will also improve the benefit-cost ratio.

###### 4.4.2.2 Incremental Measure Cost

Competitive pricing and manufacturing costs make incremental costs difficult to calculate—particularly as new CE products often cost more than traditional products when first introduced—but then quickly drop in price. Further, while CE prices may accurately reflect features and demand, it is difficult to attribute a cost differential to

the energy-efficiency features alone when the components that offer key performance features are also contributing to the product's improved energy performance. In this case, evaluators can apply several methodologies to estimate the portion of incremental costs of CE products that may be attributed to energy efficiency.

For example, for TVs, a product's energy efficiency is often linked to the underlying display technology, which provides many consumer benefits, so isolating the portion of incremental cost related to energy efficiency has been challenging for program sponsors. However, program sponsors have employed various methods for estimating incremental measure costs specific to energy efficiency, including:

- **Conduct conjoint analysis.**<sup>31</sup> Consumers are asked what they would pay for products with a variety of different feature sets including energy efficiency. Such analysis can identify the additional premium consumers are willing to pay for energy efficiency versus other features.
- **Examine industry sales data.** These data include product features, sales volumes, and actual prices paid. Analysis of these data can identify the portion of a price premium attributed to energy efficiency versus other product features.
- **Determine the differential cost of manufacturing.** Based on industry manufacturing cost data, this calculation considers the cost of individual product components over a product's life cycle. Analysis focuses on isolating costs associated with components that impact TV energy consumption. For example, the latest industry forecasts indicate that very efficient organic light-

emitting diode (OLED)<sup>32</sup> TVs costs eight times more to produce than liquid crystal display (LCD) TVs.<sup>33</sup>

##### 4.4.2.3 Free ridership

For program sponsors, a free-rider is a customer who received an incentive through an energy-efficiency program, but who would have purchased the same (or a smaller quantity of the same) high-efficiency measure on their own within one year had the program not been offered. The free-rider percentage estimated for a program reduces the program's gross savings estimates, which ultimately reduces the program's cost-effectiveness. By pushing retailers to take the extra step and order consumer electronics that go beyond the ENERGY STAR specifications, program sponsors can alleviate some of their free-ridership concerns.

A typical question for program sponsors considering CE programs has been: "If program sponsors across the west coast are already implementing a program that impacts the products that are stocked in the stores in my area, won't any and/or all participation in my program be considered free-ridership?"

The response west coast program sponsors have given to this question is that each year retailers make new assortment decisions, ENERGY STAR specifications (and therefore the retail buyers' requirements) become more stringent, and the incentives per unit decrease. The net effect, they argue, is that a new program sponsor joining the BCE program influences the retailer's decision-making in the upcoming planning season, especially when program sponsors time their program interventions to impact retailers' buying processes.

<sup>29</sup> "Consumer Electronics Television Initiative Market Progress Evaluation Report #2." Northwest Energy Efficiency Alliance Report #E13-255. April 29, 2013.

<sup>30</sup> Transfer payment is used to describe certain demand-side program payments that result in the transfer of dollars from all ratepayers to participating customers through a utility program.

<sup>31</sup> Conjoint (trade-off) analysis measures perceived values of specific product features, to learn how demand for a particular product or service relates to price, and to forecast the likely acceptance of a product if brought to market. Conjoint analysis also employs the more realistic context of respondents evaluating potential product profiles.

<sup>32</sup> An organic light-emitting diode (OLED) is a light-emitting diode (LED) with a film of organic compound that emits light in response to an electric current. An OLED display works without a backlight. Thus, it can display deep black levels and can be thinner and lighter than a liquid crystal display (LCD). In low ambient light conditions such as a dark room an OLED screen can achieve a higher contrast ratio than an LCD, whether the LCD uses cold cathode fluorescent lamps or LED backlight.

<sup>33</sup> Summary of DisplaySearch report. Available online at: <http://www.oled-info.com/displaysearch-oled-tvs-cost-8-10-times-more-lcds-produce-oled-market-will-still-grow-tenfold-2016>



## 5. EXPANSION ON CONSUMER ELECTRONICS MIDSTREAM PROGRAM DESIGNS

The following concepts, although not yet implemented, may be of interest to program sponsors assessing options for a new CE program. The following descriptions present an overview of the concepts and their potential benefits.

