STATEWIDE BUSINESS AND CONSUMER ELECTRONICS BASELINE STUDY

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Volume I of II
Main Report

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STRUCTURE OF THE REPORT

This report is divided into two sections. The first section aims to orient the reader to the Business and Consumer Electronics (BCE) Program and its objectives by (1) providing an overview of the electronics industry structure; (2) introducing the BCE program, its theory, and its logic; and (3) discussing the unique evaluation challenges faced by the program and proposing a new evaluation approach for the electronics market and upstream programs. The second part of this report provides a baseline study of BCE market through a triangulation of multiple data collection activities including (1) end-user channel assessment (including in-store and online efforts); (2) a Delphi market forecast of the program's target measures; and (3) in-depth interviews of market actors in Business-to-Consumer (B2C) and Business-to-Business (B2B) channels.

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1. EXECUTIVE SUMMARY

The purpose of this study is to provide the California IOU's with a baseline assessment of high efficiency consumer electronics (specifically televisions and desktop computers) that are part of the Business and Consumer Electronics Program effort.[1] Below we briefly describe the television and desktop computer market. We then provide a brief snapshot of our baseline findings for televisions and desktop computers. Finally, we provide recommendations for future evaluations efforts.

The Consumer Electronics Market

As recently as 2007, energy efficiency was not an important consideration for most retail buyers. Thus energy efficiency did not factor into buyers discussions and product negotiations with original equipment manufacturers (OEMs) for their consumer market assortments. Currently, its importance is increasing:

- In 2008 and 2009, energy efficiency has emerged as a prominent consideration in "greening" initiatives for OEMs and retail channels alike. While energy efficiency does not rank high among feature considerations and is unlikely to surpass primary purchase drivers such as price and performance, it is viewed by retail buyers as a valuable differentiating feature in the market.
- Rapid changes in the market are occurring due to the growing need for competitive differentiation *and* a pervasive awareness of changes in government specifications and the emergence of voluntary efficiency programs targeting the electronics industry.

Retailers wield a great deal of power in determining the product selection delivered to the consumer market. Specifically, retailer product category buyers are the primary decision-makers within the retail channel. They work closely with the OEMs to determine the final product assortment (and determine new products) for each of their stores over the course of the fiscal year. The retail buyers and OEMs work closely together, and through these interactions, desirable product features are discussed, requested, and negotiated for each retail company. However, the extent of the retail buyers control over the product assortment and feature considerations (and thus energy efficiency) differs based on the product category and other competing delivery channels for each category. Thus, there are marked differences in the availability of high efficiency models with the television and computer categories.

- **Televisions:** Within the television category, the majority of sales take place in-store, where consumers can interact with and compare television models. As consumers rarely purchase televisions from manufacturers directly, retailers are nearly an exclusive delivery channel for televisions. The decisions made by retail buyers greatly influence the consumer marketplace, often determining the state-of-the-art for televisions. Within the television market, demand for energy efficiency among consumers is low.

[1] This information was collected to support future impact evaluations using a preponderance of the evidence approach as discussed in the Market Effects Protocols.

- **Desktop Computers:** In contrast to the television market, computer retail buyers make substantially fewer energy efficient purchases in the consumer market. This is due, in part, to competing delivery channels in the computer market. Namely, two leading consumer-focused computer OEMs, Dell and Apple, deliver the majority of their product directly to consumers through online and manufacturer-specific stores and are not subject to the same retailer demands as television OEMs. Consumer demand for energy efficiency is also perceived to be low in this market, but may be higher than in the television market.

Television Baseline

While the BCE program began in early 2008, because of the product cycle and when televisions make it into stores, findings from our data collection in late 2008 and early 2009 were considered to be prior to any program intervention. Our baseline findings show that in December 2008 and the first half of 2009, ENERGY STAR and energy efficiency were not actively promoted in-store. Rather, top-ranked features, such as price and performance, were the primary focus of in-store promotions and sales associate discussions. With some exceptions, energy efficiency was only discussed once managers and associates were prompted on the topic.

All store managers interviewed indicated that consumers do not demand energy efficient products, saying that energy efficiency was not in the top three considerations of consumers. Instead, managers indicated that first tier feature considerations (price and performance) drive consumers' model selection.

Our baseline findings for this market show that:

- Consumers have a decent likelihood of purchasing an ENERGY STAR TV in store, as they take up nearly half the shelf space (46%). Moreover, nationally, ENERGY STAR TVs are estimated to make up 79% of all TVs shipped in 2008.[2] About 35% of the TVs are ENERGY STAR+15%, the level promoted by BCE, exceeding the forecast baseline market share.
- Sales associates generally are not actively promoting energy efficiency. Only 16% of sales associates mention energy efficiency as a selling point, and only 17% mentioned ENERGY STAR unprompted.
- Regardless of active promotion of energy efficient models, sales associates show energy efficient models in the same proportions that they are on the shelf. Forty-six percent of TV models shown by sales associates in store were ENERGY STAR, while the same percentage (46%) of models on the shelf overall are ENERGY STAR.

[2] These findings represent national shipments. ENERGY STAR Unit Shipment and Market Penetration Report Calendar Year 2008 Summary. www.energystar.gov/usd. Note that QDI also has relevant sales data for ENERGY STAR +15 televisions but the analysis of this data was not available at the time of this report. Future evaluators, however, should consult this information as well.

Desktop Computer Baseline

Shopping for computers is more diversified, with consumers going to both brick and mortar stores and online, as well as to various online locations.

In December 2008 and the first half of 2009, availability of energy efficiency models, and the lack of awareness and knowledge of ENERGY STAR was more pronounced for computers than televisions. Specifically, we found that:

- ENERGY STAR 2008 shipments estimate that ENERGY STAR-qualifying desktop computers comprise no more than 11% of national shipments. BCE-qualifying levels are estimated to be lower than this number. The evaluation does not have the ability to determine if this is mirrored by what was found in the store data collection as only a small minority of model numbers were matched against the ENERGY STAR database by December 2009.
- There is the potential that the stores are stocking more models than the 11% of shipments indicated by ENERGY STAR as 27% of computer models shown to researchers by sales associates, prompted and unprompted, were ENERGY STAR.
- Very few sales associates promote energy efficiency. Energy efficiency and ENERGY STAR were mentioned unprompted by only 6% of sales associates, and no more than 6% of associates mentioned energy efficiency as a reason to buy any computer product.

The Business Electronics Market

In contrast to the consumer market, the *business* electronics efficiency demand is driven mostly by end-user demand (rather than retailers pushing efficiency). Historically, the business market has had greater overall demand for energy efficient models among end users for two primary reasons: (1) high volume sales and installations generate a greater concern for operating costs for business end users; and (2) government efficiency specifications for federally funded buildings has mandated demand for many large enterprise organizations.

As TVs are not generally sold as business-to-business (B2B) products, our discussion for the business market focused on computers and monitors only.[3] Overall, high volume sales of computers and monitors drastically increase the likelihood of end users being willing to pay the incremental costs for energy efficient products since these will have the ability to reduce total operating and life cycle costs in the long run. Thus, energy efficiency plays a more prominent role in the purchase consideration in the B2B market. However, the business market functions differently than the consumer market, whereby the end users, medium and large businesses, often purchase computers and monitors as part of entire computing and IT solutions, in large volumes and as part of an entire suite of products. Such purchases can include the virtualization and consolidation[4] of servers, data centers, and

[3] We note that there is a B2B market for televisions, but the great majority of sales is focused on consumers and therefore televisions were not included as part of the program's measures for the B2B channel.

[4] Virtualization and consolidation can take many forms but the end goal is to reduce the number of physical machines needed for storage, or processing while maintaining normal functioning. This can be accomplished

storage devices. When stacked against these products that use a substantially greater amount of energy, price conscious businesses often opt to purchase their efficiency gains in areas which yield greater savings than energy efficient computers and monitors. For this reason, the primary delivery channels do not actively promote or push energy efficient computers and monitors to businesses. This market tends to be feature driven.

However, there appears to be an increase in emphasis on energy efficiency among those selling to businesses as well as those purchasing the equipment as a differentiating point. Like the consumer market, energy efficiency is situated as a second-tier feature consideration for the business market, always ranking below first tier considerations such as speed, reliability, durability, memory, size. However, the business "greening" initiative has increased energy efficiency's desirability among the OEMs who manufacture these products and the end users who purchase them and both stand to benefit from a greener corporate image.

No baseline assessments were done for the B2B market.

Recommendations for the Program and Future Evaluation Efforts

While these findings indicate that the television and computer markets are primed for energy efficiency programs, the rapidly changing nature of the market poses a series of unique challenges for program implementers and evaluators:

- The introduction of program efforts and preliminary conversations with market actors can have a near immediate impact on practices and affect the current and future program cycles. Thus, the baseline for new efficiency specifications changes quickly, with sizable differences year-over-year.
- Upstream and midstream actors are quick to claim credit for energy efficiency policies as part of their unique branding initiatives. Despite findings that indicate voluntary programs are probably influencing the discrete practices of these actors, few will openly acknowledge these potential influences.

Both issues present new design challenges for program implementers and measurement complications for future impact evaluators. For this reason, we provide the following recommendations to program implementers:

- Prior to implementation (or during a program re-design):
  - Require retailers in contracts to participate in on-going EM&V and interviews
  - Consider paying on "Lift" or net to reduce risk of losing impacts later
- During implementation of the program:
  - Set up careful contact tracking databases

using software, off-site servers that host multiple users, or machines that are designed to take the place of several others.

- Retain and manage all emails or correspondence indicating any program effects. Confirm all changes in writing (and/or email) through careful ongoing communication

➢ Periodically:

- For any new products, document the baseline well. We have attempted to provide needed baseline information for televisions, computers and computer monitors in this report.
- Examine "evidence" of program effects through careful review of upstream data coming from depth interviews or email correspondence.
- Assess sales data quarterly to monitor the market.
- Collect on-going in-store tracking to triangulate sales data and measure changes in the proportion of ES+ product available to the consumer.

Part I. Introduction to the Market and the Program

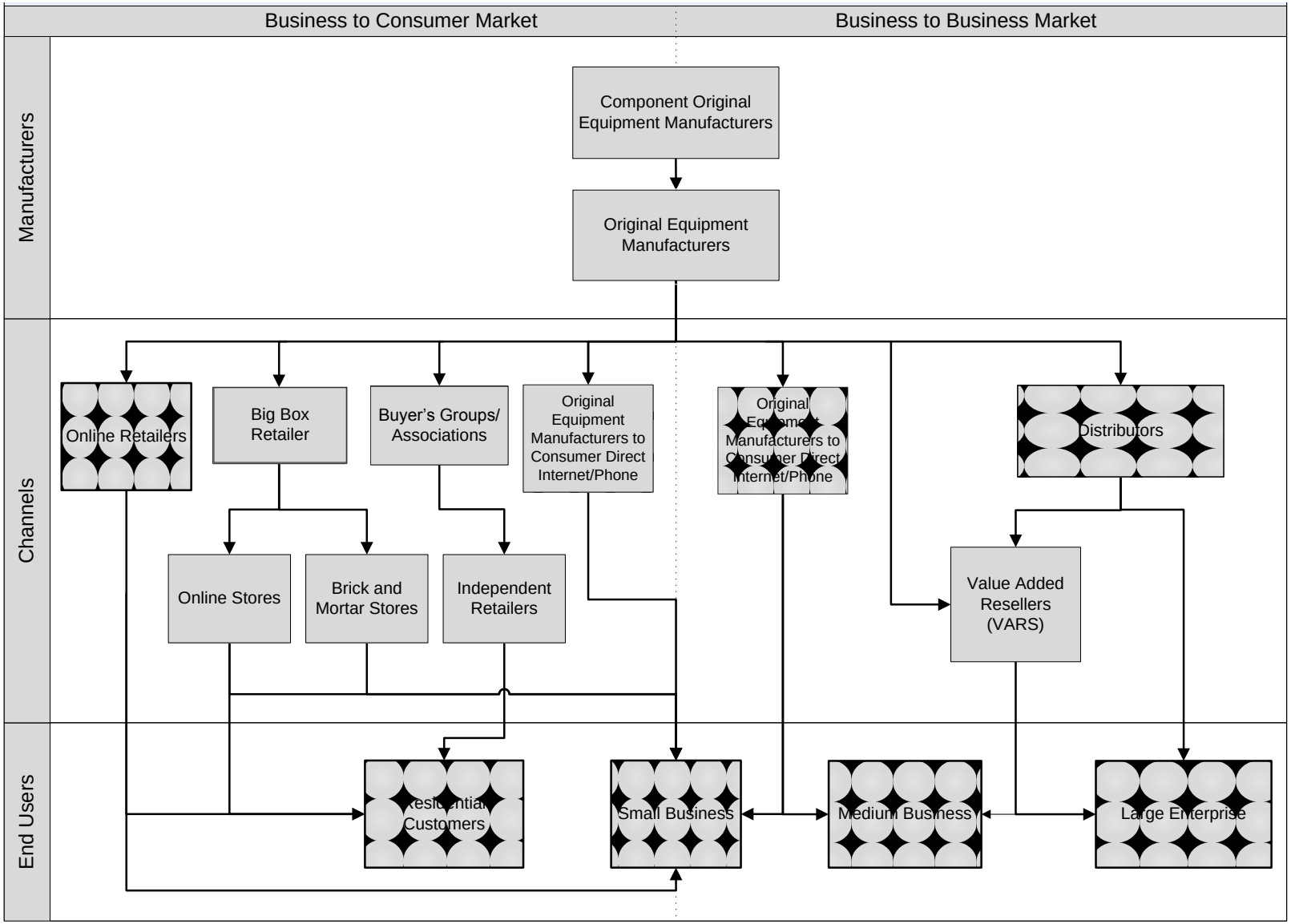
This section aims to orient the reader to the Business and Consumer Electronics (BCE) Program and its objectives by (1) providing an overview of the electronics industry structure; (2) introducing the BCE program, its theory, and its logic; and (3) discussing the unique evaluation challenges faced by the program and proposing a new evaluation approach for the electronics market and upstream programs.

2. Overview of the Business and Consumer Electronics Industry Market

The electronics industry structure can be divided into two primary end-user markets: Business-to-Business (B2B) and Business-to-Consumer (B2C). We describe these markets to help orient the reader to this market in advance of presenting the program theory and logic model.

Figure 1 provides a generic snapshot of the business and consumer electronics industry structure for the Business and Consumer Electronics (BCE) program's target categories: televisions, desktop computers, and computer monitors.

Figure 1. The Business and Consumer Electronics Industry Structure



2.1 Business to Consumer Market Structure (B2C)

Four primary distribution channels bring product to end users in the portion of the market labeled "Business to Consumer Market."

As shown in the figure, Component OEMs supply component parts to major brand Original Equipment Manufacturers (OEMs) who either fill orders for retail and online channels or market the products directly to residential and small business customers online or over the phone.

Major brand OEMs then supply B2C models through four primary channels: (1) direct to consumers via the internet or phone; (2) through big box retailers such as Best Buy or Wal-Mart; (3) through buyers groups and associations representing small, independent retailers; and (4) through online only retailers such as Amazon.com.

Original Equipment Manufacturers, the "Major Brands"

The role of the OEM in moving product to customers differs by category. For desktop computers and monitors specifically, leading OEMs such as Dell and Hewlett-Packard sell models directly to consumers as well as through retail channels. However, with the exception of Dell, the majority of consumer models are sold through retail channels. OEMs do not play as strong a role in the television market since they generally do not directly interact with consumers. Television OEMs, such as Vizio and Sony, sell their models to consumers almost entirely through retail channels while Philips and LG are more prevalent in the commercial space.

Retail Channels

Retailers play the strongest role in the B2C market since the vast majority of consumer electronics sales occur through this channel: the ten primary retailers comprise nearly 76% of the entire categories' sales volume.[5] This includes box retailers such as Best Buy and Wal-Mart, who lead as number one and two respectively among all consumer electronics.[6]

For the television market, the majority of these sales take place in-store, where consumers can interact with and compare television models. In contrast, computer and monitor sales are often purchased online through either online -only retailers or big box retailer websites.

Key Actors in the B2C Market

Because sales on the B2C channel are dominated by the retail market, big box retailers serve as the primary gatekeepers of units to the consumer marketplace. Key category buyers at retailers are the primary decision-makers in the B2C channel, working closely with OEMs brand managers to determine the final product selection for each of their stores over

[5] TWICE 2009. "TWICE CE Top 100 Retailers Get 3% Sales Boost In 2008." http://www.twice.com/article/261362-TWICE_CE_Top_100_Retailers_Get_3_Sales_Boost_In_2008.php

[6] TWICE 2009. "TWICE CE Top 100 Retailers Get 3% Sales Boost In 2008." http://www.twice.com/article/261362-TWICE_CE_Top_100_Retailers_Get_3_Sales_Boost_In_2008.php

the course of the fiscal year and in preparation for the beginning of new product cycles. Through these discussions, key product features are discussed, requested, and selected for the retail market (See our Chapter 9 on Midstream and Upstream Market Characterization on page 63 for a detailed description of the role of energy efficiency in these discussions). These retail category buyers in the consumer electronics market typically purchase product for large territories, often purchasing and selecting units for the entire US or North American market. Thus, the decisions made by retail buyers greatly influence the consumer marketplace, often determining the state-of-the-art for a given category.

2.2 Business to Business Market Structure (B2B)

There are three primary channels that bring product to end users in the portion of the B2B market: (1) OEMs sell directly to all business and/or use distribution channels to move more and VAR's product, (2) Distributors either sell to VARs or to large enterprise customers directly., and (3) VARs' also play a role in the market including ordering from distributors or directly from the OEMs, channeling product primarily to medium and large enterprise customers.

Original Equipment Manufacturers

OEMs play a much more direct role in serving the business marketplace, with a great number of OEMs working directly with large enterprise and medium-sized businesses, selling units in larger volume directly to the end user via enterprise sales account representatives or through program managers who work directly with medium and small business to meet their specific needs. Aside from direct B2B sales, OEMs use two primary channels to move products to business end users: (1) Distributors; and (2) Value Added Resellers (VARs).

Distributors

In the B2B market, distributors serve as the primary go-between for OEMs and large enterprise customers and VARs. Distributors channel units upon request to VARs and large enterprise customers, serving as a "middle man" or resale channel for high volume orders.

Value Added Resellers (VARs)

VARs serve as a both a distribution channel *and* a consultant within the B2B computer market. Ultimately, VARs work directly with small and medium-sized businesses by offering an existing product or product line and reselling it to the end-users specifications by adding features, services, or customized design as a "value." As part of their offerings, VARs will also custom design computers and information technology (IT) systems for specialized tasks and applications, often serving as an IT consultant to their customers.

Key Actors in the B2B Market

The B2B market, unlike the business to consumer market, has multiple market actors that influence the manufacturing process for computers and monitors. In the product development stages, the Product or Category manager serves as the primary decision-maker in the development of new products for the market. These actors, in particular, drive feature

development and product enhancements to meet the demands of the channels and end users.

As compared to the B2C market, the B2B market is more end-user driven, whereby the demands of large enterprise and medium business influence the specifications of computer and monitor models on the market, specifically in terms of feature selection (such as memory, speed, graphics options) to suit the unique needs of a given business. For this reason, distributors and VARs work directly with OEM's models to customize solutions for the demands of large-volume customers, and may substantially alter the product (e.g. a given desktop computer model) to conform to the requirements of the end user. Thus, the model configurations in the business market, specifically for computers, is greatly varied and heavily influenced by the end user.

2.3 A Note on IOU Program Efforts

While we present both the B2C and B2B markets above, as of October 2009, only PG&E has started pilot efforts to explore programs with the B2B market. Future Statewide efforts, however, may explore this area, so they are included in this report.

3. INTRODUCTION TO THE PROGRAM AND PROGRAM THEORY

The Business Consumer Electronics Program (BCE) aims to increase purchases of high efficiency products. The BCE program intervenes in the specific consumer electronics market (e.g., televisions, desktop computers, monitors) in order to increase the market share of qualifying units within the IOU territories.

3.1.1 Program Goals

The BCE program has the ultimate goal of increasing the market share of high efficiency models available to end users. This program aims to move the market beyond ENERGY STAR specifications for consumer electronics. Through a mid and upstream incentive model, the BCE program aims to increase the overall efficiency of the electronics market through:

1. Increasing the number of units manufactured and distributed
2. Increase the number of high efficiency models available to end users, with the ultimate aim of
3. Increasing the sales of high efficiency models to generate on-going and sustained increases in energy efficiency purchases throughout the electronics market.

In addition to its goal of directly obtaining energy savings, the BCE program also aims to generate market effects through these incentives in order to leverage the market position of its participants. These market effects are expected to generate on-going and sustained changes in practices among multiple market actors and across multiple market delivery channels.

3.1.2 Program Targets

The BCE program primarily targets the business (B2B) and consumer (B2C) electronics markets. Currently, the program focuses on a suite of select consumer electronics including televisions, desktop computers, and computer monitors,[7] with the aim of expanding into additional electronics categories in the future.

Table 1. BCE Program Target Measures as of December 2008

Category	Efficiency Standard	Target Market
Televisions	ENERGY STAR 3.0 + 15%	B2C
Desktop Computers	ENERGY STAR 4.0 Tier 1	B2C (and B2B for PG&E)
Monitors	ENERGY STAR Tier 2 + 25%	B2C (and B2B for PG&E)

[7] Note each IOU is at a different stage in the program start-up. Except for PG&E, the programs began targeting televisions first, and then expanded/will expand into the other target measures: desktop computers and monitors.

Bundled Units*	ENERGY STAR 4.0 Tier 1 Desktop & ES Tier 2 + 25% Monitor	B2C (and B2B for PG&E)

*Bundled units have not been incorporated into the programs but are included for baseline assessment for future program efforts. **Note that the PG&E program has increased is qualification levels since the baseline was conducted. TVs increased to ES 3.0+30% as of 07/2009 for new allocations, Desktop PCs increased to ES 5.0 for OEM incentives only as of 07/2009, and Monitors increased for OEMs only to ES 5.0+10% as of 10/30/09.

The program provides incentives at two levels depending on the markets: midstream for the B2C market and upstream for the B2B market. Table 2 below summarizes the program's target markets, participants, and categories.

Table 2. Summary of BCE Program Targets

Market	Target Participants	Example Participants	Target Categories
Business to Consumer	Retailers	Best Buy, Sears Holding Company	Televisions, Computer Monitors, Desktop PCs
Business to Business	Original Equipment Manufacturers (OEMs)	Dell, Hewlett-Packard, Lenovo	Computer Monitors, Desktop PCs

3.1.3 Program Activities

The BCE program intervenes in the B2C and B2B market in two ways: (1) providing incentives mid and upstream to generate changes in the market; and (2) supplementing the activities of the market actors with program generated marketing and outreach.

Notably, the three IOUs have different levels of emphasis on the two interventions mentioned above as well as different emphases within their programs on the specific markets. (Specifically, only PG&E is also focusing on the B2B market as of October 2009; however, we provide this generic description and logic model to help with future statewide evaluation efforts that may cover all program components.)

Mid and Upstream Incentive

The program works primarily upstream, with the greatest emphasis of effort focused on influencing the decision-making and practices of key market actors (i.e. the buyers) within each target account. These accounts include national retailers such as Best Buy or Dell, as well as smaller and independently owned electronics stores. Here, the aim is to generate substantive changes in a series of practices that will ultimately increase the market share of high efficiency units available to end users.

The BCE program maximizes the program's impact with the smallest incentive payout possible (and still move the market) for qualifying models by attempting to move decision-making mid and upstream (as opposed to downstream). Electronics sales are relatively 'big-ticket' items that would require a large rebate to the consumer to directly influence purchases (e.g. a $20 dollar rebate can be perceived as a nominal incentive for purchases costing in excess of $1,000 dollars because energy usage considerations are not an issue when purchasing these items). However, the retailer and OEM profit margin on these

products is low, and a small incentive has the potential to increase retailer and OEM profits by a large percent.

By paying the retailers and OEMs for each qualifying item sold, the program can increase the number of high efficiency items purchased while utilizing the same low per-unit rebate cost.

The BCE program is designed to leverage the market at the fulcrum of decision-making, by providing incentives to those market actors whose market position is most likely to generate the greatest effects at the lowest cost to the program. As the B2C and B2B markets are distinct, the BCE program intervenes at different levels within each market and with different actors for each potential account (e.g. Best Buy vs. Sears Holding Company) to maximize the program's impact. By tailoring the point of intervention for each market and within each participating account, the program leverages the decision-makers best positioned to generate changes within each market. For example, in the case of the B2C market, this is the retail buyer.

Cooperative Marketing and Outreach and Sales Associate Training

The BCE program also supplements the upstream incentive with cooperative marketing and outreach. This marketing and outreach is a secondary and substantially smaller effort of the program. This effort provides point of purchase materials to consumers and educating sales associates to alert consumers to high efficiency models. While this effort is included in the program logic, it is a smaller effort, whereby the program's primary goal is to generate market effects through its upstream incentive, not through generating and/or increasing consumer demand.

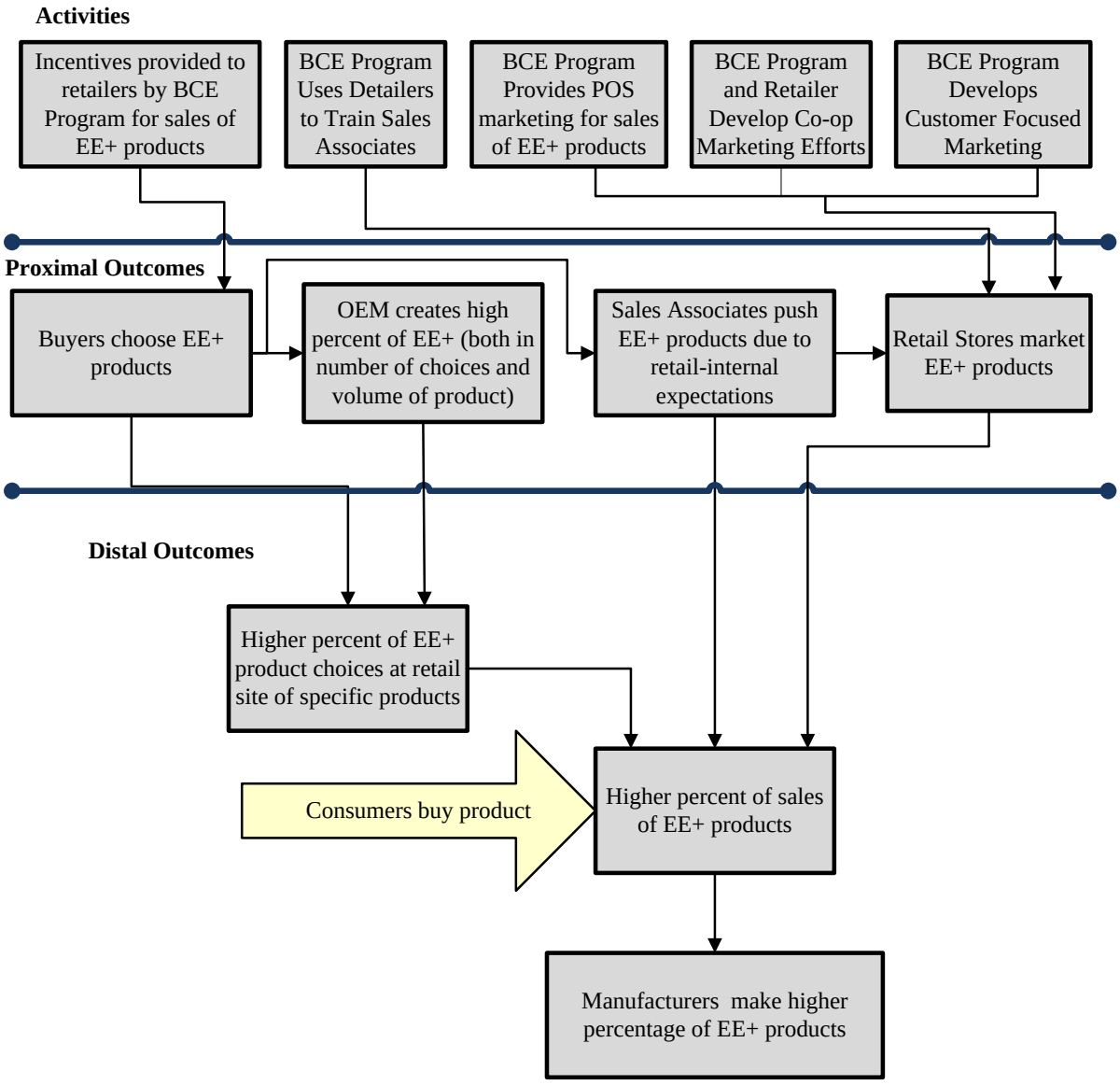
3.2 Program Theory by Target Market

As an upstream and midstream program, the BCE program intervenes through providing incentives to upstream market actors. These incentives are expected to influence the choices made in store ordering of product. Because the incentives are paid only on sales, midstream retail placement practices (such as end cap placement) in the store are expected to change as the retailer wants to sell more of the product for which they obtain an incentive. To help the retailer somewhat in this endeavor, the program provides marketing support in the form of point-of-purchase displays. Energy savings is the distal program outcome through business and consumer purchases and installations of high efficiency models. Here we outline the program theory for each target market.

3.2.1 Business to Consumer Program Theory

Within the B2C market, the BCE program aims to develop relationships with all retail accounts in order to increase the market share of televisions, computers, and monitors made available to consumers. To do so, the BCE program targets retail buyers specifically, who serve as the primary gatekeepers of products to this market's end users, residential consumers. As Figure 2 demonstrates, by leveraging these specific actors, the BCE program aims to have an effect on the entire B2C channel by generate greater demand on OEMs.

Figure 2. Business to Consumer Logic Model

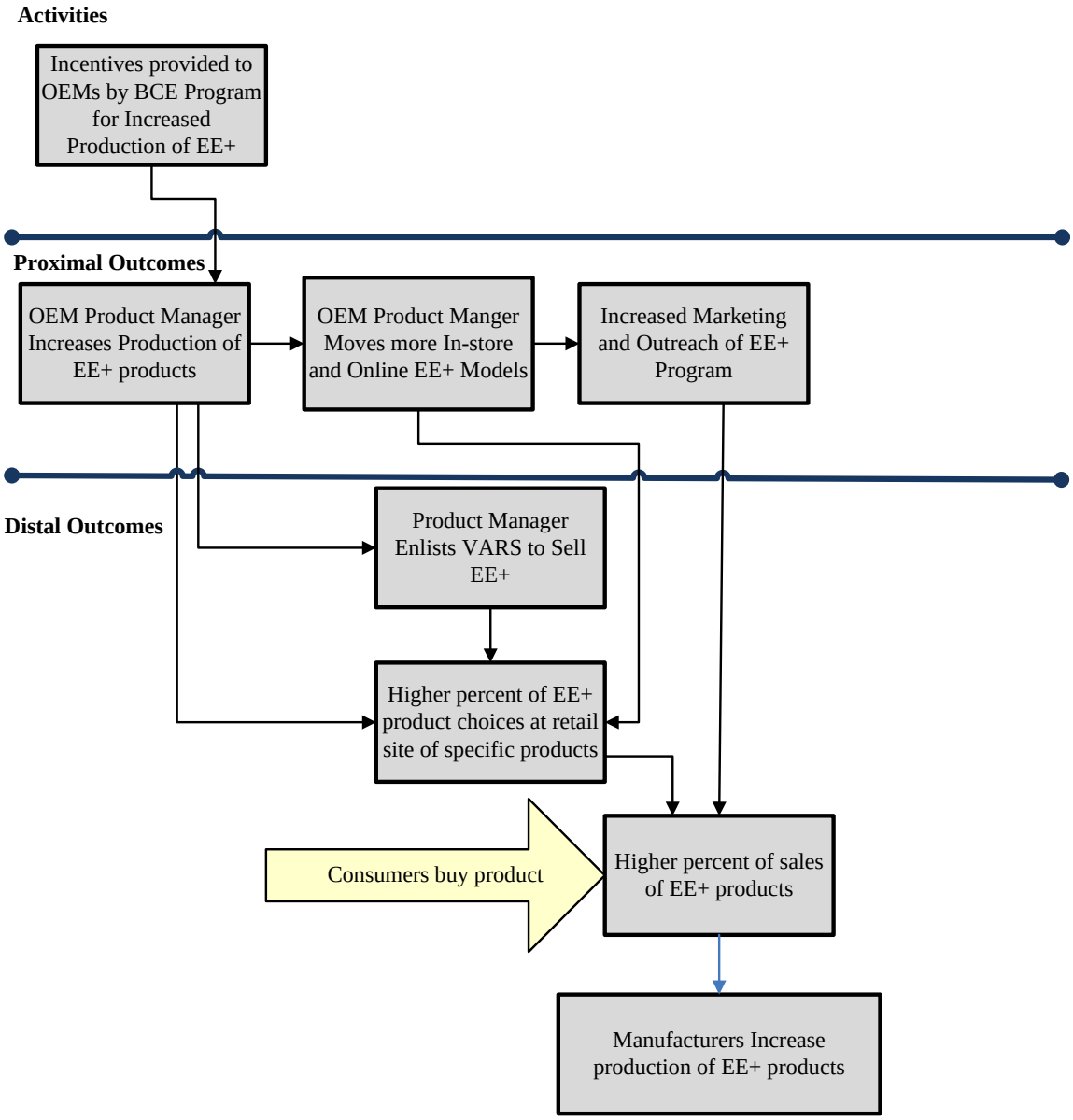


These activities, in turn, are anticipated to generate an increase in the market share of high efficiency products available to consumers in the retail channels. The retailer is assumed to know how to sell their product and now has an incentive to sell products specifically desired by the program. It is a vested self-interest by the retailer to make money that is being tapped into by the program. Further, the theory states that this increase in retailer to OEM demand and subsequent sales of high efficiency models will generate market effects, ultimately influencing the design and engineering practices of manufacturers. All energy savings will be gained as a distal impact of the program through consumer's subsequent adoption of high efficiency models (due to their greater availability in the market).

3.2.2 Business to Business Program Theory[8]

For the B2B market, the BCE program currently targets desktop computers and monitors only. Here, the BCE program provides incentives at the OEM level, targeting OEM product managers specifically. The OEM product managers are responsible for the development and engineering of new models or SKUs available to distributors, VARs, and ultimately B2B end users (large enterprise and medium sized businesses).

Figure 3. Business to Business Logic Model



[8] Note that these models have been updated and are more customized to BCE since they were incorporated into the PIP at the time of this report. The PIP changes were generic, and the Opinion Dynamics report was more customized to BCE. We also note that as of October 2009, only PG&E is pursuing the B2B efforts.

In addition to changes in manufacturing, the BCE program aims to influence the marketing and outreach activities of the OEMs. Further, this incentive to the OEM may be passed down or shared with the distribution channels, to develop efficiency-targeting marketing and outreach initiatives to end users. As with the consumer market, the B2B market is anticipated to generate energy savings as a distal impact of the program.

4. BCE PROGRAM EVALUATION

In 2005, the California Public Utilities Commission (CPUC) sponsored a set of protocols (Protocols) for evaluation of energy efficiency programs that are paid for through public goods charges within the four IOUs (TecMarket 2005). BCE, as an upstream program, is included under the current protocols.

Because this program's goal is to directly obtain energy savings, the evaluation efforts must include an impact evaluation; however, the protocols do not provide clear guidance on how to measure the effects of a single program like the BCE program, whereby the program's logic aims to generate market effects by providing incentives to all accounts and leveraging their specific market position to generate the greatest possible effects among multiple market actors and across multiple market delivery channels. There is no clear measurement approach for upstream programs, which aim to affect the decision making of a small set of actors who have the capacity to generate channel and market-wide changes in product availability to end users. Currently, all methods for gross impacts and at least one of the methods for net impacts use consumption at the installation level, M&V, and self-reported information around installation/adoption. As it is written, the current evaluation methods indicated in this protocol equate participants with end users. The current M&V approach collects attribution data at the point of the end user, not at the account/decision maker level. Thus, if we rely on the current protocols, the M&V approach and the program logic are misaligned.

The impact protocols do not provide a clear method for the BCE program, namely because: 1) it is expected that the program will influence the market (which lends itself more to a market effects evaluation), and 2) the participants of the program will not be obtaining energy savings - the energy savings will be accrued as a distal program outcome. The Protocol document is mixed in whether the market effects protocol is appropriate for a single program. In one area, it states that market changes can be created by a program (p. 20) but in another it specifically indicates that a market effects protocol is not applicable to a single program (p. 143). The Protocols, therefore, do not appear to provide specific information about the most appropriate evaluation approach for upstream programs such as BCE. As such, while the method we propose does not fit directly in the current Protocols, the Protocols are stated to be a document that is updated as needed, and may eventually cover upstream programs such as BCE more specifically.

4.1 Why Standard Impact Evaluation Methods Do Not Work

Energy impact evaluations have used multiple methods to obtain gross and net energy impacts. In California, quasi-experimental designs (i.e., participant / comparison group) and participant self-report have been the most used evaluation methods to ascribe causality/attribution and move from a gross energy impact to a net impact.[9] Typically,

[9] For example, the 89 California impact evaluations from 1994 through Pre-1998 (where net impacts were calculated) had 53% using self-report, 17% load regression model, and 17% difference of differences to

participants asked self-report questions are those directly receiving an incentive and directly obtaining the energy savings. The self-report questionnaires attempt to determine causality of program intervention with queries around purchases made and energy savings. To move to a participant population, this attribution is often weighted based on the energy savings of a sample of participants. An upstream program de-couples this evaluation relationship as consumers of a product for which an incentive to the manufacturer or retailer was paid may be totally unaware of any intervention by an energy efficiency program. Yet, it is the consumer who receives the actual energy savings.

Another relevant aspect of an upstream program for evaluation is the number and type of participants. Compared to programs aimed at the downstream consumer, there are relatively few potential participants.[10] However, these participants have the potential to influence a large part of the market. For example, bringing in only two OEMs or four retailers may influence over half of the market for a particular product category. Any analysis of this small number of participants is necessarily qualitative, which has not always been considered 'rigorous'. Based on the type of businesses in which retailers and manufacturers engage, they are extremely aware of the competitive nature of their business. There is a low (or some would say zero) likelihood of sharing sensitive data that is useful to evaluators unless some sort of contractual relationship exists. Program participants, therefore, will be more likely to provide data as well as find time to talk with evaluators. Non-participants can be difficult, or impossible, to reach. It is difficult for evaluators to even talk with non-participants, much less obtain useful data.

Therefore, upstream programs such as BCE have three strikes against them for evaluation using the prevailing typical net impact methods: 1) data for a quasi-experimental design using a comparison group is often impossible to collect; 2) there are few potential participants and the ability to show causality using statistical variance in data is absent; and 3) those purchasing the product for installation are not the actual participants in the program. Regardless of method, though, the important questions that must be answered for any impact evaluation are: "Did the program cause change?" and "What would have happened without the program?"

4.2 Proposed Evaluation Approach for Mid and Upstream Programs

Here, we propose a revised evaluation approach for the Statewide BCE program that: (1) accounts for the limited number of upstream participants; (2) acknowledges potential market effects of the BCE program; and (3) re-aligns attribution at the site of the incentive – mid and upstream. In order to overcome the aforementioned difficulties with the prevailing methods, and to ensure that the program is effectively evaluated, we propose a case study, mixed-method (qualitative and quantitative) approach where each mid and upstream participant is assessed as a case study; with energy saving effects reported in aggregate.

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determine net impacts. More recently, a review of 62 evaluations written between 2002-2008 revealed that 75% of those studies performing net analyses used the self-report approach.

[10] A noted exception is within industrial programs where there may be less than 50 companies in the entire state of a particular type of customer.

4.2.1 Case Study Causality Approach

When targeting mid and upstream the context of the target participants should be considered, as each major actor works within a unique corporation with different decision-making models and priorities. A case study approach has the ability to describe multiple facets of each participant's market approach and strategy to provide what is likely very different contexts for each upstream participant. Thus, each participant's corporate culture, market delivery approach, and place in the market should be considered when measuring and accounting for the program's influence. Because of the small number of upstream participants, all of participants should be included as part of the case study assessment. The evaluation approach should contain two primary data collection initiatives: (1) Baseline and counterfactual assessment; (1) Qualitative Causality Analysis.

The method requires, however, that evaluators begin measurement early enough to capture qualitative data and provide advice for setting up performance monitoring[11] for probable quantitative analysis at a later date. The method assesses *causality*[12] as the program interacts with the upstream participants and sets up data collection to help assess the *counterfactual*[13] later in the program cycle. (Appendix C provides a short table of the two types of causal reasoning used in social sciences.)

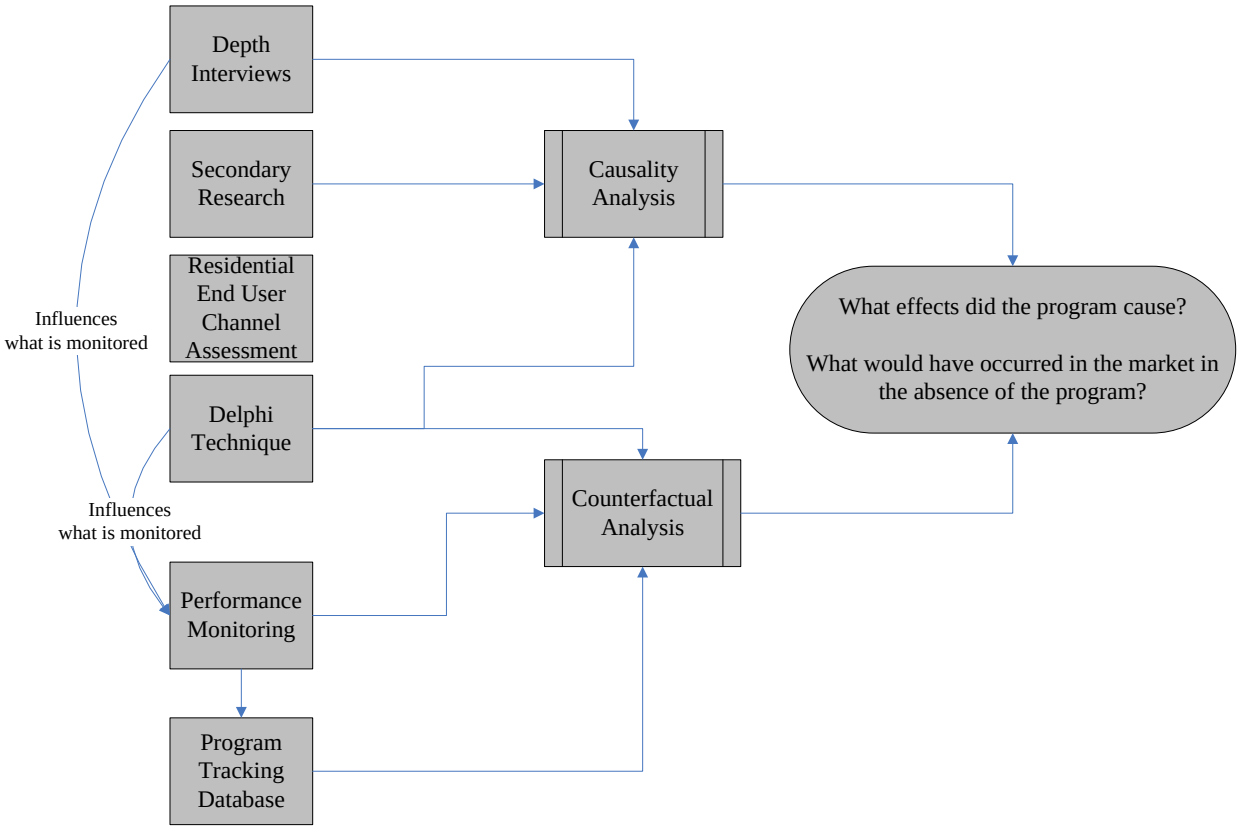
Early interaction with the program implementers and participants allows evaluators to learn about other relevant market influences outside of the program and set up needed monitoring that is targeted and cost effective. Performance monitoring of outcomes can help rule out other threats to internal validity that may affect the ultimate determination of attribution. (See Appendix B for a listing of threats to internal validity, the description of the threat and possible ways for an evaluator to rule out the threats and assign causation.) The evaluator can work closely with the implementer to assure that participants are aware of evaluation data needs and that adequate and appropriate data is able to be collected. It may be possible to address data needs through participation contract language to assure that periodic information is gathered throughout the program.

[11] Performance monitoring is regular data collection and analysis for the purpose of "watching" program processes or outcomes. Program process monitoring assesses whether the program is operating as intended or according to some appropriate standard, whereas outcome monitoring is the continual measurement of intended outcomes of the program.

[12] Causality is "the relation of cause and effect", where cause is "a person or thing that acts, happens, or exists in such a way that some specific thing happens as a result" (Random House Dictionary). Assessment of causality can occur through either qualitative or quantitative methods.

[13]The counterfactual is a concept of causality. A counterfactual is something that is contrary to fact. It can never be observed as it is what would have happened in the absence of an intervention. Assessment attempts to create a reasonable approximation of something that is physically impossible. (Shadish, Cook, Campbell 2002) According to Mohr (1995), the counterfactual is an assessment of efficacy. Assessment of the counterfactual has typically occurred through quantitative methods.

Figure 4. Graphic of Proposed Causal Method for Upstream Programs



Causality Assessment

Qualitative analyses generate meaning from disparate data, can test or confirm findings, and can rule out rival hypotheses – all which are needed within an impact analysis. The output of qualitative analyses tends to be rich in detail and provided as words. For a mid and upstream program, this type of analysis provides a determination of causality by assessing the actions of the program and the upstream actor and the subsequent changes in practices made due to these interactions. This type of analysis requires clear documentation of interactions and discussions beginning at the moment program implementers begin to intervene in the market. Discussions even prior to contracts being signed by participants are helpful as they can shed light on whether changes were made by participants because they *expected* to participate, but had not yet signed any contract. Where possible, the qualitative analysis should document details regarding specifics of consumer products that were influenced directly by the program (e.g., retailer telling OEM to use a specific component within a product to allow for that product to qualify for participation in the program). This allows for a clearer picture of which consumer products were influenced by the program intervention. This type of data can also help to determine which specific items should be included in later quantitative data collection or analysis. We see the causality assessment as containing three primary inputs: (1) secondary data review; (2) interviews with upstream participants; and (3) supplementary quantitative residential end user channel assessment. We detail each below.

Secondary Data Review

Another necessary input is secondary data collected at the beginning of the project that reflects the interactions between the program and possible / current participants. This can be a rich source of information to help address causality. When the evaluation collects and collates emails or similar type of interactions, it can help show the thread of possible influence. Knowledge of interactions before any depth interviews allows for the evaluator to "double-check" certain statements and clarify areas of uncertainty.

Interviews with Upstream Participants

The causality assessment has multiple inputs. One of the main inputs is depth interviews of program implementers and participants - both are necessary to understand causality. Early discussions between the evaluators and participants help to establish timing of when actions occurred, thus effectively addressing any ambiguous temporal components that could affect the internal validity[14] of the impact evaluation. Additionally, timely depth interviews alleviates the extreme difficulty in remembering reasons for choices made a long time in the past (as typical impact evaluations occur anywhere from 1 to 3 years after the program begins). These discussions made within a month or two of the decision to participate overcomes the natural inclination of people to incorporate past choices into their current attitudes (Stone 2000), thus providing a more accurate measurement of attribution[15]. These discussions also document decisions made if the decision maker changes jobs before the impact evaluation team is able to collect data.

Baseline Assessment of Residential End User Channels

The baseline assessment of residential end user channels provides an end user perspective of high efficiency model availability. This assessment allows the evaluator to monitor the proportion of units on the shelf available to end users. This, combined with sales data and other performance metrics, can prove to be an effective indicator the program's progress.

4.2.2 Counterfactual Assessment

While a self-reported counterfactual could be determined through surveys with program participants during the causality assessment phase of this method, it is imprudent to assign energy impacts to every measure they indicate would not have been purchased for re-sale except for the program. Market pressures to buy specific items are not static, but occur throughout the year and are manifested during the buying cycle period. As the market fluctuates, so will the retailer purchases. Therefore, program performance outcome monitoring is part of the counterfactual assessment. In our method, the key influences are determined in the early stages of the program. Baselines of these influences are obtained prior to the beginning of the program or as close to the beginning as possible and should

[14] Internal validity is defined as "…inferences about whether observed covariation between A and B reflects a causal relationship from A to B…" (Shadish, Cook, and Campbell, 2002) It is also defined as "…establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships" (Yin 2003)

[15] Attribution is defined as "to regard as resulting from; consider as caused by". Attribution and causality are considered synonymous in this write-up.

include the following: (1) performance monitoring and program tracking database; and (2) Delphi market expert counterfactual forecast.

Performance Monitoring and Program Tracking Database

On-going performance monitoring and maintaining a program tracking database is an essential part of establishing the counterfactual. These efforts should include the following: (1) historic sales data; and (2) on-going tracking of market changes for all participating accounts.

As a requirement of the program, participants should provide historic sales data as early as one year prior to the program's initial intervention in the market.[16] These data points will be used to establish a clear baseline, and when provided periodically over the year, allow future evaluators to estimate the forecasted growth rate of high efficiency models prior to the program's intervention. This data, combined with Delphi expert forecasts and the baseline assessment of end users channels allows evaluators to generate a more accurate baseline of the program.

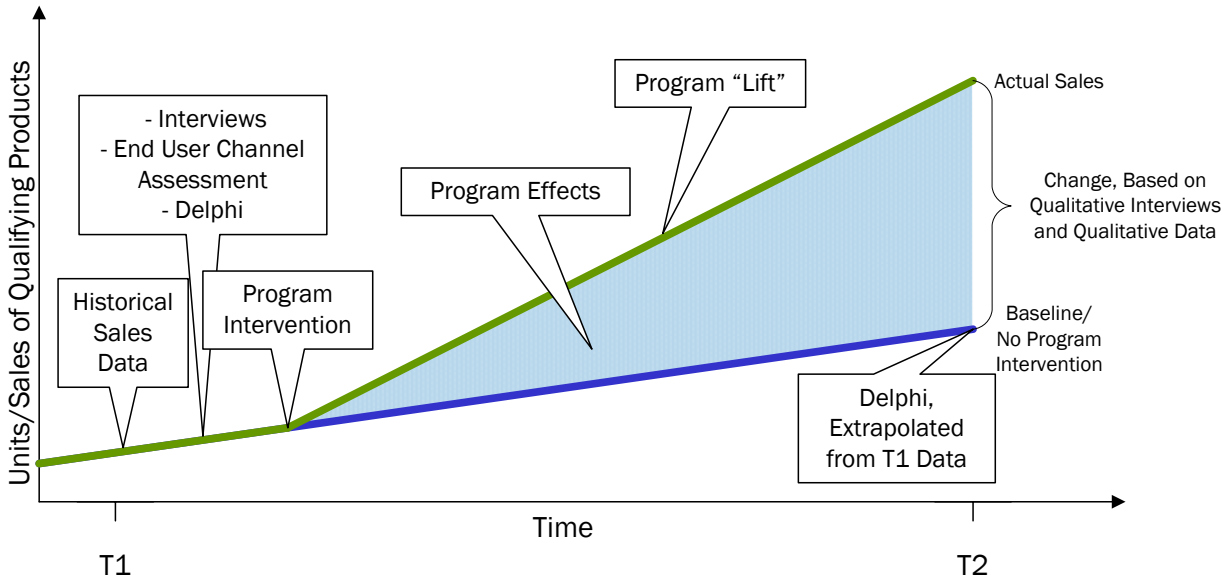
Delphi Market Actor Counterfactual Forecast

The last input in our method is the Delphi method. This is a qualitative approach to forecasting using a panel of independent experts. This method serves to generate a baseline as well as causality, by drawing on market experts to assess the market as it would have occurred in the absence of the program's interventions. This is central to the counterfactual analysis later in the evaluation. In essence, the Delphi uses experts to discuss and forecast what is expected to occur in a particular market in the next few years without the program's effects. Expert's knowledge of market influences shapes their responses and provides a forecast that is as unbiased by program expectations as possible. The output of the Delphi is a set of numbers that are used as the counterfactual – what is expected to have occurred in the absence of the program. The output of the Delphi should be applied to program tracking data and baseline data to triangulate the counterfactual.