### 5.1 SHARED INCENTIVES

This approach would require participating retailers to offer customers a portion of the incentives it earns through its energy-efficiency programs when they purchase an eligible ENERGY STAR certified product. Program sponsors might prefer this adjustment to the present midstream program design—where 100% of the incentive is used by the retailer at their discretion—because it has the potential to:

- Have a slightly positive impact on net-to-gross ratios.<sup>34</sup> Customer incentives would result in quantifiable sales lift in the program sponsor's territory which, in addition to the program's impact on retail buyers' behaviors, could lead to higher net-to-gross ratios.
- Have a positive effect on the total resource cost (TRC). Offering half of the incentive to consumers would move half of the incentive costs to the equation's benefit side in the TRC calculator, improving the TRC.
- Offer a means to prove attribution. By providing 50% of available incentives directly to eligible consumers (i.e., customers of the program sponsor) at the time of purchase, program sponsors may limit evaluator concerns about incentives for retailer sales and stocking behaviors benefiting customers outside the program sponsor's territory (i.e., accelerating the sale of energy-efficient CE products outside the program's service territory due to incentives that encouraged a change in the retailers' national stocking practices).

Under this construct, the retailer would provide consumers with instant rebates for a defined time during the year. Instead of offering consumer incentives on every sale throughout the year, incentives would be available during a specific time, and be paid on a percentage of annual retail sales. The net effect would be the retailer could offer an "instant rebate" during a specific time period, equal to two to four times the per-unit incentive from the program sponsor. This rebate could be large enough to affect the consumer's purchasing behavior. For example, a shared-incentives program design could look like the following examples:

- Offering a \$5 incentive on 4,000 units per year = \$20,000 in incentives paid to retailer.

- Assuming the retailer passes \$10,000 of incentives on to customers over 5% of sales, or 200 units.
- Generating an average incentive to the consumer of \$50 per TV. This is more likely to influence a customer's purchase decision than the simple \$5 per product incentive.

Shared incentives would make it possible for program sponsors to facilitate large enough per-unit incentives to influence consumer purchasing behavior as well as shift incentive payments to local customers to ease EM&V challenges. This approach does cut into the incentive payment to the retailer, which may make their own internal cost-benefit calculation for program participation less compelling unless it is offset by program growth.

### 5.2 ACCELERATED INCENTIVE

In a standard midstream program, retailers receive incentive payments for all qualifying units sold until the funds run out. As retailers introduce two thirds of their new products between January and June, the market share of eligible products would increase until early fall, and then would level off. For example, market share for eligible products could be less than 20% in spring and could be greater than 50% by fall.

Due to this market dynamic, program sponsors and evaluators have concerns about paying incentives late in the year (when market penetration may be very high and an incentive may no longer be necessary). An accelerated incentive approach would allow program sponsors to offer participating retailers higher incentives on sales of eligible products earlier in the year when market share is low. It would also allow program sponsors to reduce the size of incentives on sales later in the year as market share increases.

For example, instead of offering retailers a \$10 incentive on 20,000 units per year (\$200,000), an accelerated incentive might:

- Pay the retailer the first \$140,000 in incentives on 8,000 TVs at \$17.50 per TV; and
- Pay the retailer \$5 per TV for the remaining 12,000 TVs sold (\$60,000)

Thus, the incentive pool remains the same, but program sponsors offer higher incentives for early program sales to help to move the market more quickly. Large initial incentives may motivate retailers to stock more eligible

products sooner than they would have otherwise, and alleviate free-ridership concerns of evaluators. However, it might lead to lower retailer participation toward the end of a given year.

## 5.3 SUMMARY OF CE MIDSTREAM PROGRAM DESIGN EXPANSION OPTIONS

Table 3 summarizes the two ideas that expand on basic midstream program design. These ideas may help program sponsors come up with other program design approaches when developing new or enhanced promotions of ENERGY STAR certified consumer electronics.

Table 3: Summary of Alternative Midstream Program Designs

Concept	Description	Advantages	Disadvantages
<b>Shared Incentives</b>	Incentives available throughout the year to retailers. Incentives available to consumers during one point in the program, but as a larger, more significant rebate.	Large incentives drive consumer behavior. Moves more incentive payments to local customers.	Negative impact on retailer income since they do not receive all of the incentive. Program growth needs to be large enough to offset retailer incentive losses.
<b>Accelerated Incentives</b>	Pay higher incentives for sales made earlier in the year; maintain annual average incentives per unit.	Large initial incentive serves as high motivator to stock qualifying products. More acceptable to regulators.	Potentially lower end-of-year retailer participation.