The figure below provides an at-a-glance summary of the proposed EM&V approach and where these data points will be collected over the course of the program's life.

[16] This can be difficult to obtain, but is a critical item.

Table 3. EM&V Data Collection Tasks



4.3 Evaluation Method in Context of Strategic Plan

The California Public Utilities Commission adopted a long term energy efficiency strategic plan on September 18, 2008. Within this plan is a desire for market transformation. Any evaluation of market transformation relies on baseline data, knowledge of influences in a market, and causality of programs. The proposed decision acknowledges a lack of evaluation discussion within the Strategic Plan (due to lack of input by working groups and other State entities involvement in this). Our proposed method of evaluating the upstream Business Consumer Electronics Program fairly and rigorously assesses causality, obtains baseline data, and discusses market influences. We believe that it can fit well into the current and future energy efficiency program evaluation structure as outlined by the California Public Utility Commission.

4.4 Evaluability Challenges for the BCE Program and Recommendations

As discussed earlier, there are a number of necessary inputs to effectively evaluate the BCE program and to ensure that the data collected for program attribution effectively aligns with the program theory. Here, we discuss the challenges faced for the BCE program in the collection of this data.

4.4.1 Causality Assessment Challenges

The causality assessment requires the most stringent and careful management of data to ensure that the program obtains credit for their efforts in the market. Here, we describe the challenges with each and provide recommendations for dealing with these challenges.

Secondary Data Review

The causality assessment of upstream programs requires careful tracking and review of program implementers on-going interactions with program participants (here major retailer and OEM accounts) and all documents and materials exchanged in the process of negotiation. This effort requires account management software, such as SalesForce, to ensure that all pertinent emails and documents are sufficiently stored and organized chronologically to provide clear evidence of when the CE program began its interventions.

Further, this requires timely and careful maintenance of the database and attention to detail in all correspondence. The primary pitfall of such efforts is the failure to clearly communicate and state pivotal decisions, agreements, and milestones in daily communication and negotiations with participants. Here, we recommend that:

- Program implementers set up careful contact tracking databases, whereby each email or major correspondence that indicates program effects is maintained. Further, program implementers should:
  - Confirm all changes in practices related to the program in writing (and/or email).
  - Ensure all correspondence is carefully dated, and where necessary, identifiable and understandable to future evaluation teams.

Interviews with Upstream Participants

In addition to carefully documenting program effects through email correspondence and upstream interviews with participants are necessary to assess attribution of effects. To assess the unique effect of each IOU on market actors, we recommend that:

- BCE EM&V teams conduct in-depth interviews with market actors to assess the cumulative or additive effect that each IOU's participation had in leveraging the market.

While we highly recommend these interviews, such interviews are difficult to obtain. For this reason, we recommend that:

- Program implementers require *in the contract* that all market actors participate in on-going EM&V and interviews. Interviews should be conducted *at least once* for each market actor prior to the impact evaluation. Ideally, interviews should be conducted: (1) upon the introduction of any new actor into program negotiations; (2) prior to program contracts for baseline assessment; (3) after program strategy has been developed; and (4) as part of the impact evaluation.

Baseline Assessment of Residential End User Channels

In addition to collecting data upstream for the causality assessment, we recommend that the BCE programs continue to conduct end user channel assessments to determine the effects of upstream actions on product availability and retailer marketing efforts downstream. This data should be used as means of triangulating baseline data *and* a method of verifying program effects in the market, namely those related to point of purchase marketing efforts and any program-sponsored training. We recommend that:

- BCE programs continually collects residential end user data at least annually and/or prior to each change in qualify specifications or marketing efforts to effectively track the program's effects among end users. The data should be information about what is available in stores for end users to purchase.

4.4.2 Counterfactual Assessment Challenges and Recommendations

Performance Monitoring and Program Tracking Database

Developing on-going program tracking and periodic performance metrics is a necessary precaution for measuring program success and monitoring the market. This data is vital to obtain baseline market characterizations and to assess market transformation in order to inform both EM&V efforts and program design initiatives. For this reason, it is necessary that Program implementers and internal EM&V teams develop a baseline for the BCE program at two distinct periods (1) prior to the launch of the program, as developed here; and (2) prior to any increases in qualify model specifications. To complete both of these efforts, we recommend that program implementers:

- Require a minimum of baseline sales data one year prior to the beginning of program negotiations in contact. To ensure that program implementers receive this data from program participants, data should be delivered prior to the allocation of incentives. Baseline sales data should include the following, at a minimum: (1) Percent of total sales that meet ES+ specifications; and (2) Sales for each program qualifying SKU or model.

Currently, this data is in the process of being collected for participating retailers and OEMs. However, retailer compliance is low and most data collected to date has only gone as far as 3 months prior to contract signing. Thus, data collected from retailers may fail to effectively capture the baseline prior to program intervention, which may have caused market effects from the moment that the program implementers began negotiations. For this reason, it is important that BCE program implementers and EM&V teams ensure that all baseline data is collected from retailers prior to allocating incentives.

In addition, the retailer-provided data requires sophisticated model matching to determine the qualifying levels of all models provided in each dataset. Careful model number verification is vitally important and requires an enhanced level of rigor to ensure that the data obtained from retailers accurately reflects high efficiency standard specifications. Currently, retailer and manufacturer's model lists do not match ENERGY STAR qualifying lists and require a number of verification procedures to ensure that those models submitted for the baseline and incentive allocation actually meet program requirements. This issue is not new to consumer goods (and has been prevalent in white goods as well), however the BCE category has greater product turn-over on average and multiple settings that can drastically change power draw for a single model. Thus, verification is a time-consuming and costly process and requires that implementers: (1) set aside the budget necessary to devote to list matching and verification; (2) were appropriate, review qualifying model lists in advance of allocating dollars; (3) confirm and effectively document all qualifying and non-qualifying

models submitted for incentive allocations; and (4) provide clear and transparent logic for the approval of all incentive allocations.

4.4.3 Additional Challenges and Recommendations

Address Free-Rider Risk in Program Design

As an upstream program, including free-riders in the BCE program poses significant risks, whereby large percentages of qualifying models and incentive allocations may be discounted due to either a lack of EM&V compliance/cooperation of key market actors or indications that the participating company was clearly planning to meet or exceed program specifications prior to the program's intervention. To address these issues, we recommend that program implementers:

- Determine the point at which to change to qualifying model specifications (e.g. X% of sales) to maintain a consistent and standardized market share goal. To do this, data management and verification protocols need to be put in place and implemented in a timely way to ensure program implementers have the data necessary to act decisively in the swiftly changing electronics marketplace.
- Consider paying on *market share* "lift" or net to reduce risk. Program implementers should consider approaches to pay on "lift" year over year.

Assess the Implications of Spending Program Dollars Upstream and Downstream

Currently, the BCE program devotes the majority of its dollars to upstream incentives; however some funding is being spent to market downstream. However, there is little to no indication that consumers are going to drive energy efficiency specifications. Further, it is unlikely that energy efficiency will surpass top tier feature considerations in either market. For this reason, program implementers should:

- Consider the potential EM&V risks involved in allocating program dollars to marketing and outreach efforts. Future evaluators may look downstream to determine program effects and assess attribution if program efforts appear to be marketing-focused, which is not appropriate for this program.

Assess the gains associated with marketing and outreach efforts for the resource program, above and beyond its implications for utility corporate branding and marketing. If the marketing effort is meant to drive demand, program implementers should consider ways to reconcile the dual market.

Part II. BASELINE STUDY

This section of this report provides a baseline market characterization of BCE market through a triangulation of multiple data collection activities including (1) end-user channel assessment (including in-store and online efforts), (2) a Delphi market forecast of the program's target measures; and (3) in-depth interviews of market actors in Business-to-Consumer (B2C) and Business-to-Business (B2B) channels. All data for our baseline study was collected in December 2008 and early 2009.

Although the BCE program efforts started in early 2008, but due to the product cycles, the in-store baseline data was considered to be collected before the program could affect stocking decisions. Notably, however, the program was in discussions with some retail stores (although had not sent in representatives into the stores) but the program did have the opportunity to affect decision making, and potentially promotions in 2008. We document any affects that started to occur in late 2008 as part of our report (specifically in the indepth interview section below.)

5. BCE DATA COLLECTION METHODOLOGY

The Opinion Dynamics team contracted with the Statewide IOUs to assist in baseline data collection. In particular, we assisted by conducting depth interviews, a Delphi analysis, and an extensive end user channel assessment. These tasks were completed to inform program design and to assist future impact evaluators in establishing a baseline for the Statewide BCE program. Here, we outline our methods for each task. The figure below highlights where our EM&V efforts intersect with the proposed up and midstream evaluation approach posed in the earlier chapter of this report.

Figure 5. Data Collection for Current EM&V Efforts

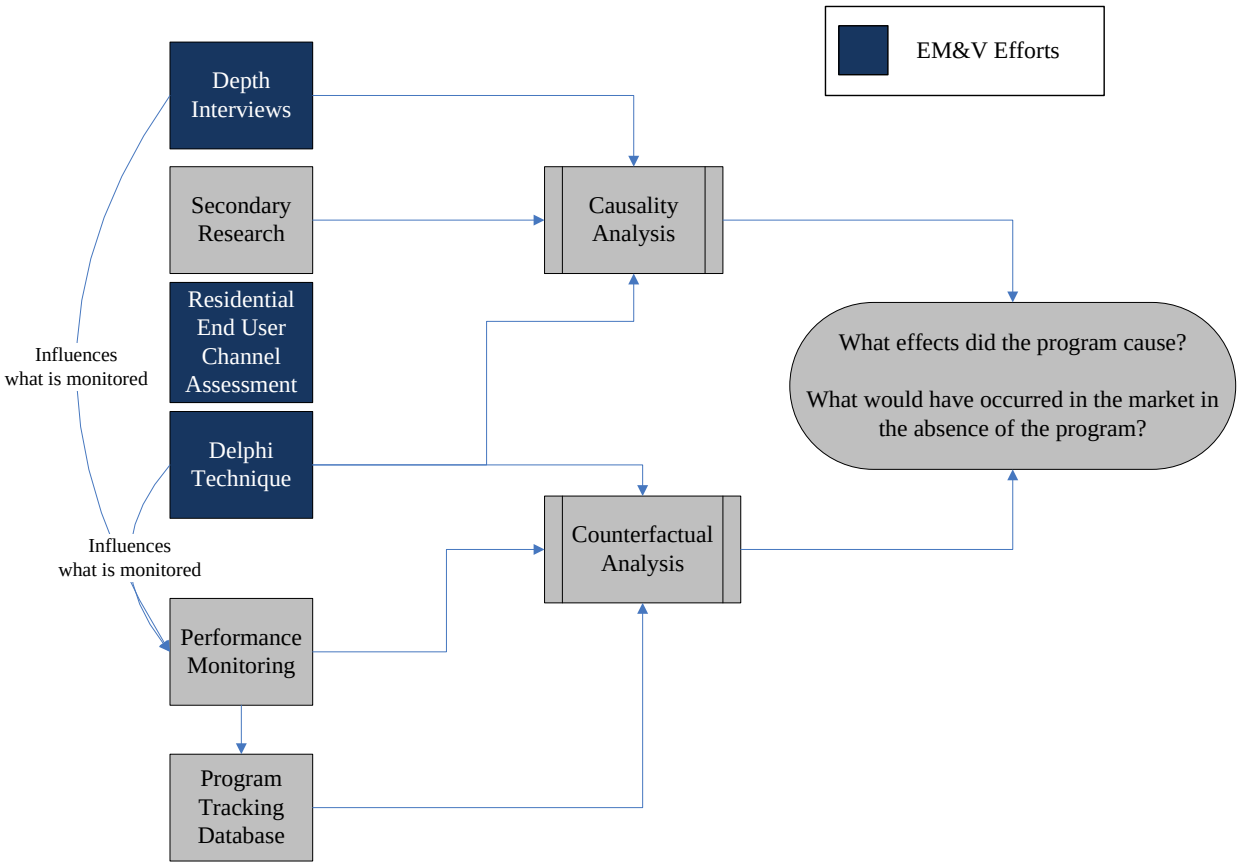
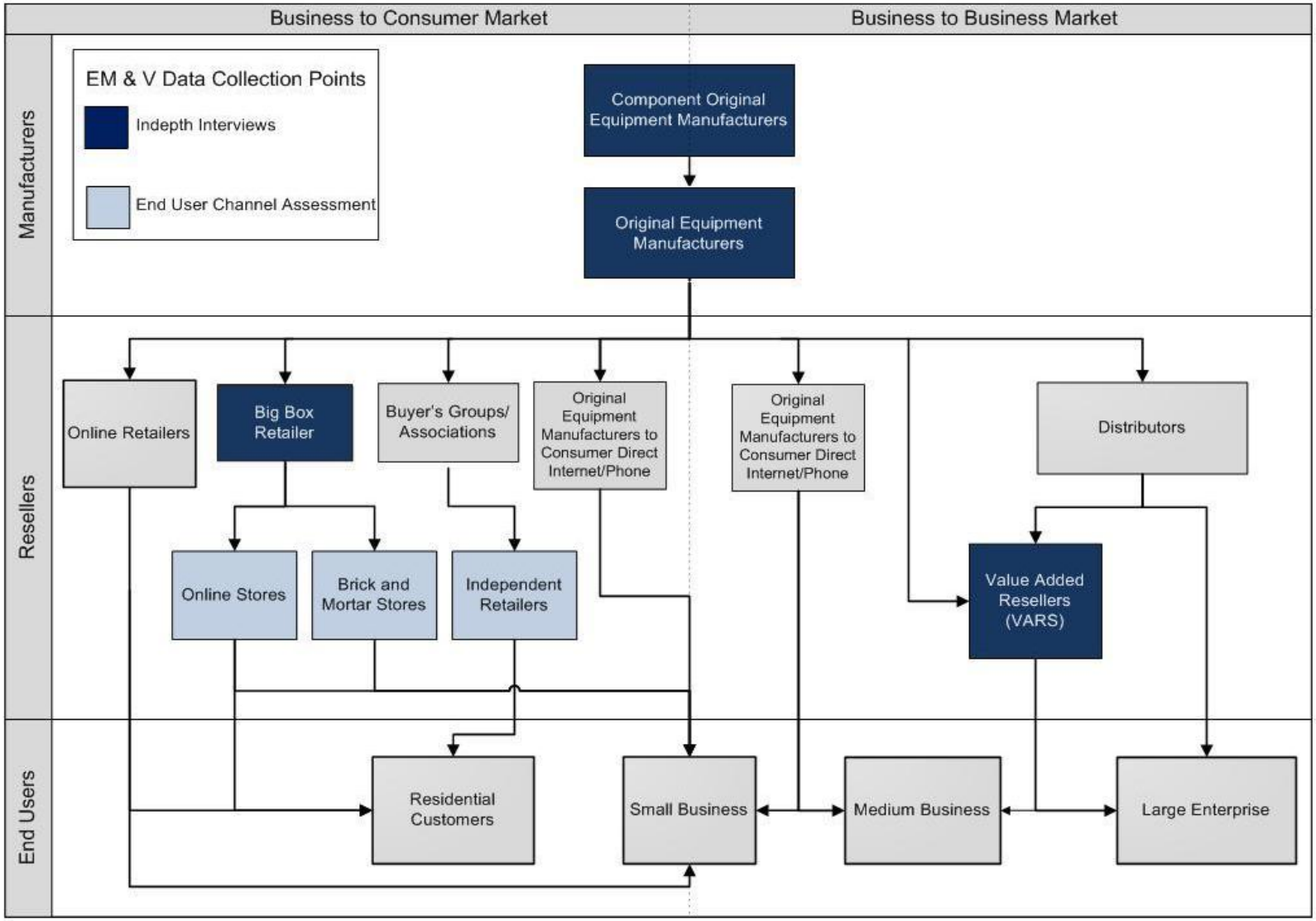


Figure 6 also provides an understanding of how our data collection tasks "fit" within the electronics industry structure.

Figure 6. Baseline Data Collection Activities within the Electronics Industry



The table below provides a summary of our data collection tasks for this effort.

Table 4. Summary of Data Collection Tasks by Measure

	Televisions	Computers, Monitors, and Bundled Units
In-depth interviews with OEM and retailer decision makers	9	7
In-depth interviews with Business to Business salespersons at OEMs and VARs	NA	4
In-depth interviews with market experts and Delphi research	Seven Experts	Six Experts
In-store visits and retailer store manager interviews	127 Total Stores Statewide	
Online analysis	13 sites	13 sites

5.1 Residential End User Channel Assessment: In-Store Analysis

5.1.1 In-Store Assessment

Opinion Dynamics sent researchers into 127 retail stores in the three California electric investor-owned utilities in December 2008 for all retailers with the exception of Club Stores, which were completed in the first half of 2009, for a baseline assessment of in-store energy efficiency practices.[17] The in-store research was conducted in three steps. First, two researchers went into each store, where one would mystery shop[18] for televisions and the other would mystery shop for computers. Next, we completed an online shelf assessment where researchers would switch sections and collect data on the number of qualifying and non-qualifying models on the shelf. In this exercise, researchers also collected data on promotions. Finally, where possible, a single researcher requested a store manager interview to discuss the overall importance of energy efficiency in their store practices. We detail each task below.

Mystery Shop

The television mystery shopper asked sales associates to show a minimum of nine different television models, three of each of the following television types: LCD, Plasma, and DLP

[17] Neither the total n for televisions nor the total n for computers adds up to the full 127 stores, as some retailers only sold one product (i.e. only televisions or only computers). The complete list of stores researched by retailer, territory, and data collected is included in Table 5.

[18] Mystery shoppers are trained researchers who "shop" for targeted product with particular research questions in mind. Here, the goal was to assess associates knowledge, promotion, and emphasis on ENERGY STAR qualified models.

Projection. Computer researchers asked sales associates to show three desktop towers, three monitors, and three combination or bundled desktop units. Mystery shoppers completed research in 105 television stores and 92 computer stores.

To determine if the sales associates are voluntarily promoting energy efficiency, researchers asked sales associates, before mentioning energy efficiency, which models they would recommend and which features are the most important in a TV/computer/monitor. In addition, associates recorded how many of the models shown to them were ENERGY STAR. Finally, after prompting on ENERGY STAR, researchers assessed sales associates' ease at locating energy efficiency TV/computer/monitor, knowledge of ENERGY STAR, and ability to cite the benefits of energy efficiency. Namely, we collected the following metrics through our analysis:

- Number of retailers actively promoting energy efficiency
- Proportion of salespersons who voluntarily promote energy efficiency, ENERGY STAR, and BCE qualifying models
- Proportion of models shown by salespersons that were energy efficient, ENERGY STAR and/or BCE qualifying models
- Salespersons knowledge of energy efficiency/ENERGY STAR (and BCE in the future)

Shelf Inventory

At the conclusion of the mystery shopping, researchers would record their results outside of the store and then return to the store to take inventory of all ENERGY STAR models on the store's shelves. Researchers completed the inventory in 105 television stores and 97 computer stores. Researchers took note of make, screen size (if applicable), model number, and whether the model was on promotion for all ENERGY STAR models on the shelves. The researcher then tallied up both the total number of units overall and the total number of ENERGY STAR units in the stores. Through this assessment, we gathered the following metrics:

- The percentage of models that meet ENERGY STAR and BCE specifications (includes on shelf)
- Proportion of ENERGY STAR and BCE qualifying models on promotion

Store Manager Interviews

Finally, one of the researchers conducted a brief interview with the store's manager. Researchers asked about customer demand, store promotion techniques, and sales for televisions and computers. For this effort, we collected the following metrics:

- Proportion of ENERGY STAR and BCE qualifying models in stock
- Perceptions of B2C customer demand for energy efficiency
- Staff training on energy efficiency/ENERGY STAR (and BCE in the future) (past, present, future)
- The proportion of B2C sales that meet ENERGY STAR and BCE specifications (past, present, future)

Table 5 provides a detailed summary of our in-store completes by IOU, retailer, and task.

Table 5. Total Completes by Retailer, Task, and IOU Territory

Retailer	Statewide			PG&E			SCE			SDG&E		
	Mystery Shop	Shelf Assessment	Store Manger	Mystery Shop	Shelf Assessment	Store Manger	Mystery Shop	Shelf Assessment	Store Manger	Mystery Shop	Shelf Assessment	Store Manger
Best Buy	22	22	7	10	10	4	8	8	3	4	4	0
Circuit City	21	22	4	9	10	1	8	8	2	4	4	1
Costco	21	20	5	10	10	4	7	8	1	4	2	0
Fry's	16	16	1	8	8	1	6	6	0	2	2	0
K-Mart	10	11	8	4	5	4	4	4	3	2	2	1
Nationwide	4	6	2	4	6	2	0	0	0	0	0	0
Office Depot	19	20	5	7	8	3	8	8	2	4	4	0
Office Max	9	9	5	4	4	2	5	5	3	0	0	0
Sam's Club	15	16	4	6	6	1	5	6	1	4	4	2
Sears	11	11	7	5	5	4	4	4	2	2	2	1
Staples	11	11	4	4	4	3	5	5	1	2	2	0
Target	16	16	3	8	9	0	5	4	3	3	3	0
Wal-Mart	22	22	5	10	10	2	8	8	2	4	4	1
TOTAL	**197**	**202**	**60**	**89**	**95**	**31**	**73**	**74**	**23**	**35**	**33**	**6**

5.2 Residential End User Channel Assessment: Online Analysis

To effectively document and develop a market characterization of high energy efficiency and ENERGY STAR sales through online channels, the ODC evaluation team conducted an analysis of current online activities for each retailer visited in store as well as a few OEMs. This effort mirrored our in-store shelf assessment by carefully documenting high energy efficiency and ENERGY STAR models at retailer and OEM websites. In addition, this effort provided a more comprehensive model list and summary of eligible products, as online channels tend to have more unique models available to consumers at any given time. Specifically, we measured the following:

- The percentage of models that meet ENERGY STAR and BCE specifications (includes on shelf)
- Proportion of ENERGY STAR and BCE qualifying models on promotion

We collected data from the following websites in December 2008.

- BestBuy.com
- CircuitCity.com
- Costco.com
- Dell.com
- Frys.com
- Kmart.com
- OfficeDepot.com
- OfficeMax.com
- SamsClub.com
- Sears.com
- Staples.com
- Target.com
- Walmart.com

5.3 Delphi Method for Market Forecast

In general, the Delphi method is a systematic, interactive method which relies on a panel of independent experts. The carefully selected experts answer questionnaires in two or more rounds. After each round, a facilitator provides an anonymous summary of the experts' answers from the previous round as well as the reasons they provided for their judgments. Thus, participants are encouraged to revise their earlier answers in light of the replies of other members of the group. During this process the range of the answers tend to decrease and the group converges towards a "correct" answer. Finally, the process is stopped after a pre-defined stop criterion (e.g. number of rounds, achievement of consensus, stability of results) and information from the final rounds determine the results. This data collection method is currently within the California Codes & Standards Protocol and has been used to create forecast a market diffusion curve for specific products. (Groshans, 2009)

In our case, there were two separate groups of experts, one for TVs and one for computers/monitors. For this process, we needed multiple perspectives to decrease possible bias in responses. Towards that end, we recruited among the groups shown in Table 6 and were successful at obtaining a diverse group for the different Delphi's.

Table 6. Delphi Experts

Area of Expertise	TV Recruited	Computer / Monitor Recruited
ENERGY STAR specifications	✓	✓
Consumer Electronics Market	✓	None
Energy Efficiency Experts, Engineering	✓	✓
Energy Efficiency CE Expert Consultants	✓	✓
Manufacturers	None	✓

Each panel of independent experts was provided a set of questions and a straw man forecast of market share of the electronic equipment without the program.[19] The forecast began in 2008 and covered five years (through 2012). Because of the fast pace of change in both the TV and computer/monitor markets, it was felt that attempting to forecast beyond five years was not useful. Additionally, since the evaluation design uses the forecast specifically for the years covered by the program, this forecast was sufficient for that purpose.

Responses from the first round of questions were gathered via email and summarized. The straw man forecast was updated to reflect the experts' comments. The second round consisted of information to the group about how the forecast had been adjusted based on their responses and had a few more questions for each. The final forecast was again adjusted based on their final responses and is presented in the findings of this report. This effort took place during the months indicated in the table below.

[19] Data collection instruments and forecast from the two rounds of this process are provided in Volume II.

Table 7. Delphi Data Collection Times

Delphi	Round 1	Round 2
TV	May 2009	July – August 2009
Computer / Monitors	August 2009	September 2009

Through this effort, we collected the following metrics:

- Current proportion of the market that is comprised of ENERGY STAR and BCE qualifying units (based on shipment data)
- Forecast of ENERGY STAR and BCE qualifying units in the market for 2008-2012 without program influence

These results will be discussed in further detail in Chapter 8: Market Forecasts.