## 6. CLOSING

EPA has prepared this document to describe early lessons learned from consumer electronics efficiency programs. Program sponsors are encouraged to consider this information when planning future programs so they can:

1) build their programs upon the best practices developed in earlier programs, 2) collaborate effectively with other market actors, and 3) fully leverage ENERGY STAR to offer the most effective CE programs possible.

<sup>34</sup> Net-to-gross is the fraction of the benefits deemed attributable to program efforts.

## 7. APPENDICES

### 7.1 BASICS OF MIDSTREAM PROGRAM APPLICATION TO CONSUMER ELECTRONICS

In CE programs, energy savings per unit are generally too small to justify consumer rebates. The energy savings would:

- Be insignificant, relative to the electronics' purchase price, making it difficult to influence customer behaviors; and
- Increase the likelihood that consumers would not submit rebate forms (increased breakage), and reduce savings claimed by the Program Sponsor.

By contrast, a midstream program provides incentives for retailers to stock and sell a higher percentage of energy efficient products than they would have otherwise. While the per unit incentive amount may be small in absolute terms, it may be more significant when compared to a retailer's profit margin on the CE product, and even more compelling given the volume of sales of CE products. These factors, taken together, may allow a midstream incentives to influence a retailer's product selection behavior.

Program Sponsors report that two common strategic questions arise regarding midstream program designs:

- What would be the proper incentive size?
- What consumer outreach strategy would typically be undertaken for a CE midstream program?

The incentives must be large enough to change behaviors, yet small enough to satisfy benefit-to-cost criteria.

For retailers, incentives for a midstream CE program should:

- Offset the retail buyers' time and efforts;
- Compensate for retailer staff time and data requirements;
- Subsidize the promotional activity;
- Justify a commitment for store-level support; and
- Remain consistent with the retailers' goals of selling more products and improving margins.

Since retailers look at a program's economic impact on their business, the program's total incentive pool is more important than the incentive earned per unit. Initial presentations to retailers by California program sponsors

indicated a midstream electronics program could generate tens of millions of dollars per year in incentive payments.<sup>35</sup> Thus, individual retailers with large market shares could have millions of dollars at stake if these programs delivered as promised.

Program sponsors need to ensure that incentives fit within overall budgets and conform to the relevant benefit-to-cost ratios. Therefore, program sponsors determine per-unit incentives by considering projected per-unit energy savings and energy costs. Variations in energy costs in different service territories will impact the level of per-unit incentives for products, even though they may generate the same kilowatt hour savings per year.

Specification changes during a program cycle will also impact incentive levels, as these changes impact the program sponsor's per-unit energy savings projections. While each program sponsor must set incentive levels that they can justify based on corporate and regulatory requirements, collaboration ensures that all participating program sponsors incent the same size categories and performance specifications. This is extremely important for overall program success. If retailers receive varying specifications from program sponsors, it is unlikely they can justify a change in their sales and stocking behaviors.

Between 2009 and 2011, the BCE's TV program incentives ranged from \$4 to \$30 per TV (see Table 1), depending on product sizes and program year. These incentives levels were sufficiently large enough to:

- Attract participation of most major CE retailers as well as many regional and local stores. In 2011, the BCE program was able to engage close to 20% of the US TV market and impact corporate buyers' decisions. Total incentives that could be earned and incentives per unit were large enough to persuade corporate TV buyers to look for products meeting program specifications. At the November 2011 ENERGY STAR Partners' meeting, Jeffrey Roesch of Sears commented that his buyers in Asia were looking for efficient TVs.

Successful energy-efficiency programs increase market penetration for eligible products. However, once market penetration grows to a specified level, energy-efficiency programs face tightened efficiency specifications and as a result must reduce incentive amounts. For a midstream program to continue to be large enough to impact a corporate buyer's purchasing decisions, retailers would have to increase overall volume of eligible product to

achieve the same returns. While it is likely not possible for one program sponsor to offer the volume of incentives needed in this scenario, adding to the number of program sponsors offering coordinated programs offers a way to reach critical mass. This helps program sponsors maintain an attractive program offering for retailers.