5.4 Upstream and Midstream Interviews

In order to create a baseline of the market and to record program effects, the Opinion Dynamics team focused on four kinds of reseller and manufacturer actors. We conducted in depth interviews with actors from 1) component OEMs, 2) major brand OEMs, 3) big box retailers, and 4) VARs. Depending on the channels they comprise, some actors reported on computers and monitors, some on TVs, and some on both.

Interviews were conducted between January and August 2009. For each interview, we aimed to collect a series of baseline metrics, including but not limited to the following:

- The percentage of models that meet ENERGY STAR and BCE specifications (includes on shelf)
- The proportion of B2C sales that meet ENERGY STAR and BCE specifications (past, present, future)
- Importance of energy efficiency in product selection (past, present, future)
- Importance of energy efficiency in product design and production (past, present, future)
- Perceptions of B2B customer demand for energy efficiency
- Perceptions of B2C customer demand for energy efficiency
- Proportion of ENERGY STAR and BCE qualifying models ordered (past, present, future)
- The type and extent of promotions of energy efficiency to B2B customers and the frequency of these promotions (past, present, future)
- The type and extent of promotions of energy efficiency to B2C customers and the frequency of these promotions (past, present, future)

6. END USER CHANNEL ASSESSMENT: IN-STORE ANALYSIS

In December 2008 and the first half of 2009, ENERGY STAR and energy efficiency were not actively promoted in-store. Rather, top-ranked features, such as price and performance, were the primary focus of in-store promotions and sales associate discussions. With some exceptions, energy efficiency was only discussed once managers and associates were prompted on the topic. This is due in part to perceptions of customer demand, where price and performance take precedence over all other considerations. Further, our data indicates that sales associates may be pushing standard or low efficiency models more than higher efficiency versions, despite relatively equal levels of in-store promotions of high efficiency and low efficiency models.

In addition, customers' access to information on energy efficiency may have been exacerbated by a general lack of knowledge among sales associates and potential disparities in ENERGY STAR model availability across product types. Notably, most sales associates do not discuss energy efficiency *unless* it is brought-up to them and a sizable group (19% for televisions and 37% for computers) of associates was unable, after prompting, to discuss ENERGY STAR. These findings indicate that it is likely only those customers who proactively inquire about energy efficiency receive information on ENERGY STAR, if at all, and many sales associates would have difficulty directing these customers to program-qualified product.

Note: Computer and monitor model qualifying data requires additional data matching that was not completed at the time of this report's publication at the end of 2009. In this report, we provide estimated computer and monitor shelf data from the mystery shopping exercise and the store manager interview estimates. Television data matching is complete.

6.1 Key Findings

ENERGY STAR Model Availability

ENERGY STAR model availability differs across categories, as qualifying televisions are more prevalent than computer products. Our baseline data from store manager interviews and our discussions with sales associates both suggests that just under half of televisions in-store are ENERGY STAR qualified, with approximately 46% of all TV models on the shelf meeting ENERGY STAR specifications.

- Over half of television models on the shelf (46%) were ENERGY STAR-qualified, with 35% of all models meeting or exceeding ENERGY STAR + 15% specifications.
- Fifty percent of store managers indicate at least half their television models are energy efficient, with 33% of managers indicating more that 80% of their models are energy efficient.

From our mystery shopping exercise we also found that:

- Forty-six percent of the television models shown to researchers by sales associates, prompted and unprompted, were ENERGY STAR.

In contrast, there are far fewer ENERGY STAR computer products:

- Thirty-two percent of store managers indicated that *less than* 20% of the stores monitors are energy efficient.
- More than half of managers (60%) indicated that 20% or fewer of their desktop models are energy efficient, while nearly half of managers (47%) indicated that less than 20% of bundled units are energy efficient.
- Just over one-quarter (30%) of the monitors shown were ENERGY STAR, along with 20% of desktops and 27% of bundled units.

Customer Demand for Energy Efficiency

Irrespective of their availability, store managers did not indicate that consumers were interested in ENERGY STAR televisions when looking to purchase, rather customer demand is driven by price and performance:

- ENERGY STAR and energy efficiency were *not* cited in the top three customer considerations when purchasing a TV by any store managers. Both energy efficiency (16%) and green technology (6%) were mentioned by store managers as a lower priority for customers.

Like TVs, customer demand for computer products was driven by the same considerations - price and performance - and energy efficiency was not cited among the top three considerations:

- For monitors energy efficiency did rank somewhat higher than other computer products, with 18% of store managers indicating it was a consideration, however it still did not rank in the top three. Energy efficiency was mentioned for desktops (3%) along with green technology (3%), and only green technology was mentioned for bundled units (4%).

ENERGY STAR Promotions

In-store promotional activities mirror perceptions of customer demand: energy efficiency is not a consideration when promoting products. The inventory of the products on the shelf indicated:

- Based on our television data, ENERGY STAR products are promoted in the same proportion as they are on the shelf, indicating that there is not concerted effort on the part of retailers to push ENERGY STAR models.

However, our TV data indicates that sales associates do not show consumer high efficiency models in the same proportion as lower efficiency models, indicating that lower efficiency models may be pushed more to consumers. Energy efficiency was not mentioned by store managers among the top promoted features for any product:

- Top-rated features promoted for televisions and monitors were picture quality and resolution (48% and 59% respectively).

- Speed/processing was most mentioned for desktops (41%), and price was most mentioned for bundled units (56%).

Dually, sales associates are not actively discussing ENERGY STAR:

- Seventeen percent of television sales associates brought up ENERGY STAR to our researchers *unprompted.* The number of computer associates who mentioned ENERGY STAR unprompted was lower, at 6%
- When asked "what makes this a good [product]," 22% percent of television sales associates mentioned something related to energy efficiency, such as being "green," environmentally friendly, and saving energy. These figures decrease when discussing monitors (6%), bundled units (3%), and desktop computers (1%).

However, when energy efficiency is brought up, sales associates will discuss the feature.

- Sixty-two percent of television associates and 57% of computer associates were able to discuss ENERGY STAR.

Yet a notable group of associates did not know about ENERGY STAR enough to engage the subject when prompted:

- Nineteen percent of television sales associates were unable to talk about ENERGY STAR at all and 37% of computer associates could not.

Based on our research, it is likely that the only customers who hear about ENERGY STAR are those that are already aware of it.

Knowledge of ENERGY STAR by Sales Associates

To assess sales associates' knowledge, researchers asked them directly, "What is ENERGY STAR?" Our findings indicate that associates require additional training on ENERGY STAR and energy efficiency:

- Forty-eight percent of television sales associates could easily answer "what is ENERGY STAR" while 35% of computer associates could answer it.

In addition, a clear disparity in knowledge exists between computer and television sales associates.

- Nearly one-fifth (16%) of television associates had no knowledge of ENERGY STAR.
- Computer associates were rated less knowledgeable by researchers, with 38% of sales associates indicated as having no knowledge of ENERGY STAR.

When researchers asked to be shown ENERGY STAR models, the same disparities between computer and television associates emerged:

- Over 40% of all sales associates were unable to locate ENERGY STAR desktop computers, monitors, and bundled units in store.
- The number of television associates who could not find ENERGY STAR models was still notable, but less than half that of computers, at 17%.

6.2 Detailed Results

ENERGY STAR Model Availability

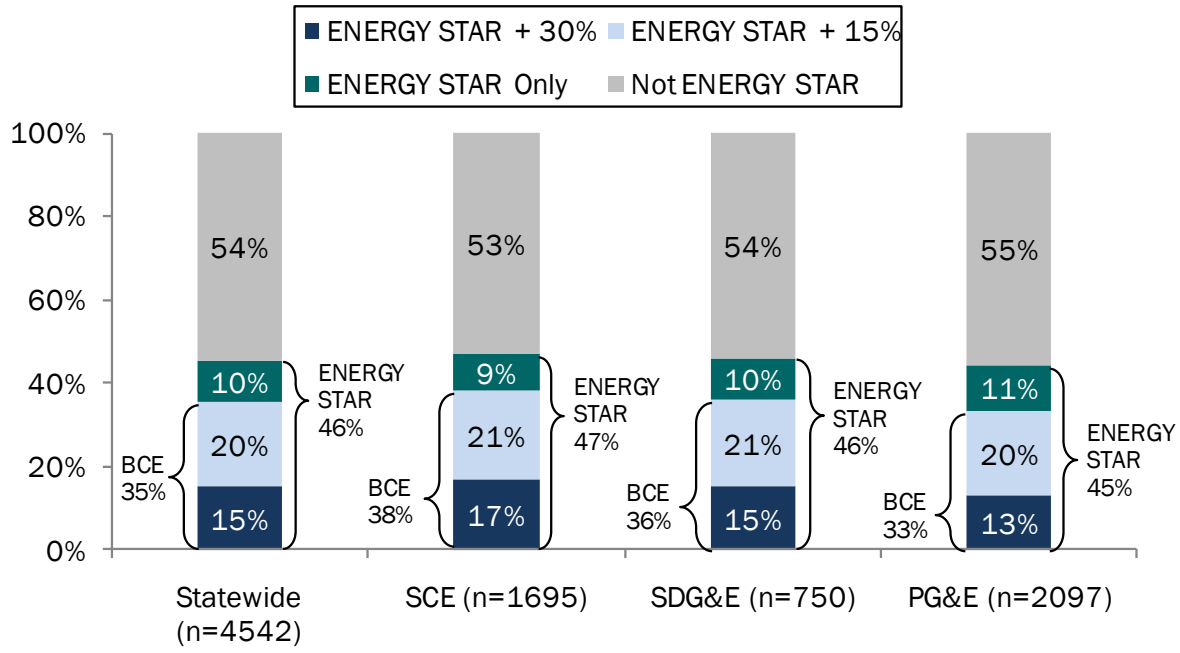
To assess ENERGY STAR model availability to consumers, Opinion Dynamics researchers: (1) collected store manager estimates of the number of ENERGY STAR models on the shelf for each product category; (2) quantified the number of ENERGY STAR models they were shown throughout the mystery shopping exercise; and (3) took inventory of the number of ENERGY STAR models available on the shelf.

Proportion of High Efficiency Models on the Shelf

After the mystery shopping session, researchers returned to the stores and conducted a full inventory of the models available for purchase on the shelves. Researchers counted the total number of models and the total number of ENERGY STAR models, and then recorded the brands, model numbers, and promotions for all ENERGY STAR models on the shelves.

While 46% of televisions on the shelf meet ENERGY STAR specifications at a minimum, most of these models exceed the standard by at least 15%. Just over one-third (35%) of all models on the shelf are ENERGY STAR+15%, the current standard for BCE qualification, and 15% are ENERGY STAR+30%, the proposed future value for BCE qualification.

Figure 7. Number of Televisions on Shelf that Meet ENERGY STAR specifications, Overall and by IOU Territory



Store Manager's Perspective on ENERGY STAR Stocking

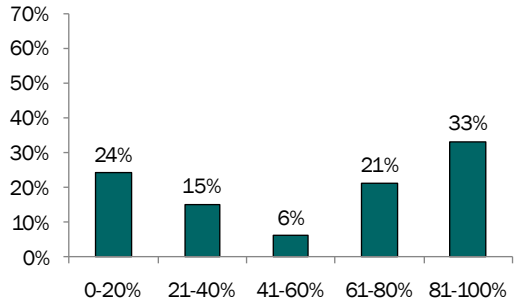
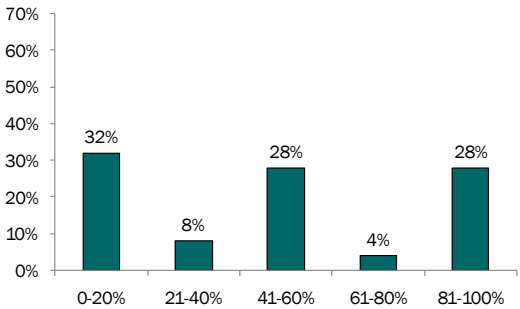
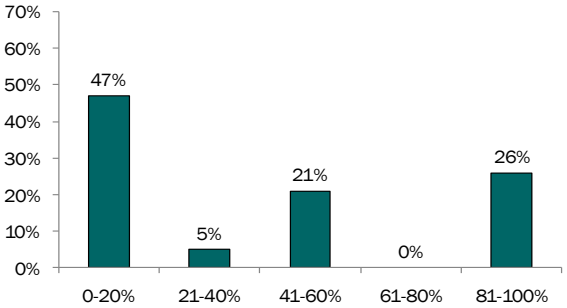
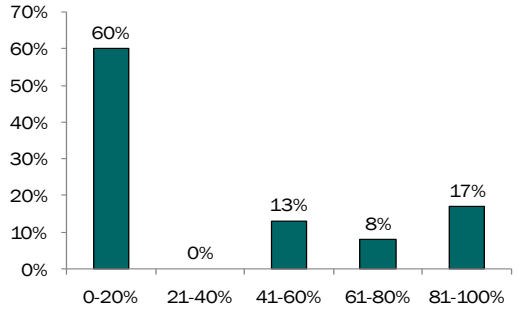
With respect to TVs, the store managers appear to be aware of ENERGY STAR availability, with 57% indicating at least half of their models were energy efficient.

Manager's perspectives on monitors, however, were significantly more polarized. Twenty-eight percent of store managers indicated that more than 80% of the store's monitors were energy efficient. Yet another 32% of store managers indicated that less than 20% of the stores monitors were energy efficient, thus indicating that managers have markedly different stocking for this product.

In contrast to televisions and monitors, about half of managers indicated that 20% or fewer of their desktop (60% and 47% respectively) with only 17% and 26% of store managers indicating that 80% of their desktops and bundled units were energy efficient.

The difference in television to computer product availability may be indicative of the following two things and will need to be compared with the number of models on the shelf to confirm which is most likely: (a) more ENERGY STAR televisions are available than computer products; and/or (b) store managers are less aware of ENERGY STAR specifications for their computer products. These computer and monitor findings will be compared to final shelf data once it is adequately matched for these two measures.

Table 8. Percentage of Product Models that are ENERGY STAR Based on Store Manger Interviews[20]

Product	20% or Less ES	80% or More ES	Dispersion of Estimations
TVs (n=33)	24%	33%	
Monitors (n=25)	32%	28%	
Bundled Units (n=19)	42%	28%	
Desktops (n=23)	43%	17%	

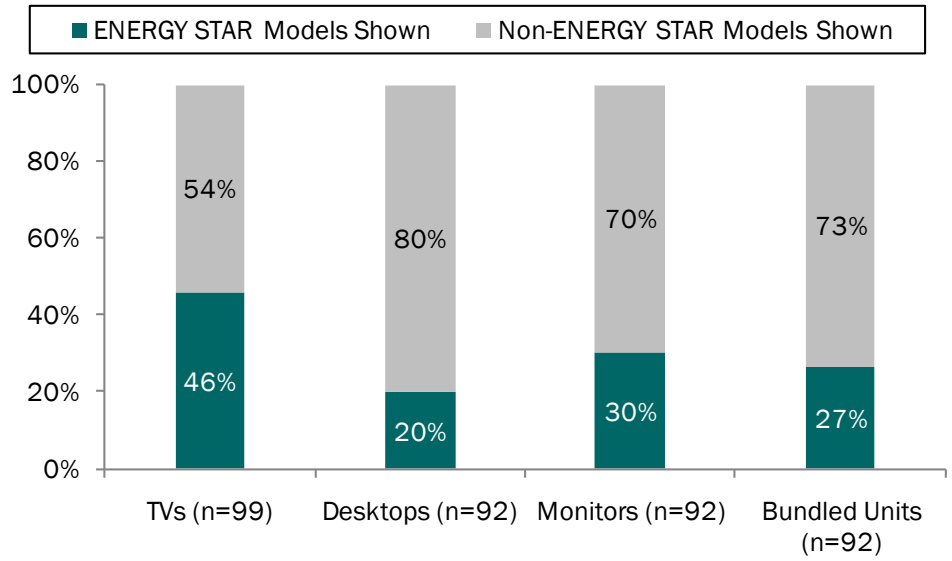
[20] Q6, Q28, Q39, Q50: Approximately what percent of the store's televisions/desktop computers/monitors/ bundled units are energy efficient?

ENERGY STAR Models Shown by Sales Associates

Opinion Dynamics researchers also noted the number of ENERGY STAR models they were shown throughout the mystery shopping exercise.

Nearly half (46%) of all television models shown were ENERGY STAR. Just over one-quarter (27%) of the bundled units were ENERGY STAR, with monitors the highest of computers products at 30%. When we compare these findings to the store manager data on ENERGY STAR inventory, we find that the number of ENERGY STAR models shown during the mystery shop is roughly similar to the percent of models estimated to be on the shelf by the store manager, with monitors as a possible exception.

Figure 8. Proportions of Models Shown that are ENERGY STAR [21]



For televisions, sales associates promoted ENERGY STAR models about as much as they appear on the shelf. Just under half of models shown (46%) were ENERGY STAR, the same percentage as the number on shelf found to qualify (46%). This finding indicates that while television sales associates are able to show ENERGY STAR models to customers, they do not seem to display any special effort in showing them. This is particularly interesting because our shelf data also indicated that ENERGY STAR televisions were promoted at the same level as non-ENERGY STAR models, which we detail in the next section.

As mentioned earlier, our current Computer and Monitor shelf data is in the process of being matched. Once it is complete, we will compare the final shelf figures with sales associates practices, as shown in the table below.

[21] Q2: Please indicate how many models you saw for each type – total ENERGY STAR, total Energy Efficient Shown (not BCE or ES)

Table 9. Percentage of Models Shown and on Shelf that were ENERGY STAR

Product Type	Percentage of Models **on Shelf** that were ENERGY STAR	Percentage of Models Shown that were ENERGY STAR	Total Number of Models Shown	Average Number of Models Shown Per Store
TVs (n=99)	46%	46%	1255	12.7
Desktops (n=92)	TBD	20%	240	2.6
Monitors (n=92)	TBD	30%	411	4.5
Bundled Units (n=92)	TBD	27%	176	1.9

Promotions of ENERGY STAR

To assess promotions of ENERGY STAR, we begin by sharing our findings of energy efficiency models being promoted during our data collection effort, store manager perceptions of customer demand and promotions, and then provide findings drawn from researchers' conversations with sales regarding product features and their prompted and unprompted discussions of ENERGY STAR.

Store Manager's Perspective on Customer Demand and Promotions

Store managers did not think customers were interested in energy efficiency, rather indicating that customer's primary focus was on price and performance features when seeking out a new product. When asked "What are the top 3 features that customers look for in a TV/desktop computer/monitor/bundled unit?" energy efficiency, ENERGY STAR, and/or "green" technology were mentioned in all categories, but it did not rank in the top three considerations. For televisions, energy efficiency was rated the highest compared to the other products, with 19% of respondents mentioning it and 6% mentioning green technology. For desktops, both energy efficiency (3%) and green technology (3%) were mentioned, while only energy efficiency was mentioned for monitors (18%) and only green technology was mentioned for bundled units (4%).

Table 10. Top 3 Features Customers Want in Products Based on Store Manger Interviews (Multiple Response)[22]

Top 3 Features	TVs (n=47)
Screen Size	79%
Price	77%
Resolution	72%
Top 3 Features	**Desktop Computers (n=32)**
Speed (Processing)	88%
Memory	88%
Price	72%
Top 3 Features	**Monitors (n=34)**

[22] Q2, Q26, Q37, Q48: What are the top 3 features that customer look for in televisions/desktop computers/ monitors/bundled units?

Top 3 Features	TVs (n=47)
Screen Size	91%
Resolution	82%
Price	65%
Top 3 Features	Bundled Units (n=23)
Speed	87%
Memory	70%
Price	70%

In addition, store managers were also asked to list the top features their stores promote for each product of focus (prior to introducing energy efficiency). Not surprisingly, the promoted features align well with the features that store managers perceived are desired by customers. As before, energy efficiency was not mentioned among the top features for any product. Rather, the top-rated feature promoted for televisions and monitors were picture quality or resolution (48% and 59% respectively). Speed/processing was most mentioned for desktops (41%), and price was most mentioned for bundled units (56%). Table 11 below shows the top three responses most mentioned by store managers.

Table 11. Top 3 Features Stores Promote Based on Store Manger Interviews (Multiple Response)[23]

Most Mentioned Features	TVs (n=48)
Picture Quality/Resolution	48%
Price	27%
Brand	27%
Most Mentioned Features	Desktop Computers (n=34)
Speed/Processing Ability	41%
Memory	41%
Price	35%
Most Mentioned Features	Monitors (n=34)
Picture quality/resolution	59%
Size (non-specific)	35%
Price	32%
Most Mentioned Features	Bundled Units (n=25)
Price	56%
Speed/Processing	36%
Brand	24%
Memory	24%

For televisions, only one respondent mentioned ENERGY STAR as a promoted feature. For desktop computers and monitors less than one in ten (6% of each) mentioned energy efficiency/ENERGY STAR for each product. Only one respondent mentioned energy efficiency in promoting bundled units.

[23] Q1, Q25, Q36, Q47: What are the top 3 features the store uses to promote televisions/desktop computers/ monitors/bundled units?

Sales Associates' Promotion of ENERGY STAR

Our findings on sales associates' promotions of ENERGY STAR are consistent with store manager accounts: energy efficiency and ENERGY STAR are not being promoted in store. In order to reach this conclusion, we asked sales associates "what makes this a good [product]" for those items they were shown and noted if ENERGY STAR was voluntarily discussed as a feature prior to researchers prompting on the subject. If ENERGY STAR was not voluntarily discussed, researchers then directly inquired about ENERGY STAR. Our findings are below.

Unprompted Promotion of ENERGY STAR

Fifteen percent of television sales associates brought up ENERGY STAR to our researchers unprompted. The number of computer associates who mentioned ENERGY STAR unprompted was lower, at 6%.

When asked "what makes this a good [product]," sales associates focused on a select group of features for each product type; namely associates focused on features related to product performance, price, and quality. This is consistent with store manager accounts of promoted features (see Table 11). Sixteen percent of sales associates mentioned something related to energy efficiency, such as being "green," environmentally friendly, and saving energy when discussing TVs. These figures decrease when discussing monitors (6%), bundled units (3%), and desktop computers (1%).

Table 12. Characteristics of Good Products Mentioned by Sales Associate (Multiple Response)[24]

Feature Mentioned	TVs (n=100)	Desktops (n=75)	Monitors (n=79)	Bundled Units (n=65)
Resolution/Picture Quality/Image Quality	66%	8%	49%	6%
Price	32%	32%	32%	31%
Screen Size	24%		26%	4%
Brand	22%	13%	14%	11%
Type (LCD, etc.)	19%		8%	
Color	17%			
Reliability/Durability	16%			
Energy Efficient/Green	16%	1%	6%	3%
Memory		59%		23%
Performance/Speed		59%	8%	28%
Features		17%	3%	15%
Size (Non Specific)		5%	20%	
Quality (Non Specific)		4%	9%	3%
Salesperson Had Purchased and Liked		5%	3%	
Touch Screen				11%
Convenience				9%
Other	5%	8%	8%	11%

[24] CQ12, CQ17, CQ22, TQ7: Please list the reasons why the sales person said it was a good television/desktop computer/monitor/bundled unit and why they would buy it.

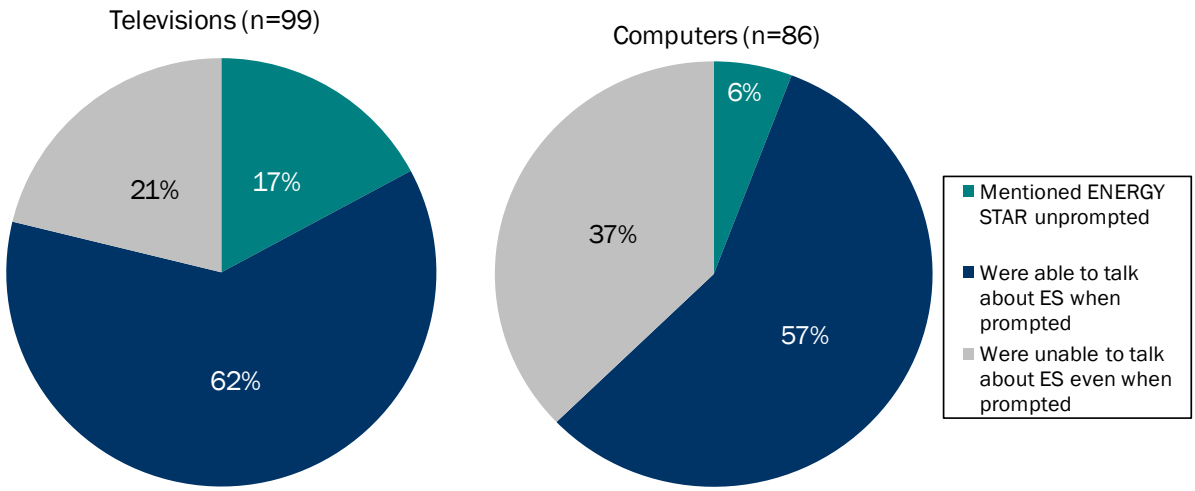
Further, when we examine the open-end sales associates' responses to "what makes this a good [product]," we find that sales associates who did discuss energy efficiency did not link it to saving money. Across all four product types, only three sales associates (out of the 100 TV associates and 79 computer associates we talked with) – two for televisions and one for monitors – pointed to a specific product and told the researcher it would save money because it was energy efficient.

Despite these relatively low figures of energy efficiency promotions, opportunities exist to better promote energy efficiency. Because price is one of the top overall features discussed by sales associates and store managers, store marketing efforts can leverage the price concern by marketing energy efficiency in terms of money saved.

Prompted Discussion of ENERGY STAR

Researchers also noted whether sales associates were able to discuss ENERGY STAR after the researcher brought it up. Notably, the majority of TV and computer sales associates were able to discuss ENERGY STAR, however far more (nearly four in ten) of computer sales associates could not discuss ENERGY STAR at all.

Figure 9. Number of Sales Associates Able to Discuss ENERGY STAR, Prompted or Unprompted[25]



In the case of both televisions and computers, more than half of sales associates were able to discuss ENERGY STAR *after* prompting; however they did not actively promote it as a feature to researchers (e.g. customers). Thus based on our research, it is likely that the only customers who hear about ENERGY STAR are those that are already aware of it.

It's difficult to determine based on this data which is the cause of which: Perhaps customers do not strongly demand energy efficiency because it is not presented to them, or perhaps stores do not prioritize it because customers do not demand it. However, both the store

[25] Q4: Did the salesperson bring up Energy Efficiency, ENERGY STAR, or the BCE program logo or promotional items without you asking? ENERGY STAR: (Yes/No), and Q7: Please indicate the salesperson's response to your question: What is ENERGY STAR? (Were able to answer/Could not answer)

manager and sale associates data indicate the same challenge for energy efficiency programs: stores do not actively promote ENERGY STAR to customers. These findings appear to support the program theory that movement of ENERGY STAR models in the consumer channel will need to occur upstream.

Knowledge of ENERGY STAR (Sales Associates)

Overall, sales associates' level of knowledge on ENERGY STAR is varied and inconsistent, with room for more substantive education and information on efficiency. In addition, associates knowledge differs greatly based on the product of focus (televisions vs. computers), where television associates demonstrated substantially higher levels of knowledge. The difference between computers and televisions is reflected in both the sales associates responses to "what is ENERGY STAR" and researchers' assessments of sales associates knowledge. We provide our findings below.

Sales Associates' Responses to "What is ENERGY STAR?"

In order to evaluate the sales associates' knowledge of ENERGY STAR, researchers asked them "What is ENERGY STAR?" and reported their responses. We then classified these responses into whether the sales associate could easily answer, could partially answer, gave an incorrect answer, or could not answer this query.

The total percentage of television sales associates who could easily answer (46%) or could partially answer (32%) the question "What is ENERGY STAR?" was high, at 78%. Most computer associates (60%) either could easily or partially answer, but the number was not as high as television associates. Table 13 illustrates how the quotes were classified and the final results of the classification.

Table 13. Sales Associate Quotes and Knowledge of ENERGY STAR[26]

Category	Example Quotes	Television (n=99)	Computers (n=86)
Could easily answer "What is ENERGY STAR?"	"ENERGY STAR is a rating given to TVs that meet a specific energy saving guideline as set by government program guidelines." "ENERGY STAR basically means they are more energy efficient and use less electricity."	48%	35%
Could partially answer "What is ENERGY STAR?"	"She knew that it meant something regarding energy usage." "It shuts your screen down when you're not using it."	30%	28%
Answered incorrectly to "What is ENERGY STAR?"	"ENERGY STAR was a setting in the control panel."	2%	3%
Could not answer "What is ENERGY STAR?"	"I am not aware of that." "I don't know, but if it's a brand, we don't have it."	19%	34%

[26] Q6: Please indicate the salesperson's response to your question: What is ENERGY STAR?

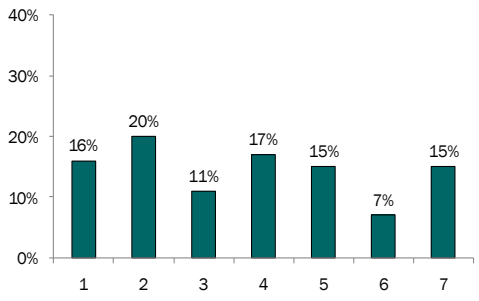
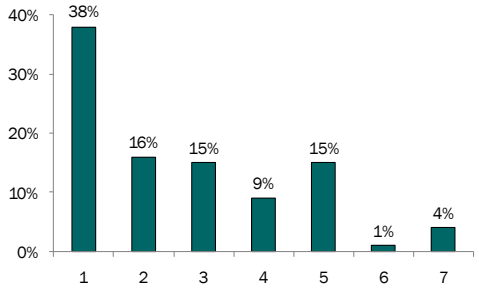
Sales Associates' Level of Knowledge of ENERGY STAR

In addition to recording sales associates' responses to "what is ENERGY STAR," we asked researchers to assess the extent to which the sales associate appeared to be knowledgeable about ENERGY STAR. The scale was 1 to 7, where 1 meant "did not know about ENERGY STAR" and 7 meant "very knowledgeable about ENERGY STAR." Researchers were specifically trained on ENERGY STAR and instructed to only give sales associates a rating of seven if the sales associate was aware of ENERGY STAR as a US Government certification indicating that ENERGY STAR labels used less energy than standard models and indicated the benefits of energy efficiency, such as reduced operating costs and/or environmental benefits.

According to this assessment, 84% of television sales associates had at least some knowledge of ENERGY STAR (a score of 2 to 7). Fifteen percent of sales associates were rated "very knowledgeable" (a score of a 7). The mean of 3.8 suggests on average, sales associates were moderately knowledgeable, but many could use additional training.

Researchers' perception of computer sales associates' knowledge of ENERGY STAR is much lower. Just 4% of associates were rated very knowledgeable about ENERGY STAR (a score of 7). Thirty-eight percent of sales associates had no knowledge of ENERGY STAR (a score of 1).

Table 14. Ratings of Sales Associate Knowledge of ENERGY STAR[27]

Product	Mean Rating of Knowledge	Did not Know about ES	Very Knowledge-able about ES	Dispersion of Knowledge Ratings
Televisions (n=95)	3.8	16%	15%	
Computers (n=73)	2.7	38%	4%	

[27] CQ7, TQ12: Please indicate the extent to which the salesperson was knowledgeable about ENERGY STAR.

These findings indicate that knowledge of ENERGY STAR is greatly varied for television associates. Knowledge of ENERGY STAR among computer sales associates is markedly lower, as nearly half of associates had no knowledge of ENERGY STAR and only 4% rated as very knowledgeable.

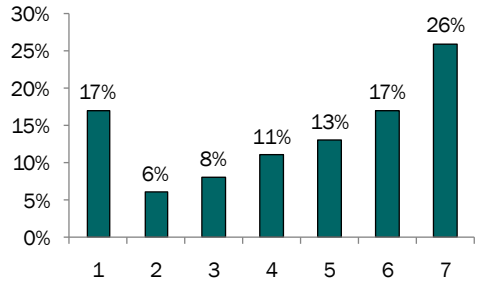
Sales Associates' Ease in Finding ENERGY STAR TVs

Here, we examine sales associates ease in findings ENERGY STAR models as a proxy for their knowledge and awareness of ENERGY STAR products in their stores. Our findings indicate that television sales associates demonstrated substantially greater ease finding ENERGY STAR products than computer sales associates, however nearly one in five could not locate ENERGY STAR models on the shelf that were known to be present. While associates who could not find computer models is nearly twice as great, these findings indicate that *all* sales associates could benefit from more education on energy efficiency specifications.

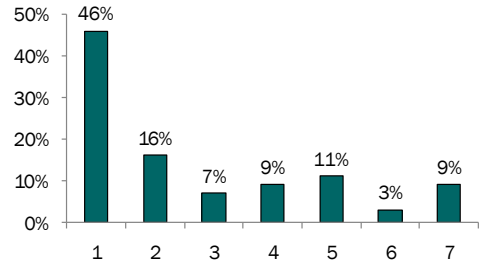
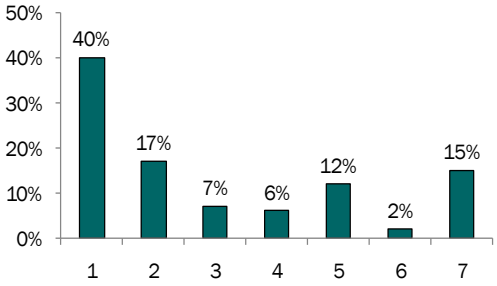
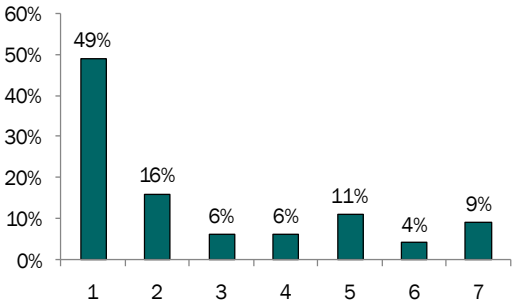
After asking "what is ENERGY STAR," researchers asked the sales associates if they could show them (additional) ENERGY STAR models. Researchers were asked to rate how easily their sales associate was able to find energy efficient TVs and computers on a 1 to 7 scale, where a 1 meant "could not find energy efficient TVs" and 7 meant "could find energy efficient TVs very easily."

The average rating of television sales associates' ability to find energy efficient TVs was moderate, at 4.6. Sales associates who could not find energy efficient models (17%) was somewhat lower than the number who could find them very easily (27%), further indicating that television sales associates can find energy efficient models with moderate ease but still have room to improve.

Table 15. Sales Associate Ease of Finding Energy Efficient Products[28]

Product	Mean Rating of Ease	Could not Find EE Models	Could Find EE Very Easily	Dispersion of Ease Levels
Televisions (n=98)	4.6	17%	27%	

[28] CQ15, TQ10: Please indicate the extent to which the salesperson could find energy efficient televisions/desktop computers/monitors/bundled units. Record your answers on a scale of 1 to 7 with one meaning "could not find energy efficient televisions/computers/monitors/bundled units" and seven being "could find energy efficient televisions/computers/monitors/bundled units very easily."

Product	Mean Rating of Ease	Could not Find EE Models	Could Find EE Very Easily	Dispersion of Ease Levels
Desktops (n=76)	2.7	46%	9%	
Monitors (n=82)	3.0	40%	15%	
Bundled Units (n=70)	2.6	49%	9%	

For computers, the mean is generally low, not exceeding 3.0 for any computer product type. Over 40% of all sales associates were unable to find energy efficient desktop computers, monitors, and bundled units. At most, across these three types, just 15% were able to find the computers very easily (this was in the case of monitors).

The data indicate that computer sales associates have farther to go than television sales associates in terms of knowledge. The distribution of sales associates "ease" in locating ENERGY STAR products and to define ENERGY STAR is very uneven, and weighted heavily toward the bottom 2 ratings. While the level of knowledge among television sales associates leaves room for improvement, computer sales associates are challenged with generating basic knowledge on energy efficiency.

Interestingly, when we compare these findings to knowledge scores (Table 14) the mean rating for televisions sales associates' ease in finding energy efficient TVs is slightly higher than the mean rating for their knowledge of ENERGY STAR, suggesting that television sales associates may be able to identify energy efficient TVs more easily than they can describe

the benefits of ENERGY STAR. For computers, the mean rating of sales associates' ability to find energy efficient models and to define ENERGY STAR is about the same, perhaps indicative of the dearth of ENERGY STAR knowledge overall for this category.

7. END USER CHANNEL ASSESSMENT: ONLINE ANALYSIS

In December 2008 and in tandem with our in-store efforts, Opinion Dynamics also conducted an inventory of thirteen stores' websites. Researchers recorded all brands, model numbers, and promotions for the models available online. Research for all stores included inventory of computers and televisions. The stores included in the website baseline effort are included in Table 16 below. Because the stores' websites are not location-specific, these findings may illustrate retailers' priorities on a wider level than that covered by the BCE program.

The importance of ENERGY STAR varies from retailer to retailer, though most retailers include at least some information about energy efficiency for their products. Nearly all retail websites indicated in the product specifications section whether a model was ENERGY STAR qualified. The only exception was Target, which did not indicate anywhere whether any of its models were energy efficient or ENERGY STAR qualified. Fry's also differed from the other websites, pointing out which televisions were ENERGY STAR qualified but not computers or monitors.

Retailers varied more in how prominent ENERGY STAR was on their sites. Of the twelve retailers that listed ENERGY STAR products, seven displayed the ENERGY STAR logo with qualifying models. The logos, while not offering new information, promoted energy efficiency more prominently, being in the main description of the model rather than the specifications section.

Five retailers also had sections on their site related to energy efficiency or ENERGY STAR. Among specific retailers, Best Buy promoted ENERGY STAR most on its site. In addition to having a specific section on ENERGY STAR products, Best Buy also offered a specific search filter allowing customers to find only ENERGY STAR qualified televisions and computers. Four other retailers had pages promoting sustainability and energy efficiency, but they did not have sections on consumer electronics. Instead, they promoted recycled products or energy efficient appliances like air conditioners. Target stands out among these retailers because it promotes energy efficiency generally but does not promote it for its consumer electronics.

The summary of stores and the ENERGY STAR information they provide is listed below.

Table 16. Store Websites Included in Online Baseline Effort

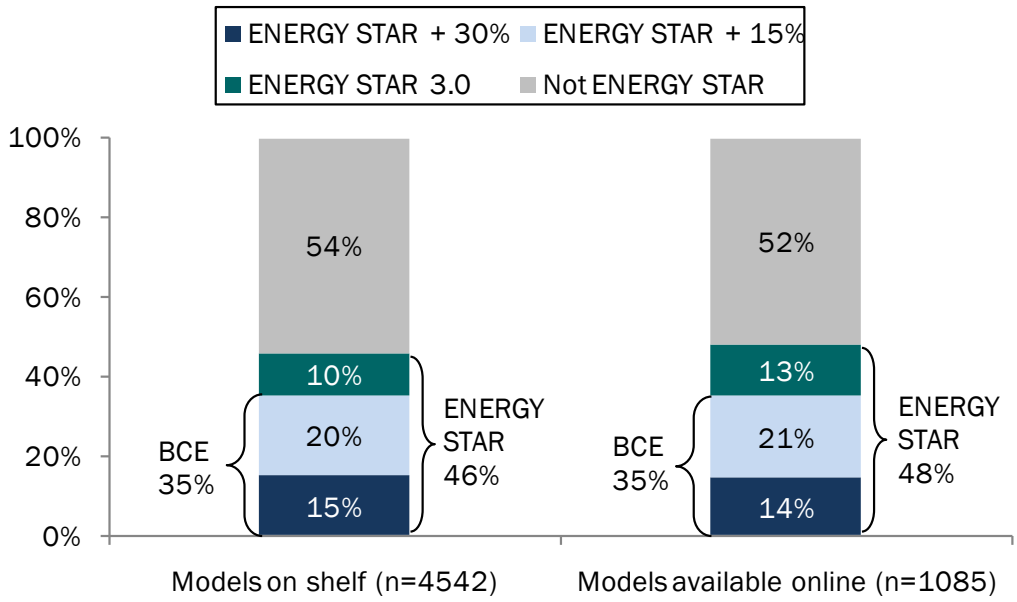
Store Name	Listed ENERGY STAR in product specifications	ENERGY STAR logo for qualifying products	Energy efficiency or ENERGY STAR section on site	Other ENERGY STAR or energy efficiency information on site
Best Buy (bestbuy.com)	✓	✓	✓	Explanation of ENERGY STAR; special search for ENERGY STAR models

Store Name	Listed ENERGY STAR in product specifications	ENERGY STAR logo for qualifying products	Energy efficiency or ENERGY STAR section on site	Other ENERGY STAR or energy efficiency information on site
Circuit City (circuitcity.com)	✓	✓		Explanation of ENERGY STAR
Costco (costco.com)	✓			
Dell (dell.com)	✓	✓		
Fry's (frys.com)	✓ [a]			
K-Mart (kmart.com)	✓	✓		Pop-up explanation of ENERGY STAR
Office Depot (officedepot.com)	✓		✓	Overall "green office" section
Office Max (officemax.com)	✓			
Sam's Club (samsclub.com)	✓	✓	✓	Overall "sustainability" section
Sears (sears.com)	✓	✓		Pop-up explanation of ENERGY STAR
Staples (staples.com)	✓	✓		
Target (target.com)			✓	Overall "eco-friendly" section, no mention of consumer electronics
Wal-Mart (walmart.com)	✓		✓	Overall "sustainability" section, page of ENERGY STAR products but does not include electronics

[a] Fry's mentioned ENERGY STAR qualification only on television model pages.

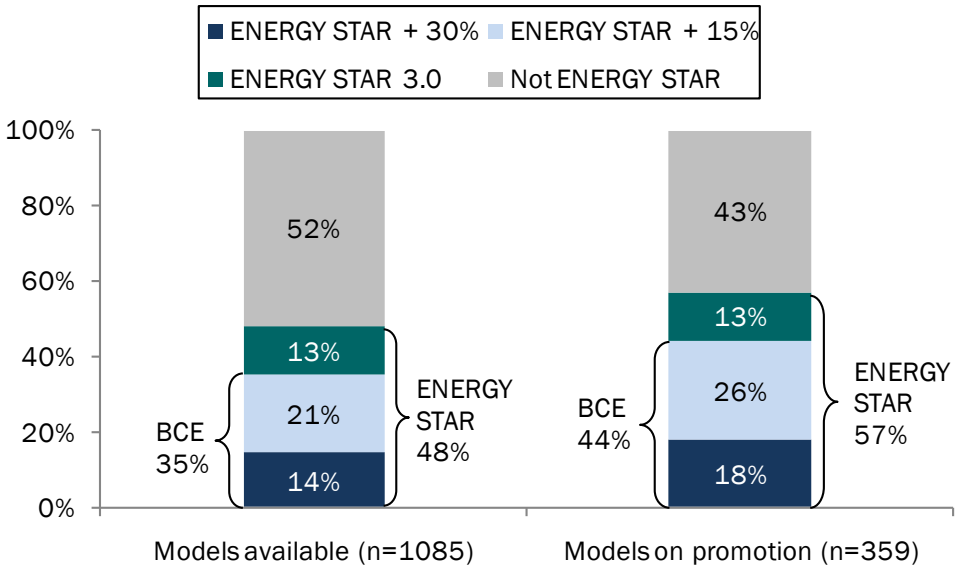
The percentage of television ENERGY STAR models available online is about the same as those in store, with 48% of online models qualifying for ENERGY STAR specifications compared to 46% in store. About the same number of models online meet the BCE standard, with 21% of models at the ENERGY STAR+15% level and 13% of models at the ENERGY STAR+30% level. Figure 10 illustrates the percentage of online models both available and on promotion.

Figure 10. Number of Televisions Online and In-Store that Meet ENERGY STAR and BCE Specifications



Unlike in-store promotions, where the number of high efficiency models on the shelf is roughly equal to those on promotion, we find that the proportion of online TV promotions of high efficiency models is slightly greater than the number of models available. It is unclear if this is an indication of upstream efforts to move more high efficiency product or if this is coincidental to other promotional efforts.

Figure 11. Number of Televisions Available and on Promotion that Meet ENERGY STAR and BCE Specifications, Online



As noted earlier, our computer data has yet to be matched.

8. MARKET FORECASTS[29]

While the sections above provide store-level data, and program implementers anticipate receiving sales data for the time period that pre-dates the program period, a third data source is a Delphi (or market) forecast based on expert opinion to estimate the market share of ENERGY STAR and BCE-targeted models *in the absence of BCE program interventions* in order to develop a counterfactual for future impact evaluations. We describe this process in greater detail in section 4.2, Proposed Evaluation Approach for Mid and Upstream Programs. Through this effort, market experts were asked to factor out BCE program effects, beginning at the point of program negotiations (Spring 2008).

Notably, these market forecasts represent expert understanding of the market at the time that the program was being developed. In the case of televisions, this forecast does not appear to agree with data collected on-site and by ENERGY STAR shipments; but it appears to be more in-line with estimates of the desktop computer market.

In this section we present three market share profiles: (1) Televisions; (2) Desktop Computers; and (3) Monitors. All forecasts were adjusted based on multiple view points of Delphi experts interviewed (see 5.3 Delphi Method for Market Forecast).

The responses provided by market experts were both specific and general. For example, a specific TV comment was "LCD market share shouldn't grow above 90-90%, with plasma around 7-8% by 2013" while a more general response was in response to the plasma market share levels "Plasma prices have fallen dramatically and energy efficiency levels are coming up. These two changes may be enough to slow large scale erosion in plasma market share". As noted in these two responses, good information is provided in both, but the detailed response allowed us to make specific changes to the forecast based on the market expert values. We made changes based on general responses by taking into account responses from other experts as well and generating our own market share estimates based on primary and secondary data collection.

The BCE program aims to impact the market share of BCE-qualifying models in order to generate greater increases in efficiency year over year. For this reason, our forecasts were developed to provide market share estimates, not total shipment figures. Market share estimates are provided as the primary metric for program success, rather than total number of units shipped. The former is less subject to economic trends, and more accurately reflects the state of energy efficiency in the market.

While forecasts typically are represented as a line graph, we have shown a stacked bar chart to represent that the information is a cross sectional view point at a single point in time each year. For our purposes, the data represent market share as of January of each year. Based on market expert feedback, it was determined that annual market share estimates are sufficient. Attempting to trend the data bi-annually and quarterly was perceived to generate a false level of precision.

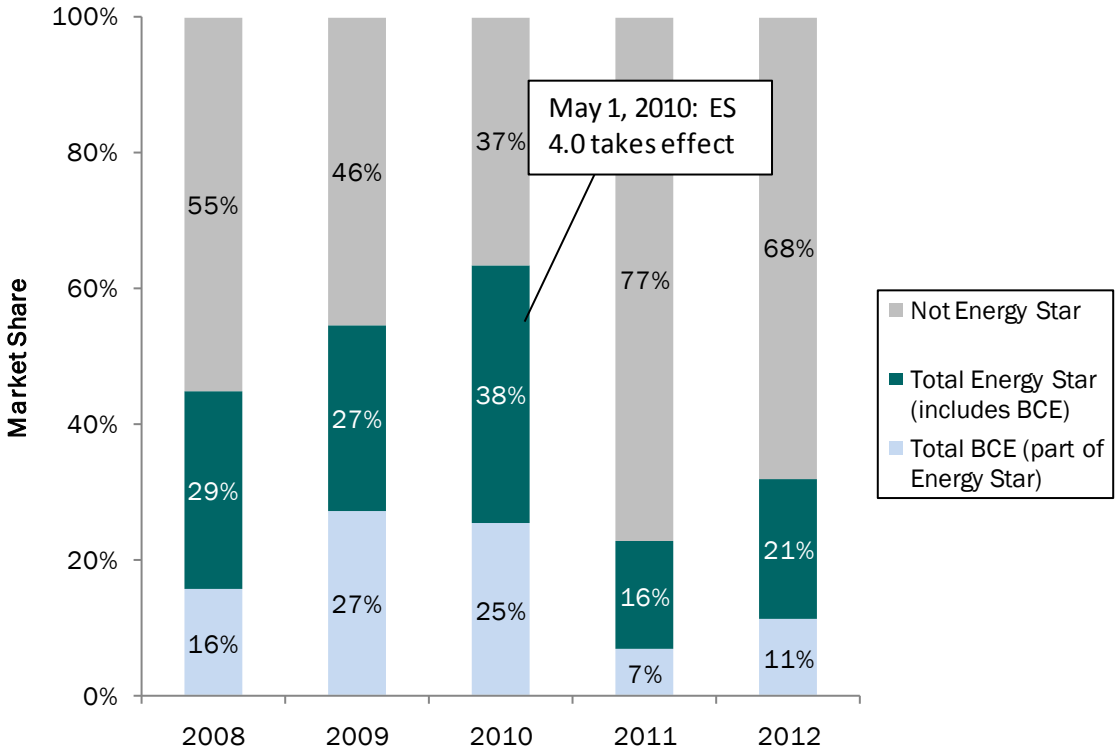
[29] It is important to note here that data collected for the Delphi forecast occurred prior to the release of ENERGY STAR's 2008 shipment data for Televisions and Computers.

Finally, it is important to note here that forecasts were developed prior to ENERGY STAR 2008 shipment reports; therefore market experts were not able to factor these figures into their market forecasts.

8.1 Televisions

Figure 12 indicates that ENERGY STAR will be at its largest market share in 2010, just before the Version 4.0 ENERGY STAR standard comes out. However, the BCE program market share actually drops slightly in 2010. For 2011, the ENERGY STAR market share drops back to its expected first year new-standard value and BCE becomes a very small part of the market. The values that back up Figure 12 can be found in Table 17.

Figure 12. California TV Market Share Forecast



It is expected that BCE market share will continue to be smaller than ENERGY STAR as it is planned to include fewer qualifying televisions that are more energy efficient than those under the ENERGY STAR specifications. The experts forecast that there will be at least 25% of the market that already meets BCE specifications, so, assuming the values are a baseline, the program would be able to obtain savings for the market share above 25%.

Table 17. California TV Market Share Forecast Table

(1,000s and percentage)

Technology	Efficiency	2008		2009		2010		2011		2012	
		N	% of LCD or Plasma market	N	% of LCD or Plasma market	N	% of LCD or Plasma market	N	% of LCD or Plasma market	N	% of LCD or Plasma market
LCD	ENERGY STAR	384	50%	563	60%	711	70%	267	25%	396	35%
	BCE	135	18%	282	30%	284	28%	80	8%	139	12%
	Total of Market	769	87%	939	89%	1016	90%	1067	90%	1132	91%
Plasma	ENERGY STAR	11	10%	12	10%	6	5%	2	2%	2	2%
	BCE	4	4%	6	5%	2	2%	1	1%	1	1%
	Total of Market	115	13%	116	11%	113	10%	113	10%	100	8%
LCD and Plasma	Total ENERGY STAR	396	45%	575	55%	717	64%	269	23%	398	32%
	Total BCE	139	16%	287	27%	287	25%	81	7%	139	11%
	Total Market *	884	100%	1055	100%	1129	100%	1185	100%	1244	99%

* Later years do not sum to 100% due to emerging technologies coming onto the market.

The values shown above are, to the best of the experts' ability, indicative of the market forecast in the absence of the BCE program. However, we believe that some of the comments may have been colored by the state of the market during the data collection period where there was a high percent of ENERGY STAR products already on the shelves that could have had some influence of the program. During the year or so of data collection for this study, the market appeared to change very quickly.