### 7.2 ENERGY STAR SUPPORT FOR CE

EPA offers a broad range of ENERGY STAR resources to assist program sponsors during design and implementation of CE programs. Examples include:

- **Specifications**—ENERGY STAR specifications currently cover eight CE product categories. EPA evaluates new products within these categories annually. Information on new specifications and revisions to existing specifications is available at: [www.energystar.gov/productdevelopment](http://www.energystar.gov/productdevelopment).
- **Product lists**—Regularly updated lists of ENERGY STAR certified CE models support rebate verification activities and are available by clicking on the relevant product page at [http://www.energystar.gov/index.cfm?c=products.pr\\_find\\_es\\_products](http://www.energystar.gov/index.cfm?c=products.pr_find_es_products).
- **ENERGY STAR Most Efficient**—This designation recognizes the most efficient products among those that qualify for ENERGY STAR. These exceptional products represent the leading edge in energy efficient products in a given year. EPA reviews product categories and recognition criteria for ENERGY STAR Most Efficient annually. Regularly updated lists of ENERGY STAR

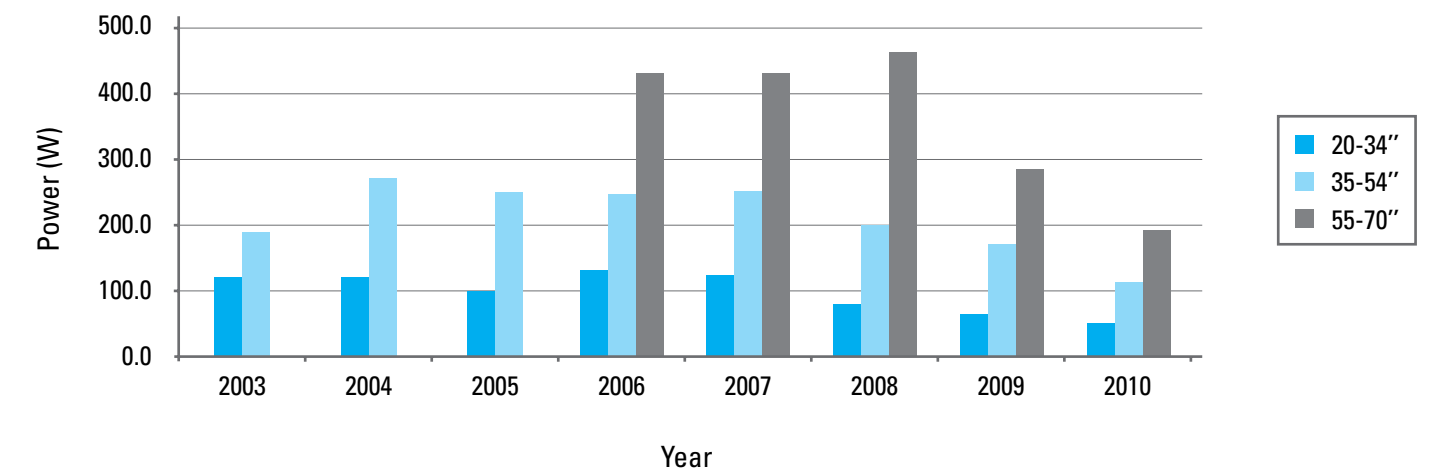
products that meet Most Efficient criteria are maintained at [http://www.energystar.gov/index.cfm?c=ppg\\_products.ppg\\_products\\_3](http://www.energystar.gov/index.cfm?c=ppg_products.ppg_products_3).

- **Marketing tools and resources**—Awareness of the ENERGY STAR label is currently 85% among U.S. households. Over 75% of consumers consciously purchasing an ENERGY STAR-labeled product indicate the label influenced their decisions.<sup>36</sup> ENERGY STAR provides co-branding resources to help program sponsors engage consumers, retailers, and manufacturers in their programs and achieve their consumer education objectives. Downloadable logos, product-related information, and educational tools allow program administrators to customize a variety of marketing and informational materials for their specific programs.
- **Partner matchmaking**—Through ENERGY STAR partnerships, EPA staff members facilitate contacts between energy-efficiency program administrators, manufacturers, and retailers to support program marketing and outreach.

### 7.3 UNDERSTANDING THE CONSUMER ELECTRONICS MARKET

To design an effective energy efficiency program for CE, it is important to understand this market's technologies, sales volumes, industry structures, and trends. Technology-specific information such as unit energy consumption, annual usage, and energy savings potential is required for program benefit-to-cost estimates. Market information

Comparison of LCD Active Mode Power Draws for Three Predominant Screen Size Ranges



<sup>35</sup> California program presentation. March 2008.