8.2 Desktop Computers

The BCE program targets desktop computers at the ENERGY STAR level, for this reason, we only provide market share for ENERGY STAR qualified models. The Computer market share estimates were generated to differentiate between the consumer and business markets. As our market assessment findings indicate, the business market is more receptive to energy efficiency (see Chapter 9, Midstream and Upstream Market Characterization). For this reason, our team generated two market penetration forecasts. Note, market experts agreed that this differentiation was necessary for the Computer market. Our market share estimates are provided in Figure 13 and Table 18 below. Notably, and backed by our qualitative research, the market share of ENERGY STAR desktop computers is substantially lower than that of televisions. In addition, our expert feedback indicates increases in efficiency beginning in 2010, and gaining steadily through 2012 as more voluntary programs (not just BCE) and codes and standards begin to affect the market. Further, we see that the business/commercial market experiences greater gains in efficiency year over year than the residential/consumer market.

Figure 13. California Desktop Computer Market Share Forecast, Residential and Commercial Customers

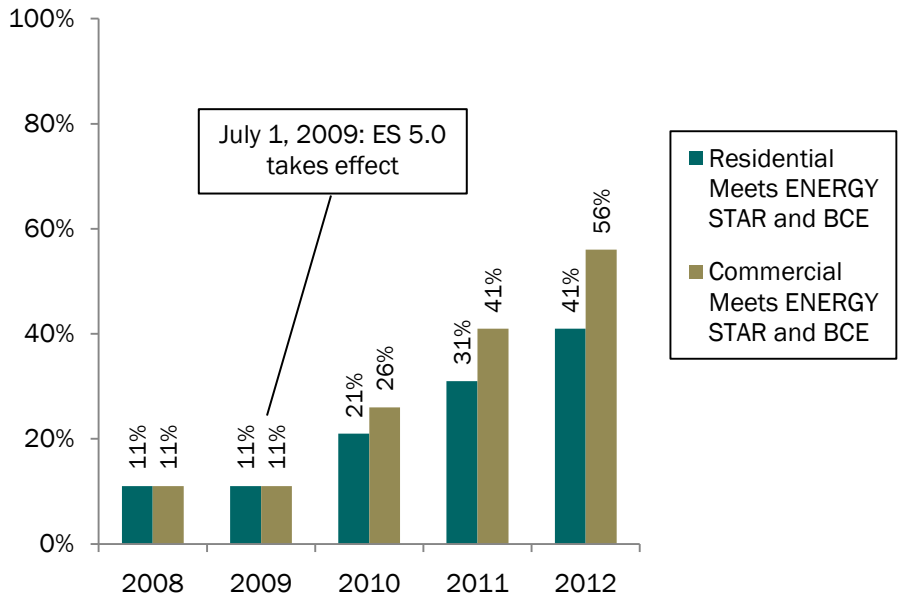


Table 18. California Desktop Computer Market Share Forecast Table

(1,000s and percentage)

Market	Efficiency	2008		2009		2010		2011		2012	
		N	% of market	N	% of market	N	% of market	N	% of market	N	% of market
Commercial	ENERGY STAR	76	11%	73	11%	140	21%	209	31%	280	41%
	Total Market	690	100%	666	100%	666	100%	675	100%	684	100%
Residential	ENERGY STAR	152	11%	148	11%	350	26%	562	41%	784	56%
	Total Market	1386	100%	1345	100%	1345	100%	1372	100%	1399	100%

8.3 Monitors

The BCE program targets monitors at 25% above ENERGY STAR's standard. Here, we provide our market expert projections for ENERGY STAR and ENERGY STAR+25%. Like the computer market, we examined the performance of monitors in both the residential and commercial markets. Here, in contrast to desktop computers, we found nearly the same market share of ENERGY STAR and ENERGY STAR plus models across both markets. This is due primarily, to the already high market share of ENERGY STAR qualified models. In addition, and unlike computers, monitors are not customized for the each market, therefore the residential and commercial markets share the relatively the same model assortment. We provide our market share estimates in Table 19 and Figure 14 below.

Figure 14. California Monitor Market Share Forecast, Residential and Commercial Customers

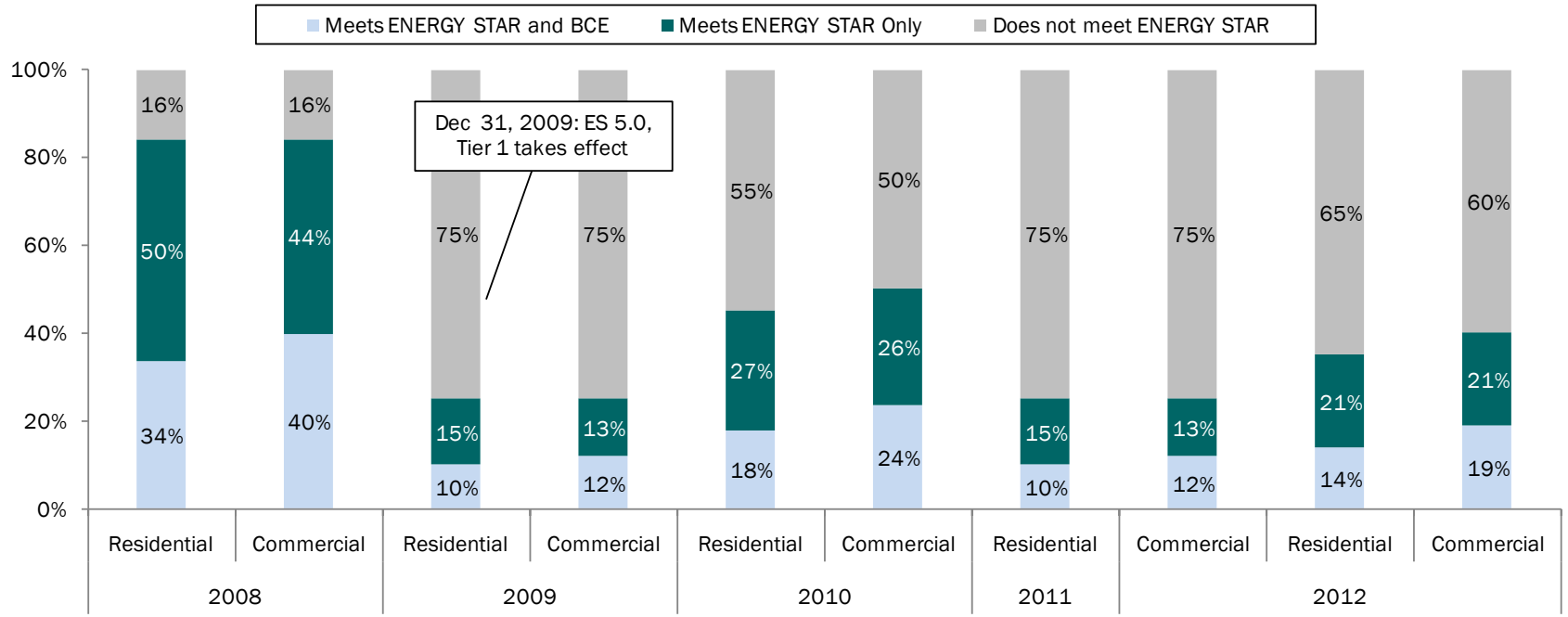


Table 19. California Monitor Computer Market Share Forecast Table

(1,000s and percentage)

Market	Efficiency	2008		2009		2010		2011		2012	
		N	% of market	N	% of market	N	% of market	N	% of market	N	% of market
Residential	ENERGY STAR	175	34%	40	10%	72	18%	40	10%	57	14%
	BCE	262	50%	60	15%	107	27%	60	15%	86	21%
	Total of Market	437	84%	99	25%	179	45%	101	25%	143	35%
Commercial	ENERGY STAR	422	40%	97	12%	193	24%	99	12%	161	19%
	BCE	466	44%	107	13%	214	26%	109	13%	178	21%
	Total of Market	887	84%	203	25%	407	50%	208	25%	339	40%

9. MIDSTREAM AND UPSTREAM MARKET CHARACTERIZATION

The Opinion Dynamics team conducted a series of in-depth interviews with market actors at various points in the electronics industry's delivery channels (see Figure 6). Here, we assessed the past, present, and future practices of each actor related to energy efficiency in order to determine the current state of the market.

9.1 Original Equipment Manufacturers

Among TV manufacturers, we interviewed: 1) a TV OEM who manufactures energy efficient TVs; and 2) a component OEM that is a raw material supplier. It is important to note that as each of these is just one of several possible actors, we do not suggest that their perspectives are representative of others'. For example, both OEMs claimed proactive roles in supporting energy efficient TVs. Nevertheless, findings from these two interviews were echoed in those from the big box channel in key ways.

Among computer and monitor manufacturers, we interviewed two OEMs who manufacture both computer and monitors and who together represent a large proportion of the market computer market. This section outlines findings from our interviews with these consumer and business electronics OEMs. Specifically, we document how energy efficiency has factored or might factor in four key areas: (1) discussions with market actors in the channels (2) OEMs corporate sustainability (3) client demand; and (4) marketing efforts. We focus on three time periods: the past (2007), the present (2008-09), and the future (2011-2012). Our findings follow.

Key Findings

TV and Component OEMs

Of the television and television component OEMs we interviewed shortly after the PG&E program was launched, two primary findings emerged: (1) Currently, the major brand OEMs are manufacturing models that exceed current ENERGY STAR specifications; and (2) OEMs, both component and major brands, note that the big box retail channel are specifically requesting models that, at minimum, meet or exceed, ENERGY STAR specifications. This emphasis on energy efficiency is noted as a stark change in request from the channel than in previous years. In particular, the component OEM specifically noted that this emphasis on energy efficiency has shifted dramatically since 2007, and further that this change in demand for high efficiency models is currently being felt across multiple component manufacturers (most located in Asia) who now perceive an increase in demand for higher efficiency specifications in North America. These effects are due, primarily, to the demand of the big box retailer channel on the major brand OEMs, and the OEMs' subsequent requests of component manufacturers to meet this demand. Further, it was indicated that new emphasis on energy efficiency was due, in part, to the voluntary programs being launched in California, namely through the outreach efforts of PG&E to multiple market actors, including

but not limited to, numerous component OEMs, Major Brand OEMs, and retailers.

These findings indicate that retailer demand for energy efficient consumer electronics appears to be moving up from specific requests of retailers influence the manufacturing decisions of OEMs.

Computer and Monitor OEMs

Desktop Computers: In contrast to the television OEMs, the supply of energy efficient desktop computer models in the *consumer* market is experiencing marginal increases. While increases in demand are being felt from big box retailers in the consumer market, there is limited willingness on the part of the retailers to absorb the incremental costs associated with procuring more energy efficient models which they believe cannot be passed on to the consumer. Thus, OEMs who serve the consumer market consider energy efficiency a relatively low priority for computers.

However, within the *business* market there has historically been a greater demand for environmentally friendly and energy efficient models, due primarily to the presence of EPEAT[30] standards, which include ENERGY STAR specifications. While the EPEAT standard is mandatory for many government and educational institutions (considered large enterprise customers which the BCE program does not incent), the overall business market has benefited by the increased volume of ENERGY STAR qualified models produced for these specific markets. In addition, the business market's end users have a more pronounced interest in efficiency specifications because they often purchase these products in large volume. Thus, a high volume order of energy efficient models can translate to significant energy and financial savings for businesses. While there is a greater demand for efficient computers in the business market as compared to the consumer market, among businesses, the concern for computer efficiency is relatively low compared to other purchase considerations – namely servers and virtualization software (see VARs section).

Further, it is difficult for OEMs to maintain consistent energy efficiency goals and voluntary or program specifications such as BCE or ENERGY STAR (in both the commercial and consumer markets) due to the *customizability* of desktop computers. Unlike televisions or monitors, desktop computers may be modified and customized to meet the specific needs of end users who often upgrade their models past targeted energy efficiency specifications.

Monitors: Of all categories, ENERGY STAR models have the greatest market share in computer monitors. Currently, most OEMs indicate that their monitor assortment is as much

[30] "The Electronic Product Environmental Assessment Tool (EPEAT) is a procurement system that helps purchasers in the public and private sectors evaluate, compare and select products based on environmental attributes. EPEAT is managed by the Green Electronics Council, a non-profit organization. EPEAT has three levels of product registration: Bronze, Silver and Gold. Product registration is based on a comprehensive set of environmental criteria. The ENERGY STAR program and the European Union's RoHS directive are two of the required criteria for EPEAT-registered products. Silver and Gold registration require additional optional criteria above and beyond those at EPEAT registration (registration status is EPEAT Bronze, which also requires points to be achieved, including ENERGY STAR and RoHS). Silver requires achievement of 50% of the optional points, and Gold requires 75% of those points."
(http://www.dell.com/content/learnmore/learnmore.aspx?c=us&l=en&s=gen&%7Eid=hmc_latit_eseries_energystar&%7Elt=popup&ref=CFG)

as 90% ENERGY STAR qualified. This is due to the inherent efficiency of LCD flat panel monitors, which dramatically exceed older CRT models in their efficiency levels. Thus, the ubiquity of ENERGY STAR monitors on the market render efficiency an understood product attribute, and efficiency is considered a non-issue in feature negotiations between OEMs and the channels. We provide a quick summary of our findings for OEMs in Table 20 and Table 21 below.

Table 20. Energy Efficiency Importance by TV OEM

OEM	Proportion of Television or Component Sales that are ENERGY STAR			Energy Efficiency within Corporate Direction, Product Design, and Discussions with Market Partners			Energy Efficiency within Client Demand			Energy Efficiency within Marketing and Outreach		
	06-07	08-09	11-12	06-07	08-09	11-12	06-07	08-09	11-12	06-07	08-09	11-12
1 (Com.)	100%	100%	100%	M-H	H	H	L-M	H	H	M	H	H
2 (TV)	~100%	~100%	100%	M	H	H	L-M	H	H	L	H	H

H= high, M=medium, L=low

Table 21. Energy Efficiency Importance by Computer and Monitor OEM

OEM	Proportion of Computer and Monitor Sales that are ENERGY STAR			Energy Efficiency within Corporate Direction, Product Design, and Discussions with Component Manufacturers			Energy Efficiency within Client Demand			Energy Efficiency within Marketing and Outreach		
	06-07	08-09	11-12	06-07	08-09	11-12	06-07	08-09	11-12	06-07	08-09	11-12
1	Comp: 10% Mon: 90%	Comp: 25% Mon: 100%	Comp: >25% Mon: 100%	L	L-M	M	L	M	M	L	M	M
2	Comp: 80% Mon: 100%	Comp: 80% Mon: 100%	Comp: >80% Mon: 100%	H	H	H	M	M	M-H	L-M	M-H	M-H

H= high, M=medium, L=low

9.1.1 *Television Manufacturers: Component Manufacturer and Major Brand OEMs*

We interviewed only one TV component manufacturer and one Major Brand OEM of televisions. Their responses are next.

Past Practices (2006-07)

In 2007, the TV Major Brand OEM sold the vast majority of their product to big box retailers with a much smaller proportion of them through an online store. Although the OEM indicated their product has been 100% ENERGY STAR compliant since 2007 (which was a stand-by specification only), the energy efficiency of their products was not necessarily a high priority for the OEM. For example, in 2007 the OEM lacked any explicit corporate policy regarding the energy efficiency of their product; however the OEM was talking about it. The representative explained, "We said this (producing energy efficient products) is a future and we want to do that, but at that time we weren't able to do that. We said in the future we want to lead for energy efficiency, this is an important aspect…"

In 2007, the energy efficiency of the product ranked as a "medium" consideration in the design and manufacture process. The TV OEM was not necessarily focused on having energy efficiency components installed into their product. Instead, the OEM explained, "The primary consideration was to get the best picture quality and the easiest user interface for [TV OEM] customers. [TV OEM] customers got value for money trying to keep the cost down as well." Thus, although some component manufacturers provided the OEM presentations on energy efficient model design, the OEM did not follow up on the topic as it was not "the primary thing" they were concerned about.

The OEM did not talk much about perceptions of consumer or retailer demand in 2007. However, we surmise from the interview that the OEM was focused on growing its business based on the price to quality ratio, a typical strategy in the consumer electronics market. However, the OEM did note that "They (our marketing team) didn't specifically promote it (energy efficiency) at that time. I mean we put on the cartons that we were ENERGY STAR compliant of course and sales wanted that but that was just for the off power, the standby power."

Providing more perspective, the component OEM explained its interest in energy efficiency and its perception of how the market is changing. This OEM, in particular, focuses on producing an energy efficient film used on television screens to reduce power draw. For this reason, this component OEM has an interest in how their product is integrated into energy efficient model design how energy efficiency is perceived among potential buyers such as other suppliers or the OEMs, all the way through the retail channel to the consumer. The respondent highlighted that in the past, the North American market has not been very responsive to energy efficient TVs: "There was just a lot of questions about whether consumers in North America would actually be purchasing, would want low powered televisions… when you look at consumer buying patterns in the U.S., we don't tend to place energy efficiency as kind of a #1 criteria for white goods." As a result, OEMs in general were

uncertain as to whether they should invest in, and focus on, the energy efficiency of their products.

Current Practices (2008-2009)

Compared to the Major Brand OEM's past practices, this market actor's current practices focus much more on the energy efficiency of their product line. The OEM's product continues to be 100% ENERGY STAR compliant but the OEM did not mention an explicit corporate policy reflecting this goal. Instead, the OEM referred to it as an "aim" making several additional references to an energy efficiency focus. For example, energy efficiency has now taken a "high" ranking and is a "regular" aspect of the OEM's conversations with component manufacturers indicating a clear change in emphasis: "We are actually trying to influence them (the component manufacturers) to push them to more energy efficiency. So when we have discussions, road map discussions, future products discussions, this is an important part of our discussion. We're always pushing to use less energy."

Consistent with the OEM's increased focus on energy efficiency, the topic has now taken on "high" importance in discussions with retailers. The OEM explains, "It's one of the important bullet points of the talk. We talk about the features of the TV including the energy efficiency." Thus, energy efficiency is now a major discussion point for retailers who "want… *at least* ENERGY STAR 3.0," indicating that retailers are also interested in product that meet ENERGY STAR plus 15% - which this OEM manufactures. Finally, it is important to highlight that the OEM now markets its products by highlighting energy efficiency to retailers. This is in contrast to the non-existent marketing done in 2007.

Consistent with the Major Brand OEM's increased focus on energy efficiency, the component OEM highlighted a big change in the current market: All OEMs now believe that there is a growing market for energy efficient televisions in North America. This stems from recent interest among retailers to order TVs that are 15% above ENERGY STAR 3.0 levels, indicating a potential effect of the BCE program's interventions. As the component OEM explains, "so we now have retailers that are talking to the brands (OEMs) and saying, you know, 'We want you to be at this kind of energy efficiency level'." Major retailers are thus influencing Major Brand OEMs to produce energy efficient TVs. The respondent compared the influence of the retailer "directive" to the potential influence of consumer demand: "It's not that consumers don't care about energy efficiency, it's just that … typically our (residential customers') electrical costs are relatively inexpensive and there's been… sort of a market misperception that all new electronics are more energy efficient." Thus, retailer demand for energy efficient televisions appears to be more powerfully influencing OEM model production than consumer demand, likely due in part to the program's interventions. As a result, energy efficiency has emerged as an important consideration within the current consumer electronics market.

Projected Future Practices (2011 and beyond)

Overall, the Major Brand OEM characterized future practices as being responsive to a higher demand from retailers for more efficient TVs. In fact, the OEM respondent believed that among retailers energy efficiency "will be a requirement, so…without it you won't be able to

get an order." Additionally the OEM aims to increase the number of products that meet the California Energy Commission (CEC) standards[31]. The OEM did not discuss much about the future beyond these two points, but we surmise that the OEM will continue to move in this direction so that their entire product meets the minimum ENERGY STAR specifications. Although the component OEM did not directly address 2011 and beyond, the expressed views up to this point are aligned with the perspective that the importance of energy efficiency in the consumer market will continue to increase, due primarily to retailer demand.

9.1.2 *Computer and Monitor OEMs – "Major Brands"*

For the computer market, the Opinion Dynamics team interviewed four market actors within two Major Brand OEMs. In this specific section, we discuss each OEM separately.

OEM 1 Past Practices (2006-07)

OEM 1 was interviewed from the B2C perspective, detailing the role of the energy efficiency in this particular market. This particular OEM has produced many products, including desktop computers and monitors, delivering approximately 90% of their products through retail channels, and about 10% through their own website directly to consumers.

OEM1's primary focus in 2007 was on features that consumers explicitly demanded, leaving energy efficiency fundamentally out of the picture at the time. In 2007 and prior, OEM 1 focused on consumer demand for product performance features first, above concerns for energy efficiency. Since consumer demand for energy efficient models was inherently low (or non-existent) at the time, most models produced for the consumer market did not qualify for the ENERGY STAR. One respondent explained how they integrated the ENERGY STAR program into their model design: "We've always participated in the ENERGY STAR program from its inception and done so enthusiastically… the challenge is balancing the requirements of meeting ENERGY STAR versus the other - a design feature that you make and bring to market what the customer feels is critical and important in choosing a product."

Further, the respondent differentiated ENERGY STAR requirements from model design that could enhance energy efficiency depending on the users' actions: "Energy efficient products (are not) necessarily tied to ENERGY STAR because you know an equal, if not a greater determinant of the actual energy use of a product…are the energy settings and the power management settings (which) the user chooses to implement. So from that standpoint, we have always designed energy efficient products and we have always enabled aggressive power management settings to make sure that the products are utilized in that mode as much as possible." Lacking a corporate policy in support of the energy efficiency of their products, and appearing to somewhat ambivalently accept ENERGY STAR criteria, the OEM reported that energy efficiency was a "low consideration" when talking to component manufacturers.

[31] For those products with a CEC standard, only products meeting the CEC standard may be sold in California.

In 2007, OEM 1 seemed to focus more on the features that they believed residential consumers wanted than on energy efficiency. Important features to consumers included "processor speed and memory and hard disk side and wireless capability". Although not explicitly stated by the OEM, it was implied that consumer demand for energy efficiency was low. This is consistent with the OEM's low prioritization of the feature in talks with component manufacturers and with the absence of any marketing highlighting the energy efficiency of the products. As expected given the low emphasis on ENERGY STAR qualifying models, OEM 1 sold a small percentage of ENERGY STAR rated computers in 2007 indicating that only 10% of the computers were ENERGY STAR compliant.

In stark contrast to desktop computers, OEM1 guessed that 90% of all monitors sold (and 100% of all LCD monitor sales) met ENERGY STAR specifications. This high compliance of ENERGY STAR models was due more to the market transformation from CRT monitors to LCD monitors, where consumer demand for this new technology was great. In other words, is the high proportion of ENERGY STAR models was not because consumers demanded ENERGY STAR but rather is a by-product of a desire for a number of features inherent in the new LCD technology. In the words of the respondent: "(In 2007, there was) a huge dramatic shift to LCD monitors of which energy efficiency is a huge part of the benefits story. But did it actually rank high in terms of what the business was driving towards and what customers were looking for when they purchased an LCD monitor? The answer is not really. It's secondary in an accompanying benefit that's inherent in the design of the product…"

Consistent with perceived low consumer demand, OEM 1 did not market or promote any computer or monitor based on the products energy efficiency in 2007. However, consistent with the OEM's interest in it, energy efficiency remained a concern, albeit a low one: "(In 2007) we were looking to find ways to inject that (energy efficiency) messaging into the total messaging story. But its priority both in terms of the customers' interest, the retailers' interest, (and) the available space to tell that story was much lower than other features." Thus, in 2007, for computers and monitors, the B2C portion of the market, was not primarily focused on energy efficiency.

OEM 1 Current Practices (2008-2009)

OEM 1 currently has no explicit corporate policy or goal defining the energy efficiency of their computer and monitor products; however, energy efficiency is "continuing to grow as an area of importance" to the OEM. When asked about where energy efficiency falls in model design the OEM 1 respondent stated, "it's somewhere…in the middle of the pack." OEM 1 appears to be looking for more ways to bring energy efficiency into their product line, including computers and monitors, although the "same old good" features (e.g. processor speed, memory, hard disk size, etc.) still take higher priority. For example, while OEM 1 would like to meet ENERGY STAR 5.0 criteria for computers, the standard requires an 85% efficient power supply which creates an increase in cost that the OEM does not believe the retailer or the consumer will pay "Because that cost has to be absorbed somewhere and….customers are looking for and considering energy efficiency but …in few if any instances have we identified their willingness to pay incremental for it; and that goes not only for the end customer but for the channel partner (retailer) as well."

Although customers may not be willing to pay for incremental costs associated with a product's energy efficiency, OEM 1 described a growing interest among residential

consumers in energy efficiency products: "the growing wave of…customer interest in more environmentally responsible products (is related) to the extent that they can be positioned as a cost saving alternative because of their energy saving abilities." Thus the OEM's current sales of ENERGY STAR computers have increased to 25% (up 15%) while monitors are at 100% (up 10%). Consistent with the increase in the OEM's higher prioritization of energy efficiency and their perception of its growing recognition among consumers, OEM 1 is now creating online marketing, as well as e-mail and physical mail campaigns. Thus, for computers and monitors, within the B2C portion of the market, the focus on energy efficiency is growing.

OEM 1 Projected Future Practices (2011 and beyond)

OEM 1 did not believe much would change three years from now. However the respondent believes that energy efficiency will continue to "become a higher priority" among the design, manufacturing, and marketing aspects of computers and monitors in the future, but will likely never surpass "price, speed, and memory size." and doubts it will ever be a primary differentiating feature because "we (have) had little or no indication that consumers are actually acting upon (their reported desire for energy efficient product)." Thus from these interviews with OEM 1, focus on computer and monitor energy efficiency within the B2C portion of the market is unlikely to increase in the near future.

OEM 2 Past Practices (2006-07)

OEM 2 produces many products, including desktop computers and monitors, primarily for the business markets. By the end of 2007 and the beginning of 2008, OEM 2 began to sell product through retail channels, however the OEM is still primarily focused on business as opposed to residential end users.

OEM 2 has a history of making energy efficient computers and monitors a corporate goal. Before 2007, OEM 2 had produced energy efficient products which meet both ENERGY STAR criteria and international criteria similar to ENERGY STAR. When the company was reorganized pre-2007, the OEM solidified this history into a corporate policy that called for ENERGY STAR compliancy for all products sold in the U.S. The company had also been proactive in working with software partners to push the development of software that manages the efficient energy usage of desktop computers. Finally, the OEM also focused on more stringent EPEAT standards. While talking about past and current corporate policy, the respondent stated "our goal is to not just meet, but to exceed both ENERGY STAR and EPEAT ratings."

Stemming from corporate policy, OEM 2 focused on the energy efficiency of its product in model design and in discussions with component manufacturers. For example, when the OEM was asked about model design and manufacturing in 2007, the respondent stated, "all of our products met the current ENERGY STAR requirements in the first half of 2007…we were focused very strongly on the upcoming ENERGY STAR requirements for ENERGY STAR 4.0. When asked about discussions with component manufacturers, the respondent replied, "we [put] those (ENERGY STAR) requirements on our suppliers." It is also important to note that for OEM 2 designing energy efficiency into the products was as important as features such as speed of the computer or the width of the monitor. Further, energy efficiency was

among a set of "environmental attributes" the OEM was focused on which included "materials of environmental concern and end of life processing, recycling."

In 2007, OEM 2 perceived a range of consumer demand for energy efficiency depending on who the company was selling to. Among the OEM's primary set of clients, business customers focused on energy efficiency because long term energy savings translated importantly into financial savings. For example, when we asked one OEM 2 respondent about the importance of energy efficiency to his business customers, he replied, "I would call it a high consideration, because…that gets into that total cost of ownership…" Thus, energy efficiency was among the top tier considerations which included price and "quality of build, the serviceability of it, the consistency of the parts, etc." However, when selling to retail channels, including retailers and VARS, one OEM 2 respondent said that energy efficiency was a "medium" consideration, while the other OEM 2 respondent, thinking only about retailers, said that energy efficiency had probably not been a consideration at all. Finally, among the company's public sector clients, energy efficiency was extremely important as these clients were mandated to buy products with EPEAT standards. Indicating dramatically different levels of emphasis depending on the market targeted.

In 2007, the proportion of ENERGY STAR models in OEM 2's computer and monitor sales was generally high; respondents estimated computer sales at 80% and monitors at 100%. The high proportion was due to a few reasons. First, the OEM's business customers were focused on energy efficiency as a form of long term cost savings. Second, included in these figures is the spillover from sales to public sector customers who were likely mandated to buy EPEAT-qualifying products with public funds. Third, most monitors manufactured tend to qualify for minimum ENERGY STAR specifications.

OEM 2 respondents did not talk too much about marketing and outreach efforts around energy efficiency in 2007. But we surmised that on average, marketing around efficiency was a low to medium consideration. We base this on three points. First, both respondents mentioned that present marketing efforts and plans were going to increase compared to those in the past suggesting that there was some but not a lot of marketing in the past. Second, the OEM had promoted the energy efficiency of their products on an online site that pertained to computing and the environment. Third, the OEM has posted an energy calculator on their own site that allows users to see the energy savings associated with various products. Thus, in 2007 and prior, the B2B portion of the market was focused more on energy efficiency, however consumer demand was relatively low or non-existent at the time.

OEM 2 Current Practices (2008-2009)

OEM 2 continues to produce many products, including desktop computers and monitors, primarily for the business markets. It has recently entered the retail channels although it is still primarily focused on business, as opposed to residential consumers.

Consistent with past corporate policy and goals, OEM 2 continues to produce energy efficient products which meet ENERGY STAR criteria, international criteria similar to ENERGY STAR, and EPEAT standards. Both model design and discussion with component manufacturers reflect this drive. As one respondent explained: "As we move toward more and more energy efficient top level machines, then the component (manufacturers) that

build them up have to be aware and focused on that as well. So certainly the suppliers, like our hard drive suppliers, our chipset suppliers, our display suppliers, you know all are part of the overall effort to achieve a certain level of energy efficiency."

Overall, current demand for energy efficient computers and monitors is similar to past demand such that on average energy efficiency rates as a medium consideration among other features. One new dynamic was the effect of the slowing economy. In the case of OEM 2's many business customers who buy in volume, the economy caused some buyers to focus on long term costs as opposed to up front ones. As one respondent explained, "I think (energy efficiency) is definitely more important, again, for all the reasons we've already discussed - economy and budget, and you know, if I'm going to replace something, let me make sure that I'm replacing it with something that's going to not just save me upfront costs, but over the life of the product." However, in the case of OEM's VARs channels, especially among smaller accounts, the effect was the opposite: the economy caused some buyers to focus on upfront costs as opposed to long term ones. One respondent explained, "especially in these economic times, some people are saying, 'you know, I'm going to focus on the tip of that iceberg, being the upfront cost versus my overall cost over the next couple years'." The OEM noted that the effect of the economy was similar on residential consumers, focusing them on upfront costs as opposed to valuing energy efficiency as a potentially money-saving feature over time. Finally, among the company's public sector clients, energy efficiency continue to be extremely important as these clients continue to buy products with EPEAT standards.

The proportion of ENERGY STAR in OEM 2's computer and monitor sales continue to be generally high: respondents estimated computer sales at 80% and monitors at 100%. The high proportion is due to the same three reasons: OEM's business customers tend to be focused on energy efficiency as a form of long term cost savings; included in these figures is the spillover from sales to public sector customers who are likely mandated to buy EPEAT-qualifying products; and most monitors manufactured tend to qualify for minimum ENERGY STAR specifications.

OEM 2 respondents stated that marketing efforts around energy efficiency are "ramping up." OEM 2 is now newly focused on their website, flyers, e-flyers, and brochures. Meanwhile, OEM 2 maintains past, more passive marketing, such as promoting the energy efficiency of their products on the online site that pertains to computing and the environment, and the online energy calculator that allows users to see the energy savings associated with various products.

OEM 2 Projected Future Practices (2011 and beyond)

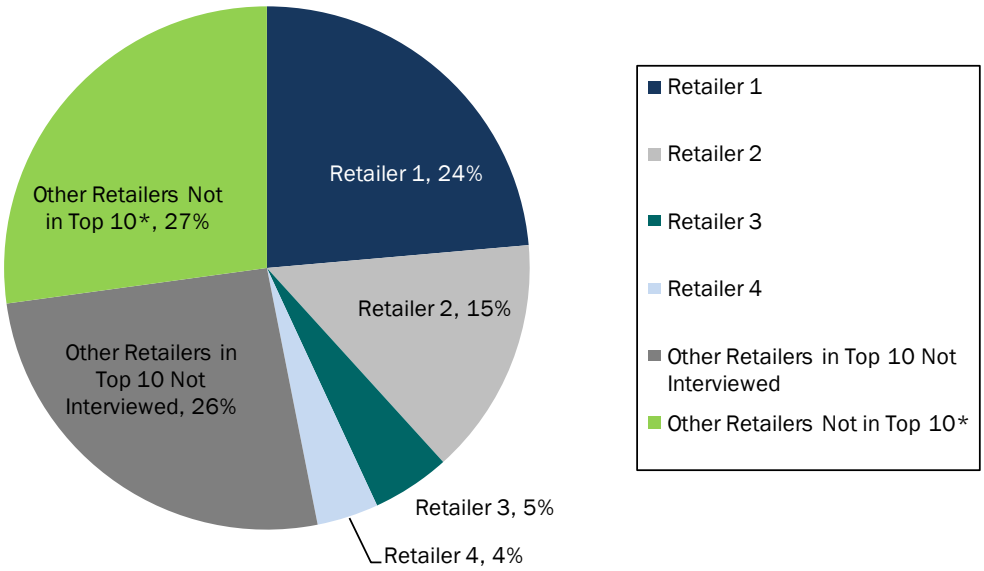
Overall, OEM 2 respondents did not characterize future practices too differently from current ones. However they did highlight two main differences between the two time periods. First, they believe that the proportion of energy efficient computers qualifying for minimum ENERGY STAR criteria will increase beyond 80%. One respondent explained that the development of the prerequisite technology around computer graphic systems, processor, and power supply was key: "The very powerful systems, they create a lot of heat, so they may have 2, 3, 4 fans that are in there, and those fans are constantly running, cooling the system down, and that's what prevents the ENERGY STAR compliance. So as technology changes to have cooler processors that are actually more powerful, you reduce the amount

of cooling requirements. So it's all engineering and development. It's not that we don't want to do it; it's just the technology has to catch up." Second, the respondents highlighted the importance of energy efficiency within the public sector "It gets higher and higher every year…I think we'll continue to see things ratcheting up." Thus, this sector is likely to support the manufacture and sale of energy efficient computers and monitors into the future.

9.2 Business to Consumer Channel – Big Box Retailers

Big box retailers primarily serve residential and small business customers at "brick and mortar" stores and online. The majority (81%) of customers purchase consumer electronics in store, as opposed to online-shopping (9%) which include OEM's and big box retailers' own websites as well as others (e.g. Amazon.com).[32] Thus, big box retailers dominate the consumer electronics delivery channel, determining which models will be available in-store as well as having some influence on the online market. These retailers determine which features, such as energy efficiency, go to the public by making specific demands of OEMs to alter or increase supply of models to meet their specific feature requirements. The table below provides a summary of the retailers interviewed for this study, comprising 52% of the entire market.

Figure 15. Consumer Electronics Retail Market



* Three of the retailers interviewed were part of this group. Together they made up 5% of the total market share.

[32] Bassill, S. QDI Strategies & Lukasiewicz, M., MXRoads, Inc. April 10, 2008. *Strategic Options for Energy-Efficient Electronics in Pacific Gas and Electric Service Territory: Marketing Delivery Systems for Electronics Measures*. Prepared for Pacific Gas and Electric Company, Emerging Technologies Program, Application Assessment Report # 0702.

The Opinion Dynamics team interviewed eight consumer electronics big box retail buyers responsible for TV, desktop computer, and monitor model selection for seven major US retailers. As of 2008, four of these seven retailers account for 64% of all sales among the top ten electronics retailers in the U.S.[33, 34] consumer electronics market, and thus these four are largely responsible for the product lines and features available to US consumers.

This section outlines findings from our interviews with these consumer electronics retailers[35]. Specifically, we document how energy efficiency has factored or might factor in four key areas: (1) corporate sustainability efforts and/or direction; (2) retail buyers' discussions with OEMs; (3) consumer demand; and (4) business to consumer marketing efforts. We focus on three time periods: the past (2007), the present (2008-09), and the future (2011-2012). Our findings follow. It is important to note that most of the retailers we interviewed do not differentiate their practices based on whether the product is a TV, desktop computer or monitor. So unless otherwise specified, we use 'consumer electronics' to cover these three kinds of products as the retailers do.

9.2.1 Key Findings

With the exception of one big box retailer who indicated that energy efficiency has been an important consideration since 2007, energy efficiency is situated as a second-tier feature consideration, always ranking below the first tier considerations of price, brand, and performance (size, speed, memory, screen resolution, etc). In 2007, energy efficiency was not an important consideration for most retail buyers of consumer electronics, and thus energy efficiency was not an important aspect in the B2C portion of the market and its importance across all areas of inquiry was low. However, energy efficiency has become moderately more important with time, partially attributed to a change in public attitudes towards it and other "green" features. This increase in focus from 2007 to the present has not moved energy efficiency to a first tier consideration, rather it serves as a differentiating feature in the second tier, with the potential to provide a given model or retailer a competitive advantage when compared to other products or retailer offerings. Thus, energy efficiency is emerging as an important aspect in the consumer market. Most retail buyers anticipate future change around energy efficiency, indicating that it is likely to become very important in the market due to a number of factors including (1) energy efficiency's growing value as a differentiating feature as consumer demand grows; and (2) increased and emerging mandatory and voluntary standards for energy efficiency. Table 22 summarizes our findings by retailer.

[33] Ibid

[34] Note: at the time these data were gathered Circuit City was still in business, was third among the top ten retailers with 15% of the total sales. We do not know how its market share was absorbed by the remaining retailers, thus the percent of sales is calculated assuming Circuit City is still in the market.

[35] It is important to note here that Opinion Dynamics has repeatedly tried to interview a buyer for one of the country's largest retailers, comprising 17% of the US Consumer Electronics market. However, due to barriers with corporate communications, we were not granted access to this buyer for an interview. Although we were able to interview another representative of this retailer, our reporting may be lacking an important perspective.

Table 22. Energy Efficiency Importance by Retailer

Retailer	Percent of Market Sales among Top Ten Retailers	Proportion of Product that is ENERGY STAR			Corporate Direction			Ordering and Interactions with OEMs			Marketing and Outreach		
		06-07	08-09	11-12	06-07	08-09	11-12	06-07	08-09	11-12	06-07	08-09	11-12
1	30%	<50%	67%	100%	L	M	n/a	L	M	n/a	L	M	n/a
2	17%	DK	100%	100%	M	H	H	M	H	H	L	M	n/a
3	6%	DK	n/a	90%	DK	DK	n/a	L	M	M	L	L	M
4	4%	>50%	90%	>90%	n/a	n/a	n/a	L	M	M	L	M	M
5	4%	60-80%	90-95%	100%	L	M	H	L	H	H	L	M	H
6	3%	DK	100%	100%	M	H	H	M	H	H	M	M	n/a
7	__[36]	60-80%	90-95%	100%	L	M	H	L	H	H	L	M	H

H= high, M=medium, L=low

n/a is "not asked" or "not answered"

DK means that the respondent did not know

[36] This retailer did not rank among the top ten consumer electronics retailers.

9.2.2 Past Practices (2006-07)

In 2007, retailers believed that consumer demand for energy efficiency was low so ordering, stocking, and marketing efforts were focused primarily on a feature set that excluded energy efficiency. Retail buyers focused on brand name, value, performance/specs, and aesthetic considerations such as casing design. When weighing efficiency against these features, nearly all retailers assigned a "low" rank to energy efficiency. In the words of one retailer, "(Brand) name and price (have) always been most important." Another retailer stated, "I don't think it (energy efficiency) was necessarily top of mind." Thus in 2007 and prior, energy efficiency was not an important aspect in the consumer market.

Energy Efficiency Ordering Practices

Retailers saw energy efficiency as ubiquitous, due, in part, to the stand-by only ENERGY STAR specifications prior to 2007, which did not include on-mode power draw requirements for TVs. Buyers indicated that they had difficulty differentiating models based on efficiency, as most models qualified for ENERGY STAR, thus most assumed that energy efficiency could not act as a strong product differentiator. One retailer said, "we assumed that doing business with the major manufacturers in our industry (meant) that most of the products we were buying were ENERGY STAR[37] qualified…" Further, even if buyers or customers sought to differentiate products beyond ENERGY STAR specifications, they would have had a hard time discerning the appropriate product to buy. A retail buyer recounted, "It was just hard to rate, especially because of different technologies and micro displayed TV's and plasmas and LCD's and how those differed in energy usage. Each one of those claiming that you know they're as good as or better than the other in terms of how they use energy."

Energy Efficiency Share of Models and Sales

Consistent with retailers noting the ubiquity of the ENERGY STAR label in the 2007 market place, many stated a significant portion of the stock they carried was likely energy efficient, at least to some ENERGY STAR standard. Although some could give estimates for percentages of energy efficient models carried and sold, most stated that their companies had not tracked energy efficiency specifications for the models they carried. Overall retailers reported a wide range of sales and stocking practices of these consumer electronics. Of those who had some idea of the past portion of energy efficient models, estimates of the percent of ENERGY STAR models stocked and sold ranged from less than 50% to 100%.

Energy Efficiency Marketing and Promotions

Since energy efficiency was not seen as a differentiating feature, it was not promoted to customers. Would-be energy efficiency-focused consumers would have been stymied by the lack of any trained staff to explain the electricity usage differences among the products. None of the retailers we interviewed stated that their staff had received any training regarding energy efficiency in 2007.

[37] All retailers we interviewed implied that ENERGY STAR was the default measure of energy efficiency in their product lines in 2007.

In contrast to the characterization of the retailers above, a markedly different characterization of another retailer emerged when we interviewed two respondents working for the same company. Several points of difference between this retailer and the others appeared to be driven by the company's environmental sustainability practices which affected its focus on energy efficiency in consumer electronics.

In comparison to the five other retailers, this retailer ranked energy efficiency as a "medium" consideration in discussions with OEMs and in the ordering and stocking of product; yet, it was still less important than brand name, price, and performance/specs considerations. Although this retailer did indicate a focus on energy efficiency (and could be considered an early adopter of energy efficiency), it did not actively market or promote this feature and none of its staff received training in energy efficiency product features. Thus, it is difficult to discern if this retailer truly differed from other big box retailers in practice.

Corporate Policies on Energy Efficiency

None of the retail respondents reported having explicit corporate policies in place mandating the stocking of energy efficient TVs, monitors, or computers. When asked specifically about corporate policies prior to early 2007, the early-adopter stated, "Well our goals were, and I'd hate for you to refer to it as policy. It's a strategic direction that we're going. We've got sustainability throughout our organization, electronics and energy efficiency is one of them." Most other retailers indicated that energy efficiency was not a focus for their consumer electronics. For example, when one retailer was asked whether or not there were any 2007 corporate policies in place for energy efficiency in TVs, he simply responded, "No, there were not."

9.2.3 Current Practices (2008-2009)

Many striking differences were uncovered between past and current practices among the retailers interviewed. Most respondents report their companies are currently, and intentionally, carrying energy efficient products. Consistent with past practices, companies' intentions are still not formalized policies; rather they are considered a "tone", or "direction." When asked if ENERGY STAR was their standard, a retailer proclaimed, "ENERGY STAR has been our standard." A different company representative stated, "We had a goal as a company by this month . . . that we're going to be 100% ENERGY STAR." Thus energy efficiency has emerged as an important aspect in the consumer market. This direction or tone is driven by a number of factors influencing currently these actors: (1) the desire to competitively differentiate themselves using "green" technologies; and (2) the emergence of on-mode ENERGY STAR specifications; (3) the emergence of mandatory standards, such as Title 20; and (4) on-going negotiations with BCE program implementers (namely PG&E) who are pushing for higher efficiency levels.

Energy Efficiency Ordering Practices

We asked respondents to rank energy efficiency among key features for their current computer, monitor, and TV ordering practices. Currently, energy efficiency has become more important for retailers when talking with OEMs and ordering product. For example, when we asked one retailer about the role of energy efficiency in discussions with OEMs, he responded that it is currently a "medium consideration". While brand, price and value are

still more important, energy efficiency is becoming a "new, hot topic" and, most strikingly different from 2007, energy efficiency is emerging as a "high priority" among retailers and their discussions with OEMs. One retailer ranked it "pretty close to number one" in terms of product features.

Energy Efficiency Share of Models and Sales

Another new trend has emerged in current practices. Many companies are beginning to track sales of their energy efficient consumer electronics, most likely in response to the requirements of the BCE program active in PG&E's service territory. Respondents were unwilling to provide specific sales figures due to proprietary reasons, but many could give estimates of product share. Most buyers indicated a dramatic increase in the share of models that meet the new ENERGY STAR specifications. Retail buyers indicated that their orders tend to consist of as much as 90 to 100% ENERGY STAR qualified product, although there are some that have smaller proportions. For example, one retailer replied that 90% of the product models and 95% of those sold were ENERGY STAR qualified, while another retailer stated that 65% of the models carried and sold were ENERGY STAR qualified.

Energy Efficiency Marketing and Promotions

Most retailers indicated that they are currently planning to implement BCE program-sponsored cooperative marketing in incenting IOU territories and also indicated that their overall emphasis on energy efficiency outside of these efforts is increasing (however there is no indication that retailers are promoting energy efficiency in-store based on our end user channel assessment (see Chapter 6, End User Channel Assessment: In-Store , beginning on page 36). On average, retailers report energy efficiency has increased since 2007, to a "medium" consideration in their promotions and marketing. All retailers we interviewed provided examples of current promotions of ENERGY STAR products.[38] For example, one retailer indicated training staff on energy efficiency and also featuring ENERGY STAR products in prominent places throughout their stores, but this was currently for white goods only, with an aim to move into CE efforts: "Every day you'll see it in the stores (white good EE promotions), energy efficiency is being pushed on our shelves, on our floors, our sales people train."

As a means of communicating to the consumer, one club retailer asked OEMs to include the ENERGY STAR label on their product boxes, which are often on display with the product in-store: "one of the big things we try to do is push our manufacturers to give themselves credit and give consumers information by providing that (energy efficiency) information on the box which is a huge sales person for us."

This drive to promote energy efficiency, however, appears to be coming from the retailers rather than immediate consumer demand which most buyers perceive to be medium to low. For many interviewed, this may be due, in part, to the work of the BCE program with retailers.

[38] One retailer, instead, stated that such promotion was in development.

Retailers believe current consumer demand hinges primarily on brand name, value, and performance and perceptions of consumer's energy efficiency demand varied among retailers. One retailer perceived increases in consumer demand articulating, "It's definitely more top of mind now…. Pricing has gone up in gas and electricity over the last year and people are just being more conscious of the environment now more than ever; and you know their desire to save money with electricity as well." In contrast, another retailer believes that energy efficiency is a low factor among consumers but growing. When asked about the importance he answered, "A low but growing factor. Higher (than 2007) but still low."

Corporate Policies on Energy Efficiency

Similar to past practices, none of the retail respondents report having explicit corporate policies in place mandating the stocking of energy efficient TVs, monitors, or computers. However three more retailers now report something other than an explicit policy, such as a "direction", "push" "goal", etc, that informs their practices in ordering, stocking and promoting energy-efficient of consumer electronics. Meanwhile, the early adopter highlighted the incorporation and development of the existing corporate direction into recent practice: "We had a goal as a company by this month…to be 100% ENERGY STAR."

9.2.4 Projected Future Practices (2011 and beyond)

When asked to project efficiency demand and practices into the future, retail buyers predict energy efficiency in consumer electronics will continue to grow and will become a very important issue. Namely, they indicate that energy efficiency will affect all dimensions of business. Retailers believe this is due in part to: (1) energy efficiency's growing value as a differentiating feature as consumer demand grows; and (2) increased and emerging mandatory and voluntary standards for energy efficiency, including Title 20, the BCE program, and changing ENERGY STAR specifications. All retailers also indicated future consumer demand for energy efficiency would benefit from efforts on the part of retailers and/or the OEMs to emphasize it as a feature. A few retailers indicated that they will use energy efficiency as a differentiating point and competitive advantage. Energy efficiency may also be used as part of strategic corporate direction and public image. Thus retailers believe that the importance of energy efficiency will continue to increase in the future consumer market.

Energy Efficiency Ordering Practices

Overall, most retailers believe energy efficiency will likely become a medium or top consideration when ordering product in the next three years, reflecting a substantial shift from 2007. Retailers postulate that energy efficiency will continue to be a topic of discussion with OEMs over the next three years. While most believe it will remain or become a high priority, most are also unsure if it will ever surpass price and feature when ordering product. Respondents based their estimates on various rationales. One retailer referred to corporate sustainability practices, "energy efficiency (will move) from a medium consideration to a high consideration based on our overall corporate approach to sustainability." When asked about the environmental push on recycling and energy efficiency, another market leader replied, "I think it's going to be as it is right now, pretty

close to number one if not number one, very high. The environmental push right now on recycling and energy efficiency puts it to the forefront. If it is important to the consumer you've got to believe it's really important to the retailer."

One respondent expects the manufacturers will drive future advances in energy efficiencies, explaining, "We expect a lot of the manufacturers to become more energy efficient with new technologies becoming available. Hopefully it is standard practice and our forecast of televisions should remain consistent because they are all becoming more energy efficient, from the factories to the panel manufacturers to the actual TV manufacturers themselves."

Energy Efficiency Share of Models and Sales

Retailers plan to continue their focus on energy efficiency in their product lines going forward. Generally, retailers estimated that 100% of their products would meet current ENERGY STAR specifications and most thought that they would meet future specifications as well. One retailer estimated future stocking practices closer to 90%. Overall however, retailers' perceptions of their future stocking practices were similar. One retailer commenting on his own estimate of 100% ENERGY STAR product said "I think that (the 100% stocking of energy efficient consumer electronics) will be (true) of all the major retailers."

Energy Efficiency Marketing and Promotions

In striking contrast to past practices where promotional focus on a model's energy efficiency was low, but consistent with current practices in which focus on energy efficiency as a feature is growing, future marketing and promotion strategies around energy efficient consumer electronics are likely to increase. Of the retailers we asked, all predict marketing and promotion strategies around energy efficient consumer electronics will likely become a medium or high consideration in the next two to three years. Compared to current practices, retailers will focus advertising ENERGY STAR products across different mediums, utilizing newsprint, email marketing and promotional events.

Retailers also stated that there will be more training of their staff. As one respondent stated, "I think we're going to be pushing it (energy efficiency) a little more. Make sure our people are even more trained on it. It is important. Right now for the most part everyone is priced the same…. It's important that you start to push the features and the main feature is energy efficiency." One retailer explained that savvy staff would be able to differentiate ENERGY STAR products such that consumers would see the benefit of energy efficient products." It (energy efficiency) is when you can explain it properly…; present it in a way that the consumer can see a benefit and it becomes very key." This further illustrates the potential market shift to energy efficiency.