<sup>36</sup> Environmental Protection Agency. National Awareness of ENERGY STAR (2011) survey.

helps to illuminate trends in technologies and customer demand, identify key market participants (manufacturers, distributors, retailers, and consumers). For corporate decision makers, market intelligence is fundamental to establishing program design criteria that will ensure effective interventions to overcome barriers to energy efficiency in the CE market in a lasting manner.

CEA, EPA, U.S. Department of Energy and government census data provide benchmarks for volumes of units sold each year, in addition to statistics on the installed base of electronics and energy-consumption trends. CEA's annual International Consumer Electronics Show is currently the preeminent venue for displaying new consumer electronics products and technologies that may reach the market several years hence.

Retailers also have become more open to sharing sales data with their energy efficiency program partners. This information provides detailed, model-level sales statistics, which evaluators can link to energy-usage data (collected by ENERGY STAR or third parties). Such data can be extremely valuable in setting baseline consumption estimates and in projecting potential savings for a measure or program.

Table 4: 2010 Unit Sales of Consumer Electronics (Thousands)<sup>40</sup>

Category	2010 Units	Category Includes
<b>TV Sets and Displays</b>	34,659	All Analog and Digital Displays
<b>Video Components</b>	34,035	VCR Decks, Component DVD Players/Recorders, and Blu-ray DVD Players
<b>Set-Top Boxes</b>	34,405	DBS Receivers, MSO Receivers, Digital Media Adapters, IPTV and Digital-to-Analog Converter Boxes
<b>Audio Separates/Systems</b>	16,965	Home Radios, Compact Audio Systems, Home Theater-in-a-Box, Rack Audio, Audio Separates Components, Multi-Room Audio Video Systems and Home Technologies
<b>Personal Computers</b>	48,831	Desktop Computers and Mobile Computing
<b>PC Related Technologies</b>	39,850	Computer Printers, Aftermarket Computer Monitors, Modems/Broadband Gateways
<b>Home Communications</b>	39,880	Corded Telephones, Cordless Telephones, Telephone Answering Devices, Stand Alone Caller ID Devices, VoIP Adapters and Fax Machines
<b>Digital Imaging</b>	52,924	Digital Cameras, Camcorders and Digital Photo Frames
<b>Portable Entertainment</b>	60,852	MP3 Players, Portable Headset Audio, and MP3 Player Speaker Docks
<b>Electronic Gaming Hardware</b>	32,600	Game Consoles and Handheld Game Consoles (Source: VGChartz, Est. U.S.)
<b>eToys</b>	39,500	Any Electronic Educational Devices, Handheld Electronic Games, Radio Controlled Vehicles, Other Battery Operated Toys
<b>Portable Communication</b>	160,741	Wireless Telephones, Smartphones, Pagers, Family Radio Services Devices and E-Readers

<sup>37</sup> Consumer Electronics Association. "U.S. Consumer Electronics Sales & Forecasts 2007-2012." May 2011.

<sup>38</sup> Ibid.

<sup>39</sup> Ibid.

<sup>40</sup> All data, except Electronic Gaming (as noted in the table) derive from shipments to dealers, as reported by the Consumer Electronics Association: "U.S. Consumer Electronics Sales & Forecasts 2007-2012." May 2011.

### 7.3.1 CE Market Trends

The CE market is a dynamic market and covers a diverse range of products present in nearly every household. Over the last few decades, the market has grown impressively--from almost nothing to a major part of the global economy. While growth has slowed due to current economic conditions, the market's value exceeded \$180 billion in 2010.<sup>37</sup> Technological advances permit continual performance improvements, new features, and lower prices. In turn, these continue to fuel demand and lead to short product life cycles. Lower prices for consumers electronics—particularly TVs, computers, cell phones, and portable audio devices—have led the installed base of products to approximately double since 1997.<sup>38</sup> US customers bought nearly 600 million electronic devices in 2010.<sup>39</sup>

### 7.3.2 Technology Trends Favor Higher Energy Efficiency

A major trend currently driving CE technology's evolution is the demand for portability. By far, the majority of consumer products sold (calculated by the number of units) are portable (i.e., laptops, wireless phones, MP3 players, tablets, and e-readers). Portable devices demand energy-efficient designs, and manufacturers of these products dedicate a large portion of research and development

efforts to improve the efficiency of power supplies. This has resulted in the availability of low-voltage processors, efficient power supplies, energy-efficient LED backlights, solid-state memory, and various power-conserving operating-system features. Many manufacturers have extended these technologically advanced energy-saving features to non-portable, in-home electronics such as TVs.