Despite retailer's stated movement towards energy efficiency, disagreement on future consumer demand remained consistent with current perceptions. Most retailers implied that future consumer demand would still be focused on brand, price, and features. Beyond this however, retailers varied as to their perceptions of where consumers would rank energy efficiency, although none believed they would rank it low.

On one end of the spectrum, approximately half of the retailers believe consumers will rank energy efficiency among the highest features when considering consumer electronics.

Conversely, about half the retailers indicated consumers will rank energy efficiency as a medium consideration. Some retailers are skeptical that energy efficiency, although likely to be a medium consideration, will ever eclipse brand name and price, among other features. Thus one retailer stated: "I think at the end of the day when they (customers) are opening up their wallet, you know it (energy efficiency) will definitely have its place. I'm guessing though you know in that middle tier section of consideration variables." Another market leader ranked the factors this way, "Brand, size, price point are the main ones and then you are talking about just some of the performance features and … energy efficiency."

One retailer believes that future consumer demand for energy efficient products can be further increased through education/marketing stating, "Brand and price point will take higher precedence but consumer's preferences can change based on education. There is room to educate consumers about ENERGY STAR meaning". Further, some retailers believe *manufacturer* marketing to, and general education of, the consumer regarding energy efficiency will have to take place to generate consumer interest. As a retailer explained, "The energy usage of TV's in particular, depends on the manufacturers to relay that message and really the better they do with relaying that message then the better we (retailers) do… I think our forecast will be dictated by that."

Corporate Policies on Energy Efficiency

Similar to past and current practices, none of the retailers believe that they will adopt explicit corporate policies mandating the stocking of energy efficient TVs, monitors, or computers in the future. However, we also surmised that none of the retailers that had so far identified corporate directions toward energy efficiency had any intention to drop them. Thus, most retailers are likely to have corporate directions supporting energy efficient consumer electronics in the future. When asked if the direction that one retailer was taking would continue to be in place three years into the future, the retailer responded, "absolutely."

9.3 Business to Business Channel (VARs)- Computers Only

The Opinion Dynamics team interviewed five VARs who supply desktop computers, and/or monitors for their clients - typically businesses. These VARS work closely with OEMs, such as Hewlett Packard (HP), Cisco, International Business Machines (IBM), Lenovo, Toshiba, etc. to provide clients with tailored product and services.

This section outlines findings from our interviews with VARs. Specifically, we document how energy efficiency has factored or might factor in four key areas: (1) corporate sustainability efforts and/or direction; (2) VARs' discussions with OEMs; (3) client demand; and (4) business to client marketing efforts. We focus on three time periods: the past (2007), the present (2008-09), and the future (2011-2012).

9.3.1 Key Findings

VARs serve as one of two primary channels in the business market. VARs might be characterized as representatives of OEMs due to the extent to which VARs focus on only

certain OEM product lines and partner with OEMs during promotions. However, VARs are inherently end-user driven, characterizing themselves as consultants whose clients' interests become their own. Thus their clients' orders become their orders to the OEMs. In clients' selection and ordering of computers and monitors, energy efficiency has rarely played a significant role.

This may be due to the way in which high volume purchases are made. Namely, VARs' clients often purchase an entire solution, which includes the virtualization and consolidation[39] of servers, data centers, and storage devices as well as computers. As these products (i.e., servers) use substantially greater amounts of energy, they are the primary focus for VARs when interacting with cost-conscious businesses. Thus, within the computer market, the capacity to focus on energy efficiency exists in the business channel; yet there is only small focus on computers and monitors as part of the business proposition.

Energy efficiency is becoming a point of product differentiation in computers and monitors in OEM marketing strategies in the business market, as demonstrated in the Computer and Monitor OEM findings. At most, energy efficiency is situated as a second-tier feature consideration, always ranking below first tier considerations such as speed, reliability, durability, memory, size, etc. for VARs and their clients. Recently, however, two separate trends have aligned to put new focus on the energy efficiency of computers and monitors in the second tier. First, fueled by the "greening" of the culture or by mandates on government funds (EPEAT standards), VARs are engaged in more conversations with clients about energy efficiency during product selection. Second, OEMs have started highlighting the energy efficiency of their products to the VARs. These changes are due primarily to movement and changes in emphasis among supplying OEMs and end users. There was no indicating that the BCE program has affected practices in this channel to date. Table 6 outlines the importance of energy efficiency by VAR.

[39] Virtualization and consolidation can take many forms but the end goal is to reduce the number of physical machines needed for storage, or processing while maintaining normal functioning. This can be accomplished using software, off-site servers that host multiple users, or machines that are designed to take the place of several others.

Table 23. Energy Efficiency Importance by VAR

VAR	Proportion of Computer as Monitor Sales that are ENERGY STAR			Energy Efficiency and Corporate Direction			Energy Efficiency within Client Demand, Ordering and Discussions with OEMs			Energy Efficiency within Marketing and Outreach		
	06-07	08-09	11-12	06-07	08-09	11-12	06-07	08-09	11-12	06-07	08-09	11-12
1	50-60%	75-80%	100%	L	L	n/a	L	M	M	L	L	n/a
2	n/a	40%	100%	L	M	n/a	L-M	M	n/a	L	L	n/a
3	100%	90-100%	100%	M	M	n/a	L	M-H	M-H	L	L	n/a
4	DK	DK	DK	L	L	L	L	M	M	L	L	L

H= high, M=medium, L=low
n/a is "not answered"
DK means that the respondent did not know

9.3.2 Past Practices (2006-07)

VARs reported that client demand for energy efficient desk top computers and monitors was generally low and discussions with OEMs, ordering, and marketing efforts were focused primarily on a feature consideration set that did not include energy efficiency. Nevertheless, VARs reported a range of estimates for energy efficient product orders. Estimates ranged from 50 to 100%, while some could not even guess, reflecting the lack of consideration energy efficiency received when ordering monitors and computers. None of the VARs could recall having discussions about energy efficiency in computer or monitor lines with OEMs in 2007. When computers and monitors were marketed with OEMs, energy efficiency was never a promoted feature. Energy efficiency was only a component of marketing when it pertained to data centers. None of the VARs had discussed energy efficiency internally as a component of product selection policy for monitors or computers.

Client Demand

VARs reported that client demand for energy efficiency was generally low and discussions with OEMs, ordering, and marketing efforts were focused primarily on a feature consideration set that did not include energy efficiency. When selecting products, customers wanted models with a high feature to price ratio. For computers, the important features included processing speed, hard drive space, and durability; for monitors the important features included screen size and brighter screens. Summing up, one respondent said: "(for computers) hard drive capacity, the processor speed, the size you know if it's a small form factor…that it didn't take up too much desktop space. With the monitors, it would be the size of the monitor; whether it had speakers you know the resolution." When weighing it against these features, nearly all VARs assigned a "low" rank to energy efficiency. We also asked VARs if their clients had any negative associations with energy efficiency in computer and monitor products and most said that it was generally viewed positively but lowly. Finally, when energy efficiency did come up in conversation with clients, the focus was on the biggest "energy guzzlers" including data centers, storage devices, and server banks, which was salient to cost-conscious clients. In the area of computing, energy efficiency was associated with finding solutions to these guzzlers such as virtualizing servers.

Energy Efficiency Ordering Practices

For all of our respondents, 2007 ordering practices were customer driven with orders to OEMs reflecting the product selections the clients and VARs had made together. Because energy efficiency was a low consideration for clients, it was also a low consideration for the VARs who did not necessarily focus on whether or not the product ordered was energy efficient. Nevertheless, VARs reported a range of estimates for energy efficient product orders. Estimates ranged from 50 to 100%, while some could not even guess, reflecting the lack of consideration energy efficiency received when ordering monitors and computers. This finding may also stem from the VARs' inability to see the differentiation that energy efficiency might bring. Some VARs indicated that the ENERGY STAR was prevalent and thus not a point of differentiation.

Energy Efficiency Share of Models and Sales

Although some VARs could give estimates for percentages of energy efficient models sold, most stated that their companies had not tracked energy efficiency specifications for the models they carried. So even though some VARs actually reported selling a high proportion (i.e., 50% to 60% or 100%) of models deemed energy efficient, these estimates were based on respondents' deductions based on what they happened to know about their primary product lines. Because some VARs noted the prevalence of the ENERGY STAR label in the 2007 market place, many stated a significant portion of their sales was likely energy efficient.

Discussions with OEMs

We asked VARs about the kind of discussions they were having with OEMs back in 2007 and the role of energy efficiency in those discussions. Conversations included the business relationships between the organizations, referred to as "strategic partnerships" by one VAR in which the VAR implied that they would help push that OEM's product. However, none of the VARs could recall having conversations about energy efficiency in computer or monitor lines, although one VAR said that she was aware that at least one OEM had made "white papers" and "marketing collateral" focused on energy efficiency available. Instead, some of the VARs reported having conversations focused on the energy savings possible through the virtualization and consolidation of servers. In the words of one VAR, "On the server side, we talk a lot about virtualization; it's been…big, you know, banks and blade servers." In this case, the VAR refers to the consolidation of several servers into a "blade server" that would run on a fraction of the energy and use less space than the aggregate it replaced.

Energy Efficiency Marketing and Promotions

In 2007, about half the VARs we spoke with had entered into marketing and promotion relationships with at least one of their primary OEMs. In most cases the marketing was focused on "price and technology enhancements". When computers and monitors were marketed, energy efficiency was never a promoted feature. Energy efficiency was only a component of marketing with OEMs when it was focused on clients whose data centers could be consolidated or virtualized.

Corporate Policies on Energy Efficiency

We asked the VARs whether they had had any internal discussions about the role energy efficiency would play in product selection. None of the VARs had discussed energy efficiency as a component of product selection policy for monitors or computers. At most, VARs had had conversations about the energy efficiency of their own organizations' IT infrastructure.

9.3.3 Current Practices (2008-2009)

Consistent with past practices, VARs are still highly client-driven and this is reflected in VARs ordering and sales practices. This means that, in general, VARs are ordering energy efficient computers and monitors when their customers have expressed interest in and selected them. However, VARs now report raised interest in energy efficient computers and monitors, fueled by increased client interest in "green" products, awareness of the EPA ratings, and attention to costs. VARs report that the increase in client demand for energy efficiency in

2008-09 has become an important but second tier consideration when clients select monitors and computers. VARs reported a range of estimates for energy efficient product from 40 to 100%, reflecting increases of proportion of product for most VARs. In stark comparison to their past discussions, most VARs are now discussing the energy efficiency of computers and monitors with the OEMs. However, these are not necessarily lengthy or frequent discussions. Further, energy efficiency is still more focused on virtualizing and consolidating the biggest "energy guzzlers" than it is on buying energy efficient computers and monitors. This continues to be reflected in the joint OEM and VARs marketing and promotions in which energy efficiency is only a topic associated with the consolidation or virtualization of servers. Finally, consistent with past practices, VARs are not currently having any internal discussions about the role energy efficiency should play in product selection.

Energy Efficiency Client Demand

While much of the focus on energy efficiency in computers used to be in storage devices, servers and data centers, clients are now becoming somewhat focused on computers and monitors. When asked about whether energy efficiency the increased as a feature important to clients, one VAR summarized, "More this year than last year. And it's becoming a significant piece of the equation especially with certain kinds of power guzzling equipment, data centers and that kind of thing, servers and storage devices - things like that. Also it's even coming down to more in the desktop and monitors." Consistent with past client demand for high feature to price ratio when choosing computers and monitors, current client demand is still focused on this ratio which generally includes the same feature set (i.e. processing speed, durability, screen size, etc.). However, VARs now report that the increase in client demand for energy efficiency in 2008-09 has become an important but remains a second tier consideration. As one VAR reports, "[Energy efficiency] is a (medium) consideration where it wasn't before…Anything revolving around green is a conversation you can have with a customer nowadays." Yet VARs still characterize energy efficiency as a "tie-breaker" between two models, and "icing on the cake" as opposed to a "deal breaker:"

Some clients are asking for the EPEAT standards by name. While mostly true of clients from the public/government sector who are mandated in the way they spend public funds, some business clients are also interested in the EPEAT rated products. One VAR explained, "The customers - especially because we do so much public sector - almost all of our government customers now are asking for the EPEAT rated equipment…" For clients from private companies, their increased interest in energy efficiency is not mandated by government but is primarily rooted in financial savings. However this interest has been partially stymied by the downturn in the economy and clients' resultant unwillingness to upgrade to more efficient models. As one VAR explained, "…with the economy the way it is, most people are thinking…short term price savings. So if something is cheaper and maybe not as energy efficient, they still may go with that."

We uncovered key differences in the VAR clients' perceptions of monitors and computer. In general, clients tend to associate any new model with being more energy efficient, yet they also generally view monitors as being more energy efficient than computers. Thus they are more likely to upgrade their computers to save money as opposed to monitors. One VAR summarized:

> "I think in general most people assume that all of the units because they're newer are going to burn - they use less power than the old ones. So simply by buying new they'll reduce their power consumption. (But) would you buy 200 new computers a year early because you were going to save $50 and -especially in today's economy- spend the extra thousand to two thousand dollars per desktop to save $50, when you can pay nothing for another year and recycle them out in another three or four year period? And monitors more so even. A lot of times companies are buying new desktops but they don't buy new monitors. They'll leave the monitor for two cycles so you go by some companies they've got monitors they refresh every three years and they'll refresh on the third recycle rather than the second. The second recycle instead of the first."

Finally, if VARs and their clients are talking about energy efficiency, computers and monitors are secondary to the financial and energy savings associated with virtualizing and consolidating the biggest "energy guzzlers". One VAR explained the tremendous financial and energy savings that can be realized through savvy consolidation and virtualization: "We're making a big push on energy reduction but we're doing it on the server through virtualization side and printer through consolidation, where you're not only doing all kinds of good things from a green perspective reducing computers by 90%, servers by 90%, reducing printers by 50-60 percent [but also] saving a boatload of money for the customer….So instead of replacing 20 servers you buy three and virtualize them and instead of having 200 printers you have 50 printers, all kinds of savings on power. On the server side a lot of savings on cooling. A lot of savings on purchasing 1/10th the number of servers, a lot of savings on acquisition of the printers and a lot of positive things on disposing of 10% of the servers you used to every four years. So we see that as a real - when you can combine green with which is that feel good tie breaker with actually showing the company a huge savings I think that has been a great play for us." Another VAR explained how big financial savings for a client is also representative of big energy savings: "Even the other day, you know, I had a client … co-locating their servers. They have two racks of servers that they're co-locating and I had a discussion with them, even though it wasn't about energy efficiency, what it was about was server consolidation and taking that one rack or those two racks and consolidating it… through software and hardware solutions into one rack. You know, even though they didn't see the energy efficiency in it, what they saw was, instead of paying $1,400 a month for two racks, $700 a month in two racks, but the end result was exactly that; they're no longer using two racks of energy and reducing the load on the grid."

Energy Efficiency Ordering Practices

Consistent with past ordering practices, 2008-09 ordering practices for all of our respondents, were customer driven with orders to OEMs reflecting the product selections the clients and VARs had made together. However, because energy efficiency is now a medium consideration for clients, it has also become a medium consideration for the VARs. VARs reported a range of estimates for energy efficient product orders. Estimates ranged from 40 to 100% reflecting increases of product for most VARs. Still, at least one VAR could

not guess the proportion of energy efficient computers and monitors ordered reflecting the lack of consideration energy efficiency received when ordering monitors and computers.

Energy Efficiency Share of Models and Sales

Consistent with the increase in client demand for energy efficient computers and monitors and the increase in the resultant ordering, VARs reported that sales of energy efficient monitors and computers generally increased. However, again, these estimates were not necessarily based on close tracking of energy efficient sales, rather some of the respondents still deduced this on what they happened to know about their primary product lines. Although some could give estimates for percentages of energy efficient models carried and sold, most stated that their companies had not tracked energy efficiency specifications for the models they carried.

Discussions with OEMs

In comparison to their past discussions, most VARs are now discussing the energy efficiency of computers and monitors with the OEMs; however, these are generally not lengthy or frequent discussions. For example, when we asked one VAR about discussions regarding energy efficiency, the VAR responded, "(It's) not a huge discussion." One interesting point about these discussions is that energy efficiency in a monitor or computer model line may just as likely be brought up by the VAR who is interested in finding product to satisfy increased client demand as it is likely to be brought up by OEMs who want to make sure that the VAR represents the energy efficiency of the products. For example, one VAR explained, "(It was) six months (ago) that it (energy efficiency in computers and monitors) started to be something real that we were, you know, that people (OEMs) were asking about and people were interested in and so it was something enough for us to push." Yet, when asked about the role energy efficiency plays in these discussions, another VAR stated, "Well they're [OEMs are] mostly giving us the information. I mean the manufacturers are the ones that make the stuff. We just sell it. They want to make sure that their partners and resellers… understand the full value proposition (of) their products…It's more being pushed out from them to us. Finally, it is important to note that in general, VARs and OEMs are still primarily discussing components of the price to feature ratio, and that when they discuss energy efficiency, the roles of consolidation and virtualization tend to be as important, if not more, than the energy efficiency of a line of computers or monitors.

Energy Efficiency Marketing and Promotions

Similar to the number of VARs marketing in 2007, about half the VARs we spoke with reported having entered into marketing and promotion relationships with at least one of their primary OEMs during 2008-09. Again, in most cases the marketing was focused on "price and technology enhancements". Energy efficiency was only ever a component of marketing with OEMs when it pertained to the consolidation or virtualization of servers. Focusing in this area also affords VARs "higher margin possibilities." When computers and monitors were marketed, energy efficiency was never a promoted feature. However, at least one VAR mentioned promoting energy efficient computers when working on product selection with a client: "(It's) a broad spectrum of stuff that they're looking for in a PC. So in the process of helping them decide, if I have a choice between a computer that's rated silver

or gold [EPEAT] or ENERGY STAR over one that may not be, I will tend to talk to them about that and move them into one of the higher rated PCs."

Corporate Policies on Energy Efficiency

Consistent with past practices, VARs are not currently having any internal discussions about the role energy efficiency should play in product selection. None of the VARs had discussed energy efficiency as a component of product selection policy for monitors or computers. At most, VARs had had conversations about the energy efficiency of their own organizations' IT infrastructure.

9.3.4 Projected Future Practices (2011 and beyond)

VARs were split between those who believe that energy efficiency in computers and monitors will become mandatory and those believe that the market will continue more or less as it is, three years from now. In either case, VARs believe that client demand will still be based on the feature set to price ratio, with energy efficiency a second tier consideration among the features. In general, VARs expect that their orders will likely be comprised entirely of energy efficient product, whether or not energy efficiency is a main focus of their clients' original product selection. VARs also believe discussions with OEMs would be affected by whether or not mandatory requirements for product efficiency were in place. But some VARs also believe that OEMs might take a proactive stance on the energy efficiency of computers and monitors.

Energy Efficiency Client Demand

VARs generally believe that three years from now, client demand will primarily still be based on the feature set to price ratio, with energy efficiency a second tier consideration. However, they also believe that demand for energy efficiency might become absorbed into the assumption that all computers and monitors will, over time, become energy efficient. Thus, when asked what client demand would become, one VAR summarized: "I honestly think that it'll always be features per price....I think … in three years, people are going to accept the fact that most all computers are going to be rated very high on the energy level… at which point it's going to be almost like it is with [monitors]; that people are just going to assume that their desktops and laptops and monitors are rated at certain energy consumption or higher." Some VARs gave reasons for why clients might come to expect highly energy efficient computers and monitors. For example, one VAR stated, "I think … anything with green at all will just be totally mandatory....any kind of product … filling green initiative … will be just paramount. …by then it will just be a given that that is one of the top things that all products have to adhere to." In the absence of regulations, one VAR commented that only incentives will increase client demand for energy efficient computers and monitors.

Energy Efficiency Ordering Practices

Since VARs ordering practices are essentially the conclusion of their discussions with clients during product selection, VARs future ordering practices are expected to follow client demand. Thus, orders will likely consist of the products chosen on the same feature set to price ratio criteria as previously outlined. Overall, most VARs believe energy efficiency in

computers and monitors will remain a medium consideration among clients and/or will be required three years from now. Thus, in general they expect that their orders will likely be comprised entirely of energy efficient product, whether or not energy efficiency is a main focus of their clients' original product selection. Moving to 100% energy efficient orders reflects a substantial increase in rank over past ordering practices, but only a smaller increase over current ordering practices.

Energy Efficiency Share of Models and Sales

Consistent with client demand and the resultant ordering for energy efficient computers and monitors, VARs expect that the proportion of sales of energy efficient monitors and computers will likely be 100%. One VAR stated "I don't see any reason why [the percentage of ENERGY STAR certified laptops] can't be 100%."

Discussions with OEMs

We asked VARs about the kinds of discussions they will likely be having with OEMs and the role of energy efficiency in those discussions three years into the future. Consistent with current practices, VARs believe that discussions about the energy efficiency of computers and monitors with the OEMs will occur, but take less of a priority to the first tier considerations that make up the feature set outlined above. As one VAR explained, " I think that we're going to still have real similar discussions." However, VARs believed discussions with OEMs would also be affected by whether or not mandatory requirements for product efficiency were in place. If so, then such discussions with OEMs would obviously be unnecessary. In the absence of such regulations, one VAR thought that along with the current set of first tier features, discussions with OEMs might also include the "new (technological) things that they're doing and their willingness to innovate." Another VAR echoed this point, "I think on a manufacturer level that our manufacturers and our OEMs know they have to do something to change the industry." Thus, some VARs believe that OEMs will have a proactive stance on the energy efficiency of computers and monitors.

Energy Efficiency Marketing and Promotions

We did not ask VARs directly about what kinds of marketing or promotions they might be doing with OEMs three years from now. However, we surmise that there are a few possibilities for marketing depending on which of the VARs-postulated futures are considered. In the case that energy efficiency in computers and monitors becomes mandatory it is unlikely that there will be any resources spent on promoting this feature of the product. In the case that incentives are given to clients to buy energy efficient products, it is possible that OEMs and VARs will promote such models. In the absence of any regulations or incentives, but with continued client interest in "green" products, it is also possible that OEMs and VARs will promote such energy efficient models. Finally, since VARs repeatedly mentioned data centers, storage devices, and servers as the products to focus on to reduce energy and financial costs, it is likely that, similar to current marketing practices, OEMs and VARs will focus on promoting energy efficiency in these products as opposed to computers and monitors.

Corporate Policies on Energy Efficiency

We did not ask VARs directly about whether they expected internal discussions about energy efficiency in computers and monitors three years from now. Given the lack of such discussions and policies up to now, it seems unlikely that much discussion will take place in this area in the future.

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B. INTERNAL VALIDITY

Past evaluators have explained internal validity in terms of impact evaluation using experimental or quasi-experimental designs. While our method is not explicitly an experimental or quasi-experimental design, the threats to internal validity brought out in these approaches are thought to be a good way to think about bridging the differences between analyses that rely on variance in data to show causality (statistical approach) versus analyses that rely on context and processes to show causality (our approach).

Threat Name	Threat Description	Possible ways to rule out threat within evaluation
Ambiguous Temporal Precedence	Lack of clarity about which variable occurred first may yield confusion about which variable is the cause and which is the effect	Baseline information
Selection	Systematic differences over conditions in respondent characteristics that could also cause the observed effect.	Depth interviews and baseline on-site information
History	Events occurring concurrently with treatment could cause the observed effect.	Comparison over time with stores outside of California with the same chain
Maturation	Naturally occurring changes over time could be confused with a treatment effect.	Longitudinal tracking of specific metrics; Delphi of market experts
Regression	When units are selected for their extreme scores, they will often have less extreme scores on other variables, an occurrence that can be confused with a treatment effect.	This is not an issue for this approach
Attrition	Loss of respondents to treatment or to measurement can produce artificial effects if that loss is systematically correlated with conditions.	Possibly with an exit survey or through discussion of data from the original participant depth interviews
Testing	Exposure to a test can affect scores on subsequent exposures to that test, an occurrence that can be confused with a treatment effect	This is not an issue for approach, although could come into play during depth interviews somewhat
Instrumentation	The nature of a measure may change over time or conditions in a way that could be confused with a treatment effect.	This would come into play for longitudinal tracking. Set in place good QA.
Additive and Interactive Effects of Threats to Internal Validity	The impact of a threat can be added to that of another threat or may depend on the level of another threat.	Vigilance in other areas.

*Threat name and description taken directly from Shadish, Cook, and Campbell 2002, p. 55.

C. CAUSAL REASONING

This table presents the two types of causal reasoning used in the social sciences. It is provided for reference and to clarify the differences. The naming convention for the different types is based on the work of Mohr (1995).

Factual Causal Reasoning	Physical Causal Reasoning (Underpins Factual Causal Reasoning)
Positivist or empirical approach. Positivism asserts that causal relationships are not directly observable, and therefore defines causality as a matter only of "observed regularities in associations of events". (Maxwell 2004)	*Realist approach.* Realism defines causality "as consisting not of regularities but of real (and in principle observable) causal mechanisms and processes, which may or may not produce regularities." (Maxwell 2004)
Example – The fact that a roof is a man-made structure that can fall down and the fact that the hurricane wind was very strong caused the fact that the roof fell apart.	Example – The hurricane wind tore off the roof.
Approaches used to deal with causal validity: - Experimental Design - Quasi-Experimental Design	Approaches used to deal with causal validity: - Modus Operandi - Searching for Discrepant Evidence - Triangulation - Member checks
Applies to impact analysis in program evaluation.	Applies to impact analysis in program evaluation.
Use of quantitative analyses.	Use of quantitative or qualitative analyses.
Use of variation in variables, the relationship between variables, and data on counterfactual to demonstrate causality.	Use of observation and analysis of processes to demonstrate causality. Repeated observations and interviews as well as a sustained presence of the researcher to provide a clear picture of causal processes and help rule out spurious associations.
Statistical determination of relationships.	Narrative and connecting analysis for discussion of relationships