The amount of electricity a TV uses is determined by three factors: 1) screen size, 2) the type of technology used (e.g., plasma, LCD, or LED), 3) picture brightness, 4) emergence of new features that may use additional energy and 5) how many hours TVs are on or in standby/off.. For a four-year period, from the end of 2007 through late 2011, the average unit-energy consumption for TVs has dropped more than 60%.<sup>41</sup> (even as screen sizes have grown). A recent CEA study<sup>42</sup> documented similar reductions in TV energy consumption through 2010, providing the following technical explanation for these improvements: "Power consumption in TVs has fallen dramatically in the relatively short history of digital TV—thanks to the success of the ENERGY STAR program combined with technological innovation, industry competition, and consumer demand."

Innovations in LCD and plasma technologies have enabled nearly 80% of TV models<sup>44</sup> to meet ENERGY STAR's 4.0 specification. Advancements in power supply design and integration of efficient chip sets and power management have further contributed to reductions in active and standby power use. New features, such as LED backlighting for LCD TVs, are beginning to appear and support further gains in energy savings. Replacing standard fluorescent backlighting for LCD TVs with LED has produced numerous new TV models that meet the efficiency levels set forth in the ENERGY STAR 5.3 specification. At the same time, these new models provide customer-desirable features, such as a thin profile as well as enhanced brightness and contrast. The emergence of

OLED technology also looks promising to reduce TV energy consumption even more over the next five to 10 years.<sup>45</sup>

### 7.3.3 CE Market Structure Compatible with Retailer-Focused Programs

Retail stores continue to be the dominant sales channel for CE. Retailers range from large, diversified retailers such as mass merchandisers to smaller specialty stores and Internet retailers. Large CE retailers like Best Buy offer a diverse array of CE products, including computers, CD, DVD and Blu-Ray players, as well as major appliances, and more. Mass merchandisers such as Kmart, Wal-Mart, Sears, and Target and warehouse stores such as Costco and Sam's Club have also become significant outlets for CE products.

Together, large national chains account for more than 75% of CE sales and have considerable global buying power.<sup>46</sup> With store networks throughout the United States, these retailers compete primarily on price. Specialty retailers and local electronics stores often compete with mass merchandisers by providing a sharp product focus as well as knowledgeable sales and service.

Brick and mortar stores have experienced competition from online channels, which have become increasingly popular for all electronics categories. Many electronics manufacturers utilize Internet-based retailers (e.g., Amazon and J&R) to market and distribute their product lines. Most leading retail chains in this industry also maintain Websites where customers can buy CE and other products. In the TV category, online retailing accounts for more than 10% of total shipments of CE.<sup>47</sup>

<sup>41</sup> Banwell, Peter. "ENERGY STAR Updates and Welcome to Charlotte." 2011 ENERGY STAR Products Partner Meeting, Charlotte, November 8, 2011.

<sup>42</sup> King, Darrell and R. Ponoum(TiAx, LLC). "Power Consumption Trends in Digital TVs Produced since 2003." Prepared for Consumer Electronics Association. February 2011.

<sup>43</sup> King, Darrell and R. Ponoum (TiAx, LLC). "Power Consumption Trends in Digital TVs Produced since 2003." Prepared for Consumer Electronics Association. February 2011.

<sup>44</sup> Heffron, Aaron (The NPD Group). "Online for Consumer Electronics: Online Shopping & Purchasing." 2011 ENERGY STAR Products Partner Meeting, Charlotte, November 7-10, 2011.

<sup>45</sup> Park, Phadke, Shah, and Letschert. "TV Energy Consumption Trends and Energy-Efficiency Improvement Options." LBNL-5024E, Environmental Energy Technologies Division, International Energy Studies Group, Lawrence Berkley National Laboratory, July 1, 2011.

<sup>46</sup> "Top 100 CE Retailers, A to Z," This Week in Consumer Electronics. May 23, 2011.

<sup>47</sup> Heffron, Aaron (The NPD Group). "Online for Consumer Electronics: Online Shopping & Purchasing," 2011 ENERGY STAR Products Partner Meeting, Charlotte, November 7-10, 2011.

